

**LAND AT CARLAND CROSS WIND FARM**  
**CARLAND CROSS**  
**ST NEWLYN EAST**  
**CORNWALL**

Results of a Geophysical Survey



South West Archaeology Ltd. report no. 210430



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LAND AT CARLAND CROSS WIND FARM, CARLAND CROSS,  
ST NEWLYN EAST, CORNWALL  
RESULTS OF A GEOPHYSICAL SURVEY

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By J. Bampton  
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Work undertaken by SWARCH for Cornwall Council

*SUMMARY*

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*This report presents the results of a geophysical survey carried out by South West Archaeology Ltd. (SWARCH) on land at Carland Cross Wind Farm, Carland Cross, Cornwall. The site is located to the north-west of the Carland Cross junction of the A30 and the A39, immediately north of a group of Bronze Age barrows (Scheduled Ancient Monument: 1017049, 1017050, 1016888). Phases of enclosure occurred across the site in the 19<sup>th</sup> and 20<sup>th</sup> centuries and a wind farm was built on the site in the 1990's and remodelled in the 2010's.*

*The geophysical survey identified five groups of anomalies including; three historical field boundaries that were established by the time of 1840's and 1880's mapping, and removed through the 19<sup>th</sup> and 20<sup>th</sup> centuries; a modern service pipe; two possible ditch-type anomalies and a possible field drain-type anomaly associated with redundant cables/trenches between decommissioned wind turbines; and possible ditches associated with an undated field system or 19<sup>th</sup>-21<sup>st</sup> century ploughing activity. Frequent parallel positive and negative linear anomalies associated with ploughing, and two areas of magnetic disturbance associated with wind turbines decommissioned in the 2010's were also evident in the survey data.*

*Given the prominence of prehistoric monuments in the vicinity of the site and limitations of any non-intrusive survey, some archaeological mitigation at the site seems prudent and is recommended. Perhaps evaluation trenching or some degree of monitoring and recording could provide efficacy of- and validate the results of the geophysical survey and aid to confirm the presence or absence of any archaeology resource on the site.*

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April 2021

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## ACKNOWLEDGEMENTS

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## PROJECT CREDITS

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## 1.0 INTRODUCTION

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<b>LOCATION:</b>	LAND AT CARLAND CROSS WIND FARM
<b>PARISH:</b>	ST NEWLYN EAST
<b>COUNTY:</b>	CORNWALL
<b>NGR:</b>	SW 84304 54278
<b>SWARCH REF.</b>	SNNC21
<b>OASIS REF.</b>	SOUTHWES1-432778

### 1.1 PROJECT BACKGROUND

South West Archaeology Ltd. (SWARCH) was commissioned by Cornwall Archaeology Unit (CAU) to undertake a geophysical survey on land at Carland Cross Wind Farm, Carland Cross, St Newlyn East, Cornwall. This work was undertaken in accordance with best practice and ClfA guidance.

### 1.2 TOPOGRAPHICAL AND GEOLOGICAL BACKGROUND

Carland Cross is at the junction of the A30 and the A39, c.1km south-west of Mitchell, 3km south-east of St Newlyn East and 9km north of Truro. It is on a hilly ridge line with numerous springs in the immediate area. The site is within c.350m north-west of the junction across two large fields that occupy a plateau and gentle-moderately steep west-south-west facing slope. The site was at a height of between c.130m-140m AOD.

The soils on the site are the slowly permeable seasonally waterlogged fine loamy soils of the Sportsmans Association in an area predominantly characterised as the well drained fine loamy and fine silty soils over rock of the Denbigh 1 Association (SSEW 1983), which overlie interbedded siltstone and mudstone of the Grampound Formation (BGS 2021).

### 1.3 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

Carland Cross is a historical cross-roads at the junction of the A30 and the A39 with a collection of modern buildings. It is in the Parish of St Newlyn East, the settlement of which was first recorded in 1311 (HER no. MCO15903), within the deanery and hundred of Pyder (Lysons 1814). It was likely in the area of the large Domesday Manor of Cargoll, slightly west of St Newlyn East, which had 50 households and was in the tenancy of the Canons of Bodmin (St Petroc) (Morris 1992). Mitchell, near to the site, was first recorded as *Meideshol* in 1239 (HER no. MCO15745). Carland Cross may be named for the adjacent historical Cowland Farm (Watts 2004). Having since been altered by the application of a more common local place-name element, 'car' from the Old English *carr* referring to 'rock'. However, it may be derived from a Cornish element 'corlan' referring to an 'enclosure/fold' (Thomas 1991).

Cornwall's Historic Landscape Characterisation (HLC) describes the site as within Post-medieval Enclosed Land (HCO13) – '*Land enclosed in the 17th, 18th and 19th centuries, usually from land that was previously Upland Rough Ground and often medieval commons. Generally in relatively high, exposed or poorly-drained parts of the county*'; although it is adjacent to Medieval Farmland (HCO4), Upland Rough Ground (HCO7) and Modern Enclosed Land (HCO11) and with some disused industrial areas associated with quarrying/mining in the area. Aspects of pre-medieval farmland exist away from the site, although near to the site 19<sup>th</sup> and 20<sup>th</sup> century enclosure and alterations of possibly previously upland rough ground has occurred.

Historical mapping from c.1810 depicts the area of the site as within a very large enclosure defined by tracks to its east and south and probably indicative of large open grazing or rough grazing. *Carland* is labelled on the adjacent surveyor's draft mapping for the Grampound area, as are

barrows along the ridge to the south of the site. The 1840 tithe map for *Newlyn* (St Newlyn East) depicts that the site would still have largely been across a single large area, although with some small straight sided enclosures at the north and south ends of the site. The site survey area may fall across plots 1567, 1568 and 1571. These plots and the adjacent plots of 1569 and 1570 were all listed in the tithe apportionment as part of *Ventonnarron Downs*, which belonged to *Christopher Henry Thomas Hawkins Esq.* and was occupied by a *William Searle*. These plots were named: *Warrens* (1567), *Little Garlings* (1568), *Three Little Downs* (1569), *Little Downs* (1570) and *Little Downs* (1571); and they were all listed as *Common*, with some fields in the wider landscape listed as under *arable* use. The description/name of ‘Downs’ may refer to aspects of the landscape: the hills the site is on, small hills/mounds on the site, or warrens etc. This could therefore be indicative of the sites topography in general or features in the surrounding landscape, or features on the site itself, including possible barrows, of which others are known and survive in the area (see below).

Ventonnarron Downs derives its name from the Old English *fenn* referring to ‘marsh/wet places’ and one of the many springs in the area. *Warrens* is indicative of both use and form of the site. The field name *Garlings* could be of interest if it refers to a historical context. It may be derived from a personal name, or Old English *gāra* with a similar Germanic/Norse root derivation that refers to triangular pieces of land and/or intersections of roads/boundaries (inferred from existing place name analysis present in Watts 2004). Relatively small enclosures at the edges of common grazing acted as holding areas for when livestock needed corralling. By the time of the first and second edition Ordnance Survey (OS) maps the site has been enclosed further and the boundary between the two fields of the site established and a boundary dividing the south field in-two in place. These maps also indicate the rough/scrubby nature of the still open and some enclosed land on and near the site, and show the impact of mining to the west of the site. Subsequent OS mapping shows the loss of the boundary dividing the south field in-two between 1963 and 1972; and the shift of the boundary dividing the north field to the west during the same period, as other boundaries towards the north end of the site and survey area were removed. Mapping established by 1994 depicts the Carland Cross Wind Farm, including; a mast and five wind turbines in the two fields composing the site. These features are not present on satellite imagery from 1985. The wind farms original turbines were removed and replaced with fewer, larger turbines between 2009 and 2017. Supporting cartographic sources for this section can be seen in Appendix 2.

Cornwall’s Historic Environment Record (HER) includes various entries near to the site: to the north and north-west the medieval settlement and mill at Lappa, first recorded in the 16<sup>th</sup> century (MCO15337, MCO26454), the post-medieval lead mine of East Wheel Rose (MCO12081), and a modern railway bridge and demolished railway station (MCO53900, MCO53899); to the north-east of the site a cropmark identified on aerial photography of an Iron Age ‘round’ and undated curvilinear cropmark at Nancemeer (MCO8269, MCO33566), a Medieval settlement recorded in 1394 at Goonwinnow (MCO14582), cropmarks of Medieval field boundaries at Trevilson (MCO33579), a field-name of ‘Chapel Close’ indicating a chapel near Nancemeer (MCO10080), and the mound of a probable post-medieval spoil heap near Trevilson (MCO33358); west of the site Mesolithic findspots/flint scatters including 774 pieces at South Cargoll and Cargoll Mine (MCO1351, MCO54509), the cropmark of an undated enclosure near Ennis (MCO32373), Extensions to East Wheal Rose forming mines at Wheal Constance and Cargoll exporting lead, silver and zinc (MCO12884, MCO11926), and the site of World War II bombing targets or decoys at Wheal Constance (MCO32368); east of the site a group of three barrows and a contiguous pair of barrows at Mitchell (MCO3120, MCO3121, MCO2122 – Scheduled Ancient Monument no.1017350 / DCO1036; and MCO3119, MCO2118 – SAM no.1017350 / DCO1036), and medieval strip field systems visible as cropmarks near Mitchell (MCO32268, MCO32245); and broadly south of the site, documentary evidence of an undated enclosure at Carland Down, although with no identified earthwork (MCO21486), post-medieval and later features including a milestone, boundary stone, prospection or military ordnance pits, mounds associated with an ‘old shaft’ on 1880’s mapping and the site of a demolished ROC post (MCO48972, MCO64209, MCO32376, MCO32401,

MCO42673), cropmarks or Medieval field systems at Trewaters (MCO32402), a possible medieval beacon at Warrens Barrow (MCO4043), documentary evidence of prehistoric hut circles at Carland Cross (MCO19213), groups of Scheduled barrows at Carland Cross (MCO2323, MCO2324, MCO2325, MCO2326, MCO2327, MCO2329, MCO2330, MCO2331, MCO2332 – SAM no.1017049, 1017050, 1016888 / DCO1030, DCO1031, DCO927); further south-east of the site is another concentration of Scheduled monuments, including five bowl barrows at Hendra and other barrows/features (SAM no. 1019020, 1019021, 1017394 / DCO1034, DCO1035, DCO1033).

A number of previous archaeological works have taken place across or near the site associated either with the development of the Carland Cross Wind Farm, adjacent stretches of the A30 and nearby barrows close to the A30. These include archaeological assessments, walkover survey, geophysical survey and watching briefs/evaluation near the site (ECO2190, ECO3911, ECO3918, ECO3919, ECO1398). The site and areas of the wind farm to the west were subject to a geophysical survey, watching brief and desk-based assessment (ECO1869, Thomas 1991, ECO4064, ECO4077, ECO4298, ECO3913). Work to the west of the site corroborated- and expanded on Mesolithic evidence listed on the HER with findspots and included test pits that identified survival of clear distinct plough-scars (ECO1398). The previous desk-based assessment for the Carland Cross wind farm incorporated the site (ECO1869, Thomas 1991).

#### 1.4 METHODOLOGY

This work was undertaken in accordance with current best practice and CIfA guidance. Any desk-based assessment aspect of this report follows the guidance as outlined in: *Standard and Guidance for Archaeological Desk-Based Assessment* (CIfA 2014a) and *Understanding Place: historic area assessments in a planning and development context* (English Heritage 2012). The geophysical (gradiometer) survey follows the general guidance as outlined in: *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider* (Europae Archaeologiae Consilium/European Archaeological Council 2016) and *Standard and Guidance for Archaeological Geophysical Survey* (CIfA 2014b).

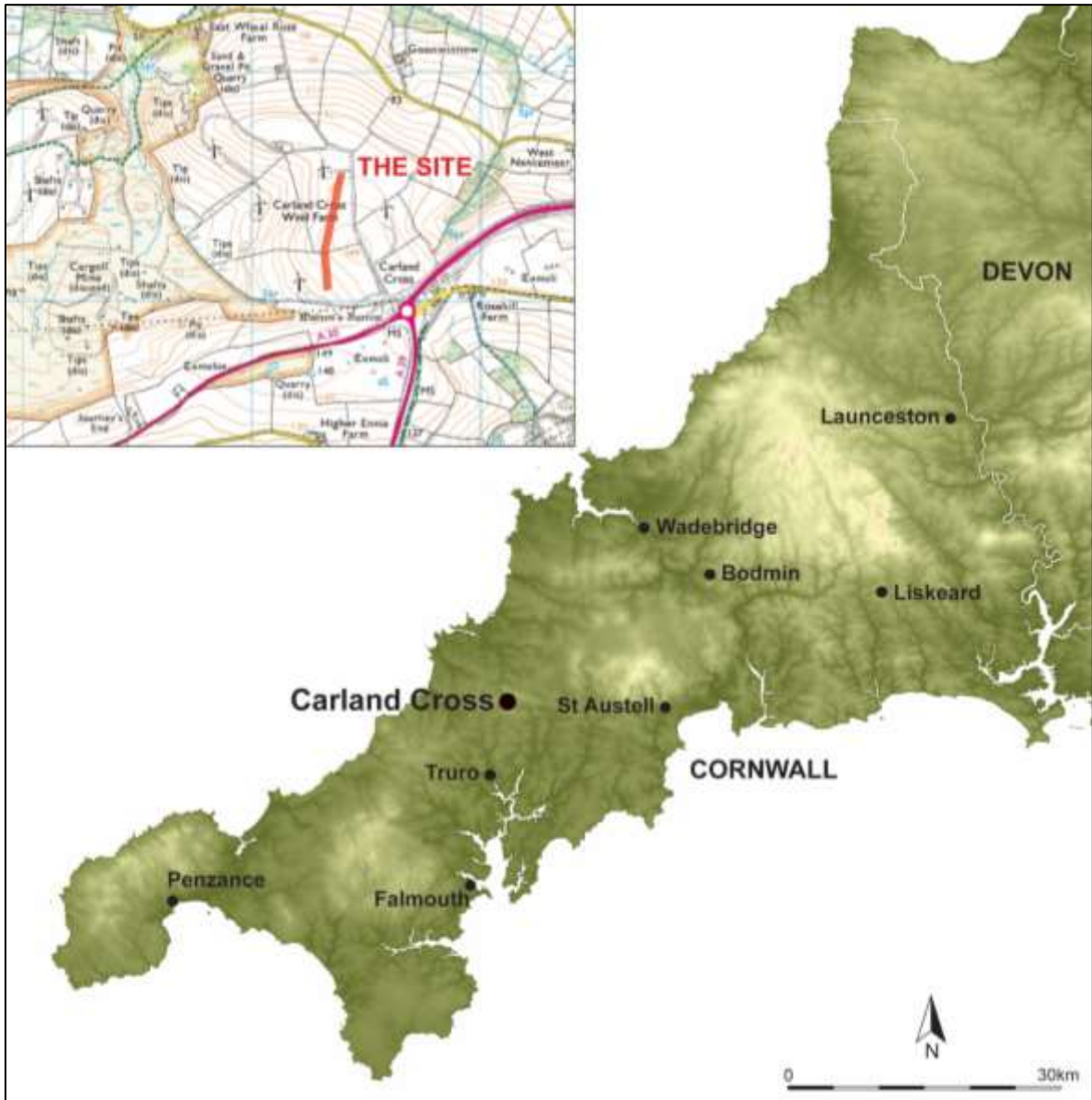


FIGURE 1: SITE LOCATION (THE SITE IS INDICATED).



## 2.0 GEOPHYSICAL SURVEY

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### 2.1 INTRODUCTION

An area of c.1.5ha was the subject of a magnetometry (gradiometer) survey. The purpose of this survey was to identify and record magnetic anomalies within the proposed site. While identified anomalies may relate to archaeological deposits and structures the dimensions of recorded anomalies may not correspond directly with any associated features. The following discussion attempts to clarify and characterise the identified anomalies. The survey was undertaken on the 15<sup>th</sup> of April 2021 by J. Bampton; the survey data was processed by J. Bampton.

### 2.2 SITE INSPECTION

The site was located within two relatively large fields (north and south) with straight sided Cornish hedgebanks lined with post and wire fences. These fields were divided by a Cornish hedgebank; the north field had trackways along its north and east sides; and the south field had trackways along its east and south sides. The north field had been recently ploughed, tilled and seeded. It had a large wind turbine at the north end of the area to be surveyed and contained a known water main. Its south-east corner was its highest point and it had a relative plateau at its top which sloped down to the west-south-west; gently at first and becoming steeper. Its soil was ostensibly compact and contained a frequent amount of stone, presumably ploughed-up from the underlying bedrock/natural. Indicating a probable degree of truncation across the north field of the site. Very few, if any, finds were noted on the surface during the survey. The south field was under a relatively long grass/silage, between ankle and knee length. At the south end of the survey area was a fenced-off portion of the field and to the south-west of the survey area a large wind turbine. This field sloped moderately to relatively steeply to the south-west. The soil was ostensibly compact. There were no apparent earthworks visible on the site during the geophysical survey. The centre line of the proposed service trench/pipe had been marked along the site with flags on thin metal pegs. These will have probably left a noticeable response within the survey data. Supporting photographs for the site inspection can be seen in Appendix 3.

### 2.3 METHODOLOGY

The gradiometer survey follows the general guidance as outlined in: *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider* (Europae Archaeologiae Consilium/European Archaeological Council 2016) and *Standard and Guidance for Archaeological Geophysical Survey* (CIfA 2014b).

The survey was carried out using a twin-sensor fluxgate gradiometer (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- and set out using a Leica CS15 GNSS Rover GPS. The data was downloaded onto *Grad601 Version 3.16* and processed using *TerraSurveyor Version*

3.0.36.0. The primary data plots and analytical tools used in this analysis were *Shade* and *Metadata*. The details of the data processing are as follows:

Processes:

*DeStripe* all traverses, median; used to equalise underlying differences between grids (potentially caused by instrument drift or orientation, directional effects inherent in magnetic instrument, or differences in instrument set up during survey e.g. using two gradiometers).

*DeStagger* all traverses out- and inbound by 0.75m; reduces staggering effects within data derived from zig-zag collection method.

*Clip* +/- 1SD; removes extreme data point values.

Details:

1.5284ha surveyed

Stats threshold post processing; Max. 115.37nT, Min. -103.66nT; Standard Deviation 8.37nT, mean 0.16nT, median 0.00nT.

Stats threshold processed data clipped to 1SD; Max. 8.52nT, Min. -8.21nT; Standard Deviation 3.45nT, mean 0.10nT, median 0.00nT.

## 2.4 RESULTS

Table 1 with the accompanying Figures 2 and 3 show the analyses and interpretation of the geophysical survey data. Additional graphic images of the survey data and numbered grid locations can be found in Appendix 1.

LAND AT CARLAND CROSS WIND FARM, CARLAND CROSS, ST NEWLYN EAST, CORNWALL: GEOPHYSICAL SURVEY RESULTS

Anomaly Group	Class and Certainty	Form	Archaeological Characterisation	Comments
1	Very weak-moderate positive and negative, probable	Linear	Historical boundaries	Anomalies that ostensibly equate to historical boundaries. At the north end of the site this response is indicative of a ditch with a kink represented on mapping between 1840 and 1963. At the southern end of the site a response is indicative of a ditch represented on 1840 mapping. The approximately NW-SE aligned response in the south field is indicative of a possible double ditched and banked boundary (a probable Cornish hedgebank) that is represented on mapping between 1888 and 1963. Response of most northerly example c.+2nT; of the approximate NW-SE example in the south field, between +10nT to +30nT and -7nT to -17nT; and the southernmost example aligned approximately east-west, +8nT to +22nT (generally c.+14nT).
2	Very strong dipolar, probable	Linear	Modern service (water main)	Indicative of an extant modern service (water main) associated with the proposed works. Response of <+/-100nT
3	Weak-moderate positive, probable	Linear	Ditches or former service trenches associated with removed turbines	Three anomalies represent two linear features and may typically be indicative of ditches; however, these examples run in straight lines between former wind turbine locations and on a distinct alignment from either historical field boundaries or ploughing activity evident in the data. These probably represent former service trenches between removed turbines. Cable or pipe may have been removed during the decommissioning of former turbines, or still be present within these probable features. A small section/example of this group in the south-west corner of the north field may equate to a historical field boundary that would have crossed at approximately the same location. This boundary may be located slightly further to the west or have been partially truncated by works associated with the Carland Cross Wind Farm through the 1990's and later. The approximate north-south example responses of between 10nT and 20nT along its south half and c.+7nT along its north half; the approximate NW-SE example response of <+6nT.
4	Very weak negative, possible	Linear	Field drain or former service trench associated with removed turbines	Indicative of compact or stony material associated a lined field drain, service in-filled with stony natural/material or former track/route. This anomaly may be associated with Group 3 and represent a similar former wind turbine service trench. It is aligned with the location of a decommissioned wind turbine and may have been linked to services near the site boundary/track or a wind turbine once in the field to the east (a row of which once approximately mirrored those examples in the fields of the site). Responses of c.-2nT.
5	Very weak positive, possible	Linear	Ditches or ploughing activity	Indicative of cut and in-filled features such as ditches. Very weak and intermittent response and approximate alignment may equate to ploughing/agricultural activity or shallow ground disturbance. Proximity to- and directions of anomalies may be associated with Historical boundary (Group 1). Probable truncation of any buried archaeological resource may account for a weak response. This group is parallel to the two predominant and noticeable directions of ploughing across the site. Response of c.+5nT (between+1nT to +6nT).
<b>Other anomalies</b>				
-	Strong dipolar, probable	Point/ovoid	Ferrous objects/debris	Black crosses in Figure 3. The site has 22 dipolar responses that denote the proposed line of a new service trench/pipe, and a very small number of sporadic dipolar responses. These strongest examples are indicative of ferrous objects that are typically presumed to be modern, such as farm machinery fragments. The 22 examples on the line of proposed works are the result of metal pins/flags that had been put on the site. Similar and weaker responses can be indicative of geological features/anomalies. These are highly probable to be non-archaeological in nature. Responses of <+/-100nT.

Anomaly Group	Class and Certainty	Form	Archaeological Characterisation	Comments
-	Weak-moderate positive and negative	Linear	Ploughing activity	Densely packed parallel positive and negative linear anomalies. Visible in Figure 2 running predominantly parallel to the site boundaries and perpendicular to the slopes of the fields. In the south field this is evidently aligned approximately east-west, parallel to the field's north boundary. In the north field this is aligned predominantly NW-SE, parallel to the field's west boundary. In the north field there is also the ephemeral response of ploughing perpendicular to the west field boundary. At the north and south ends of the site the response variation was very slight and strengths low, <c.>+/-1nT; at the south end of the north field it was more varied but still weak, <c.>+/-9nT; at the north end of the south field this was more varied with a moderate strength <c.>+/-20nT. This variation across the site may be indicative of the relative depths of soil and ploughing. These depths may be associated with topography and agricultural activity.
-	Magnetic disturbance, probable	Spread of points	Magnetic disturbance	Typically these types of response are near the edges of sites and fields due to the magnetic disturbance from fence lines as well as areas of debris and farm equipment. In the north field of the site two areas of this type of response equate to the locations of decommissioned wind turbines erected and removed between 1991 and 2017. Responses of generally between +/-10nT and +/-40nT.

TABLE 1: INTERPRETATION OF GRADIOMETER SURVEY DATA.

## 2.5 DISCUSSION

The geophysical survey identified five groups of anomalies including three historical field boundaries (Group 1), a modern service pipe (Group 2), two possible ditch-type anomalies (Group 3) and a possible field drain-type anomaly (Group 4) associated with redundant cables/trenches between decommissioned wind turbines and possible ditches (Group 5) associated with an undated field system or modern agricultural activity (ploughing/historic field system). The presence of moderate-strong dipolar possible ferrous and geological anomalies, parallel positive and negative linear anomalies associated with ploughing, and areas of magnetic disturbance associated with former modern wind turbine locations are explained in Table 1.

The general 'noise' (inherent geological variation) of the site was relatively quiet at the north and south ends of the site,  $\approx \pm 1\text{nT}$ , this variation becoming gradually greater towards the middle of the survey area:  $\approx \pm 9\text{nT}$  at the south end of the north field and  $\approx \pm 20\text{nT}$  at the north end of the south field. Differential depths of soil and ploughing, including truncation/cutting of the underlying natural/bedrock probably accounts for most of this variation. The slopes and relative plateaus across the site and agricultural activity will account for some of this perceived differential depths of soil.

Based on historic mapping: the site was ostensibly historically open grazing, *common* on the 1840's tithe apportionment, that was subject to phases of enclosure through the 19<sup>th</sup> century and subsequently arable use through the later 19<sup>th</sup> century and later. Group 1 anomalies at either end of the site represent enclosures that are present c.1840. The southern most of these was removed by 1888. Other field boundaries at the site were imposed by c.1888 and parts of these and the c.1840's enclosures at the north end of the site were removed between 1963 and 1972, when the fields were slightly remodelled and some boundaries shifted. This phase of work included the removal of the probable Cornish hedgebank identifiable in the survey data in the south field.

All of the other anomalies are most likely associated with modern activity, including; service trenches (Groups 3 and 4) associated with wind turbines that were built in the 1990's and removed between 2009 and 2017, a modern water main (Group 2), and ploughing (Group 5). The Group 5 anomalies could be associated with ditches or ploughing parallel to- or equating to- the adjacent Group 1 historical boundary. It is possible that the Group 5 anomalies are coincidentally aligned with modern activity and features and associated with undated activity on the site; however the Group 5 anomaly response is weak and intermittent and may not survive to a substantial degree.

Although the site is devoid of probable significant archaeological features or deposits, the presence in the wider landscape of prehistoric monuments and findspots mean that there is still potential for archaeological finds or deposits on the site. These may not be present in the geophysical record due to having been fully truncated or being represented by small discrete features, such as postholes. During the survey the site had evidently been worked, and given the probable shallow nature of any topsoil on the site any buried archaeological resource may have been truncated to a varying degree.

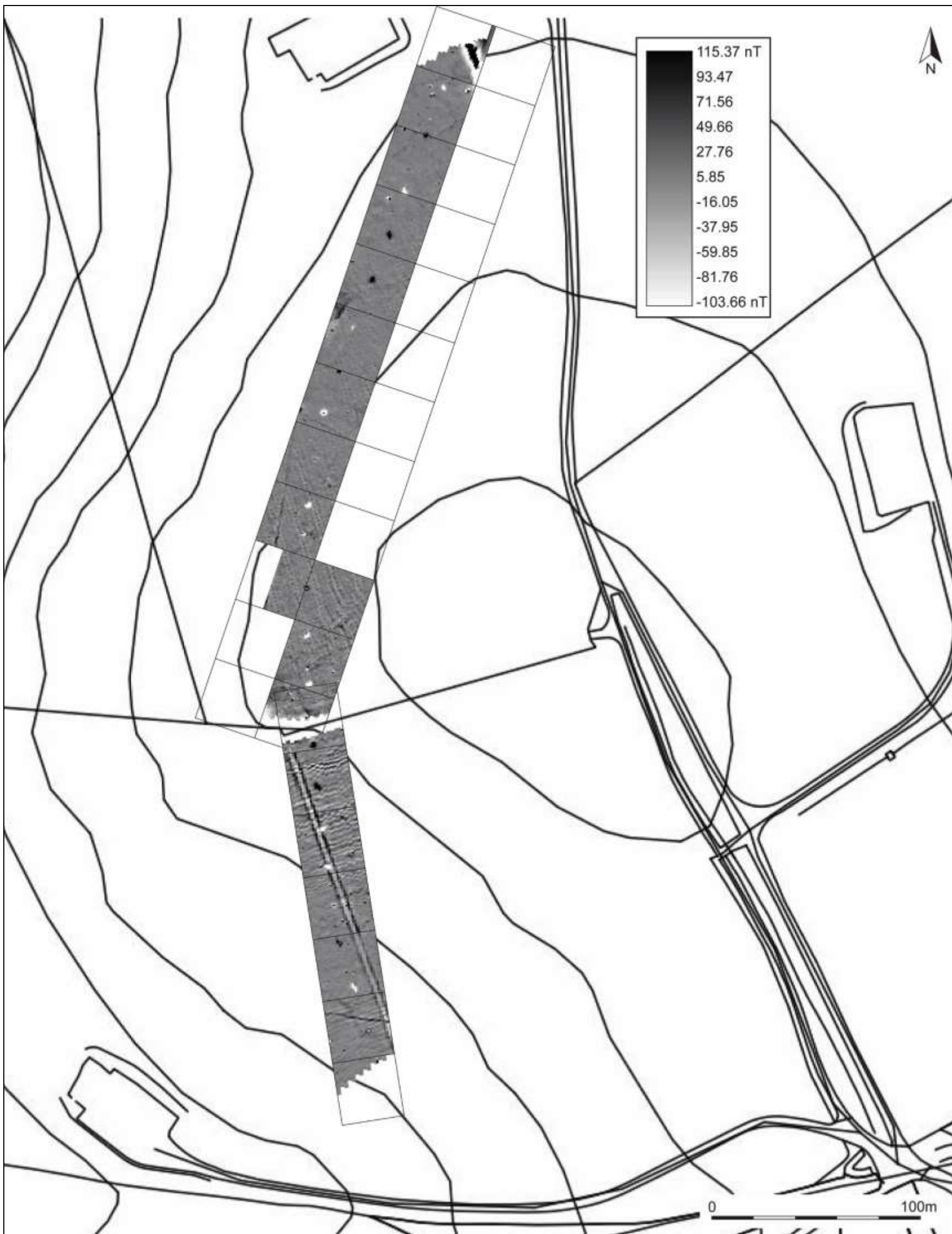


FIGURE 2: SHADE PLOT OF GRADIOMETER SURVEY DATA; MINIMAL PROCESSING.

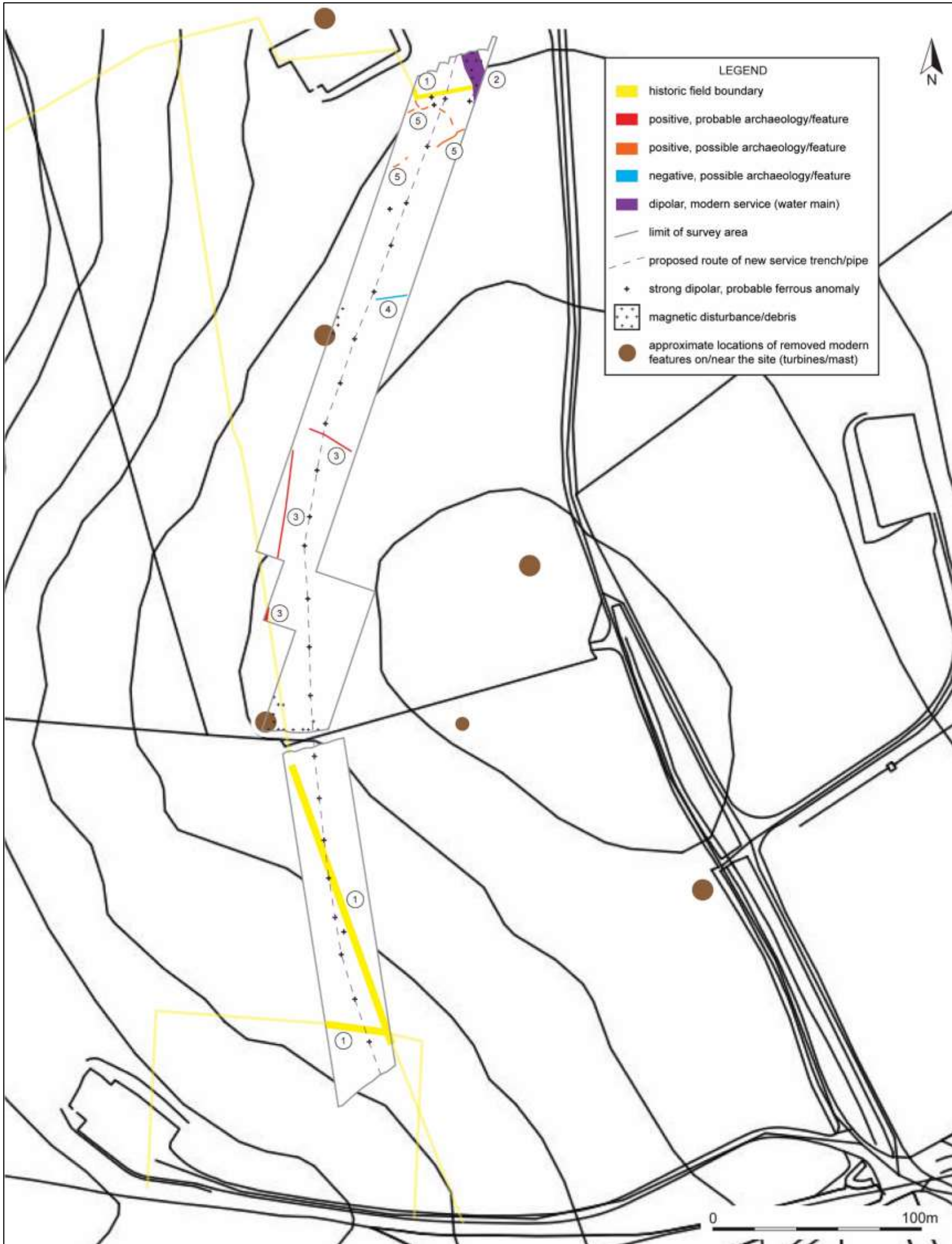


FIGURE 3: INTERPRETATION OF GRADIOMETER SURVEY DATA.

### 3.0 CONCLUSION

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The site is located to the north-west of the Carland Cross junction of the A30 and A39, at the Carland Cross Wind Farm. It is on historically open upland, although in a wider landscape of medieval farmsteads and prehistoric activity, including Bronze Age Barrows very near the site and Mesolithic findspots to the west. The land around the site was enclosed in the 19<sup>th</sup> century. This enclosure was altered in the 20<sup>th</sup> century and a Wind Farm was built across the fields of the site in the early 1990's. The original wind turbines were removed in the 2010's and the newer, extant, turbines erected. Archaeological works across the site, associated with the 1990's wind farm, included desk-based assessment and ostensibly geophysical survey and field work. Although the Cornwall HER does not record finds or features associated with these phases of work on the site directly/within the limits of this survey.

The geophysical survey identified five groups of anomalies including; three historical field boundaries that were established by the time of 1840's and 1880's mapping, and removed through the 19<sup>th</sup> and 20<sup>th</sup> centuries; a modern service pipe; two possible ditch-type anomalies and a possible field drain-type anomaly associated with redundant cables/trenches between decommissioned wind turbines; and possible ditches associated with an undated field system or 19<sup>th</sup>-21<sup>st</sup> century ploughing activity. Frequent parallel positive and negative linear anomalies associated with ploughing, and two areas of magnetic disturbance associated with wind turbines decommissioned in the 2010's were also evident in the survey data. Any potential buried archaeological resource on the site will have been truncated to some degree by agricultural activity.

Given the prominence of prehistoric monuments in the vicinity of the site and limitations of any non-intrusive survey, some archaeological mitigation at the site seems prudent. Perhaps evaluation trenching or some degree of monitoring and recording could validate the results of the geophysical survey and aid to confirm the presence or absence of any archaeology resource on the site.



## 4.0 BIBLIOGRAPHY & REFERENCES

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### *Published Sources:*

- Chartered Institute of Field Archaeologists** 2014a (revised 2017): *Standard and Guidance for Historic Environment Desk-based Assessment*.
- Chartered Institute for Archaeologists** 2014b (revised 2017): *Standard and Guidance for Archaeological Geophysical Survey*.
- DW Consulting** 2016: *TerraSurveyor User Manual*.
- Europae Archaeologiae Consilium** 2016: *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider, EAC guidelines 2*.
- English Heritage** 2008: *Geophysical Survey in Archaeological Field Evaluation*.
- Lysons, D. & Lysons, S.** 1814: *Magna Britannia, volume 3: Cornwall*. London.
- Morris, J.** 1992: *Domesday Book*. Phillimore.
- Schmidt, A.** 2002: *Geophysical Data in Archaeology: A Guide to Good Practice*. ADS series of Guides to Good Practice. Oxbow Books, Oxford.
- Soil Survey of England and Wales** 1983: *Legend for the 1:250,000 Soil Map of England and Wales (a brief explanation of the constituent soil associations)*.
- Watts, V.** 2004: *The Cambridge Dictionary of English Place-Names*. Cambridge University Press, Cambridge.

### *Unpublished Sources:*

- Thomas, N.** 1991: *Report to Renewable Energy Systems Ltd; An Archaeological Evaluation of the Carland Cross Area*. CAU Report No. 1991R002.

### *Websites:*

- British Geological Survey** 2021: *Geology of Britain Viewer*.  
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
- Cornwall Council Historic Environment Record (HER) and HLC** 2021: *Cornwall Council Interactive Map*  
<https://map.cornwall.gov.uk/website/ccmap/> and <http://www.heritagegateway.org.uk>

### *Cornwall Record Office (CRO)*

- Surveyors draft map for the St Columb Major area, c.1810
- Newlyn Tithe Apportionment, c.1840
- Newlyn Tithe Map, c.1840
- Ordnance Survey 1<sup>st</sup> edition, 6 inch map, Sheet: Cornwall XLIX.NW, surveyed 1879, published 1888
- Ordnance Survey 2<sup>nd</sup> edition, 6 inch map, Sheet: Cornwall XLIX.NW, surveyed 1906, published 1908

APPENDIX 1: ADDITIONAL GRAPHICAL IMAGES OF THE GRADIOMETER SURVEY



FIGURE 4: GEOPHYSICAL SURVEY GRID LOCATION AND NUMBERING.



FIGURE 5: RED-GREY-BLUE SHADE PLOT OF GRADIOMETER SURVEY DATA; GRADIATED SHADING; CLIPPED BY 1SD (STANDARD DEVIATION).



FIGURE 6: RED-GREY-BLUE SHADE PLOT OF GRADIOMETER SURVEY DATA; BAND WEIGHT EQUALISED; GRADIATED SHADING.



FIGURE 7: RED-BLUE-GREEN(2) SHADE PLOT OF GRADIOMETER SURVEY DATA; GRADIATED SHADING.

APPENDIX 2: SUPPORTING SOURCES



FIGURE 8: EXTRACT FROM THE SURVEYOR'S DRAFT MAP, c. 1810; THE APPROXIMATE LOCATION OF THE SITE IS INDICATED (CRO).

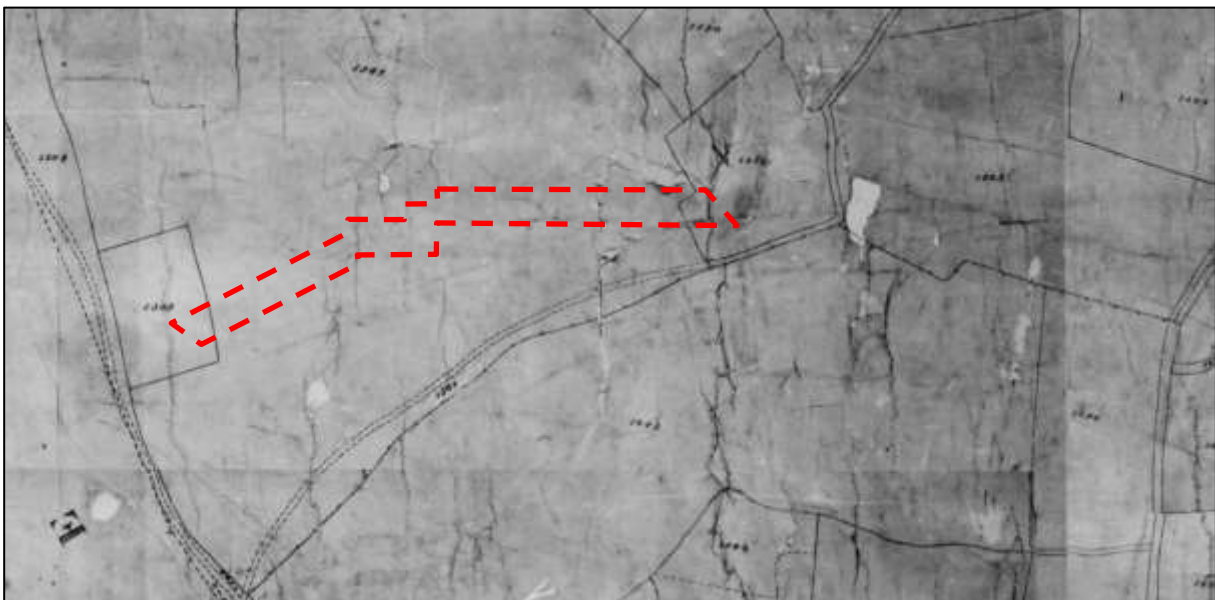


FIGURE 9: EXTRACT FROM THE NEWLYN TITHE MAP, 1840; THE APPROXIMATE LOCATION OF THE SITE IS OUTLINED IN RED (CRO).

LAND AT CARLAND CROSS WIND FARM, CARLAND CROSS, ST NEWLYN EAST, CORNWALL



FIGURE 10: EXTRACT FROM THE ORDNANCE SURVEY 1<sup>ST</sup> EDITION, 6 INCH SERIES, PUBLISHED 1888; THE APPROXIMATE LOCATION OF THE SITE IS OUTLINED IN RED (CRO).

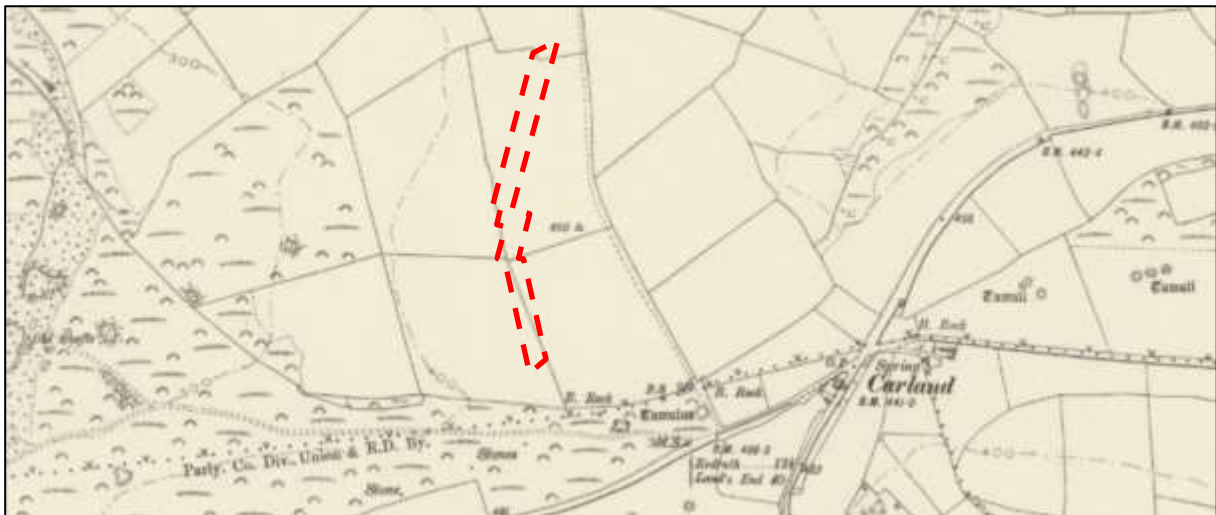


FIGURE 11: EXTRACT FROM THE ORDNANCE SURVEY 2<sup>ND</sup> EDITION, 6 INCH SERIES, PUBLISHED 1908; THE APPROXIMATE LOCATION OF THE SITE IS OUTLINED IN RED (CRO).

APPENDIX 3: SUPPORTING PHOTOGRAPHS



1. View of the south field of the site; viewed from the north-east (no scale).



2. View of the south end of the sites north field; viewed from the south-east (no scale).



3. View of the north field of the site; viewed from the south (no scale).





4. The south-east corner of the sites north field; viewed from the south-west (no scale).



5. View of the north-east corner of the south field; viewed from the north-west (no scale).



6. View of the east side of the sites south field; viewed from the north (no scale).



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