

# LAND at HIGHER GOONAMARTH ST. MEWAN CORNWALL

Results of a Geophysical Survey



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Land at Higher Goonamarth, St Mewan, Cornwall

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### Results of a Geophysical Survey

*For*

Bryony Fowler

*of*

Cleanearth (the Client)

*By*



**SWARCH project reference:** MHG14  
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## *Summary*

*This report presents the results of a geophysical survey carried out by South West Archaeology Ltd. (SWARCH) on land at Higher Goonamarth Farm, St. Mewan, Cornwall in advance of the construction of a 50m (77m to tip) wind turbine.*

*The survey identified a group of anomalies that probably equate to ridge and furrow. A pattern formed by medieval ploughing practices. The survey also identified a linear bipolar anomaly representative of a modern trench containing a metallic pipe or cable and frequent amorphous anomalies indicative of the underlying igneous geology.*

*Any development is unlikely to disturb any significant archaeological deposits or remains.*

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## 1.0 Introduction

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**Location:** Higher Goonamarth  
**Parish:** St. Mewan  
**County:** Cornwall  
**NGR:** SW9878054963  
**Type of survey:** Gradiometer  
**Date of survey:** 8<sup>th</sup> January, 2015  
**Area surveyed:** 1.13ha

### 1.1 Project Background

This report presents the results of a geophysical survey carried out by South West Archaeology Ltd. (SWARCH) at Higher Goonamarth Farm, St. Mewan, Cornwall (Figure 1). The work was commissioned by Bryony Fowler of Cleanearth Energy (the Agent) in order to identify any buried archaeology or heritage assets that might be affected by the installation of a 500Kw wind turbine (50m to tip).

### 1.2 Topographical and Geological Background

The proposed turbine would be located on the upper western flanks of the Gover river valley, just north-west of Goonamarth Farm, at an altitude of c.220m AOD. The soils of this area are the gritty loamy acid soils with a wet peaty horizon of the Hexworthy Association (SSEW 1983), overlying the granites of the St Austell Intrusion (BGS 2014).

### 1.3 Historical Background

The site of the proposed turbine lies within Higher Goonamarth Farm, which is first recorded in 1347, with the place-name element *goon* indicative of late (i.e. post-Conquest) enclosure. It probably formed parcel of the Manor of Treverbyn Trevanion, and was sold in 1852 along with the rest of the holdings of John Trevanion. There are documented references to a blowing house here in 1540, and an 'old' stamping mill is shown in the valley on the 1838 tithe map. From c.1820 china clay extraction became increasingly important, the rate of extraction and dumping accelerating in the later 20<sup>th</sup> century. In 1838 the land use is described as 'croft' and 'furze', which are rough grazing and scrub, possibly with the potential for providing fuel.

### 1.4 Archaeological Background

The impact of the china-clay industry on the land north of St Austell is immediately apparent: vast clay pits and enormous spoil heaps dominate this strange and desolate landscape. Parts of the landscape around Goonamarth have escaped despoliation, and these areas may contain features and structures relating to earlier china clay and tin exploitation, as well as settlement. Assessment, survey and fieldwork have been carried out by Exeter Archaeology (2002) and CAU (Cole 2004) at Goonamarth, with a possible Bronze Age roundhouse identified in an evaluation trench near Higher Biscovillack. A list of local Historic Environment Record entries can be seen in Appendix 1. A full desk-based assessment, walkover survey and historic visual impact assessment for the proposal site has previously been produced by SWARCH (Report No.: 141225).

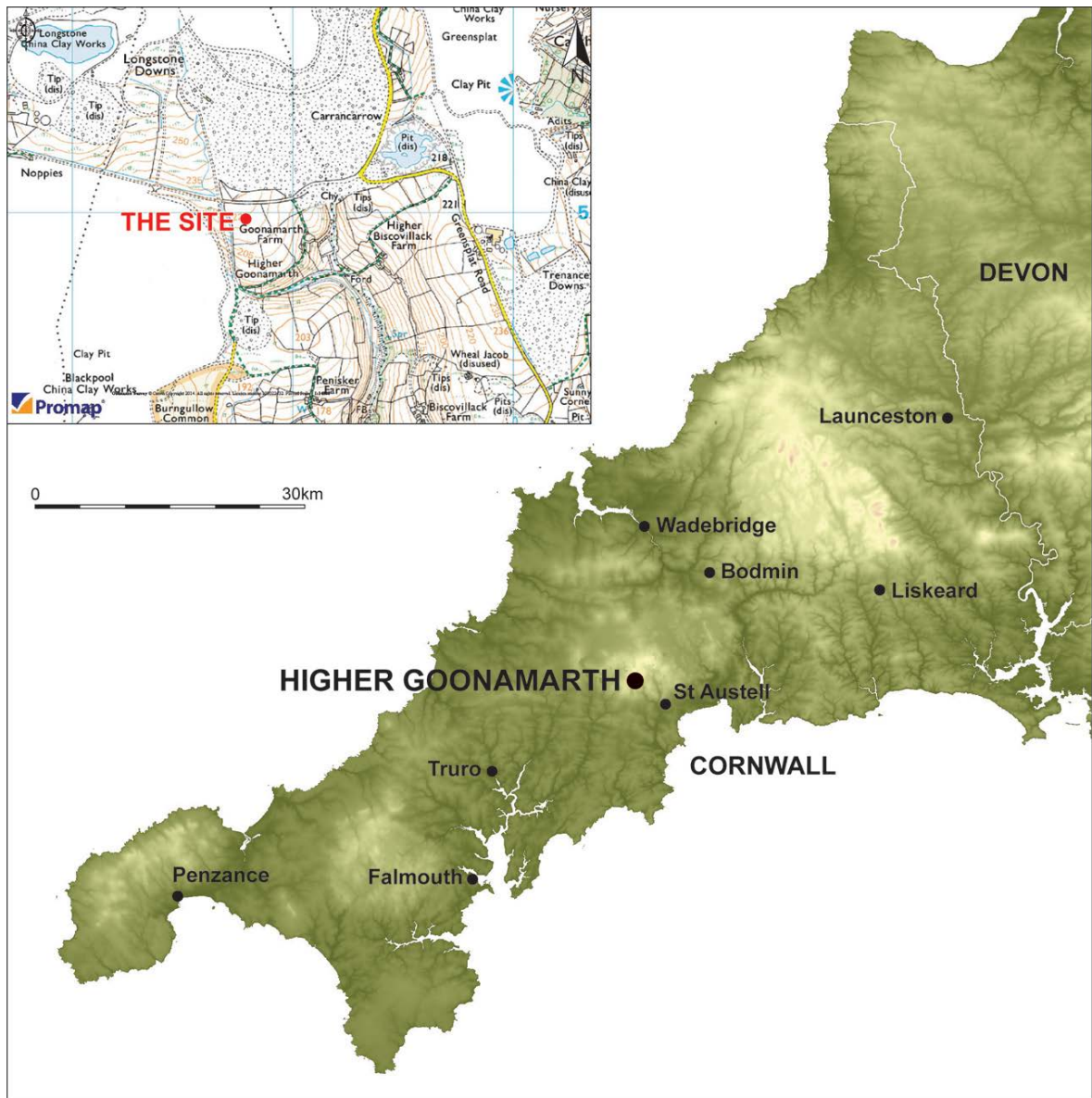


Figure 1: Site location (the approximate location of the proposed turbine is indicated).

## 1.5 Methodology

The gradiometer survey follows the guidance outlined in *Geophysical Survey in Archaeological Field Evaluation* (English Heritage, 2008) and *Standard and Guidance for Archaeological Geophysical Survey* (IfA, 2011, updated 2013).

*‘Archaeological geophysical survey uses non-intrusive and non-destructive techniques to determine the presence or absence of anomalies likely to be caused by archaeological features, structures or deposits, as far as reasonably possible, within a specified area or site on land, in the inter-tidal zone or underwater. Geophysical survey determines the presence of anomalies of archaeological potential through measurement of one or more physical properties of the subsurface.’* (Standard and Guidance for Archaeological Geophysical Survey, 2011).

The results of the survey will as far as possible inform on the presence or absence, character, extent and in some cases, apparent relative phasing of buried archaeology leading to the formulation of a strategy to mitigate a threat to the archaeological resource.

## 2.0 Gradiometer Survey

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### 2.1 Introduction

The purpose of this survey was to identify and record magnetic anomalies. While the anomalies may relate to archaeological deposits and structures, the dimensions of recorded anomalies may not directly correspond with any associated archaeological features. The following discussion attempts to clarify and characterise any identified anomalies. An area of 1.13ha surrounding the proposed turbine base and also encompassing the proposed access to the site was subject to the survey (see Figure 2). This area included two parts of a large field divided by a barbed wire fence. The survey took place on 8<sup>th</sup> January 2015 by SWARCH personnel in overcast conditions. The field was a meadow containing short grass. The land sloped gently to the south; it was relatively flat, although undulations, some possibly indicative of ridge and furrow and occasional stones were visible.

The survey identified one group of anomalies of probable archaeological origin that are not represented in the cartographic record. This group was comprised of c.13 parallel linear anomalies, most likely indicative of medieval ridge and furrow. The remaining anomalies were of modern origin and represent cable or service trenching; and amorphous geological variations indicative of the local igneous geology.

### 2.2 Methodology

The gradiometer survey follows the general guidance as outlined in: *Geophysical Survey in Archaeological Field Evaluation* (English Heritage, 2008) and *Standard and Guidance for Archaeological Geophysical Survey* (Institute for Archaeologists, 2011, updated 2013).

The survey was carried out using two twin-sensor fluxgate gradiometers (Bartington Grad601). These machines are sensitive to depths of up to 1.50m. The survey parameters were: sample intervals of 0.25m, traverse intervals of 1m, a zigzag traverse pattern, traverse orientation was circumstantial, grid squares of 30×30m. The gradiometer was adjusted ('zeroed') every 0.5-1ha. The survey grid was tied into the Ordnance Survey National Grid. The data was downloaded onto *Grad601 Version 3.16* and processed using *TerraSurveyor Version 3.0.25.0*. The primary data plots used in this analysis were *Shade*, *3D & Relief*, and *Metadata*. The details of the data processing are as follows:

Processes: West half of site (grids F13-15, E19-22) Clip +/- 3SD; DeStripe all traverses, median; DeStagger, offset out- and inbound by -2 intervals; Interpolate X and Y, double resolution.  
East half of site (grids F16-19, E23-26) Clip +/- 3SD; DeStripe all traverses, median; DeStagger, offset out- and inbound by up to -5 intervals; Interpolate X and Y, double resolution.

Details: West half of site (grids F13-15, E19-22) 0.52ha surveyed; Max. 115.42nT, Min. -100.82nT; Standard Deviation 3.47nT, mean 0.05nT, median 0nT.  
East half of site (grids F16-19, E23-26) 0.61ha surveyed; Max. 99.51nT, Min. -100.49nT; Standard Deviation 5.59nT, mean -0.03nT, median 0nT.

### 2.3 Results

Figures 2 and 3 with the accompanying Table 1 show the analyses and interpretation of the geophysical survey data. Additional graphic images of the survey data can be seen in Figure 4.



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Anomaly group	Class and Certainty	Form	Archaeological characterisation	Comments
1	Alternate positive and negative, probable	Linear	Ridge and Furrow	Medieval ploughing practices formed relatively wide ridges divided by furrows (troughs). One of these ridges seemed partially visible on the ground in the north of the site.

Table 1: Interpretation of Gradiometer Survey data.



Figure 2: Shade plot of gradiometer survey results (the survey grid is shown in red).

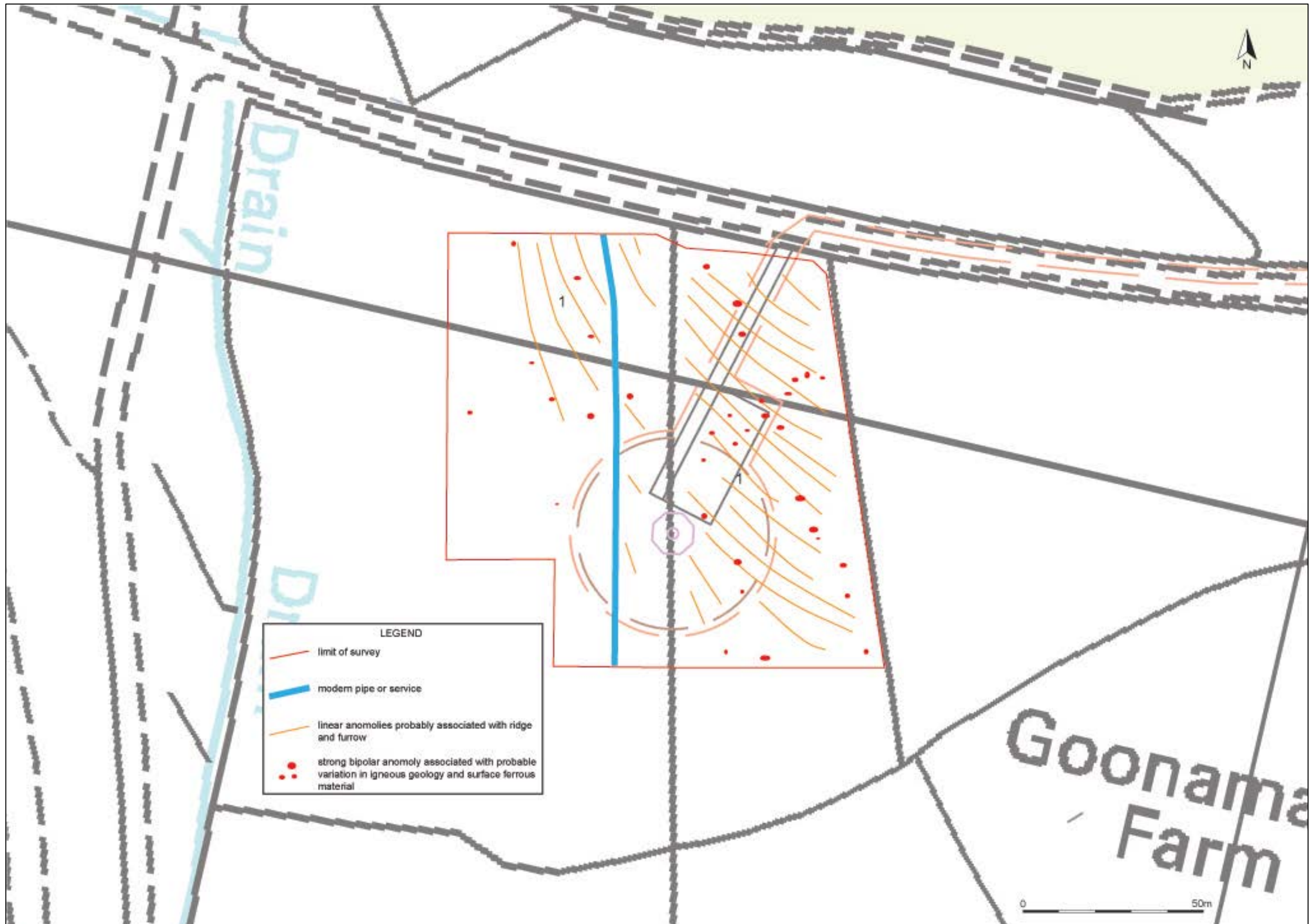


Figure 3: Interpretation of gradiometer survey data.

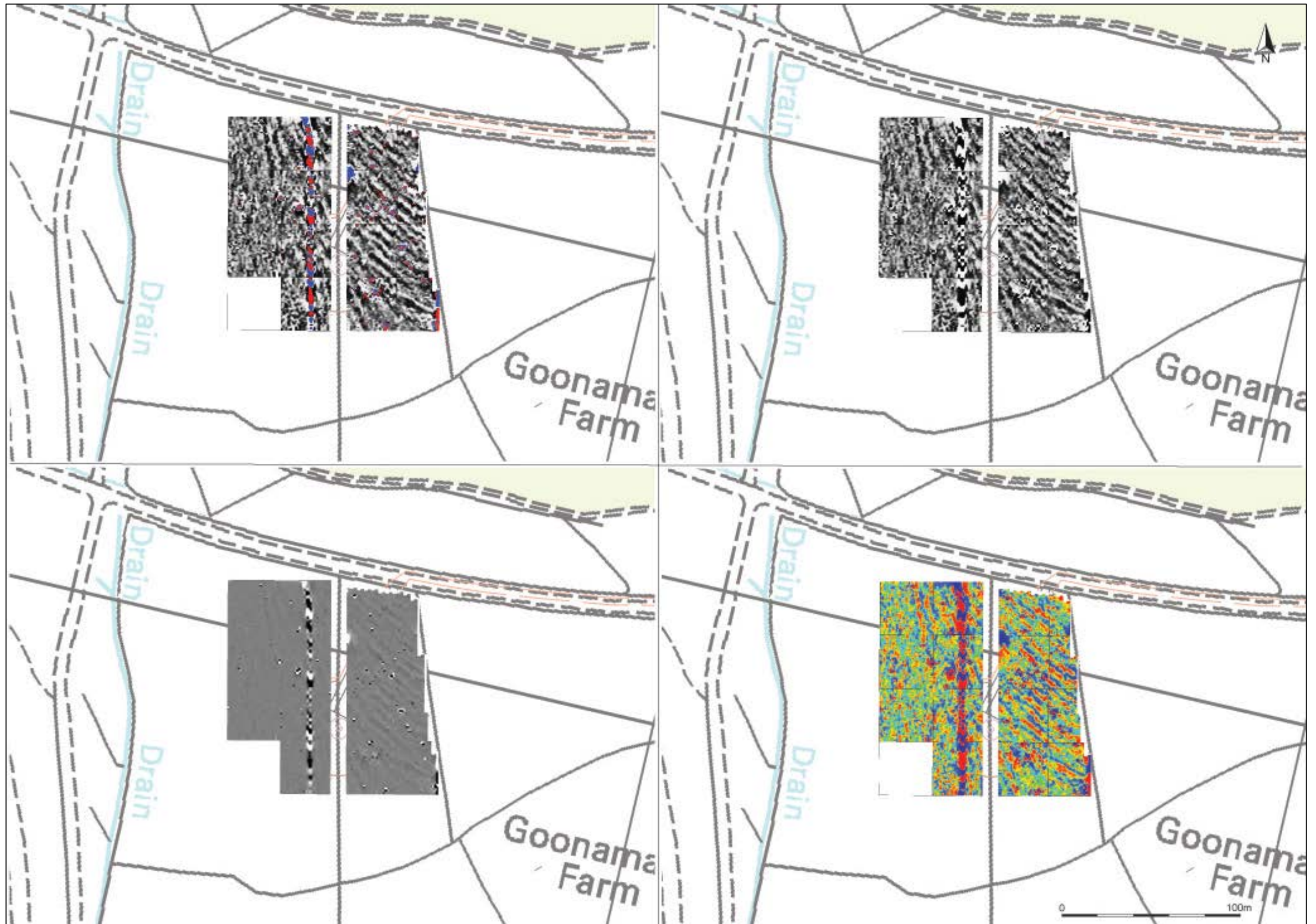


Figure 4: Various shade plots of gradiometer survey data, all with graduated shading. Top left; band weight equalised, blue-greyscale-red. Top right; band weight equalized. Bottom left: shade plot. Bottom right; band weight equalized, red-blue-green 2.

## 3.0 Discussion and Conclusion

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### 3.1 Gradiometer Survey

Anomaly Group 1 probably equates to a series of ridge and furrow linear anomalies. A pattern formed by medieval ploughing practices.

The survey also identified a linear bipolar anomaly representative of a modern trench containing a metallic pipe or cable and frequent amorphous anomalies indicative of the underlying igneous geology.

No historical features were shown within the survey area in the cartographic record and this is supported by the geophysical survey.

### 3.2 Conclusion

The geophysical survey suggests there was a period of ploughing on the site in the medieval period, probably from c.1347, the physical remnants of which survive as a sub surface geophysical anomaly. The longevity of the site as 'croft' and 'furze' and now meadow in an area dedicated to china clay industrial processes may have preserved this ridge and furrow pattern, protecting it from truncation by modern ploughing and despoiling with china clay waste.

Any development is unlikely to disturb any significant archaeological deposits or remains.

## 4.0 Bibliography & References

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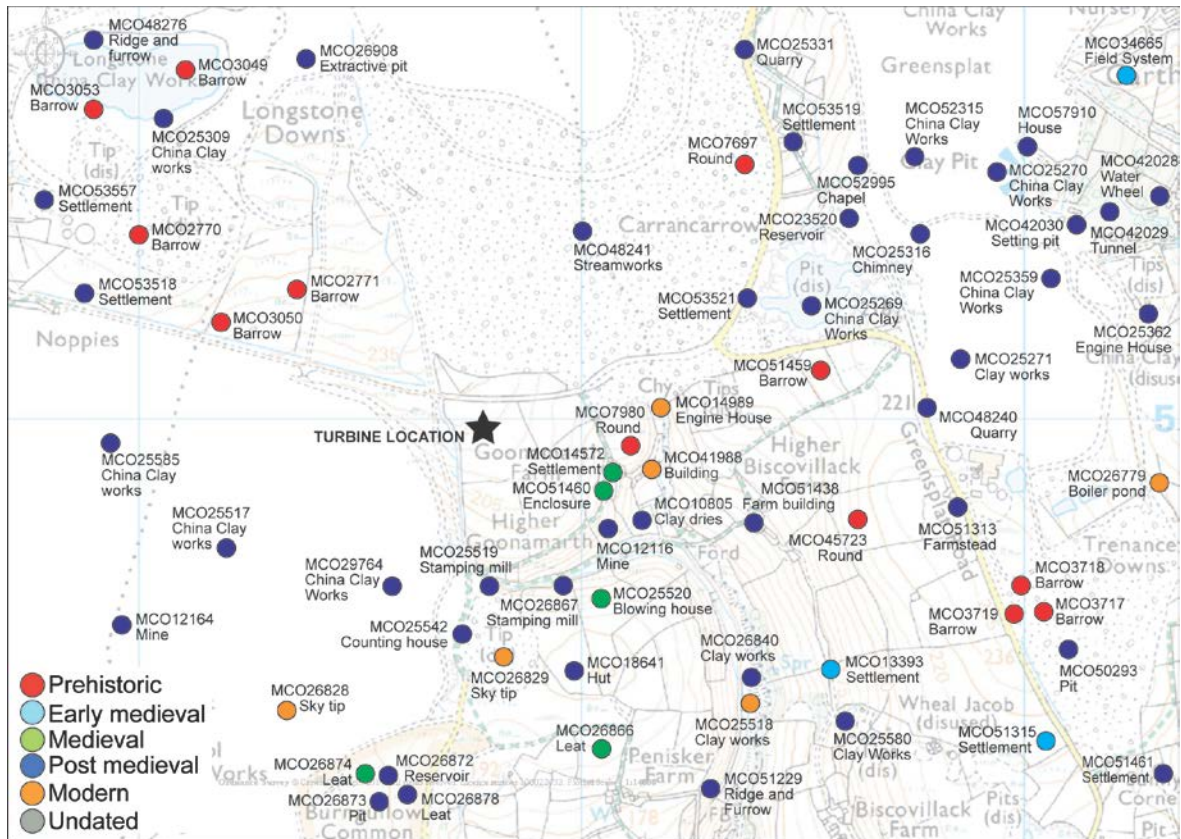
<http://www.heritagegateway.org.uk/Gateway/Results.aspx>

### Unpublished Sources:

**Morris, B.W. & Wapshott, E.** 2014: *Land at Higher Goonamarth, St. Mewan, Cornwall: results of a desk-based assessment, walkover survey and historic visual impact assessment*. SWARCH report 141225.

**Cole, R.** 2004: *Goonamarth and Higher Biscovillack, Cornwall: archaeological assessment*. CAU report 2004R058.

Appendix 1  
Local Historic Environment Record Entries



Nearby HER entries (source CCHES).

Mon. ID	Site Name	Record	Notes
MCO14572	Goonamarth – medieval settlement	Documentary	Settlement first recorded 1347
MCO51460	Goonamarth – medieval enclosure, post-medieval farmstead	Extant structure	Goonamarth farmstead, farmhouse, buildings and medieval enclosure
MCO7980	Goonamarth – Iron Age Round, Romano-British Round	Documentary	Field-name <i>Round Park</i> suggests a round but there are no remains
MCO41988	Goonamarth – modern building	Extant structure	Small granite-and-brick building under a slate roof
MCO41989	Goonamarth – modern engine house	Extant structure	An engine house and driving chimney stack
MCO10805	Goonamarth – post-medieval china clay dries	Demolished structure	A C19 pan kiln, converted into industrial housing by 1907
MCO12116	Goonamarth – post-medieval mine	Demolished structure	Mine working recorded at Goonamarth on the tithe map but no extant remains
MCO51459	Higher Biscovillack – Bronze Age barrow	Extant structure	Four circular features visible on APs NE of Higher Biscovillack, possibly a barrow group
MCO45723	Higher Biscovillack Farm – Iron Age enclosure, Romano-British enclosure	Cropmark	Sub-circular enclosure visible on APs
MCO51458	Higher Biscovillack – post-medieval agricultural building	Extant structure	Higher Biscovillack shown on the 1840 tithe map
MCO48240	Carancarrow – post-medieval quarry	Extant structure	A quarry is visible on aerial photographs
MCO51313	Higher Biscovillack Farm – post-medieval farmstead	Extant structure	Shown on the tithe map
MCO25271	South Greensplat – post-medieval china clay works	Extant structure	South Greensplat China Clay Works shown at this location on the 1881 OS map
MCO13393	Biscovillack – early medieval settlement	Documentary	Settlement first recorded 1169 as <i>Botschelvec</i>
MCO25580	Wheal Jacob – post-medieval china clay works	Extant structure	Wheal Jacob China Clay Works in operation by 1858 and shown on the 1881 OS map
MCO3718	Trenance downs – Bronze Age barrow	Demolished	The site of a barrow recorded by Thomas and

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		structure	excavated in 1973 prior to covering by spoil
MCO3719	Trenance Downs – Bronze Age Barrow	Demolished structure	A possible barrow was recorded here in the C19 although the location is uncertain and no remains are visible
MCO3717	Trenance Downs – Bronze Age Barrow	Demolished structure	The site of a barrow excavated in 1973 prior to destruction by spoil heaps
MO50293	Trenance Downs – post-medieval prospecting pit	Extant structure	The remains of prospecting pits visible on APs
MCO51315	Biscovellet – early medieval enclosure	Extant structure	Oval feature visible on APs is also visible on the ground, possibly an enclosure
MCO12996	Wheal Jacob – post-medieval mine	Extant structure	Wheal Jacob is recorded at this location on the 1881 OS maps as ‘Tin Disused’
MCO51461	Sunny Corner – post-medieval farmstead	Extant structure	Sunny Corner is shown on the 1881 OS map and as is still occupied
MCO22520	Goonamarth - medieval blowing house	Demolished structure	A blowing house recorded in 1540 no longer survives and the site is heavily overgrown
MCO26866	Penisker – medieval leat, post-medieval leat	Extant structure	A leat at Penisker could be associated with the china clay works or it could be medieval and served a steam works
MCO26840	Gover Valley – post-medieval china clay works	Extant structure	China clay works at Gover Valley were surveyed at 1:2500 by CAU in 1990
MCO25518	South Halviggan – modern china clay works	Extant structure	South Halviggan China Clay Works was in operation by 1858 and closed in 1912; features shown on OS maps suggest some survive
MCO51299	Pensiker – post-medieval ridge and furrow	Crop mark	Traces of ridge and furrow are visible on APs
MCO18641	Goonamarth – post-medieval hut	Extant structure	In 1975 Sheppard reported the site of five huts; however, the huts could be tanners pits
MCO26829	Great Halviggan – modern sky tip	Extant structure	A sky tip at Great Halviggan
MCO26868	Higher Goonamarth – post-medieval stamping mill	Extant structure	The site of a stamping mill at Higher Goonamarth is shown as operational on the tithe map of 1840
MCO25519	Goonamarth – post-medieval stamping mill	Demolished structure	Field-name <i>Mill Meadow</i> is recorded on the tithe award which suggests the site of a stamping mill at Goonamarth
MCO25542	Higher Goonamarth – post-medieval counting house	Extant structure	A count house at Higher Goonamarth is reported extant in 1970 and partly demolished in 1980
MCO26828	Great Halviggan – modern sky tip	Extant structure	Two small sky tip dumps
MCO26874	Burngullow Common – medieval leat	Extant structure	A leat on Burngullow Common is visible, the function of the leat is uncertain but it may be associated with streamworks
MCO26872	Burngullow Common – post-medieval reservoir	Extant structure	A reservoir on Burngullow Common is recorded in 1990 but it is unclear what the reservoir was used for
MCO26878	Burngullow Common – post medieval leat	Extant structure	A leat on Burngullow Common is still visible
MCO26873	Burngullow Common – post medieval prospecting pit	Extant structure	Surface mining on Burngullow Common is represented by conjoined sub rectangular prospecting pits with heaps downhill
MCO29764	Great Halviggan – post medieval china clay works	Extant structure	Great Halviggan China Clay Works was established in 1817
MCO25517	Halviggan – post medieval china clay works	Demolished structure	Halviggan china clay works was established in 1817 the site appears to have been destroyed by expansion of the Blackpool China Clay works
MCO12164	Halviggan and Burngullow – post-medieval mine	Extant structure	Halviggan and Burngullow tin mine was in operation in 1822-1847
MCO25585	Noppies – post-medieval china clay works	Demolished structure	Noppies China Clay Works was recorded as due to close in 1942
MCO2771	Halviggan – Bronze Age barrow	Documentary	The site of a barrow recorded by Henderson
MCO3050	Longstone Downs – Bronze Age barrow	Documentary	The site of a barrow recorded by Henderson
MCO2770	Halviggan – Bronze Age barrow	Documentary	The site of a barrow marked on early OS maps and the tithe award
MCO53518	Noppies – post-medieval settlement	Extant structure	All that survives of Noppies settlement are low walls and heaps of rubble with large stones
MCO48241	Carrancarrow – post-medieval	Extant structure	The remains of tin streaming are visible on APs



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	streamworks		
MCO7697	Carancarrow – Iron Age Round, Romano-British Round	Documentary	The name Caven Nanskarou is suggested as the site of a round but there are no remains
MCO53519	Carrancarrow – post-medieval settlement	Extant structure	A settlement to the SE of Carrancarrow recorded at this location on the tithe map 1840 appears to be two cottages converted into one house and is still occupied
MCO32995	Greensplat – post-medieval nonconformist chapel	Demolished structure	Methodist chapel and adjoining Sunday school and trap house within boundary wall
MCO25315	Greensplat – post-medieval china clay works	Extant structure	Greensplat China Clay Works is still active
MCO23516	Greensplat – post-medieval chimney	Demolished structure	The engine house at Greensplat was demolished in 2002 and was the subject of a building survey
MCO53520	Carrancarrow – post-medieval reservoir	Extant structure	Two circular features visible on APs at Carrancarrow are two pits associated with china clay work, possibly reservoirs
MCO25269	Carrancarrow – post-medieval china clay works	Extant structure	Carrancarrow China Clay Works was established in 1819 and had extant remains in 1990
MCO53521	Carrancarrow – post-medieval settlement	Extant structure	the surviving remains of Carrancarrow settlement
MCO34665	Carthew – early medieval field system	Demolished structure	The area of land immediately between the road running through Carthew and Wheal Martyn China Clay works shows evidence for possible fossilized medieval strip fields
MCO57910	Carthew – post-medieval house	Demolished structure	An C18 or early C19 house and ornamental gardens are recorded on the OS 1810-1813 map of Cornwall
MCO25270	Wheal Martyn – post-medieval china clay works	Extant structure	Wheal Martyn china clay works opened in 1869 using steam power, pumps went into liquidation in 1880
MCO42030	Wheal Martyn – post-medieval setting pit	Extant structure	A set of mica drags and setting pits at Wheal Martyn
MCO25359	Gomm – post-medieval china clay works	Extant structure	The site of Gomm China Clay Works
MCO25362	Gomm – post-medieval engine house	Extant structure	An engine house which served the Gomm pit and housed a Cornish beam engine of the rotative type
MCO42029	Wheal Martyn – post-medieval tunnel	Extant structure	A flat rod tunnel at Wheal Martyn
MCO42028	Wheal Martyn – post-medieval water wheel	Extant structure	An 18 ft water wheel at Wheal Martyn
MCO26779	Lansalson – modern boiler pond	Extant structure	The remains of a small horizontal steam engine winder house of mass concrete construction
MCO48276	Longstone Downs – post-medieval ridge and furrow	Extant structure	Remains of earthwork ridge and furrow are visible on APs
MCO3053	Longstone Downs – Bronze Age barrow	Documentary	A barrow is marked on the 1881 OS map
MCO25309	Longstone – post-medieval china clay works	Extant structure	Longstone China Clay Works was to close in 1942 when owned by ECLP Co. Ltd.
MCO3049	Longstone Downs – Bronze Age barrow	Documentary	The site of a barrow recorded by Thomas in 1851
MCO26908	Longstone Downs – post-medieval extractive pit	Extant structure	Surface mining on Longstone downs was surveyed at 1:2500 by CAU in 1990
MCO53557	Longstone – post-medieval settlement	Extant structure	The settlement at Longstone is recorded on the 1881 OS map and is still occupied
MCO25331	Carrancarrow – post-medieval quarry	Extant structure	A quarry near Carrancarrow is shown at this location on the OS map of 1963

Local HER records (source: CCHES).



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