

**SPAN FARM, WROXALL
VENTNOR, ISLE OF WIGHT**

Detailed Gradiometer Survey and Archaeological Walkover Report

Prepared for:
Mr Robert Corry

Span Farm
Rew Lane
Wroxall
Ventnor
Isle of Wight
PO38 3AU

By:
Wessex Archaeology

Portway House
Old Sarum Park
Salisbury
SP4 6EB

Ref: 70800.01

December 2008

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Summary

Wessex Archaeology was commissioned by Mr Robert Corry to conduct a geophysical survey and archaeological walkover on land at Stenbury Down, Span Farm, Wroxall, Isle of Wight, ahead of the proposed construction of a wind turbine and associated services and approximately centred on NGR 453901 079104.

The geophysical and archaeological walkover surveys were carried out over approximately 2.4ha. The geophysical survey identified that the Site was magnetically quiet with several anomalies of archaeological interest identified. Further anomalies identified within the dataset included a series of weak magnetic trends that may indicate former boundaries or drains, numerous strong ferrous responses likely to be modern in origin and also a pair of modern services linked to the high voltage transformer and radio station at the north of the Site. The walkover survey did not identify any features of certain archaeological origin.

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Acknowledgements

The detailed gradiometer survey was commissioned by Mr Robert Corry. The assistance and hospitality of Mr and Mrs Corry is gratefully acknowledged.

The fieldwork was directed by Nathan Thomas, and assisted by Daryl Freer. Nathan Thomas processed and interpreted the geophysical data and wrote this report. Illustrations were prepared by Linda Coleman. The project was managed and quality-controlled on behalf of Wessex Archaeology by Sue Farr.

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1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Mr Robert Corry to undertake a geophysical survey and archaeological walkover on land at Stenbury Down, Span Farm, (**Figure 1**), centred on NGR 453901 079104 (hereafter 'the Site'), prior to the proposed construction of a wind turbine and associated services.

1.1.2 The aim of the geophysical and walkover surveys was to establish the presence/absence, extent, character and date of detectable archaeological remains in view of the development proposal, and follows a rapid desk-based assessment of the development area recently carried out by Wessex Archaeology (WA 2008).

1.1.3 This report presents a brief description of the methodology followed, detailed survey results, and the archaeological interpretation of the geophysical data.

1.2 The Site

1.2.1 Stenbury Down is a prominent chalk ridge that rises to a height of 220m aOD, approximately 1.4 km to the south west of the village of Wroxall. The Site is delimited by a bridle path to the west, a golf course to the south, and Appuldurcombe wood and downland to the east and north.

1.2.2 The Site encompasses an area designated for the construction of the wind turbine and a cable route of approximately 600m that runs parallel with the existing bridle path and connects the wind turbine to a high voltage transformer. The current land use of this area is pasture, with the study area partitioned into three separate fields by wire stock fencing. At the southern end of the Site, an access track is also present.

1.2.3 A total area of approximately 2.4ha was covered by the detailed gradiometer survey (**Figure 1**). This included the area immediately surrounding the planned turbine location and a 30m corridor that followed the proposed cable route.

1.2.4 The soils underlying the Site are typical paleo-argillic brown earths (581d) of the Carstens series (SSEW 1983). These types of soils

have been shown to produce magnetic contrasts suitable for the detection of archaeological features through detailed survey utilising the Bartington Grad 601-2 gradiometer.

2 METHODOLOGY

2.1 Introduction

2.1.1 A geophysical specification was prepared by Wessex Archaeology to investigate the proposed study area. The methodology consisted of a detailed gradiometer survey using a Bartington Grad 601-2 dual gradiometer system. This survey was conducted in accordance with English Heritage Guidelines for Geophysical Surveys (2008).

2.1.2 In addition, an archaeological walkover was carried out during the course of the geophysical survey. This involved both field operatives observing and noting any prominent features, for example earthworks, that appeared incongruous within the development area and which may have an anthropogenic origin.

2.1.3 The geophysical and walkover surveys were conducted by Wessex Archaeology's in-house team on the 10th and 11th of December 2008.

2.1.4 Survey grids were established at 30m x 30m using a Leica 1200 RTK GPS system, which is able to provide locations in real-time, precise to within 2cm, and therefore exceed English Heritage recommendations.

2.1.5 The detailed gradiometer survey was conducted using a Bartington Grad 601-2 Gradiometer system over 30m x 30m grids with a sample interval of 0.25m along transects spaced 1m apart. Data were collected in the zigzag method along traverses running from north to south, along the route of the development.

2.1.6 Results from the geophysical survey were subject to limited processing. Processes applied to correct the data were;

- De-stripe/zero mean traverse (± 5 nT thresholds applied)
- De-stagger (to account for minor walking errors)

2.1.7 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.

3 RESULTS AND INTERPRETATION

3.1 Geophysical Survey

3.1.1 The geophysical survey identified that the Site was magnetically quiet, with a limited number of anomalies of archaeological interest highlighted. Results are presented as both greyscales and XY trace plots for the Site (**Figures 2** (north) and **3** (south)).

3.1.2 The interpretation of the datasets indicates the presence of possible archaeological anomalies, trends, numerous ferrous/burnt or fired

objects and the route of modern services. The interpretation is shown for the Site in **Figure 4** (north **a** and south **b**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.

- 3.1.3 Numerous ferrous anomalies are visible throughout the detailed survey dataset. These are presumed to be modern in provenance and are not referred to in the interpretation, unless considered relevant to the archaeological interpretation.

3.2 Detailed Survey Results and Interpretation

- 3.2.1 Anomalies **4001**, **4002**, and **4003** are irregular discrete responses varying in diameter from between 8 to 10m. The responses do not appear to form any coherent distribution, but do correspond to localised variations in the topography identified in the walkover survey. It is possible that these anomalies relate to in-filled features that may be of an anthropogenic origin, for example large pits or quarry scoops. However, a natural origin is equally, if not more, likely.
- 3.2.2 A number of other smaller discrete anomalies, which appear across the dataset, have also been identified as of a possible archaeological nature. These anomalies may also indicate the location of backfilled negative features, such as storage/waste pits. The lack of any regular patterning again weakens the argument for these anomalies being derived from past human activity.
- 3.2.3 At the southern end of the Site, anomalies **4004** and **4005** mark the location of a series of weak magnetic trends visible within the dataset. **4004** highlights a series of curvilinear trends that run closely parallel to the boundary of this field defined by the access road. Anomaly **4005** encompasses a series of magnetic trends that run on a west-east alignment in the area designated for the location of the wind turbine. It is possible that these trends relate to features such as former field boundaries, drains or ploughing systems. A natural origin, for example geological features or natural drainage channels, cannot be ruled out.
- 3.2.4 Further weak trends on various alignments have been highlighted across the Site, for example **4006** and **4012**. It is possible that these reflect further former field divisions or drainage systems. A number of curvilinear anomalies may be of archaeological interest although the lack of contrast with the magnetic background weakens such an interpretation.
- 3.2.5 Strong dipolar isolated ferrous anomalies appear throughout the dataset and it is probable that most of these anomalies are modern in origin and relate to ferrous material (iron/steel) derived from recent farming practices across the Site. However, as identified within the DBA (WA 2008), some of these responses may indicate debris derived from a crash involving two WWII Spitfire aircraft. Two large

responses **4007**, located near to the proposed location of the turbine and **4011**, situated east of the bridle path are particularly prominent.

- 3.2.6 Anomaly **4008** is a strong ferrous response attributable to a manhole cover visible on the surface.
- 3.2.7 Modern services are also visible within the data set. This includes curvilinear anomaly **4009** that appears to connect the radio station to the transformer located at the northern extent of the Site and also anomaly **4010** that appears at the north-eastern fringe of the dataset. This anomaly runs on a north-west to south-east alignment and again appears to terminate at the high-voltage transformer.
- 3.2.8 Wire stock fencing, which encloses the three fields that comprise the Site, is responsible for the strong magnetic response along the western extent of the dataset, and between the fields. The presence of a steel sheep pen between two of the fields, and a strong magnetic response close to the radio station at the northern end of the Site can also be seen in the dataset.

3.3 Walkover Survey

- 3.3.1 The walkover survey did not identify any features of certain archaeological origin.
- 3.3.2 At the northern extent of the Site, adjacent to the radio station, the aspect of the land is fairly level with no obvious earthworks present. Heading south along the route of the proposed cable route, the nature of the ground becomes more corrugated with a number of pronounced scoops and ridges. The irregular morphology and spacing of these features are difficult to reconcile with any known types of archaeological features, although the geophysical anomalies **4001**, **4002** and **4003** do correspond closely to the location of these features.
- 3.3.3 The southern extent of the Site, (south of the access road and car park) where the proposed turbine location is situated, is also fairly even in character. South of the proposed turbine site, a large hollow is present, although it is likely that this is a natural feature.

4 CONCLUSION

4.1 Introduction

- 4.1.1 Geophysical and archaeological walkover surveys were carried out over approximately 2.4ha at the Site in advance of proposed development. The geophysical survey identified that the Site was magnetically quiet with a limited number of anomalies of archaeological interest identified. The walkover survey did not identify any features thought to be of archaeological significance.

4.2 Summary

- 4.2.1 Anomalies **4001**, **4002** and **4003** are discrete anomalies that correspond with localised variations in the site topography. A number of other discrete anomalies may be of archaeological interest.
- 4.2.2 A number of weak magnetic trends across the site may indicate the presence of former field boundaries, drains or ploughing systems, however, a natural origin is also likely.
- 4.2.3 A pair of modern services crossing the northern end of the survey were identified, both associated with a high voltage transformer.
- 4.2.4 The geophysical and walkover surveys at the Span Farm site have enhanced our understanding of the potential archaeology present within the proposed development area.

5 REFERENCES

English Heritage, 2008. *Geophysical survey in archaeological field evaluation*. Research and Professional Service Guideline No 1, 2nd edition.

Soil Survey of England and Wales, 1983. *Soils of South West England: Sheet 5*. Ordnance Survey, Southampton.

APPENDIX 1: SURVEY EQUIPMENT AND DATA PROCESSING

Survey Methods and Equipment

The magnetic data for this project was acquired using a Bartington 601-2 dual magnetic gradiometer system. This instrument has two sensor assemblies fixed horizontally 1m apart allowing two traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m separation, and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have a resolution of 0.1nT over a ± 3000 nT range, and measurements from each sensor are logged at intervals of 0.25m. All of the data are stored on an integrated data logger for subsequent post-processing and analysis.

Wessex Archaeology undertakes two types of magnetic surveys: scanning and detail. Both types depend upon the establishment of an accurate 20m or 30m site grid, which is achieved using a Leica 1200 RTK GPS system and then extended using tapes. The Leica 1200 RTK GPS system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined to an accuracy of 1-2cm in real-time and therefore exceed the level of accuracy recommended by English Heritage (2008) for geophysical surveys.

Scanning surveys consist of recording data at 0.25m intervals along transects spaced 10m apart, acquiring a minimum of 80 data points per transect. Due to the relatively coarse transect interval, scanning surveys should only be expected to detect extended regions of archaeological anomalies, when there is a greater likelihood of distinguishing such responses from the background magnetic field.

The detail surveys consist of 30m x 30m grids, and data are collected at 0.25m intervals along traverses spaced 1m apart. This gives 1600 measurements per grid and is the recommended methodology for archaeological surveys of this type (English Heritage, 2008).

Post-Processing

The magnetic data collected during the detail survey are downloaded from the Bartington system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

As the scanning data are not as closely distributed as with detailed survey, they are georeferenced using the GPS information and interpolated to highlight similar anomalies in adjacent transects. Directional trends may be removed before interpolation to produce more easily understood images.

Typical data and image processing steps may include:

- Destripe – Applying a zero mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;
- Destagger – Shifting each traverse forward or backward by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Clipping – Limiting the displayed range of the processed data to either $\pm 3nT$ or $\pm 3SD$. in order to enhance the appearance of smaller anomalies.
- Despike – Filtering any data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings caused by modern, small ferrous objects at the surface

Typical displays of the data used during processing and analysis:

- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This image can include a hidden line algorithm to remove certain lines and enhance the image. This type of image is useful as it shows the full range and shape of individual anomalies.
- Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.

APPENDIX 2: GEOPHYSICAL INTERPRETATION

The interpretation methodology used by Wessex Archaeology separates the anomalies into two main categories: archaeological and unidentified responses.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Probable archaeology – used for features which give a clear response but which form incomplete patterns.

The unidentified category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Possible archaeology – used for features which give a response but which form no discernable pattern or trend.
- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.

Finally, services such as water pipes are marked where they have been identified.