



Lanuah Farm, St Ewe

Archaeological assessment of proposed wind turbine



Historic Environment Projects

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Client	Cornwall Council
Report Number	2014R015
Date	May 2014
Status	Final
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Acknowledgements

This study was commissioned by Cornwall Council and carried out by Historic Environment Projects, Cornwall Council.

The viewshed mapping was carried out by Krysia Truscoe.

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.

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Cover illustration

The view north from adjacent to the proposed turbine site across the rural landscape towards the china clay spoil dumps.

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Abbreviations

ADS	Archaeological Data Service
BGS	British Geological Survey
CC	Cornwall Council
DBA	Desk-based Assessment
DTM	Digital Terrain Model
EH	English Heritage
EIA	Environmental Impact Assessment
GIS	Geographical Information Systems
HBSMR	Historic Buildings Sites and Monuments Record
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment, Cornwall Council
HEPAO	Historic Environment Planning Advice Officer
IfA	Institute for Archaeologists
LB	Listed Building
LPA	Local Planning Authority
MoRPHE	Management of Research Projects in the Historic Environment
NGR	National Grid Reference
NMP	National Mapping Programme
NPPF	National Planning Policy Framework
NRHE	National Records for the Historic Environment
OASIS	Online Access to the Index of Archaeological Investigations
OD	Ordnance Datum
OS	Ordnance Survey
SAM	Scheduled Ancient Monument
WHS	World Heritage Site
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

1 Summary

Historic Environment Projects, Cornwall Council, was approached by Cornwall Council in September 2013 with a request to provide costs for an archaeological assessment of the potential impacts of construction of a wind turbine at Lanuah Farm, St Ewe as part of a proposed planning application by Cornwall Council (ref GCWEP).

The proposal is for a 900kw wind turbine with a hub height of 45m and a maximum blade tip height of 67m positioned on agricultural land at Lanuah Farm, to the west of Mevagissey, in the parish of St Ewe at SW 98431 45333 (NGR). The wind turbine is to be sited at a height of approximately 90m OD to the west of a ridge crest. The area surrounding the site proposed for the turbine is recorded as Farmland, Medieval.

The assessment consisted of a desk-based assessment, viewshed analysis out to 10km and consideration of designated sites up to 15km from the proposed turbine location, and a walkover survey.

Given the location chosen for the wind turbine, it was anticipated that there was some potential for negative impacts on the settings of a number of important Scheduled Monuments, Listed Buildings, Registered Parks and Gardens and Conservation Areas within a 15km radius. Visibility of the site was particularly good from the ridge-tops that characterise the area. The intervening valleys were often narrow and substantially vegetated, inhibiting views back to the proposed turbine site. The heritage assets are spread quite equally around the proposed turbine site although at approximately 5-10km the coastline cuts across from southwest to northeast in the south-easterly sector. A small section of the northern part of the Charlestown World Heritage Site Area is potentially intervisible with the proposed turbine, though the distance from the site at Lanuah limits the impacts. Cumulative impacts were also assessed as a result of the increasing number of existing and proposed turbines in the area.

Two Scheduled Monuments, both crosses, are located within 1km of the proposed turbine site, along with the Grade I Listed Church of All Saints in St Ewe. There are also a significant number of Grade II Listed Buildings, predominantly farmhouses, cottages and agricultural buildings relatively close to its site. The twenty-eight undesignated sites within its vicinity generally survive only as documentary records.

Overall the potential visual, audible or setting impacts of the proposed wind turbine on the identified heritage assets are rated as minor, though the setting impacts on St Ewe, Polmassick, Heligan and Caerhays, when viewed from around the landscape are assessed as moderate or large.

A report summarising the results of the assessment and its conclusions was prepared for the client.



Figure 1 Location of the proposed wind turbine in south-central Cornwall.



Figure 2 Location of proposed wind turbine at Lanuah Farm.

2 Introduction

2.1 Project background

Historic Environment Projects, Cornwall Council, were approached by Cornwall Council in September 2013 with a request to provide costs for an archaeological assessment of a proposed wind turbine planning application. The proposal is for a 900kw wind turbine with a hub height of 45m and a maximum blade tip height of 67m. This proposal is part of the Cornwall Council GCWEP project.

The site chosen for the wind turbine is currently semi-agricultural land at an elevation of approximately 90m OD to the west of a ridge-top at SW 98431 45333. The site lies to the south of the Lanuah Farm buildings, in the parish of St Ewe (see Figures 1 and 2). The area surrounding the site proposed for the turbine is recorded as Farmland, Medieval. This forms the agricultural heartlands with farming settlements documented before the 17th Century whose field patterns are morphologically distinct from the generally straight-sided fields formed in the later Enclosure Acts.

Pre-application screening for a 900kw turbine and associated infrastructure has determined that this application is not considered an EIA Development within the meaning of the EIA Regulations.

A model brief prepared by the Historic Environment Planning Advice Team, Cornwall Council, was used to guide this archaeological assessment, in conjunction with the advice provided by English Heritage (2011). The brief states:

An assessment of the archaeological potential of the site and the potential impacts of the development on surrounding historic assets will be required to provide information in support of a planning application for the proposed development in accordance with the requirements of National Planning Policy Framework paragraph 128.

Cornwall Council Historic Environment Service believes high quality design should play a key role in minimising any adverse effects of renewable energy projects, whether this is directed at the disposition of wind turbines and energy crops in the landscape or the positioning of photo-voltaic cells on historic buildings or within the countryside. Fundamental to achieving high quality design will be a sound understanding of the character and importance of the historic asset involved, whether at the scale of individual buildings and sites or more extensive historic areas and landscapes.

Cornwall Council Historic Environment Planning Advice Officer's further advice dated late May 2013 states:

Our current guidance (agreed with EH & Planning) for medium-sized (61 to 99m) turbines is:

- All proposals will require an archaeological assessment. Those in 'Anciently Enclosed Land' with HER sites within 500m will also require a geophysical survey.*
- An assessment of the settings of designated heritage assets will be required when Scheduled Monuments, Listed Buildings, Conservation Areas, the World Heritage Site, Registered Battlefields or Registered Parks and Gardens lie within 10km (60m to tip) or 15km (100m to tip).*

The assessment consisted of a desk-based assessment, viewshed analysis out to 10km and consideration of designated sites out to 15km from the turbine location, a walkover survey of the location, site visits intended to determine setting impacts on designated sites within the surrounding landscape and a geophysical survey of areas likely to be physically impacted by the construction of the turbine. The potential for cumulative impacts was considered. Given the location of the proposed wind turbine, the potential for negative impacts upon important heritage assets or their settings as a result of erecting the wind turbine was anticipated. Of those identified, the Listed Buildings in St Ewe and the Registered Park and Garden at Heligan were of particular interest as these

sites lie within 2km of the proposed wind turbine location and may be subject to the greatest negative impacts (Figure 25; Figure 27).

2.2 Aims and objectives

The principal aim of the study is to gain a better understanding of the archaeological impacts which would result from the construction of a wind turbine at Lanuah Farm, St Ewe.

The overall project aims were to:

- Establish viewsheds of the proposal site.
- Draw together existing historical and archaeological information about the site and its landscape setting from published and unpublished sources and information on designated and undesignated assets from national and local Historic Asset registers (such as the CSHER, NMR, Heritage Gateway, etc.).
- Review and analyse historic map evidence for the site.
- Consider any geotechnical or geophysical data for the site.
- Undertake a site 'walkover'.
- Produce 'statements of significance' for all designated historic assets, that are identified as potentially impacted on by the current proposals following the initial filtering of the ZTV. Where currently undesignated assets are identified their likely significance should be indicated i.e. 'national', 'regional' or 'local'.
- Inform whether archaeological recording of any extant remains is required.
- Inform whether an archaeological evaluation or further archaeological recording of any potential buried remains is required (for instance by means of a geophysical survey).
- Inform whether palaeoenvironmental sampling would be required.
- Identify the construction, use and 'end of life' impacts of the current proposals on designated heritage assets (as listed in the NPPF, but including the Outstanding Universal Value of the World Heritage Site) and on undesignated historic assets.
- Follow English Heritage Guidance 'The Setting of Heritage Assets' (2011) to produce assessments of the significance of setting of affected assets and the impacts of the proposals on those settings.

The principal project objective is to produce an illustrated report setting out the range of potential impacts of the proposal, the relative significances of the potentially affected sites and suggestions for suitable mitigation measures.

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
 - Norden's Map of Cornwall (printed in 1728 but mapped *circa* 1600)
 - Joel Gascoyne's map of Cornwall (1699)
 - Thomas Martyn's map of Cornwall (1748),
 - OS 1 inch survey (*circa* 1810)
 - St Ewe Tithe Map (*circa* 1839),
 - 1st and 2nd 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 as part of 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 turbine.

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. The methodology employs ArcGIS software and a Digital Terrain Model (DTM), which ignores potentially temporary surface features such as buildings, woodland, vegetation, etc. to provide a surface model of potential intervisibility between the proposed wind turbine and key heritage assets within the surrounding landscape. This 'bare earth' modelling provides a clear baseline from which to assess changes and impacts that could occur as a result of the proposed wind turbine. A viewshed or ZTV (Zone of Theoretical Visibility) was generated for an 'observer point' based on the location of the proposed wind turbine.

When performing viewshed analyses, 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 turbine at Lanuah Farm, 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 additional offsets of 45m to represent the height of the turbine hub and 67m to represent that of the blade tips.

This viewshed was checked on the ground, given that vegetation and other factors may substantially block views to and from key sites, whilst significant heritage assets within the theoretical viewsheds were visited (where access was possible) and the landscape within which they sit considered to determine likely intervisibility with the proposed development site, inclusion within key views, and the natures of their settings, both locally and at a distance. This informed the likely scales and types of any visual impacts which might affect their settings, as required by English Heritage (2011). Viewshed radii of 10km or 5km were used to determine potential impacts on designated heritage assets (as appropriate); a radius of 1km was used for undesignated heritage assets (Figure 17).

Sites identified through intersection of the ZTV modelling with GIS layers containing designated and undesignated heritage assets produced data sub-sets which were further filtered according to their intersection with zones representing 1km, 5km and 10km from the site, as required by the HEPAO model brief and English Heritage guidance.

The site types within these data sets were then analysed to determine their likely sensitivity to impacts on settings. Those site types which had no setting (documented sites) were excluded from further analysis, as were those which by their nature have very localised settings (for example, milestones, wayside crosses and fingerposts) except where in very close proximity to the application site. The resultant site lists were further filtered by close examination of the ZTV data and a 2005 vertical aerial photograph GIS layer to remove from the lists those sites where mature vegetation or proximal buildings would almost certainly block intervisibility and where intrusion into key views would be unlikely. Designated sites with limited settings and those with local settings which were more than 2km from the application site tended to be excluded from assessment at this stage unless specific reasons, such as wholly unimpeded intervisibility, were identified to justify their retention.

The resultant site list consisted of a mixture of designated assets having substantial intervisibility with the proposal site, Scheduled Monuments whose original settings were intended to include large areas of the surrounding landscape (for example, prominent hilltop barrows, hillforts, and rounds), or which were designed to function as parts of intervisible elements of larger groups with landscape settings (for instance barrow cemeteries), other high grade designated historic structures which were intended when built to be highly prominent within the landscape (predominantly church towers), and upstanding undesignated sites in close proximity to the development site. This filtered group of sites was assessed to determine impact.

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 setting impacts on key heritage assets within the ZTV, site visits were made to both the site proposed for the wind turbine, and to selected 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 and whose settings were assessed as vulnerable to impacts from the development where public access was available. Where this was not the case, the nearest possible vantage point was utilised, preferably one in which the proposed development site formed the backdrop to a view of the designated heritage site or was within the same view.

A walkover survey of the site proposed for the wind turbine and for its 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 Geophysical Survey

Grid locations

A magnetometer survey of the area surrounding the proposed turbine location and along the route proposed for its cable connection was commissioned from Stratascan Ltd, part of the Sumo Group.

The location of the survey grids was plotted together with referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site or by using Leica Smart Rover RTK GPS, (Real-time Kinematic Global Positioning System) which can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. A SmartNet RTK GPS uses Ordnance Survey's network of over 100 fixed base stations to give an accuracy of around 0.01m.

Survey equipment and gradiometer configuration

Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The instrument consists of two fluxgates very accurately aligned to nullify the effects of the Earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each gradiometer has a 1m separation between the sensing elements so enhancing the response to weak anomalies. Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling

points in a full 30m x 30m grid. The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m, though strongly magnetic objects may be visible at greater depths. The collection of data at 0.25m centres provides an optimum methodology for the task balancing cost and time with resolution.

The readings are logged consecutively into the data logger which in turn is daily downloaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

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 Record of the Historic Environment (NRHE) 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 site is located approximately 90m OD at SW 98431 45333 (NGR). It is approximately 15km east of Truro and 3km west of the coastal village of Mevagissey (see Figures 1 and 2). Topographically the site is on the centre of a ridge-top that curves around from the north to the west, the proposed site being located slightly to the west of the crest. On the western edge of the proposed site the landscape falls away steeply to several small stream valleys. The landscape to the north, south and east gently follows a similar pattern of irregular ridges and steep-sided valleys, these often having wooded slopes and streams in their bases (Figure 11).

The topography predominantly defines the views to and from the site, with the greatest intervisibility being to and from the higher ground. Agricultural activities immediately surround the site, whilst pockets of designed landscapes populate the wider area. Lanuah Farm, now separate from the proposed turbine field, occupies the northern part of the ridge-top, the turbine being proposed to be located to the south of the farm buildings.

From the proposed turbine site the views to the west extend down a narrow valley, whilst to the south they are along the ridge-top. Views to the north and east are more restricted as the hedgerows influence ground level visibility, however beyond the northern hedgerow the view is quite extensive (Figure 23; Figure 24).

The bedrock geology in this location consists of sandstone and argillaceous interbedded rocks of the Portscatho Formation. This is a sedimentary bedrock formed approximately 375-392 million years ago in the Devonian Period in a deep sea environment. No superficial deposits are recorded (British Geological Survey website).

The Historic Landscape Characterisation of the turbine site is recorded as Farmland, Medieval (Anciently Enclosed Land). This HLC Type forms Cornwall's agricultural heartlands, and contains farming settlements documented before the 17th Century set within morphologically distinct field patterns of Medieval or Prehistoric origins (Figure 10).

4 Project extent

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

The assessment also takes into account and quantifies impacts on the settings of heritage assets (both designated and undesignated) within the viewshed and selected radii of the proposed turbine sites in line with paragraph 129 of the 2012 National Planning Policy Framework (NPPF), 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). These impacts were assessed out to the following distances:

- Non-designated heritage assets – 1km radius.
- Grade II Listed Buildings and Conservation Areas – 5km radius.
- World Heritage Sites – 10km
- Scheduled Monuments, Grade 1 and Grade II* Listed Buildings and Registered Parks and Gardens – 15km radius.

5 Designations

The table below cross-references the designated and undesignated assets with the radial distance of their locations from the study area (Figure 22). The distances used refer to the English Heritage guidance relating to the setting assessments of potentially impacted heritage assets. Where assets cross over between two distances, the closest distance to the study area has been used to account for that asset. The first number in each box refers to the total number of assets within that radius, the second refers to those which fall within the ZTV. For the 10-15km zone there was only a consideration of sites within it, not a full viewshed analysis, so the single number represents the total number of sites of each designation within the zone.

Designation	Within 1km/ viewshed	1-5km/ viewshed	5-10km/ viewshed	10-15km	Total/ viewshed
Undesignated Sites (Regional/ Local)	28/28	-	-	-	28/28
Conservation Areas (National)	-	3/1	-	-	3/1
Registered Parks and Gardens (National)	-	2/2	2/2	3	7/7
Grade II Listed Buildings (National)	12/12	306/53	-	-	318/65
Grade I & II* Listed Buildings (National)	1/1	12/3	35/13	1156	1204/17
Scheduled Monuments (National)	2/2	6/5	19/12	48	75/19
World Heritage Sites (International)	-	-	1/1	-	1/1

Table 1 Quantification of sites within 15km of the study area and those which fall within the viewsheds.

5.1 Rights of Way

No rights of way traverse the sites proposed for the wind turbine, nor the remainder of the area required for sub-surface cabling. This area is not registered as open access land under the CROW Act 2005.

6 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.

6.1 National Planning Policy Framework 2012

The following paragraphs within the above document frame planning policy relating to the Historic Environment and are germane to this assessment:

128. *In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.*

129. *Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.*

132. *When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.*

133. *Where a proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:*

- *the nature of the heritage asset prevents all reasonable uses of the site; and*
- *no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and*
- *conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and*
- *the harm or loss is outweighed by the benefit of bringing the site back into use.*

134. *Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use.*

135. *The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.*

139. *Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.*

6.2 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.

7 Results of desk-based assessment

The prehistoric remains in this area are concentrated into a series of hilltop enclosures rather than of a scattering of findspots or a clustering of smaller monuments such as barrows as typified by other areas in Cornwall. There are some barrows in elevated locations such those at Carnwinnick (1020751), Bodrugan (1004470) and on the Dodman (1020865). These hilltop sites are variously described as 'camps,' 'enclosures,' 'hillforts' or 'cliff castles'. All are located on hill crests, the majority taking advantage of positions overlooking the multiple river and stream valleys throughout this area. Castle Hill is one of the most typical of these, sited at a confluence of three valleys and overlooking a small cove, it also commands good views inland. Resugga (1017685), Carvossa (1016890) and Golden Camp (1016889) all overlook, from west to east, the upper reaches of the Fal River, thought in the past to be navigable as far as Gram-pound (Figure 18; Figure 20). Dodman Point (1020865) is the most impressive of the sites of this type within this area (Figure 22; Figure 29). At 34ha it dwarfs the other promontory fort of Black Head close by to the northeast. Apart from its large ramparts that utilise and modify the naturally precipitous cliffs, it has a long history of use physically represented by Bronze Age barrows, an Iron Age enclosure and occupation and Medieval field systems. There are also two phases of signal stations, the surviving hut dated to 1794, and a large granite cross erected as a navigational aid.

The Medieval field system on the Dodman is indicative of the characteristic agricultural features still surviving within the wider landscape. Many local place-names have a Medieval origin. Lanuah is first recorded in 1302 as Lanewa, a derivative of the old spelling of St Ewe with the 'Lan' prefix referring to a church site, traditionally an enclosure surrounding a church (Padel, 1988; 82). In this case it probably refers to land associated with the Church of All Saints, formerly the Church of St Ewe, in the nearby village of St Ewe. Little is known about this saint or the dedication, but the first known records date to the 10th Century. Other Early Medieval records also reveal little, the Domesday Book does not contain direct references to St Ewe or Lanuah, but records the nearby manor of Galowras, which may have controlled the land, this being held by Nigel and valued at 7s (Thorn and Thorn, 1979).

Similarly, Lanuah was not shown on Norden's Map of Powder Hundred, but St Ewe (as St Eva), and 'Lane va' was depicted by Gascoyne on his map of 1699, although slightly to the north of the location of modern Lanuah (Figure 3; Figure 4). On the St Ewe Parish Tithe Map of 1839 the field patterns can be seen to have changed little immediately surrounding Lanuah, although the farm buildings are now more developed (Figure 5). To the northeast, around Kestle, the Tithe Map and 19th Century OS maps show that small fields of Medieval form have been retained. However over much of the area surrounding Lanuah the progression of maps show larger rectangular blocks of fields being created. These larger fields are a product of the Enclosure Acts in place from the 17th Century and are here shown to have been enacted post 1839. On the Tithe apportionment Lanuah

was referred to as 'Lanoure' and was owned by Christopher Henry Thomas Hawkins with a life lessee, the Reverend Samuel Thomas Gully, effectively in possession and William Solomans as the tenant. The proposed turbine field was called 'Road' and is described as arable and marshland, like much of the land in this holding. The more historic meanings of the word 'road' could explain this unusual name as it can refer to a part of a mine or trade route. It should be noted that several of the surrounding fields also shared derivatives of the same name.

The Post Medieval period in Cornwall and elsewhere saw the development of large estates with country houses, designed landscapes and significant collections of plants. Heligan (1000538) and Caerhays (1000448) are two of the most well known in the vicinity (Figure 27; Figure 28). Heligan was part of the Arundell estate during the 12th Century and was sold to Sampson Tremayne in the late 16th Century. The house was developed from the 17th Century with the garden undergoing several remodelling phases in the 17th-18th Centuries. In the 19th Century there was extensive planting of exotic species including rhododendrons and bamboo. These have now been restored after they became derelict following World War II.

Caerhays (1000448) was also part of the Early Medieval estate of the Arundell family, passing by marriage into the Trevanion family c1379. Improvements to the house and garden were made in 1703 and successively throughout the 18th and 19th Centuries with input from John Nash and possibly Humphry Repton. The estate was sold to the Williams family in 1853 and in c1885 John Charles Williams began the woodland garden that features the camellias and rhododendrons that Caerhays is noted for.

The wider landscape has been (and continues to be) significantly altered by china clay extraction. The resultant pits and spoil dumps are clearly visible within this landscape and the ports and coastal villages around St Austell Bay have many related industrial features, Charlestown, a component of the Cornish Mining World Heritage Site, being the prime example (Figure 24; Figure 32). In the modern period few changes have been made to the immediate surroundings of Lanuah; the small farming settlements and fields remain, many structures being protected by Listed Building status; the estates remain largely intact and maritime activities are still pursued from the coastal settlements.

8 Results of viewshed analysis

See Figure 17-Figure 19

Given the topography of the site, its surroundings, and the height of the turbine, the viewshed analysis suggests that it is likely to be visible over a fairly large proportion of the surrounding countryside. In line with the requirements of English Heritage guidance, a Zone of Theoretical Visibility has been mapped to a distance of 10km from the proposed site, though the ZTV mapping was extended out to 15km in view of the height of the proposed wind turbine. The visibility of the turbine will diminish with distance, and will at many local sites, be blocked by the local terrain, by intervening buildings within settlements or farmsteads, or by high hedgerows and mature groups of trees. However vegetation, particularly deciduous trees, changes seasonally and may be subject to cutting back or complete removal which could significantly change the degree of intervisibility between a historic asset and the proposed turbine site, affecting the degree to which the setting of a heritage asset may be affected.

8.1 1 km radius ZTV

See Figure 13- Figure 19

The ZTV suggests that the turbine mast or blades could potentially be visible from almost the entire zone, with the exception of a few steep slopes facing away from the site to the north, south and west. The zone includes the Scheduled Monuments of Corran (or Beacon) Cross and a Medieval cross base at St Ewe. Within the village of St Ewe there are multiple listed buildings, including the Grade I Listed Church of All Saints (Figure 25), The Crown Inn and individual houses.

8.2 1km to 5km radius ZTV

See Figure 13-Figure 19

Parts of the wind turbine could potentially be visible from all of the ridge-tops that encircle the proposed site within the 1-5km radius area. The area extends north to the village of Sticker, east to Chapel Point, south almost as far as Dodman Point and west to within a kilometre of Tregony. It is characterised by a series of steep-sided valleys and broader ridge-tops which influence the theoretical intervisibility.

The wind turbine will not be intervisible with some sites, including the Conservation Areas and associated Listed Buildings within Mevagissey and Gorran Haven to the southeast due to their coastal inlet topography. Similarly the narrow valley at Pentewan is only likely to be intervisible at the northern extent of the Conservation Area. There will be greater potential intervisibility with the proposed site from features on ridge tops, in particular the prehistoric camps at Sticker and Castle Hill (Figure 30).

This zone contains a number of potentially intervisible Scheduled Monuments and Listed Buildings. Notably, there will be partial intervisibility with the Registered Parks and Gardens of Heligan and Caerhays Castle (Figure 27; Figure 28).

8.3 5km to 10km radius ZTV

See Figure 15; Figure 20; Figure 21

The wind turbine would potentially be visible from a low proportion of the 5km to 10km radius area around it, visibility again being significantly constrained by the local topography of ridges and valleys. Equally significantly, approximately 40% of this zone is located over the sea, specifically St Austell, Mevagissey and Veryan Bays. Whilst the sea does not feature any historic assets, the maritime activities and seaward approaches are significant to the landscape setting and history of the area. They are likely to have a high degree of intervisibility with the proposed site.

Within the ZTV for this radius there are a number of notable sites including the Registered Parks and Gardens of Trewarthenick and Trewithen and the World Heritage Site Area at Charlestown. Scheduled Monuments within this zone include the prehistoric sites of Carvossa, Castlezens and Golden Hill, together with the contemporary promontory forts at Black Head and Dodman Point (Figure 29; Figure 32). All will be potentially intervisible to some extent with the proposed turbine site.

8.4 10km to 15km radius

See Figure 15; Figure 22

This radius extends to Roche in the north, Fowey in the east, and Truro to the west. The southern extent is approximately 10km out to sea from the coastline. The visibility of the proposed wind turbine site within this zone is likely to be low, probably confined to ridge-tops, and will be moderated by the relatively considerable distance of heritage assets from the proposed wind turbine site. The zone does contain a substantial number of Grade I and II* Listed Buildings and three Registered Parks and Gardens although there are relatively few Scheduled Monuments. Setting impacts on these are unlikely.

8.5 Scheduled Monuments within the 10km radius ZTV

See Figure 15; Figure 20

There are 19 Scheduled Monuments within 10km of the proposed wind turbine site falling within the ZTV, as follows:

Note – some of these sites have multiple entries in the Schedule of Monuments.

Reference	Name
1010843	Fair Cross, 420m west-northwest of Tregidgeo Farm

1006647	Corran Cross 320m east of Lanuah
1016889	Golden Camp Hillfort
1007952	Medieval Wayside Cross base, 550m west-northwest of Lanhadron Farm
1011994	Sticker Camp later Prehistoric-Roman Round
1007291	Round southwest of St Stephen's Beacon
1014897	Wayside Cross in Holy Trinity Church yard
1016890	Prehistoric and Roman Settlement at Carvossa
1004391	Black Head Promontory Fort
1004470	Round Barrow 870m southeast of Bodrugan
1003091	St Stephen's Beacon Hillfort
1020865	Later Prehistoric cliff castle, two Prehistoric round barrows, Medieval field system and associated remains on Dodman Point
1020104	Standing Cross 200m south of Trelowthas
1019163	Menacuddle Well
1004256	Camp 180m north of Castle Hill
1010849	Medieval Cross base at St Ewe
1017685	Resugga Castle later Prehistoric univallate hillfort
1019743	Castlezens Multiple Enclosure Fort
1020751	Round Barrow 530m northwest of Carnwinnick

Table 2 Scheduled Monuments within the 10km radius ZTV

Some of these potentially intervisible Scheduled Monuments consist of structures such as crosses and a well whose settings are inherently very local. The majority are not close to the site proposed for the wind turbine and in line with English Heritage guidance, no assessment of impacts on their settings therefore needs to be made. However, two: Corran (or Beacon) Cross and the cross base at St Ewe are within a kilometre and therefore setting impacts have been considered.

Features such as hillforts and barrows, in contrast, were intended, when constructed, to have far-ranging settings. Many of the Scheduled Monuments within the 10km viewshed consist of monuments of these types, and assessments of impacts on the settings of a number of these were judged to be required where they lay relatively close to the site proposed for the wind turbine, where substantial intervisibility was likely, where they were judged to have sensitive settings, or where impacts on or intrusion into key views of the sites appeared likely to occur.

8.6 Registered Parks and Gardens within the 15km radius

See Figure 22

Reference	Name	Grade
1000545	Tregrehan	II*
1000510	Trewithen	II*
1000655	Tregothnan	II*
1000448	Caerhays Castle	II*

1000658	Trewarthenick	II
1000538	Heligan	II
1000651	Menabilly	II

Table 3 Registered Parks and Gardens within the 15km radius.

The Grade II Registered Park and Garden at Heligan and the Grade II* Garden at Caerhays Castle are within 5km of the proposed turbine site (Figure 27; Figure 28). Both are positioned within valleys, and as a result potential intervisibility with the turbine will be sporadic or limited across the protected areas. Tregrehan, Menabilly (Figure 31) and Tregothnan are more than 10km away and intervisibility with the turbine site is likely to be minimal. The density of vegetation recorded within all the parks reduces the likelihood of intervisibility, however all are designed landscapes within extensive natural or agricultural contexts extending out into the landscapes surrounding them.

8.7 Areas of the Cornish Mining World Heritage Site within the 10km radius ZTV

See Figure 21

The northern edge of the Charlestown Area of the Cornish Mining World Heritage Site is intersected by the 10km radius ZTV (Figure 32). The majority of the area, along with its associated leat is within a valley and is unlikely to be intervisible with the turbine site at all, significantly reducing the severity of any potential impacts.

8.8 Grade 1 and II* Listed Buildings within the 15km radius

See Figure 19; Figure 20; Figure 22

There are 1204 Grade I or II* Listed Buildings within 15km of the proposed wind turbine site, 17 of these falling within the ZTV.

Reference	Name	Grade
1137082	Church of All Saints	I
1138159	Higher Lodge	I
1141100	Trewithen House	I
1160827	Pavilion approximately 15m northeast of Trewithen House	I
1211925	Holy Trinity Church	I
1327073	Church of St Michael	I
1328913	Pavilion approximately 15m northwest of Trewithen House	I
1136796	Levalsa Farmhouse	II*
1141044	Trethennal Manor Farmhouse adjoining wall, gate piers and mounting block	II*
1141079	Barn and two adjoining engine houses approximately 10m north of Trewithen Farmhouse	II*
1141132	Golden Manor	II*
1141133	The Keep approximately 50m east of Golden Manor	II*
1211944	St John's Methodist Church and attached schoolrooms	II*
1212189	The Old Manor House	II*
1289697	Market House	II*

1310504	Barn with gate piers and adjoining building approximately 50m east of Golden Manor House	II*
1327442	Church of St Mewan	II*

Table 3 Grade I and II* Listed Buildings within the 15km radius

The Church of All Saints is the closest of these at only 1km from the proposed site (Figure 25). Lavalsa Farmhouse, Higher Lodge and St Michael's Church are within 5km; the remaining heritage assets are all outside the 5km radius from the proposed turbine site (Figure 28). The churches, in particular, are potentially significant landmarks in addition to their inherent historical importance; however many of the sites listed above, such as the barns, pavilions, barn and Market House are more locally important.

8.9 Grade II Listed Buildings within the 5km radius ZTV

See Figure 18; Figure 19

Within the 5km zone there are 318 Grade II Listed Buildings. Of these, 65 are within the ZTV:

Reference	Name	Grade
1136757	Steward's House about 150m northeast of Heligan House	II
1136784	Kestle Farmhouse	II
1136796	Levalsa Farmhouse	II*
1136921	Tregain Farmhouse with attached front garden wall	II
1136967	Trelissick Farmhouse with attached garden wall	II
1137040	Eastern Cottage and Western Cottage	II
1137125	Scobell Monument in the churchyard about 1m north of the north transept of the Church of All Saints	II
1137241	Churchtown Farmhouse	II
1137340	Polgorran including attached garden wall, cottage, coach house and stable	II
1137911	Cornerways	II
1137990	Caerhays Barton Farmhouse	II
1138213	Row of 3 monuments in the churchyard about 2m southeast of south aisle of the Church of St Michael	II
1138253	Unidentified monument in the churchyard about 6m north of the north transept of the Church of St Michael	II
1141081	Carveth Farmhouse and outbuildings around courtyard to northeast	II
1143984	Hewas Inn	II
1144028	Cross shaft at SW 955 473	II
1144030	Guidestone at SW 954 473	II
1144031	Guidestone at SW 957 473	II
1144327	Chapel Point House	II
1144747	The Barley Sheaf Inn	II

1144754	Menagwins Cottage	II
1144756	Methodist Church with attached Sunday School and coach house	II
1144757	Tregonan	II
1144762	Group of three monuments in the churchyard about 3m west of the nave of the Church of St Michael	II
1144767	Unidentified monument in the churchyard about 12m north of the nave of the Church of All Saints	II
1144768	Johns Monument in the churchyard about 4m northwest of the tower of the Church of All Saints	II
1144769	Price Monument in the churchyard about 12m south of the south aisle of the Church of All Saints	II
1144770	Lychgate at the north entrance to the churchyard of the Church of All Saints	II
1144771	1 and 2 St Ewe	II
1144772	Nantuat	II
1144773	The Crown Inn	II
1144774	Pair of attached houses about 50m southwest of the Crown Inn	II
1144779	Signpost at SW 997 418	II
1144791	Bosue Farmhouse	II
1144792	Corran Cross at SW 985 457	II
1144793	Guidestone at SW 972 473	II
1144794	Guidestone at SW 984 471	II
1144799	Higher Kestle Farmhouse	II
1144802	Signpost at SW 982 461	II
1144804	Trelewack Farmhouse	II
1144806	Pengrugla	II
1144807	Step a Side	II
1144808	Signpost at SW 971 455	II
1144809	Pair of attached houses about 15m west of Honey Cote	II
1244089	Unidentified monument in the churchyard about 6m northwest of the north transept of the Church of St Michael	II
1291759	The Gate House	II
1311907	Ivy Cottage and Windsmere and house attached to the north	II
1312394	Corner Cottage	II
1312473	Harris Monument in the churchyard about 9m north of the nave of the Church of All Saints	II
1312514	Bridge over the River Luney	II
1312523	Trevithick Farmhouse	II
1312541	Pair of gate piers about 100m southeast of Tregonan Farmhouse	II

1312581	Stables about 15m north of Levalsa Farmhouse	II
1327050	Lodge with attached walls and piers at the northwest entrance to Heligan House	II
1327051	Pair of gate piers about 10m south of Levalsa Farmhouse	II
1327052	Rose Cottage	II
1327053	Tregear Farmhouse	II
1327054	Stable about 30m east of Trelissick Farmhouse	II
1327075	K6 Telephone kiosk outside St Ewe Institute	II
1327076	Cross	II
1327077	Outbuilding about 10m southeast of the Crown Inn	II
1327082	Tregavarras Cottage	II
1327446	House about 60m east of Trecaine Farmhouse with attached front garden walls and gateway	II
1379452	Peruppa Farmhouse	II

Table 4 Grade II Listed Buildings within the 5km radius ZTV

Impacts on the settings of all of these feature types are very unlikely unless they are in very close proximity to the proposed wind turbine. The list includes structures such as guidestones, milestones, stiles, churchyard walls, lych gates, headstones or chest tombs, crosses and bridges, all of which have very localised settings. Others such as houses, farmhouses and manors might well have been deliberately designed to have rather more extensive settings; however in terms of their designation as heritage assets these are still likely to be limited in extent. Few if any of these structures are likely to have been constructed with the aim of being dominant in the landscape, with the intention to be viewed from a distance, or with designed vistas. On the other hand, several of the assets were probably designed to be 'ornaments' to the adjacent area, often to be viewed from an adjacent approach.

8.10 Conservation Areas within the 5km radius ZTV

See Figure 18; Figure 19

Of the three Conservation Areas within 5km of the proposed turbine site, only Pentewan is within the Zone of Theoretical Visibility. The Pentewan Conservation Area covers the narrow estuary of the St Austell River and the associated harbour. Only the north-eastern section of the Conservation Area is within the ZTV, as it is upslope facing the proposed site. This could expose it to some visual and setting impacts from the wind turbine.

8.11 Undesignated historic assets within the 1km ZTV

See Figure 17

The ZTV mapping suggests that the majority of the landscape within a 1km radius of the site will be intervisible with all or part of the proposed wind turbine. Within this zone, the Cornwall and Scilly Historic Environment Record (HER) records 28 potentially intervisible sites:

Reference	Name	Period
MCO11417	TREGONDEAN - Early Medieval settlement, Medieval settlement	Early Medieval
MCO115	ST EWE - Medieval plain an gwarry	Medieval

MCO14509	GEAR HOOPER - Medieval settlement	Medieval
MCO14510	GEAR VEAN - Medieval settlement	Medieval
MCO14917	HIGHER KESTLE - Medieval settlement	Medieval
MCO15525	LOWER KESTLE - Medieval settlement	Medieval
MCO21114	KESTLE - Medieval field system	Medieval
MCO21392	BEACON CROSS - Iron Age enclosure, Romano British enclosure	Prehistoric
MCO21821	ST EWE - Undated enclosure	Undated
MCO2620	GEAR HOOPER - Bronze Age barrow	Prehistoric
MCO2621	GEAR HOOPER - Bronze Age barrow	Prehistoric
MCO26249	ST EWE - Early Medieval lann	Early Medieval
MCO26254	ST EWE - Post Medieval almshouse	Post Medieval
MCO29691	BEACON CROSS - Medieval road	Medieval
MCO3646	TREGONDEAN - Bronze Age barrow	Prehistoric
MCO49366	ST EWE - Post Medieval signpost	Post Medieval
MCO4975	BEACON CROSS - Medieval cross	Medieval
MCO50251	TREGONDEAN - Prehistoric enclosure	Prehistoric
MCO5281	GEAR HOOPER - Medieval cross	Medieval
MCO53099	ST EWE - Post Medieval school	Post Medieval
MCO53100	ST EWE - Post Medieval teachers house	Post Medieval
MCO53422	ST EWE - Post Medieval signpost	Post Medieval
MCO5825	ST EWE - Medieval cross, Post Medieval cross	Medieval
MCO6464	ST EWE - Medieval church	Medieval
MCO7964	GEAR - Iron Age round	Prehistoric
MCO8058	HIGHER KESTLE - Prehistoric field system, Iron Age round, Romano British round	Prehistoric
MCO8151	LANVAH - Iron Age round, Romano British round	Prehistoric
MCO8505	ST EWE - Iron Age round, Romano British round, Medieval plain an gwarry	Prehistoric

Table 5 Undesignated historic assets within the 1km radius ZTV

The severity of impacts on undesignated assets will depend on the degree of their survival, the type of monument and its settings. Many are undesignated because they are no longer upstanding and have only documented records which have no setting. Others such as crosses and signposts have very immediate settings and almshouses or teacher's houses have specific settlement-related settings, likely to be less sensitive to the visual impacts implied by the ZTV.

9 Results of site walkover

See Figure 23; Figure 24

A site walkover was undertaken on 4th February 2014. The weather was initially sunny and clear but became overcast, wet and windy with significantly reduced visibility in the

afternoon. The proposed turbine field is just below the crest of the ridge and is approximately rectangular. The field is approximately flat in the northeast corner, sloping down gently to the south, and falling steeply away close to the western boundary (Figure 23). Currently it has been left fallow with rough grass and scrub beginning to take over; the ground surface is very uneven. The field boundaries are low, being approximately one metre high Cornish hedges topped with a further metre of vegetation including hawthorn, blackthorn, ivy and brambles. The views to the south and west from the site were quite extensive along and up to the crest of the ridge and down the narrow valley towards Polmassick (Figure 23). The hedgerows restricted views from ground level to the north and east. The proposed site is immediately adjacent to the quite busy road from St Austell to Gorran, traffic being clearly audible and visible. Two small existing turbines are visible to the south from the site.

10 Field verification of ZTV

See Figure 13-Figure 15; Figure 23-Figure 32

Sites of archaeological significance identified using ZTV analysis and within the 15km radius from the proposed site are located in the fieldwork table (*Table 9*), and were numbered from 1-19 working from those sites closest to the turbine site outwards in an approximately clockwise order.

The significance of each site is graded as follows:

- WHS- World Heritage Site
- S Scheduled Monument
- L Listed Building
- A Site of National Importance
- B Site of Regional Importance
- C Site of Local Importance
- D Natural Feature or non-antiquity

The condition of each site was assessed where possible during the walkover survey and is graded from 1-4:

- 1 No surviving remains evident above ground
- 2 Poor preservation
- 3 Fair preservation
- 4 Good preservation

The sites have been given one of five Overall Impact grades; from Very Large which approximates to damage and loss of the site's integrity and which represents a key factor in the decision-making process, to neutral which equates to no perceptible effects. The full scale is:

Impact Category	Typical Descriptors of Effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or

	receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but may be important in influencing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 6 Overall Impact descriptors

In addition to the above descriptors the Overall Impact is determined using the combined result of a Sensitivity rating and Magnitude of Impact rating (DMRB Vol.11; 2/1-5).

The Sensitivity ratings are:

Sensitivity Rating	Typical Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Table 7 Sensitivity Rating descriptors

The Magnitude of Impact ratings are:

Magnitude of Impact rating	Typical Descriptors
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 8 Magnitude of Impact Rating descriptors

The viewshed mapping and potential impacts were, where possible (given constraints on public access and the general topography of the area), ground checked from a number of locations. The fieldwork results and impact assessment are detailed in the table below.

10.1 Fieldwork results and impact assessment

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
1	Beacon Cross MCO29691	SW 98251 45289	Univallate enclosure with ramparts surviving as a low earth bank. Adjacent to the enclosure is Beacon or Corran Cross on the western field boundary. From both assets there will be a high degree of intervisibility with the proposed turbine with only the 1-2m high hedges and walled boundaries obscuring the intervening space. One existing turbine is visible. These assets are located in a rural, agricultural setting, although are next to a busy road.	Iron Age or Romano-British	S	2	High	Moderate	Large
2	St Ewe village MCO53100 / MCO53099 / 1144773 / 1137082 (Figure 25)	SW 98205 46129/ SW 98177 46128	The village includes the Grade I Listed Church of All Saints, the Grade II Crown Inn, the undesignated Schoolmaster's House and adjacent School and multiple Listed houses. The village is located in a slight hollow facing in towards the church. The small church spire is not a significant landmark. Some mature trees surround the village but do not form a substantial screen. The proposed turbine is unlikely to be visible from much of the village but the southeast side of the church and the school have more open views directly towards the turbine site. The village is set in a rural environment and retains its historic character with few overtly modern intrusions.	Medieval or Post Medieval	L Grades I and II	4	High	Moderate	Moderate

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
3	Bridge over the River Luney and Polmassick village 1312514 / 1312523 (Figure 26)	SW 97156 45587	Very well maintained slate rubble bridge dated 1876 in the centre of the hamlet. Polmassick is a quiet historic village located on the steep slope of valley with some mature trees though they do not form a substantial screen. The village is in a highly rural setting with only a few modern amenities present. From the bridge, the views up slope towards the proposed site, which include the village, are particularly open and it is highly likely that some of the turbine will be visible and possibly audible. The intervisibility from the remainder of the village will depend on vegetation and elevation.	Medieval or Post Medieval	L Grade II	4	High	Moderate	Moderate to minor
4	Caerhays Castle and Estate 1000448 / 1138159 / 1327073 (Figure 28)	SW 97160 41109	The grounds of Caerhays are a Registered Park and Garden whilst St Michael's Church and Higher Lodge are Listed Buildings. The main aspect of the Castle is out to sea over the lawns in front of it, however the majority of the garden, and protected landscape extends north behind the house. The grounds and Listed Buildings are therefore on high ground with good views inland towards the turbine site, though it is quite a distance away. There are also views from some of the nearby headlands that are likely to include the Estate and the turbine. No other turbines are currently visible. This designed landscape is set within a wider agricultural environment with	Medieval or Post Medieval	A Grade II* L Grade I	4	High	Minor	Moderate

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			roads cut into the bedrock or surrounded by woodland, controlling views of the estate. Although the Church is small, it is in a prominent hilltop location and, significantly, is intervisible with Gorran Church tower.						
5	Methodist Church 1144756 and Gorran Village	SW 98810 43130	The 19 th Century slate constructed Methodist Church with attached Sunday school and the coach house are Listed Buildings. The village lies in a small narrow valley facing northeast and inland. Whilst the lower-lying centre of the village is very unlikely to be intervisible with the turbine site, the edges of it almost certainly will be as there is little substantial vegetation to obscure views. The church tower is quite tall and is a clear landscape feature from several aspects. There are two turbines already visible from the south-eastern edge of the village. The village is set in a rural landscape though experiences significant through traffic going to Gorran Haven, whilst the china clay waste tips form the horizon to the north.	Post Medieval	L Grade II	3	High	Minor	Minor
6	Castle Hill Camp 1004256 (Figure 30)	SX 00045 43740	The remains of this site are located on a prominent hilltop overlooking the river valleys and Portmellon Cove. Although the valley sides here are quite densely wooded, the crest is largely devoid of trees and exposed to a high possibility of intervisibility with the proposed turbine site. The typically	Unknown possibly Prehistoric	S	3	High	Moderate	Moderate

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			prominent location of this Prehistoric asset is set within a relatively undisturbed rural environment although there is significant modern intrusion nearby at Portmellon and Mevagissey.						
7	Heligan 1000538 (Figure 27)	SX 00316 45854	A Registered Park and Garden, Heligan is predominantly located in a valley but the entrance, woodland and some of the designed landscape extends upslope towards or facing the proposed turbine site. These upslope areas have wide ranging views in most directions and the mix of open areas and mature trees allows a quite high possibility of intervisibility. The garden is set within a rural and coastal environment with some modern amenities into which the turbine, at quite close proximity will likely intrude.	Post Medieval	A Grade II	4	High	Moderate	Moderate
8	Dodman Point (Figure 29)	SX 00150 39562	The archaeological remains on Dodman Point include a Prehistoric cliff castle, probable Bronze Age barrows, a Medieval field system, Napoleonic signal station and Victorian navigational cross. These are located at a significant elevation above sea level providing clear views in all directions with the most important vistas extending out to sea and also back inland as far as the china clay industrial remains north of St Austell. It is highly likely that the proposed turbine will be visible from various points on the peninsula, several turbines already exist within views from	Prehistoric -Post Medieval	S	3	High	Minor	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			the site.						
9	Pentewan	SX 01862 47230	A well preserved fishing village designated as a Conservation Area. The main square has a southwest aspect towards the harbour/sea and Penare Point. The village is low-lying and surrounded by steep valley sides. Pentewan is set in a maritime coastal environment surrounded by a rural landscape. Although the settlement extends upslope facing the turbine site, intervisibility is very unlikely given the height above sea level of Penare Point.	Post Medieval	B	3	Medium	No change	Neutral
10	Charlestown 17 (Figure 32)	SX 03760 51785	The internationally important area of Charlestown is located in a valley leading to the sea. Within the settlement, the eye is directed down the main street with a view of the sea to the south. To the west, in the intervening space between Charlestown and the proposed turbine site is a significant hill obscuring any view of it completely. Charlestown has a maritime and coastal setting within the conurbation of St Austell. It includes many modern amenities, tourist features and a high proportion of new houses which are not particularly sympathetic to the preserved cottages in the centre of the settlement. The density of housing, garden vegetation and topography taken together obscure any views of the turbine site.	Post Medieval	WHS	3	Very High	No change	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
11	Tregrehan 1000545	SX 05192 53547	The Registered Park and Garden of Tregrehan is located in a hollow and on a west facing slope between St Austell and St Blazey Gate. It is set in the urbanised area of St Austell, with busy roads and housing, although to the north the generally rural environment is interspersed with the features associated with the china clay industry and mineral extraction. The garden has a mix of open areas and mature trees potentially allowing some limited views of the proposed turbine site.	Post Medieval	A Grade II*	4	High	No change	Neutral
12	Menabilly 1000651 (Figure 31)	SX 09638 51904	Menabilly, a Registered Park and Garden, is on a west facing slope facing Dodman Point across St Austell and Mevagissey Bays. Although few landscape details could be seen from this distance it is possible that the proposed turbine would be visible, depending on weather conditions and the density of vegetation throughout the garden. Menabilly has a designed landscape setting within a wider rural, agricultural and maritime environment. The view to the bay across to Dodman Point is an essential part of its rural setting.	Post Medieval	A Grade II	4	High	Negligible	Minor
13	St Austell 1211925 / 1289697 / 1212189	SX 01419 52452/ SX 01392 52504/	The centre of St Austell includes the Listed Buildings of Holy Trinity Church, Market House and the Old Manor House. These are located in a busy urban environment with much modern development obscuring all views out to	Medieval or Post Medieval	L Grades I and II*	3	High	No change	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
		SX 01362 52480	the surrounding landscape. It is very unlikely any part of the proposed turbine will be visible. The settlement looks in on itself, rather than outwards towards the surrounding landscape.						
14	Sticker Camp 1011994	SW 98579 50327	The round is located on a quite prominent hill crest. It has a rural setting but is adjacent to the village of Sticker and the very busy A390 road. It is likely that at least the upper parts of the turbine will be visible.	Later Prehistoric -Roman	S	3	High	Negligible	Minor
15	Carvossa 1016890	SW 91879 48266	The prehistoric settlement is located in quite open farmland with some intervening hedgerows and wooded valleys between it and the turbine site. Carvossa is on a hilltop overlooking the Fal river in a rural setting with sporadic farms settlements. The views to the east are quite extensive and it is possible that at least the top of the turbine will be visible. This will be dependent on weather conditions and vegetation density, and the turbine will be at quite a distance from Carvossa.	Prehistoric and Roman	S	2	High	Minor	Minor
16	Trewithen 1000510 / 1141079 / 1141100	SW 91172 47510	Trewithen is a Registered Park and Garden and includes Listed barns, farmhouses and other buildings. The majority of the garden is located in a hollow and the perimeter of the RPG is quite densely wooded. Although a modern visitor attraction, Trewithen is a designed landscape within a highly rural setting. It is unlikely that much, if any, of the turbine would be visible	Post Medieval	A Grade II* L Grades I and II*	4	High	Negligible	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			from the majority of the protected area.						
17	Golden Camp Hillfort 1016889	SW 92454 46853	The hillfort is situated on high ground close to the Fal river valley in a rural setting. The intervening space to the proposed turbine site has areas of woodland which may obscure views. It is possible that parts of the turbine may be visible.	Prehistoric	S	3	High	Minor	Minor
18	Trewarthenick 1000658	SW 90415 44098	The Registered Park and Garden surrounding the east facing house is quite open on the east side but densely wooded to the west and north and around much of the perimeter. Trewarthenick is a designed landscape within a woodland and agricultural setting. Although unlikely, if the turbine is visible from the gardens, it will be an extremely small feature within any views.	Post Medieval	A Grade II	3	High	Negligible	Minor
19	Castlezens 1019743	SW 92967 42179	Castlezens multiple enclosure fort is located on a hillcrest surrounded by a pasture and farmland. There are potentially clear views in most directions from the hillfort although the immediate area is characterised by hedges greater than 2m in height. These restrict views into the hillfort and any views from ground level and may obscure views of parts of the proposed turbine.	Prehistoric	S	2	High	Negligible	Minor

Table 9 Fieldwork Impact Assessment Results

At each accessible designated heritage asset listed in the table above, the potential visibility of the proposed wind turbine was considered and views out from the proposed turbine site towards key heritage assets were checked. Though true levels of intervisibility were impossible to determine from ground level given that the proposed turbine has not yet been constructed, the general degree of openness of the views out from the sites could be assessed.

Where possible, photographs were taken from the proposed site towards the filtered list of heritage assets and from the assets back to the proposed site. In practice, this process was somewhat hampered in terms of capturing the historic asset and view towards the proposed site in the same photograph due to difficulties of access. The practicality of finding both a suitable viewpoint and a safe place to stop for photographs further constrained attempts to capture ideal viewpoints. However every effort was made to get as close as possible to the historic assets and to take photographs at least representative of the view where the asset itself could not be included. Within settlements, groups of buildings, mature trees and shrubs also blocked many views back to the site. The visibility cut-off imposed by the local topography suggested by the viewshed mapping was confirmed, though from ground level several areas of suggested intervisibility were closed off by woods and hedgerows as well as by topography.

Field verification tended to confirm the viewshed mapping; the turbine will be visible to some extent from many ridge-tops and to a lesser extent as the viewer descends into the valleys. At distances of around 5km from the proposed site, visual impact may occur but will become weaker. Given the increasing number of proposed wind turbines in this area it will also become harder to distinguish individual turbines and cumulative impact will become increasingly relevant.

11 Geophysical survey results

The geophysical survey identified a number of anomalies that have been characterised as being either of a probable or possible archaeological origin.

The difference between probable and possible archaeological origin is based on a confidence rating. Features identified within the dataset that form recognisable archaeological patterns or seem to be related to deliberate historical acts have been interpreted as being of a probable archaeological origin. Features of possible archaeological origin tend to be more amorphous anomalies which may have similar magnetic attributes in terms of strength or polarity but are difficult to classify as being archaeological or natural.

The following list of numbered anomalies refers to numerical labels on the interpretation plots (Figure 33 and Figure 34).

Probable Archaeology

- 1 A series of rectilinear features probably caused by cut features. These are at differing orientations indicative of two phases of activity.

Possible Archaeology

No possible archaeology has been identified within the survey area.

Other Anomalies

- 2 A strong positive linear indicative of a modern metallic service, such as a pipe or cable.
- 3 A number of magnetic 'spikes' (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

The survey was carried out over approximately 1 hectare and revealed a number of cut features of archaeological origin. These are probably enclosures or historic field boundaries. A short section of a modern service was detected in the east of the survey area and a small number of magnetic spikes also exist on site.

12 Statements of Significance

Many of the sites have already had their significance assessed by Scheduling or Listing. Where sites are Scheduled or Listed they have not been considered under the Sites and Monuments Records category below, even though they usually feature on that list, to avoid duplication. Subsurface and associated remains are likely to be of equal significance to the sites identified below.

12.1 World Heritage Site (Site 10)

These sites are designated and defined by UNESCO (UNESCO website):

The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. This is embodied in an international treaty called the Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by UNESCO in 1972.

Sites inscribed on the World Heritage List benefit from the elaboration and implementation of a comprehensive management plan that sets out adequate preservation measures and monitoring mechanisms. In support of these, experts offer technical training to the local site management team.

The inscription of a site on the World Heritage List brings an increase in public awareness of the site and of its outstanding values, thus also potentially increasing tourist activities at the site. When these are well planned for and organized respecting sustainable tourism principles, they can bring important funds to the site and to the local economy.

12.2 Scheduled Monuments (Sites 1, 6, 8, 14, 15, 17, 19)

Scheduled Monuments have Statutory Protection under the Ancient Monuments and Archaeological Areas Act 1979. These are sites that have been identified by English Heritage, the Government's archaeological advisory body, as being of national importance, and are included in the County Lists maintained by the Secretary of State for Culture, Media and Sport. A schedule has been kept since 1882 of monuments whose preservation is given priority over other land uses. The current legislation, the Ancient Monuments and Archaeological Areas Act 1979, supports a formal system of Scheduled Monument Consent for any work to a designated monument (English Heritage Website).

12.3 Registered Parks and Gardens (Sites 4, 7, 11, 12, 16, 18)

Registered Parks and Gardens are described and defined by English Heritage as (English Heritage Website):

The English Heritage 'Register of Historic Parks and Gardens of special historic interest in England', established in 1983, currently identifies over 1,600 sites assessed to be of national importance. The emphasis of the Register is ... *on 'designed' landscapes; ... gardens, grounds and other planned open spaces, such as town squares ... rather than on planting or botanical importance.*

Historic parks and gardens are a fragile and finite resource: they can easily be damaged beyond repair or lost forever ... The main purpose of this Register is to celebrate designed landscapes of note, and encourage appropriate protection. It is hoped that, by drawing attention to sites in this way, English Heritage will increase awareness of their value and encourage those who own them, or who otherwise have a role in their protection and their future, to treat these special places with due care.

Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes' special character.

12.4 Listed Buildings (Sites 2, 3, 4, 5, 13)

Sites are Listed to mark their special architectural and historical interest; they are protected by law, and Listed Building Consent must be granted for any alterations to a designated building. Some sites, such as the Market House in St Austell, have been given Grade II* status, which means they are considered 'particularly important...of more than special interest.' The remaining sites are designated as Grade II listed and are therefore considered 'nationally important and of special interest' (English Heritage Website).

12.5 Conservation Areas (Site 9)

Conservation areas are designated for their special architectural and historic interest. They are designated by the local planning authority and comply with national standards. Designations of Conservation Areas were first made in 1967 and typically include town or city centres, fishing and mining villages, historic estates, housing and transport links (English Heritage Website).

12.6 Regional Significance (included in Sites 1, 2, 3)

These remains are considered of regional significance because of their rarity, setting and upstanding evidence but are otherwise undesignated assets.

13 Likely impacts of the proposed development

13.1 Construction Phase Impacts

The construction of the turbine, specifically the excavations for the foundations and cable run, will have direct, physical and irreversible impacts upon any archaeology in these locations. The geophysical survey results indicate that the construction of the turbine will have little or no impact depending on the extent of the turbine base excavations (Figure 33 and Figure 34). There are four linear anomalies in the eastern half of this area which are likely to be of prehistoric or medieval date, whose investigation could therefore add to archaeological knowledge of the area. Provision of a works compound, additional access routes or any widening of the existing gateways would also have a moderate physical and irreversible impact on any archaeology in these locations. The above four linear anomalies, in addition to a fifth by the entrance to the field, are likely to be physically impacted by the cable route (Figure 33 and Figure 34). The overall impacts on probable sub-surface archaeology are likely to be minor negative.

Construction will also create some minor visual and audible disturbance though as these are temporary and reversible they are considered as negligible impacts only.

13.2 Operational Phase Impacts

During the operational phase only the visual and audible impacts will apply. These will vary according to the weather, season, distance from, and intervisibility with, the proposed site and the sensitivity of individual heritage assets. Such impacts will be temporary and potentially reversible (when the turbine is eventually dismantled, as required by the planning conditions applying to such features), and will vary in overall magnitude according to receptor distance from the turbine, degree of intervisibility or intrusion of the turbine within key views of them and the sensitivities of their settings.

13.3 End of Use Phase Impacts

Assuming the proposed turbine is not re-powered or replaced, the end of use impacts will be as a result of machinery to remove the turbine components. These will be minor audible and visual but temporary and reversible impacts. Should the foundations also be entirely removed there may be further significant, physical and irreversible impacts on any surrounding subsurface archaeology.

13.4 Impacts on the Cornish Mining World Heritage Site

The Charlestown World Heritage Site areas are located to a very minimal extent within the viewshed (Figure 21; Figure 32). The area will not be physically impacted upon and there will not be visual and audible impacts resulting from construction, operation and end of use activities. This is because the potentially intervisible areas are substantially obscured by housing and associated vegetation. Current distractions from the significance of the area originate from the conurbation of St Austell slightly to the north of Charlestown. The addition of the proposed turbine has the potential to alter the setting of the World Heritage Site area, though at a distance of approximately 8km this impact would be negligible. Any setting impact would only be perceived from a viewpoint out to sea where the turbine and Charlestown could potentially be included within the same view. The overall impact is rated as neutral.

13.5 Impacts on Scheduled Monuments

No Scheduled Monuments will be physically impacted upon by the proposal. Beacon cross and enclosure will experience moderate to large audible and visual impacts during all three phases due to their close proximity. Dependant on the wind direction, the remaining Scheduled Monuments may experience an audible impact, however this is likely to be negligible. The settings of those within the viewshed such as Golden Camp, Sticker and Carvossa will be visually impacted to a minor extent, dependant on how much of the proposed turbine will be visible from them, as their prominent settings are vulnerable to intrusion. Castle Hill Camp is at much closer to the proposed site and has a prominent setting over a river valley. Views from the Camp and of it from the surrounding countryside are likely to include the proposed turbine, impacting appreciation of its setting to a moderate extent (Figure 30). The promontory fort on Dodman Fort occupies a commanding position over the adjacent seascape (in particular) and landscape (to a lesser degree), the site having significant open views in all directions (Figure 29). Although there is unlikely to be an audible impact from any of the three phases, there will be moderate to minor visual and setting impacts, particularly during the operational phase. Overall however the impacts on Scheduled Monuments can be rated as minor.

13.6 Impacts on Listed Buildings – Grade I and II*

The wind turbine is felt likely to have a neutral impact on those high grade Listed Buildings which do not fall within the viewshed. There may be a slight visual impact for all Listed sites close to 5km from the proposed site during all three phases; this will diminish with increasing distance from the site. The Market House and Old Manor House, both Grade II*, and the Grade I Holy Trinity Church in St Austell are very unlikely to experience any negative impacts as their location in the centre of the town obscures any views out and their setting is essentially the modern urban environment. Those within St Ewe, a relatively unspoilt and quiet village, are highly likely to experience visual and audible impacts during the construction, operational and end of use phases to a moderate level, though this will be dependent on the extent of intervisibility with the turbine and the degree of screening afforded by vegetation or topography. The Grade I Church of All Saints in St Ewe has the most extensive setting of the Listed Buildings in the village. Although it has a very small spire which is not a landmark feature, the church is well preserved with a secluded churchyard to the east and south, this directly facing the proposed site. The surrounding mature trees do not provide substantial screening and therefore the church is likely to experience moderate visual and audible impacts to its setting and on views out from it (Figure 25). St Michael's Church and Higher Lodge at Caerhays approximately 4km to the south-southwest of the proposed site are Grade I Listed, with extensive views northwards (Figure 28). Their settings are mainly related to the formal grounds of Caerhays but they also interact with the wider rural landscape, as the estate farms much of this land and the church is intervisible with the church at Gorran to the east. Visual and setting impacts are likely to be significant and are

therefore rated as moderate. The overall impact on Grade I and II* Listed Buildings is assessed as negative/moderate.

13.7 Impacts on Listed Buildings – Grade II

No Grade II Listed Buildings will be physically impacted upon and only those within the viewshed will experience a visual impact during all three phases (Figure 18). With the exception of those in St Ewe and Polmassick it is highly unlikely any will experience an audible impact. Whilst the bridge over the River Luney in Polmassick is part of the road system, there are views from it up the valley towards the proposed turbine site (Figure 26). A rotating turbine may distract from the historic location and character of the bridge and surrounding village, and therefore the impact is rated as negative/moderate. The Methodist church in Gorran is set within a village environment with a high volume of traffic to Gorran Haven. Although the views out from Gorran are limited, they tend to be directed northwards by the topography and include the proposed turbine site. There are already two turbines visible from this location. As a result of the nature of the views and the somewhat restricted setting of this site, the impacts on this church are considered to be minor. The overall impact for Grade II Listed Buildings is assessed as minor.

13.8 Impacts on Conservation Areas

There are three Conservation Areas within 5km but only one, Pentewan, will be potentially intervisible with the turbine site (Figure 19). Those outside the ZTV will not experience any visual impacts but as they are coastal, located around the villages of Gorran Haven and Mevagissey, there may be a minor impact to their setting when considered from a maritime viewpoint, as a modern turbine will be juxtaposed with the historic maritime activities of these areas. This consideration also applies to Pentewan where the topography and aspect of the village greatly restrict intervisibility to the upslope parts only. The ground surface at the turbine site will not be visible and as it is highly unlikely the turbine will be visible or audible during any of the three use phases, the impacts are assessed as neutral. The overall impact is therefore assessed as neutral.

13.9 Impacts on Registered Parks and Gardens

Visual impacts may be limited by the density of vegetation making up these designated landscapes, however many views from the parks were specifically designed and many may now include the proposed turbine (Figure 22). The settings of these parks are simultaneously formal, deliberately natural, within related or unrelated surrounding agricultural land (in some cases out to significant distances) and they often interact with the seascape. The proposed turbine will theoretically be intervisible to some extent from all seven parks though distance will diminish the impact of the construction, operational and end of use phases. At 2km from the proposed site, Heligan will experience the greatest impacts (Figure 27). Heligan is mostly located in a valley but the park entrances and woodland are on the crest of a ridge and part of the garden is on a southwest facing slope exposing it to visual and possibly audible impacts. The planted gardens, particularly the upslope areas, have extensive settings including the agricultural and coastal surroundings, which will be impacted to a large degree by the installation of a turbine.

Similarly Caerhays has extensive views and parts of its setting extend to the north towards the turbine location (Figure 28). The main aspect of Caerhays Castle is southwards to the sea and the formal gardens surrounding it. However the parkland, woodland and agricultural land, including the church and lodge discussed above will be intervisible with the wind turbine, and will experience a moderate impact on all views and on the setting of the park.

Beyond 5km from the proposed turbine site the effect on Registered Parks and Gardens decreases and would consist of setting and visual impacts only. The parks at Trewithen, Trewarthenick, Tregrehan and Tregothnan are included in this category. Any views of the turbine from such sites would be fragmentary or intermittent, vegetation will provide screening and the turbine will be a very small and relatively insignificant component

within views. The turbine will intrude on the wider setting of these sites, but due to distance this will result in very minor or negligible impacts.

Menabilly, in contrast, is set on a west facing slope with generally extensive views across St Austell Bay and has a setting which includes the maritime environment to a greater extent than the other designated parks, despite being almost 15km from the proposed site (Figure 31). The rural environment of the Dodman Point is also very clear from this viewpoint (Figure 29). The turbine will intrude into these settings resulting in a minor impact. The large and moderate impacts on Heligan and Caerhays results from the higher degree of intervisibility and negative effect upon settings compared to the other Registered Parks and Gardens. The overall impact on Registered Parks and Gardens is assessed as minor.

13.10 Impacts on Undesignated Historic Assets

All undesignated sites within the 1km radius of the proposed site are potentially susceptible to audible impacts, though this will be dependent on weather and wind direction (Figure 17). All sites within the viewshed will be visually impacted to some extent during all three phases, though at worst this is considered as minor for the more prominently positioned, extant or closest sites such as those in St Ewe (Figure 25). The majority of the undesignated sites are known from documentary sources only or are signposts and crosses with very limited settings. The overall impact on such sites is therefore assessed as neutral.

13.11 Impacts on Historic Landscape Character

The landscape surrounding the proposed wind turbine site is dominated by extensive areas of farmland of Medieval origin interspersed with tracts of later enclosed land. Most of the land has been farmed since at least the Medieval period, in some places long before, as alluded to by the surviving place names and prehistoric remains. From the 17th Century onwards parts of this area were subjected to enclosure under the Enclosure Acts with the imposition of larger, more regularly shaped fields and intensive farming methods that reduced some archaeological sites to below ground remains only. In places this is highlighted by the use of block work walls as field boundaries instead of the more traditional Cornish hedges. The seven Registered Parks and Gardens in the vicinity also influenced and continue to influence the layout and character of the landscape. However the Post Medieval enclosures still preserve much of the original open character of the area, with small farming settlements scattered throughout the landscape.

With the exception of the growth of the St Austell conurbation some distance away, the overall character of this landscape has changed little. The elevated nature of the area is clearly ideal for locating the proposed wind turbine and is likely therefore to become increasingly popular for generating electricity from wind power as other areas in Cornwall have. The insertion of individual wind turbines will erode the coherency and legibility of the former and surviving historic landscape character of this area. The addition of the proposed wind turbine at Lanuah will materially change historic landscape character, given the relatively few wind turbines already operational within this area and the lack of similarly modern and intrusive infrastructure, resulting in a minor overall impact.

14 Cumulative impacts

Recent English Heritage guidance requires assessments of applications for renewable energy installations to consider the cumulative impacts of installations in addition to specific impacts. The area surrounding Lanuah is not currently populated with multiple wind turbines but there are proposals for a number, and the elevated landscape is ideal for generating energy from wind. This indicates a high potential for cumulative impacts.

From the proposed turbine site at Lanuah Farm, two operational turbines are visible. From the majority of sites visited, no turbines, or only the above two, were visible to varying extents. Few of the sites highlighted in this assessment are significant landmarks although many have extensive and sensitive settings, including the multiple Registered

Parks and Gardens and the Scheduled Monuments. In particular the prehistoric Scheduled Monuments occupy prominent hilltop locations, command significant landscape views and have degrees of intervisibility with other approximately contemporary sites. From the sea, a wider viewpoint of multiple heritage assets and their relationships can be appreciated, and will incorporate both existing and proposed turbines. The distraction created by the rotating blades of the proposed wind turbine at Lanuah could be, or at least could become, detrimental to the appreciation and understanding of the setting of these monuments and of the wider landscape, especially in relation to areas which could contain a number of operational wind turbines.

The majority of the remaining sites considered consist of Listed Buildings within settlements, and although their settings are quite localised, many of these settlements have open views, and a degree of visual prominence within the surrounding agricultural landscape. The setting of some of these, such as sites within St Ewe, Gorran and Caerhays in particular, may be adversely affected to at least a minor degree by the visual distraction of the cumulative effects of multiple turbines constructed in the landscape around them (Figure 25; Figure 28).

It should be noted that assessments of setting refer to the heritage significance and surroundings of historic assets. Individuals' perceptions of setting, the associated aesthetics and appreciation and their perception of the impact of one or multiple wind turbines will differ.

Wind farms, where multiple turbines are installed in close proximity, can have a visual coherency which despite their size and quantity may limit the negative impacts they may otherwise impose. The placement of individual wind turbines sporadically across the landscape, as may become the case around Lanuah, is unlikely to achieve any coherency and therefore is likely to be potentially more distracting in perceptions of the historic landscape or in the appreciation of the settings of heritage assets.

Such adverse visual impacts are, given the 25 year lifetime of any specific wind turbine, judged to be temporary in nature (though long-lived) and would be reversed on their dismantling. Therefore, any unmitigated impacts associated with their construction and operation would not be permanent, though they may impact on the settings of designated sites and in the ways in which these sites and this historic landscape are perceived and appreciated for substantial periods. For those sites with local or limited settings having small-scale and/or limited numbers of turbines within their surrounding landscape, impacts are likely to be minor in most cases. For those sites with sensitive settings, where the construction of additional wind turbines is considered likely to result in a significant alteration to the historic character of the surrounding landscape, cumulative impacts may well be significantly greater, and assessment of them should form an important part of the planning process.

15 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.

15.1 Site redesign

Mitigating any potential impacts on heritage assets might be possible through the relocation of the wind turbine and redesign of cabling routes to reduce direct physical impacts on sub-surface archaeological remains within the proposed site demonstrated through geophysical survey or setting impacts on sensitive assets within the landscape surrounding the proposed turbine sites. However given the topography, the substantial height of the turbine and the minimal nature of the surrounding vegetation screens, such an approach would seem unlikely to be able to achieve any substantial diminution of setting impact (Figure 11). English Heritage or Cornwall Council may require the production of photomontages demonstrating that any submitted proposal could achieve an aim of minimising such impacts.

15.2 Archaeological recording

In a case where the finalised site design would seem likely to result in unavoidable physical impacts on likely sub-surface features, a brief for work to mitigate these impacts would be prepared by Cornwall Council's Planning Officers, setting out its scope. A Written Scheme of Investigation (WSI) to meet the brief would need to be prepared and agreed to establish and direct a programme of mitigating archaeological work.

The Planning Officer may require further archaeological evaluation or recording to provide a level of information sufficient to determine the potential and scale of sub-surface impacts on archaeological features identified by the geophysics before a recommendation for the granting of planning permission could be made.

Subsequent archaeological recording works could include a watching brief (observation by an archaeologist during mechanical ground reduction activities) or excavation and recording prior to construction works. This could target areas where significant features had been identified through geophysical survey, or where the balance of probability suggests that sub-surface archaeology might survive. This approach provides for preservation by record of buried archaeological features or artefacts and reduces any impacts on the archaeology of the sites to moderate with some benefits in the form of increased knowledge and awareness of the heritage assets.

It should be noted that the form of any mitigation applied to the site would be determined by the Planning Officer, who might require studies additional to those identified within this assessment in order to determine his recommendations.

16 Conclusion

Significant archaeological sites and heritage assets have been identified within a 15km radius of the proposed wind turbine. These include Scheduled Monuments, such as those at Sticker and Carvossa, for which the overall impacts have been rated as minor, due to their distance from the site and the reversible effects on their settings. Impacts on the Registered Parks and Gardens vary from neutral to large according to distance from the proposed wind turbine, intervisibility with its site and the extents of their settings. Although the impacts will be theoretically reversible, the operational impacts in particular will significantly alter the settings of the parks at Heligan and Caerhays and may also apply to the other Registered Parks and Gardens to a lesser extent. Upon the Listed Buildings, Conservation Areas and the World Heritage Site and especially those with more limited settings, the effects will be limited to minor visual and audible impacts. The exceptions will be the Listed Buildings at St Ewe and Polmassick and the Scheduled Beacon Cross enclosure whose close proximity to the proposed site will result in greater visual, audible and setting impacts, assessed to be moderate or large in severity.

Although currently few in number, the cumulative impacts of this proposed turbine, any within the planning process or any future turbines will become increasingly negative as they erode the historic character of the landscape. The viewshed mapping includes large areas out to sea with considerable views of the landscape that combine the World Heritage Site, Conservation Areas, Scheduled Monuments and Registered Parks and Gardens and their rural settings. The high volume of maritime leisure and economic pursuits in this area past and present mean the view from the sea is frequently accessed. The potential for the creation of negative visual impacts resulting from the combined settings of one or more turbines within this view might become an important consideration.

Due to the topography and location of the heritage assets considered, the adoption of a site redesign mitigation strategy as suggested above is unlikely to achieve any positive change on the impacts which have been identified. The geophysical survey identified several linear anomalies within the turbine and cable route areas which are likely to be field boundaries of prehistoric or medieval origin. Further archaeological investigation into the existence and nature of the probable subsurface archaeology in the proposed turbine field and along the cable connection route may enhance our understanding of the

archaeology of this site and surrounding area and help to mitigate direct impacts on archaeology resulting from the construction of the turbine at Lanuah.

The impacts of the wind turbine are all reversible, with the exception of those on the sub-surface archaeology which prove to be incapable of mitigation by redesign, and there may be environmental benefits associated with its installation. However the high level of significance already placed on the designated heritage assets with sensitive settings surrounding the proposed turbine site and potential impacts on their settings should be taken into account when considering this and similar applications within this part of Cornwall.

17 References

17.1 Primary sources

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Martyn's 1748 Map of Cornwall

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17.2 Publications

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Sharpe, A. 2013, *Lanuah Farm, St Ewe, proposed wind turbine: Written Scheme of Investigation for archaeological assessment*. Unpublished report for Historic Environment Projects, Cornwall Council

17.3 Websites

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<http://www.cornish-mining.org.uk> 03/01/2014 Cornish World Heritage Site

<http://www.english-heritage.org.uk/caring/listing/> 03/01/2014 English Heritage designation information

<http://www.english-heritage.org.uk/publications> 03/01/2014 English Heritage guidance

<http://www.heritagegateway.org.uk/gateway/> English Heritage's online database of Sites and Monuments Records, and Listed Buildings. 03/01/2014

<http://www.legislation.gov.uk> 03/01/2014 Government documents, Acts and legislation

<http://www.oxforddictionaries.com/definition/english/road?q=road> 07/01/2014 Oxford English Dictionaries Online historic and current definitions

<http://whc.unesco.org/> 03/01/2014 World Heritage Site information

18 Project archive

The HE project number is 146339

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Fal Building, New County Hall, 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.I-L\Lanuah_Farm wind turbine assessment 2014
3. English Heritage/ADS OASIS online reference: cornwall2-171162
4. This report text is held in digital form as: G:\TWE\Waste & Env\Strat Waste & Land\Historic Environment\Projects\Sites\Sites L\Lanuah_Farm



Figure 3: The proposed turbine site at Lanuah Farm and its surroundings as shown on John Norden's 17th Century Map of Cornwall.



Figure 4: The proposed turbine site at Lanuah Farm and its surroundings as shown on Joel Gascoyne's 1699 Map of Cornwall.



Figure 5: The proposed turbine site and its surroundings as depicted on Martyn's Map of Cornwall 1748.



Figure 6: The proposed turbine site as depicted on the 1807 OS 1 inch Map.

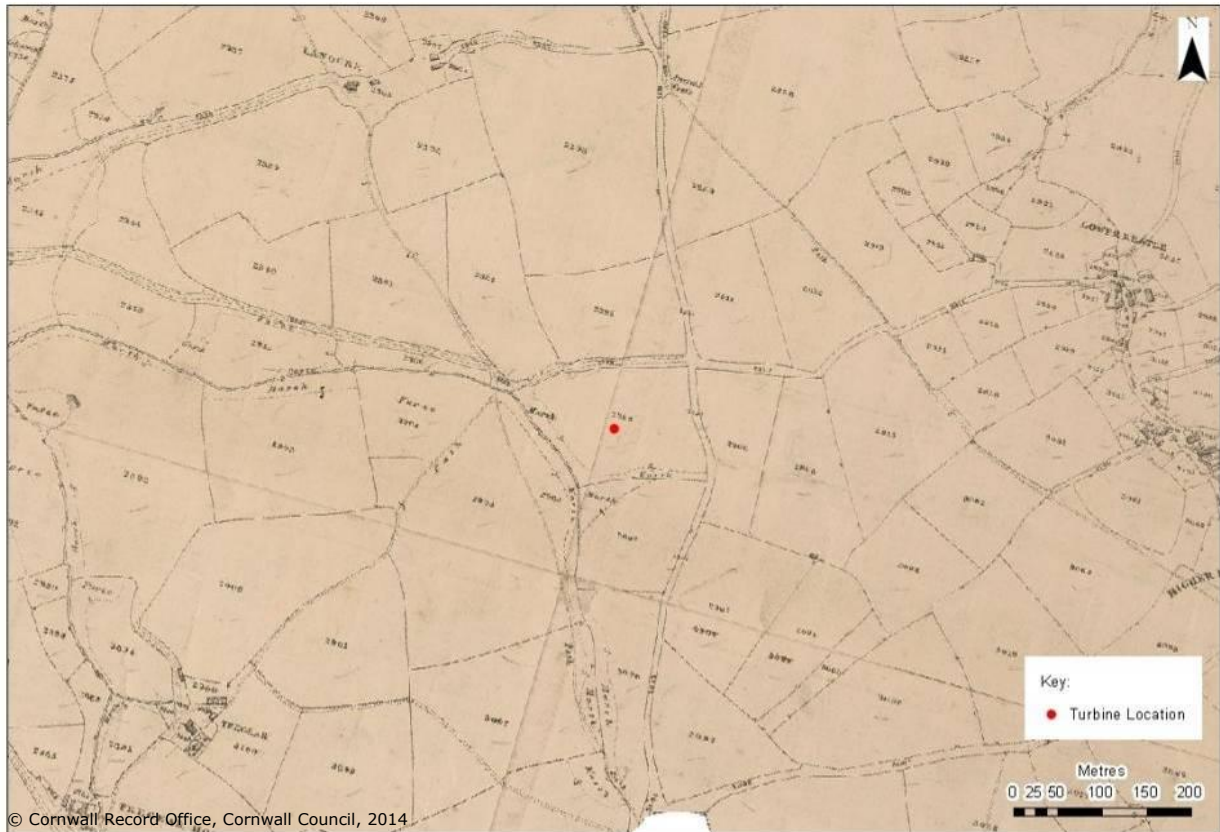


Figure 7: The proposed wind turbine location superimposed on the c1839 Tithe Map for the parish of St Ewe.

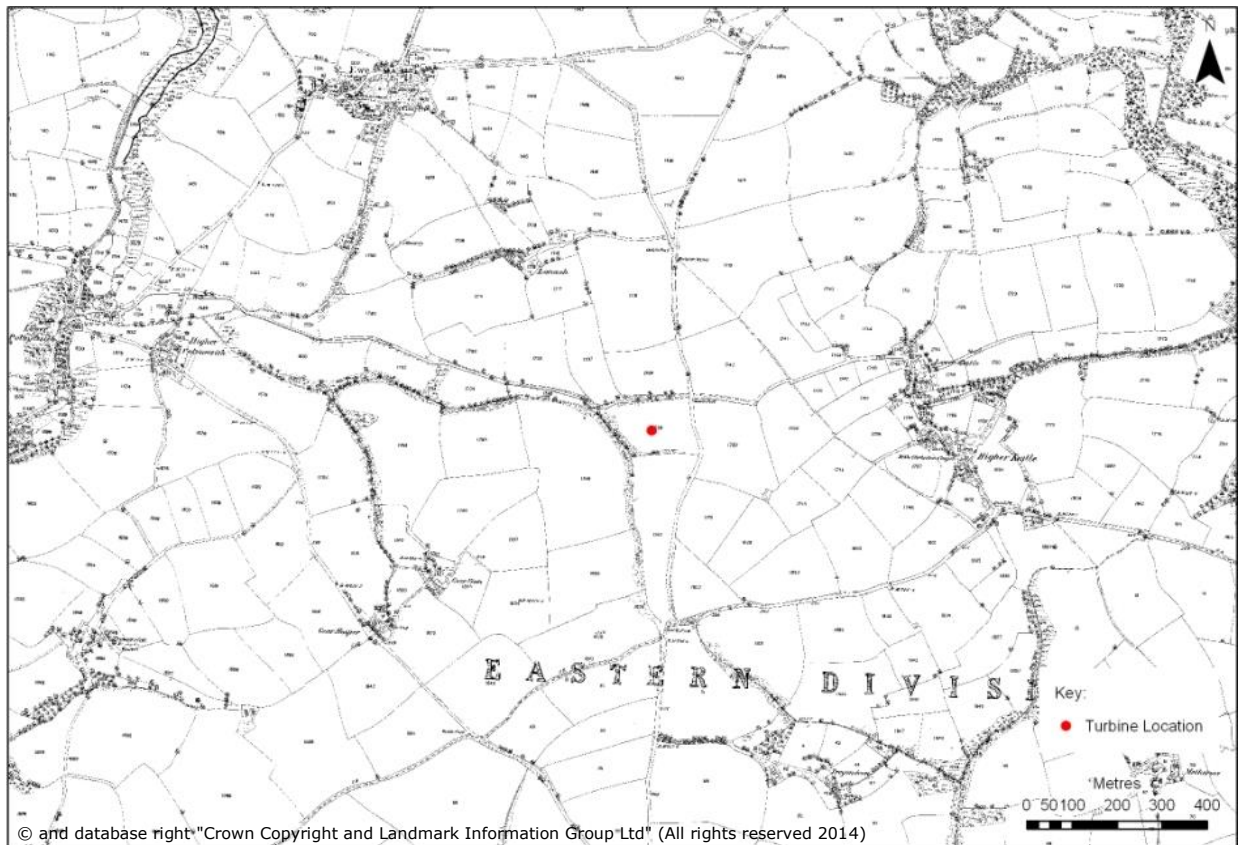


Figure 8: The proposed turbine site superimposed on the OS c1875 25" map.

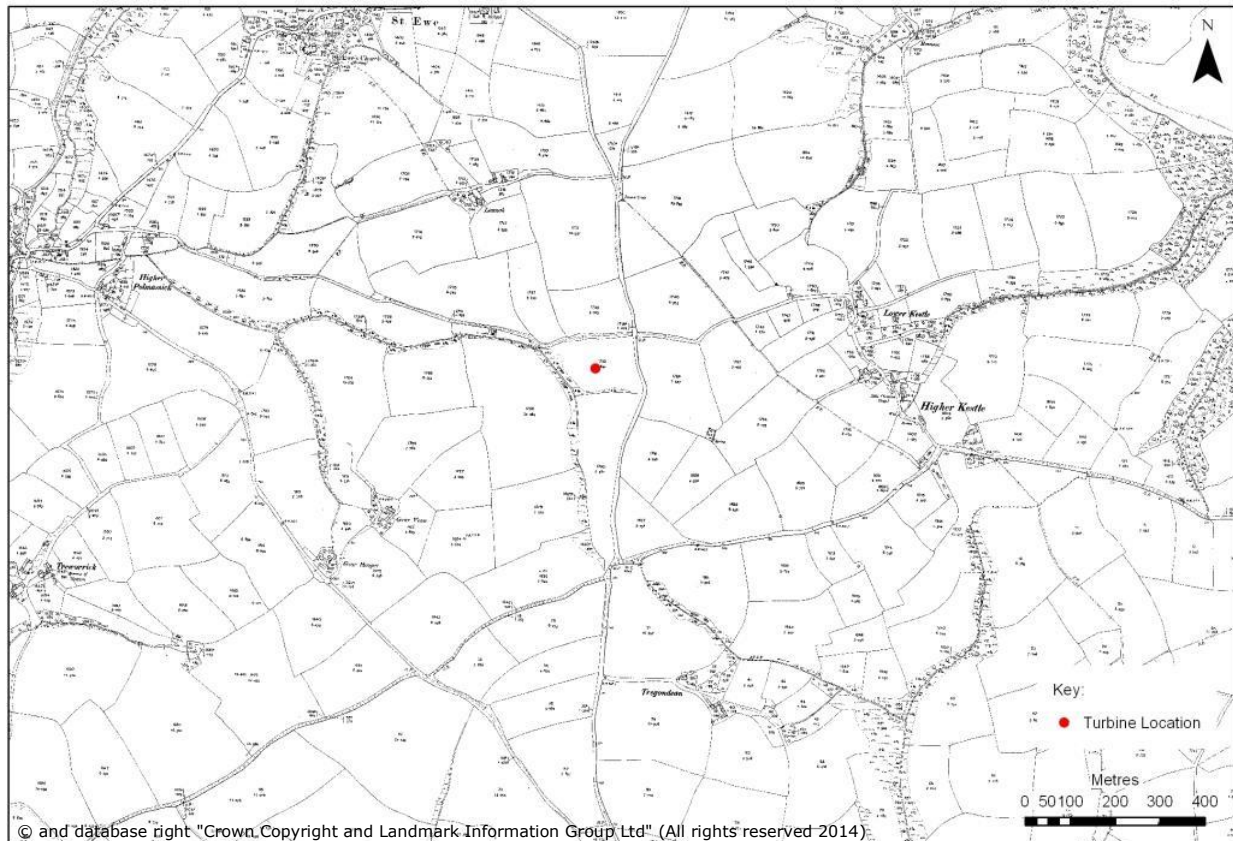


Figure 9: The proposed turbine site superimposed on the OS c1908 25" map.

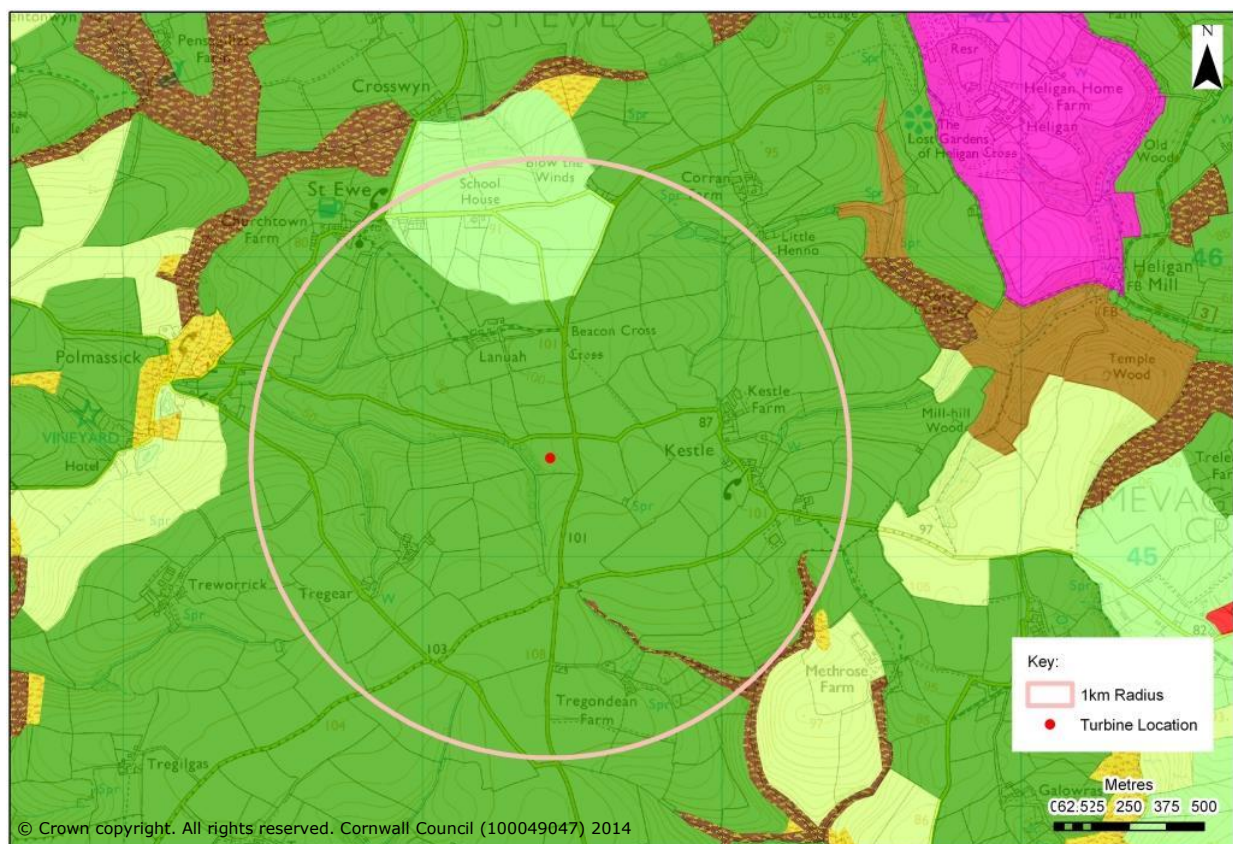


Figure 10: Historic Landscape Characterisation of the area surrounding the proposed turbine site. The dark green represents the Medieval farmland and the light green the Post Medieval farmland.

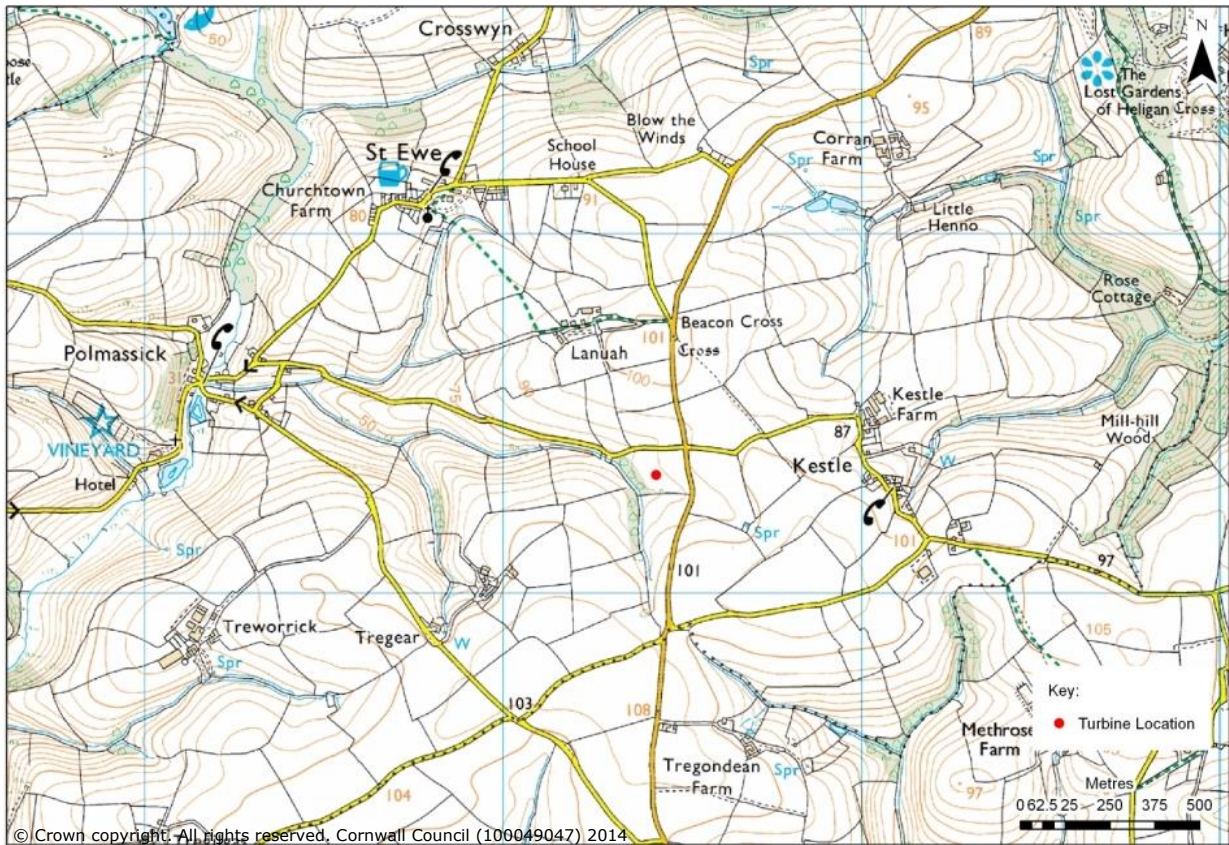


Figure 11: Contour map of the area surrounding the proposed site, note the ridges and steep scarp slopes.

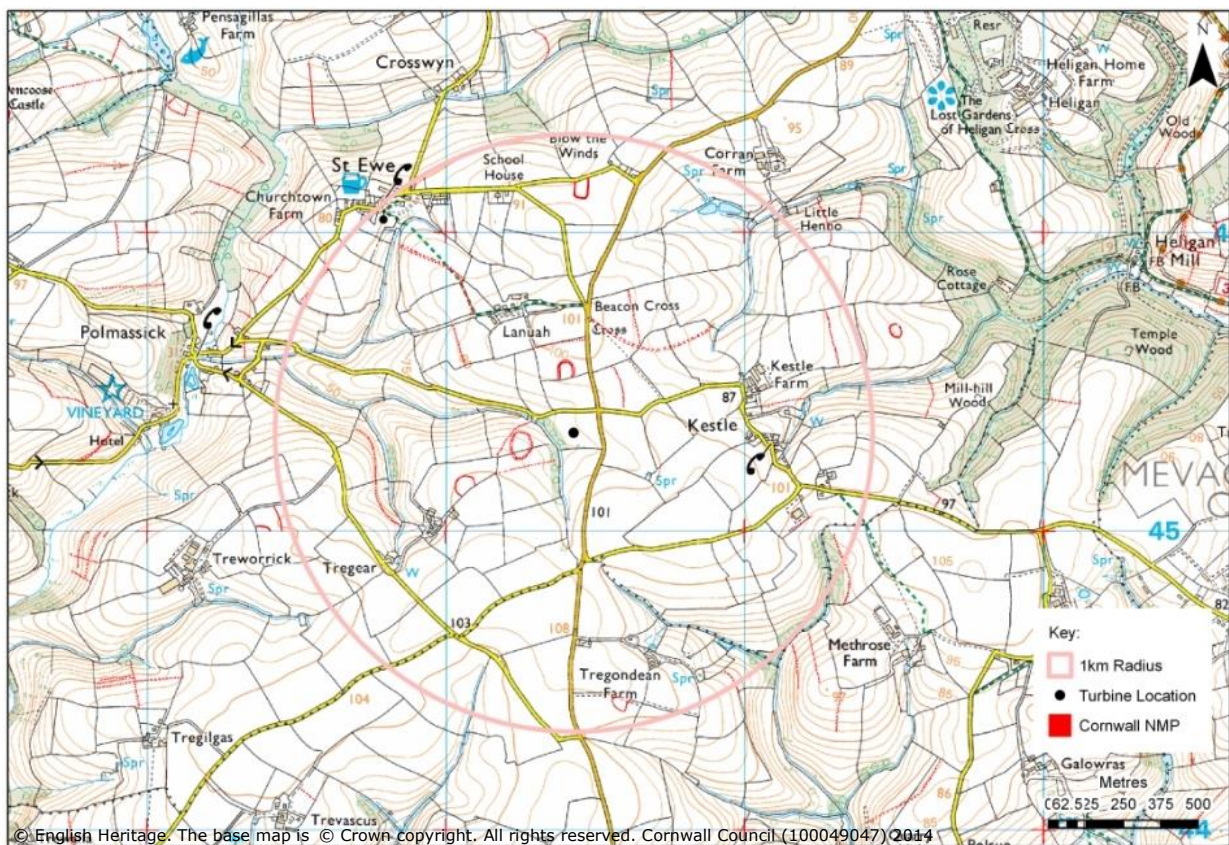


Figure 12: NMP data for the proposed site and surrounding area. Note the late prehistoric settlement enclosures on the surrounding hilltops.

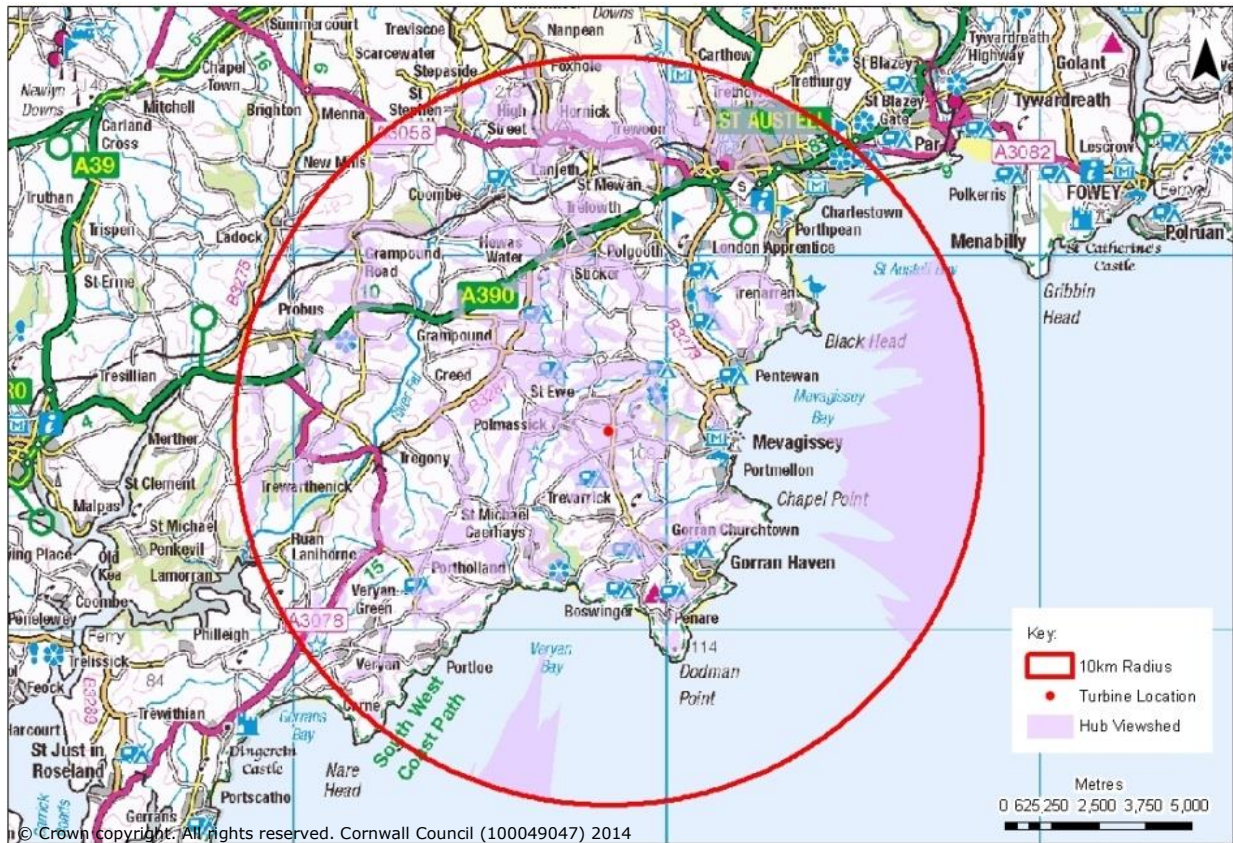


Figure 13: Viewshed for the turbine hub.

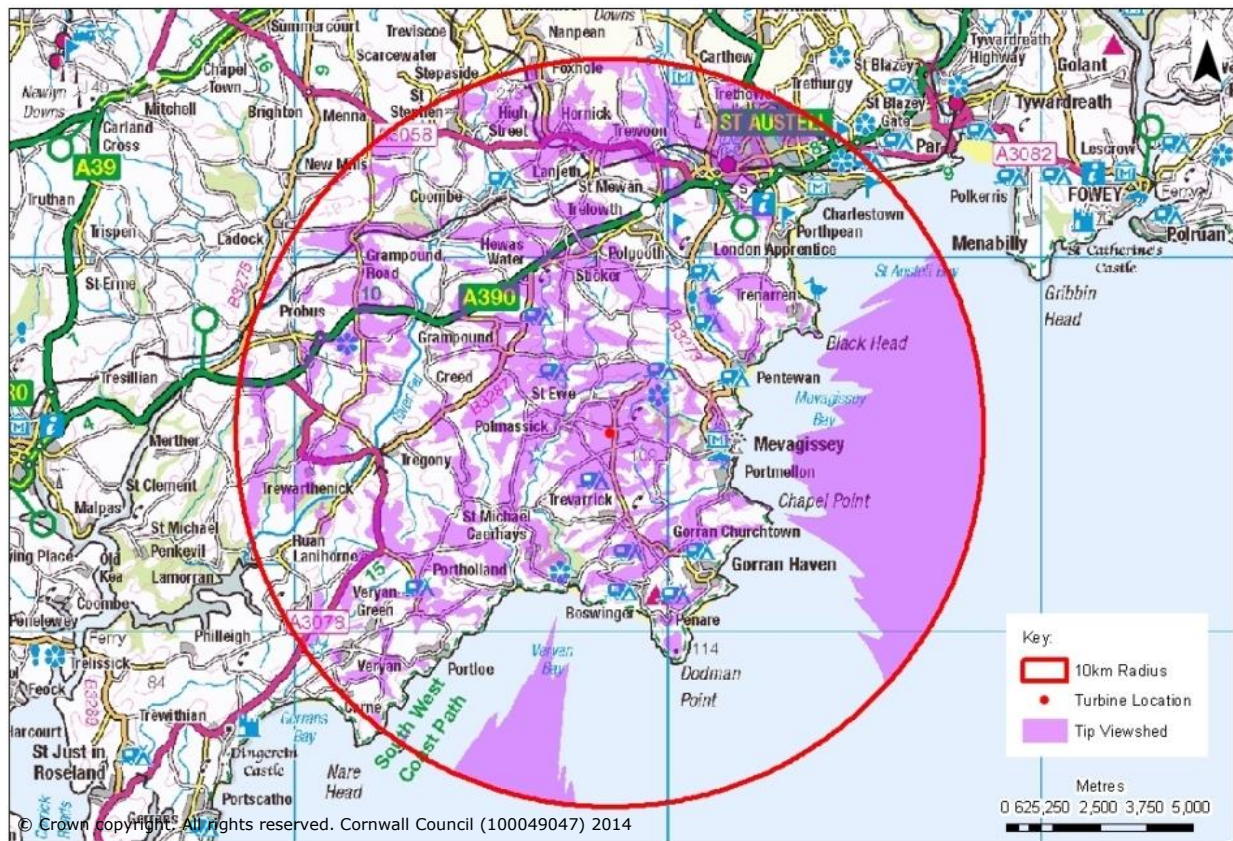


Figure 14: Viewshed for the turbine tip.

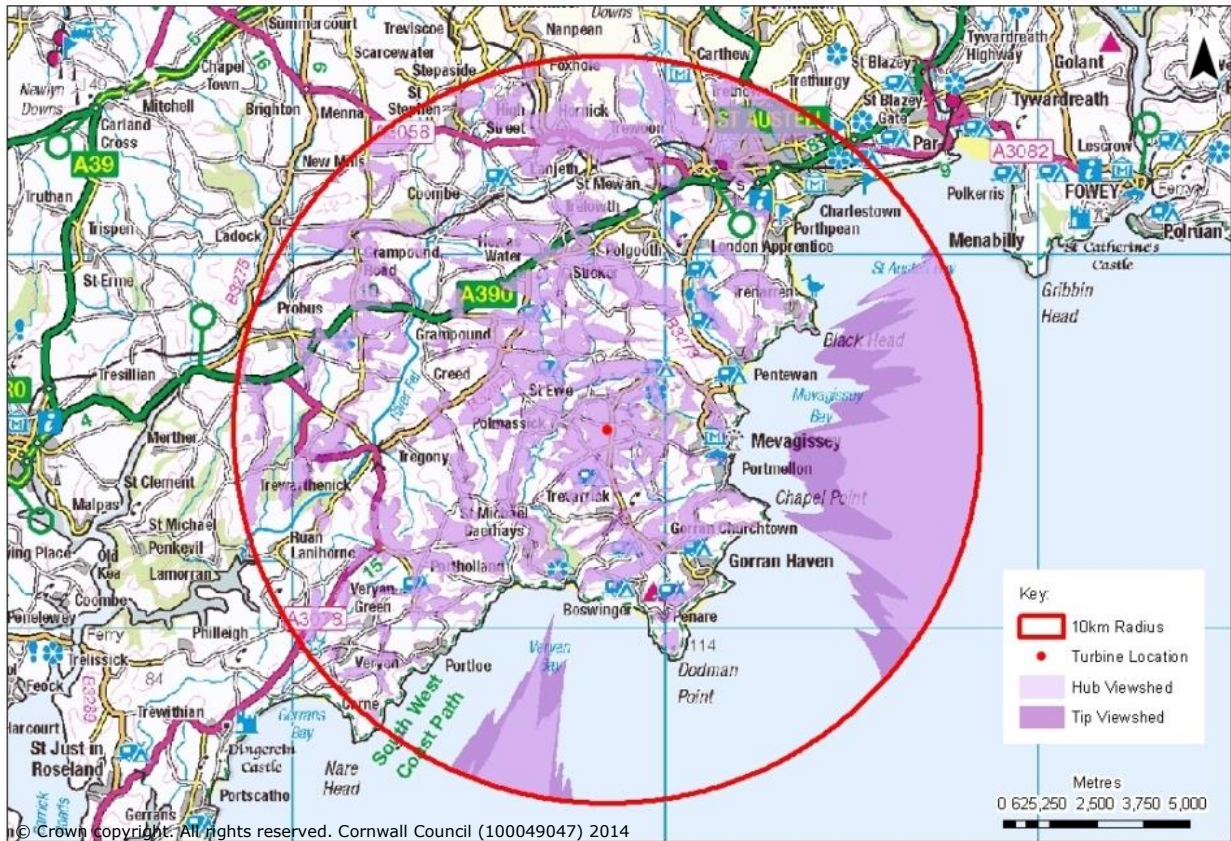


Figure 15: Combined hub and tip viewshed from the proposed turbine.



Figure 16: Map showing the radial zones within which each category of heritage asset has been considered.

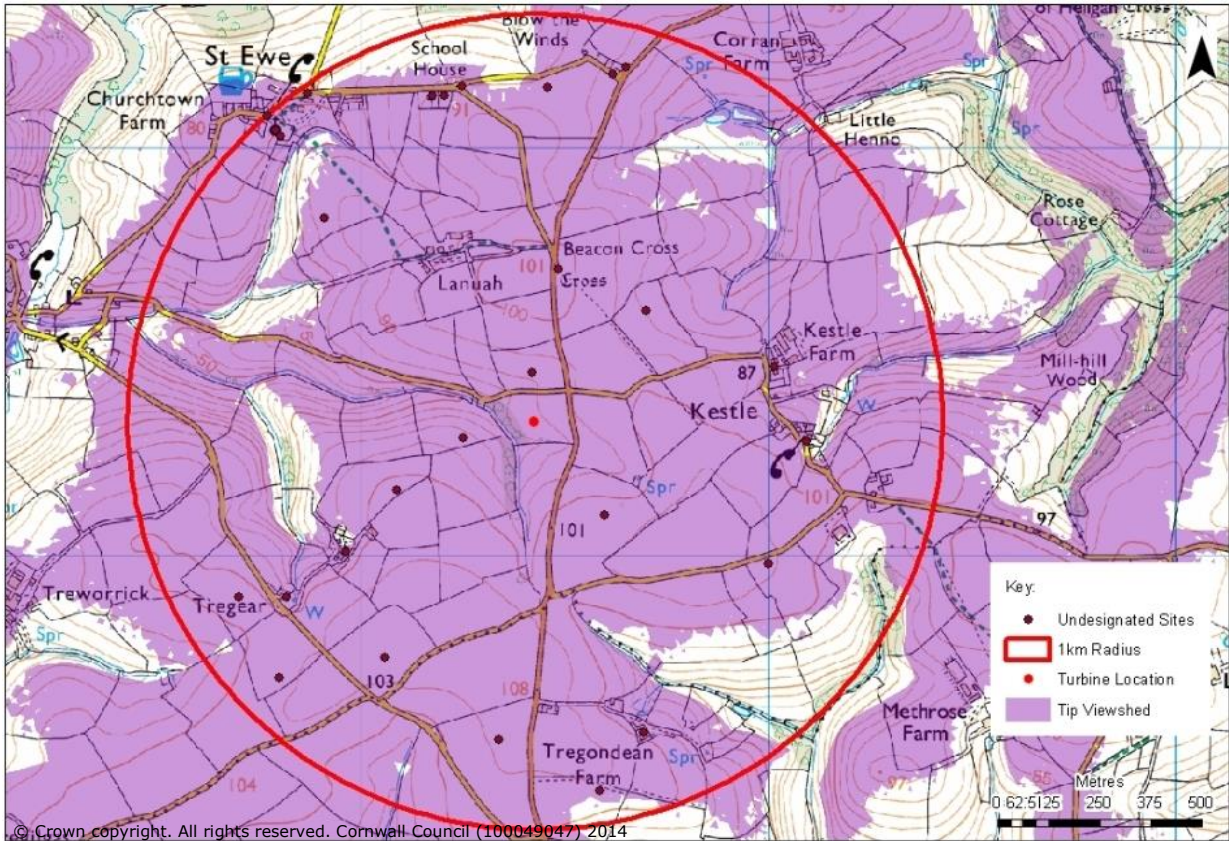


Figure 17: The 1km radius around the proposed site showing undesignated assets within the viewshed.

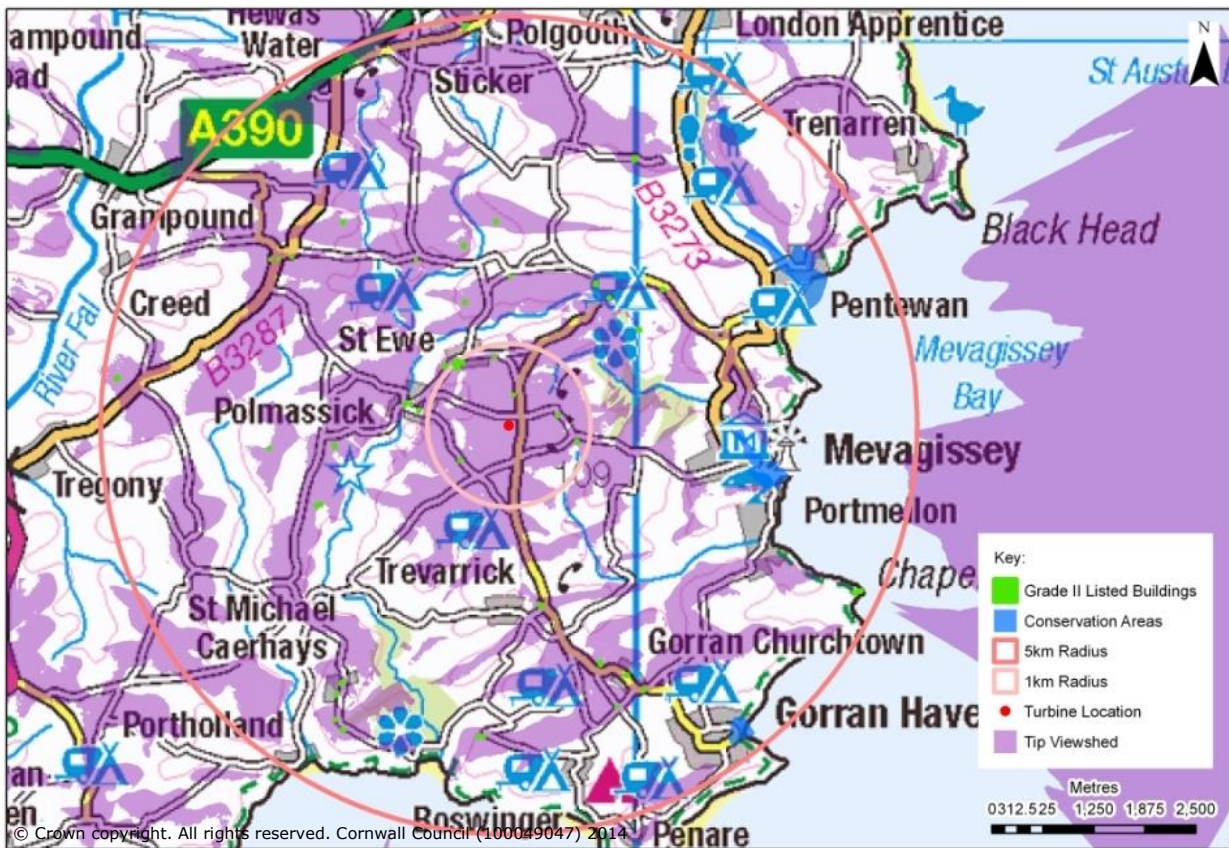


Figure 18: Map illustrating the Grade II Listed Buildings and Conservation areas within a 5km radius from the proposed turbine site.

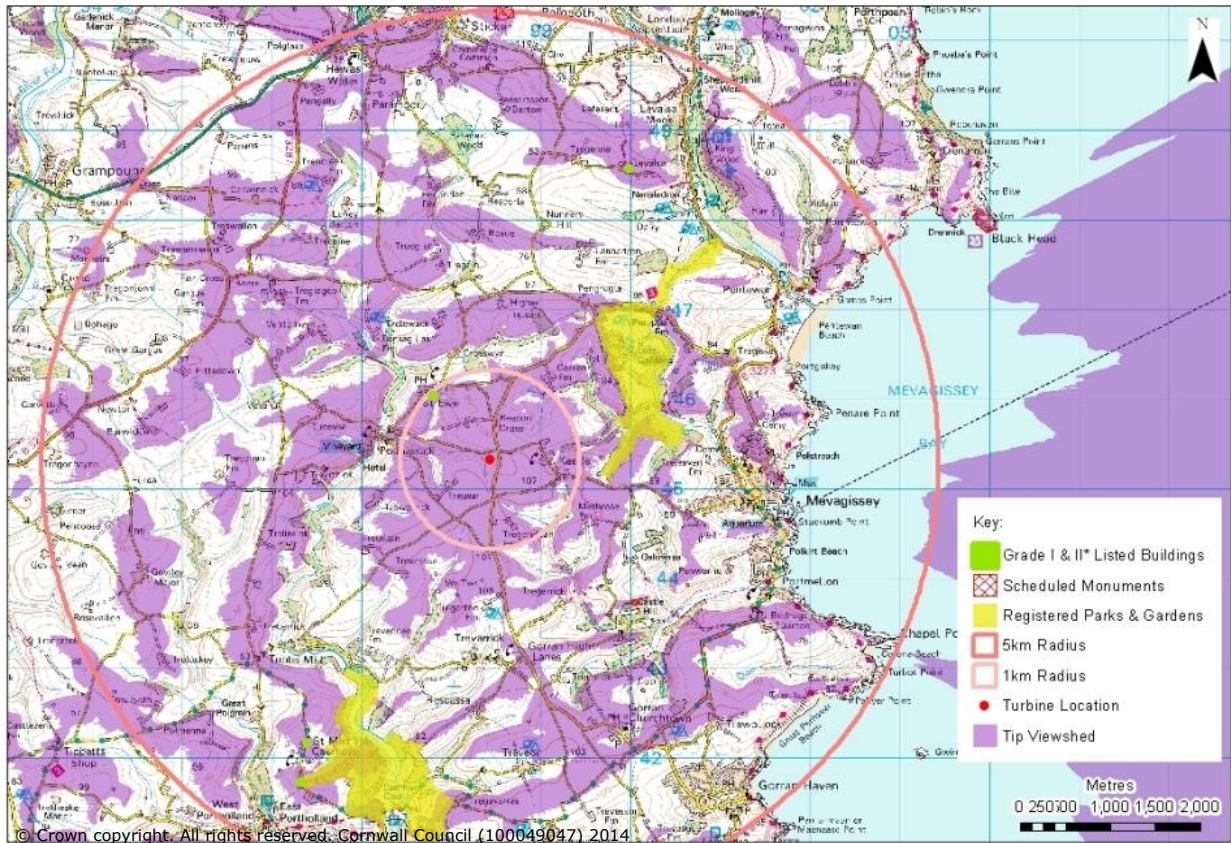


Figure 19: The 5km radius showing all designated assets within the viewshed.

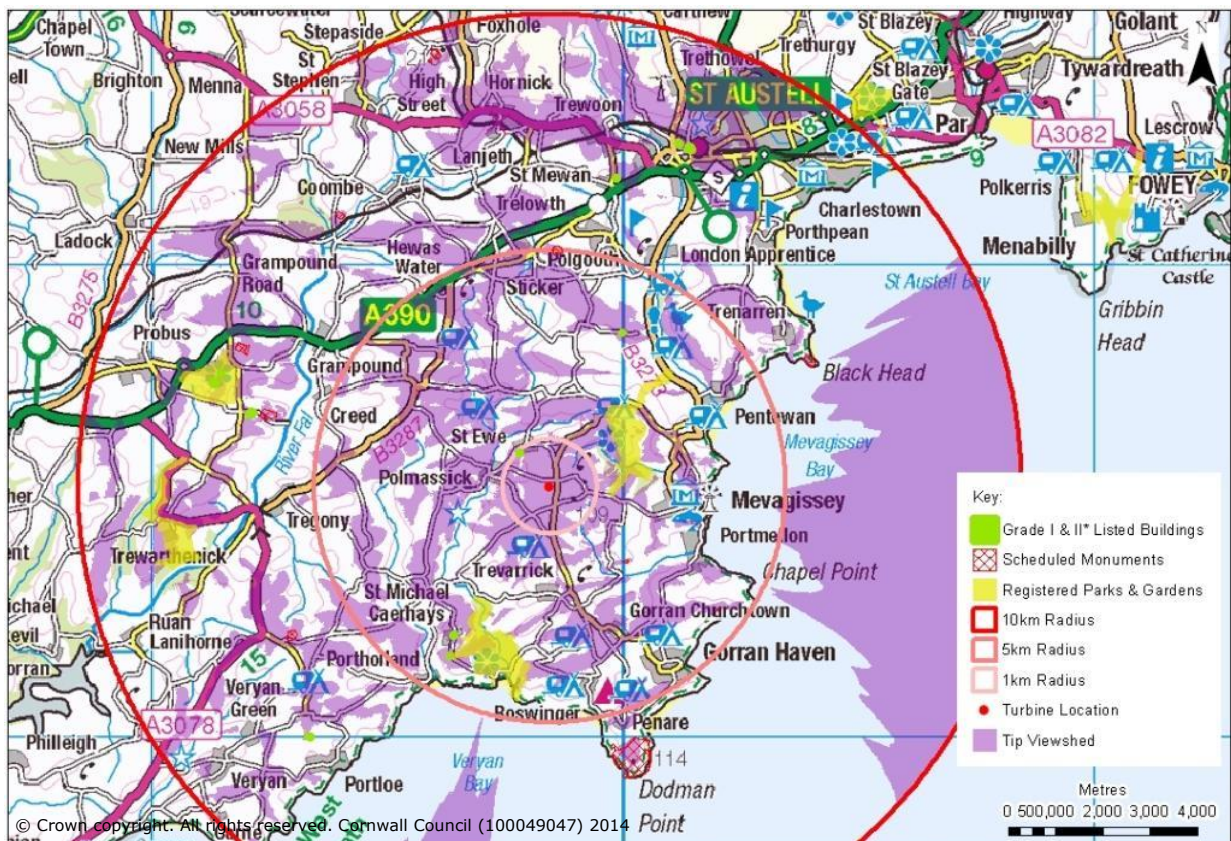


Figure 20: The 10km radius showing the Grade I and II* Listed Buildings, Scheduled Monuments and Registered Parks and Gardens within the viewshed.



Figure 21: The 10km radius indicating the relative proximity of the Charlestown Area of the Cornish Mining World Heritage Site to the proposed turbine site.



Figure 22: The Registered Parks and Gardens, Scheduled Monuments and Grade I and II* Listed Buildings within a 15km radius of the proposed turbine site.



Figure 23: The proposed wind turbine field looking west.



Figure 24: The view north towards the Hensbarrow china clay landscape from the northern side of the proposed turbine field.



Figure 25: The chancel of the Church of All Saints, St Ewe and the view southeast across the churchyard towards the proposed turbine site.



Figure 26: The bridge over the River Luney in Polmassick and the view east up the valley towards the proposed turbine site.



Figure 27: The view southwest from the western edge of Heligan. The proposed turbine will be located on the horizon in this photograph.



Figure 28: The view north-northeast across Caerhays Park from the Church of St Michael in Caerhays towards the proposed turbine site.



Figure 29: The view north across the Scheduled Monument of the Dodman, taken adjacent to the Victorian navigational cross and with the china clay tips on the horizon.



Figure 30: Castle Hill, in the middle ground of the crest of the hill, looking northwest towards the proposed turbine site on the horizon.



Figure 31: The view west taken from above and slightly north of Menabilly, looking across St Austell Bay towards the approximate proposed turbine location. Note the agricultural nature of the landscape in this view.



Figure 32: The centre of Charlestown where key views are south out to sea rather than west towards the proposed turbine site.

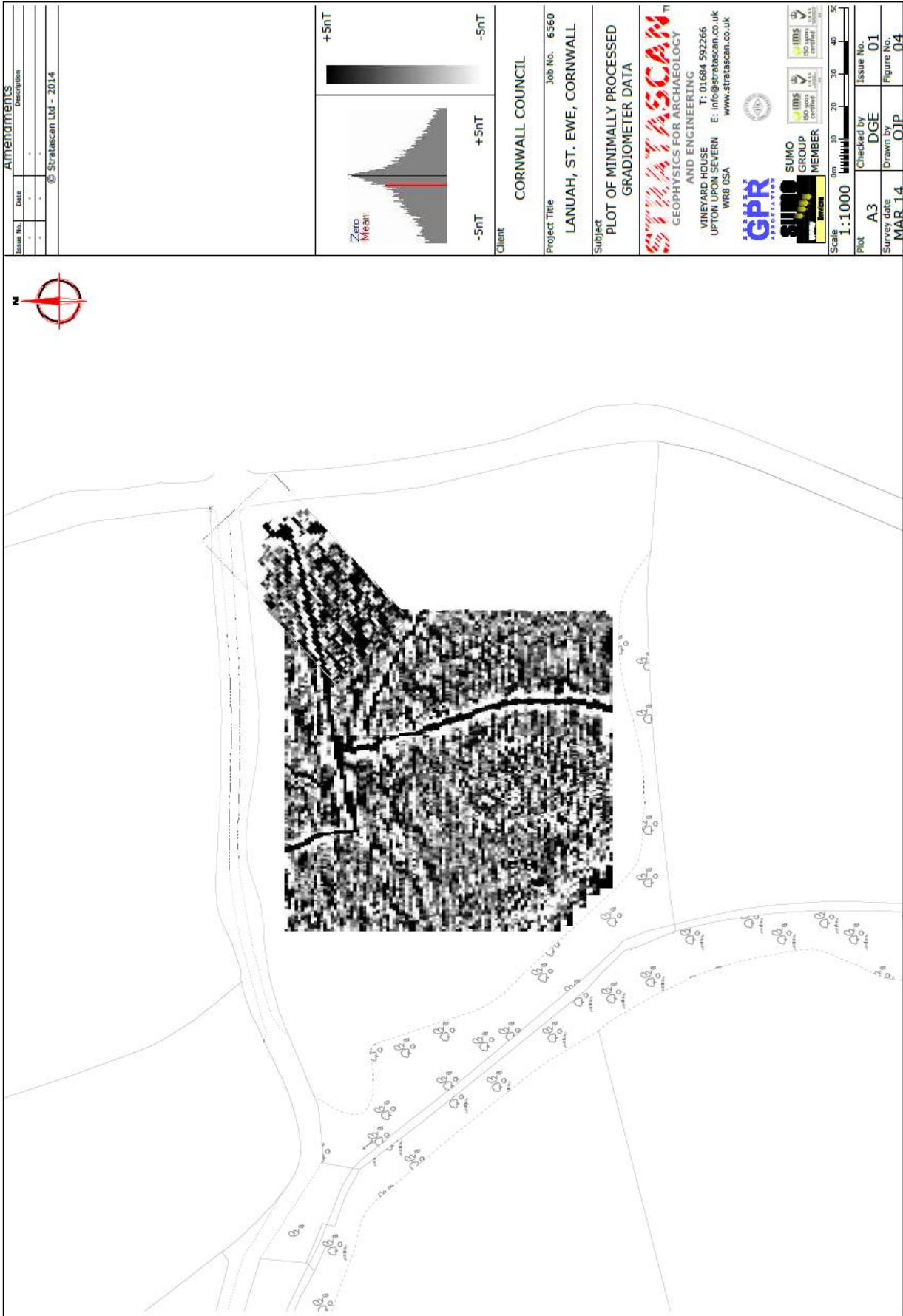


Figure 33: The geophysical survey plot of the raw data.

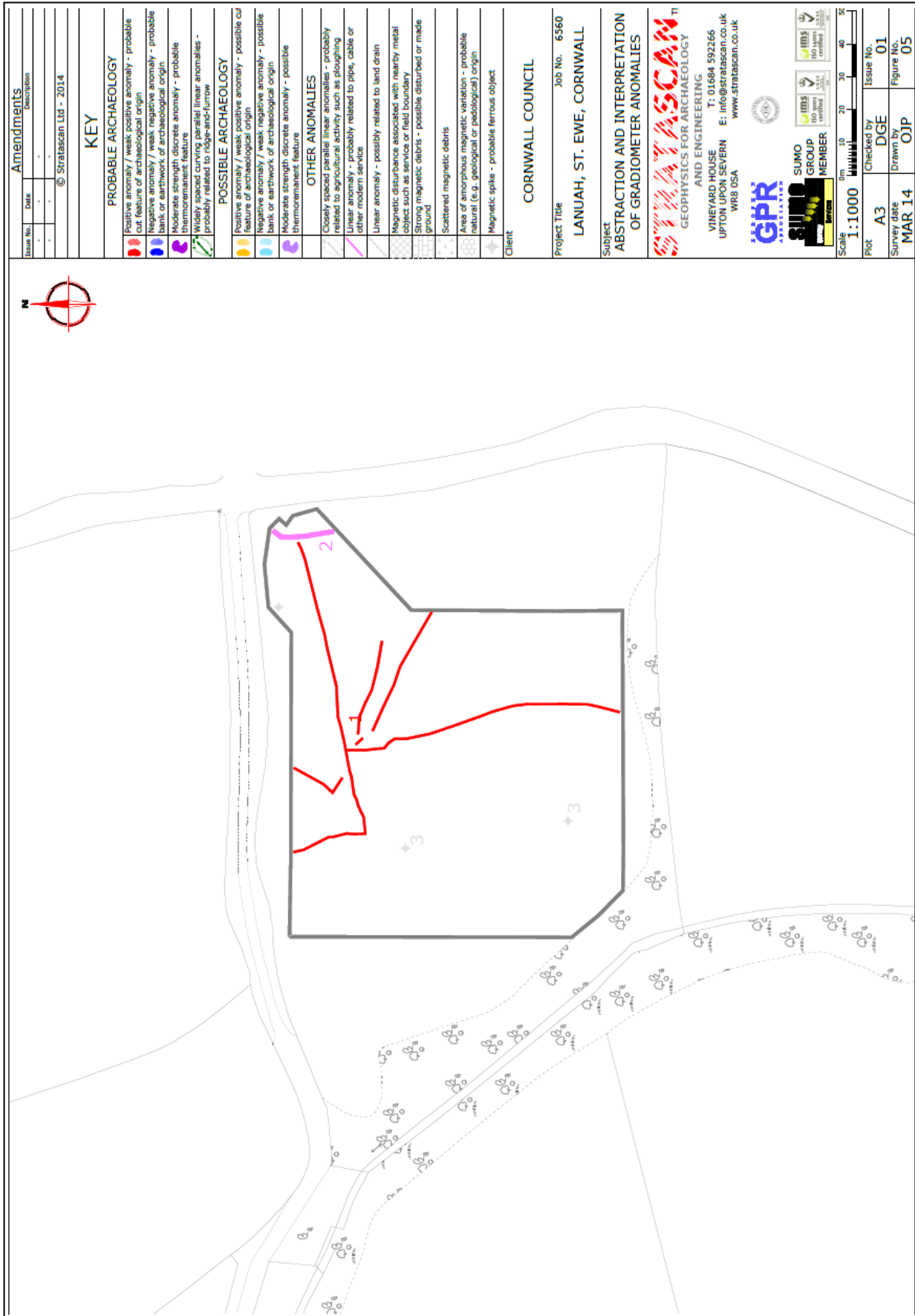


Figure 34: The interpretation of the geophysical survey results derived from the raw data plot shown above.