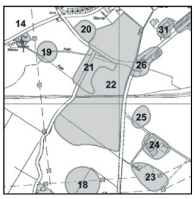
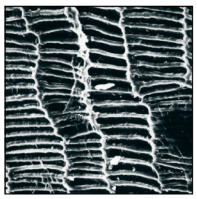
EHNS/01










LAND OFF RODEFERN LANE, NESSCLIFFE, SHROPSHIRE

GEOPHYSICAL SURVEY
PLANNING REF. 14/03858/FUL

commissioned by Base Architects
on behalf of Mr Andy Blake

March 2018

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

LAND OFF RODEFERN LANE, NESSCLIFFE, SHROPSHIRE

GEOPHYSICAL SURVEY
PLANNING REF. 14/03858/FUL

commissioned by Base Architects
on behalf of Mr Andy Blake

March 2018

This report adheres to the quality standard of ISO 9001:2008

PROJECT INFO:

HA Job No. **EHNS/01** / NGR **SJ 4008 1878** / Parish **Great Ness** / Local Authority **Shropshire County Council** / OASIS Ref. **headland5-294990**

PROJECT TEAM:

Project Manager **Sam Harrison** / Author **Alistair Webb** / Fieldwork **Nick Adams, Ross Bishop** / Graphics **Caroline Norrman, David Harrison, Josh Gaunt**

Approved by **Sam Harrison** .....

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HEADLAND ARCHAEOLOGY

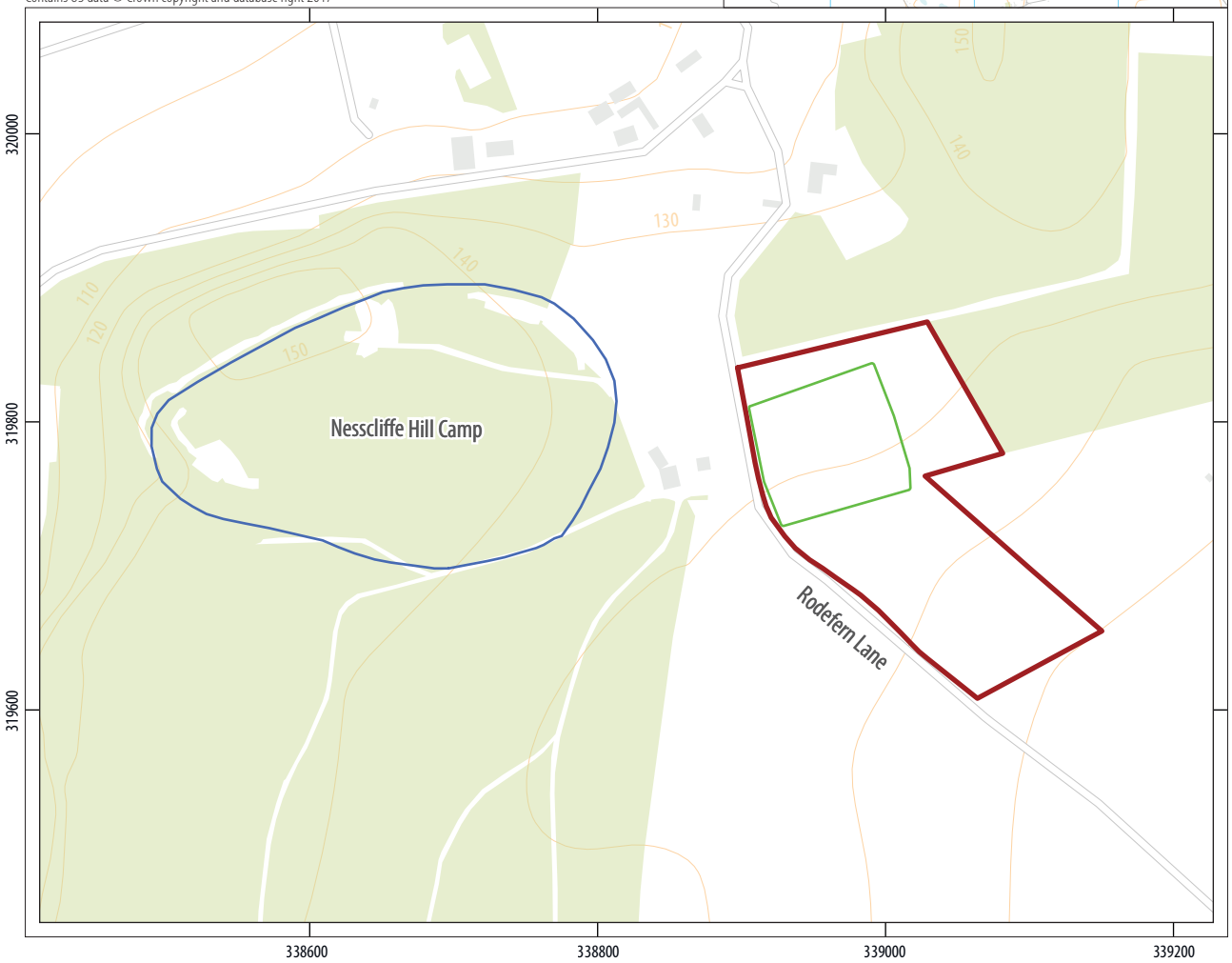
PROJECT SUMMARY

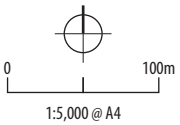
Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey of a 0.5 hectare site at Nesscliffe, Shropshire to fulfil the terms of a consented planning application. The site lies adjacent to Nesscliffe Hill Camp, an Iron Age Hill Fort that is also a Scheduled Monument. The survey has not identified any anomalies of likely archaeological origin and on this basis is assessed as having a very low archaeological potential.

CONTENTS

LIST OF ILLUSTRATIONS

EHNS/01
land off Rodefern Lane
Nesscliffe
Shropshire





application area
scheduled monument
geophysical survey area

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ILLUS 1 Site location

LAND OFF RODEFERN LANE, NESSCLIFFE, SHROPSHIRE

GEOPHYSICAL SURVEY

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by Base Architects, on behalf of Mr Andy Blake (The Client), to undertake a geophysical (magnetometer) survey over the footprint of a proposed eco-house at Nesscliffe, near Hopton, Shropshire (Illus 1). The survey was carried out in order to comply with Condition 5 of consented planning application 14/03858/FUL:

> *No development approved by this permission shall commence until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation (WSI). This written scheme shall be approved in writing by the Planning Authority prior to the commencement of works. Reason: The site is known to hold archaeological interest.*

The work was undertaken in accordance with a Written Scheme of Investigation (Headland Archaeology 2017) which was submitted to and approved by Dr Andy Wigley, Natural and Historic Environment Manager at Shropshire Council and in accordance with guidance contained in the National Planning Policy Framework (DCLG 2012). All work was undertaken in line with current best practice (Chartered Institute for Archaeologists 2014, English Heritage 2008).

The survey was carried out on July 5th 2017.

1.1 SITE LOCATION, LAND-USE AND TOPOGRAPHY

The consented development area (CDA) comprises a square block of agricultural land, approximately 80m by 70m (centred at SJ 4008 1878), that forms the footprint for the construction of an earth sheltered eco-house. It lies immediately adjacent to Rodefern Lane, which borders the CDA to the west with farm tracks to the north and south. Nesscliffe Hill Camp lies 100m west of the CDA (see below). The CDA is currently fallow (Illus 2).

The site was on a slight slope rising from approximately 135m above Ordnance Datum (AOD) at the southern edge of the survey area to 139m aOD on the northern boundary.

1.2 GEOLOGY AND SOILS

The underlying bedrock geology comprises siltstone, mudstone and sandstone of the Tarporley Siltstone Formation. No superficial deposits are recorded (NERC 2017).

The soils are classified in the Soilscape 10 association being characterised as freely draining, slightly acid sandy soils (Cranfield University 2017).

2 ARCHAEOLOGICAL BACKGROUND

There are no previously recorded designated or non-designated heritage assets within the CDA. However, the CDA is situated 100m east of Nesscliffe Hill Camp (Illus 3), an Iron Age Hillfort (Scheduled Monument No. 120285).

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide sufficient information to establish the presence/absence, character and extent

ILLUS 2 Survey area, looking north-west

of any archaeological remains within the CDA. This will therefore enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains, if present, and determine the nature of any further archaeological work, if required.

The specific archaeological objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore model the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

3.1 MAGNETOMETER SURVEY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the Earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney and Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10-15cm sample interval) on roaming traverses (swaths – see Illus 3) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R8s Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Terrasurveyor V3.0.32.4 (DWConsulting) software was used to process and present the data.

3.2 REPORTING

A general site location plan is shown in Illus 1 at a scale of 1:20,000. Illus 2 is a site condition photographs Illus 3 is a 1:4000 scale survey location plan showing the GPS swath data. A detailed data plot of the fully processed data (greyscale), the minimally processed data (XY traceplot) and an accompanying interpretative plot, are presented at a scale of 1:1,000 in Illus 4 to Illus 6 inclusive.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information and Appendix 3 describes the composition and location of the site archive. Data processing details are presented in Appendix 4. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 5.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (Headland Archaeology 2017) and guidelines outlined by Historic England (English Heritage 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All illustrations from Ordnance Survey mapping are reproduced with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

> *The illustrations in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All illustrations are presented to most suitably display and interpret the data from this site based on the experience and knowledge of management and reporting staff.*

4 RESULTS AND DISCUSSION

The ground conditions were good underfoot and consequently the data quality was very good throughout. The magnetic background across the CDA was fairly uniform with very little variation and very few anomalies. Those anomalous responses that do stand out are discussed below.

4.1 FERROUS AND MODERN ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is common on most sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious clustering to suggest anything other than a random spread of ferrous detritus in the topsoil.

4.2 AGRICULTURAL ANOMALIES

A single short linear anomaly aligned north-north-east/south-south-west at the north-western corner of the survey area is identified. This is perpendicular to the current field layout and is likely to be due to recent cultivation.

4.3 GEOLOGICAL ANOMALIES

Minor variations in the magnetic background are due to small changes in the composition of the upper soil horizons.

4.4 ARCHAEOLOGICAL AND POSSIBLE ARCHAEOLOGICAL ANOMALIES

No anomalies of possible or probable archaeological origin have been identified by the survey.

5 CONCLUSION

The geophysical survey has successfully evaluated the consented development area and has not identified any anomalies of possible or probable archaeological origin. Therefore on the basis of the geophysical survey the site is assessed as having very low archaeological potential.

6 REFERENCES

Chartered Institute for Archaeologists (CIfA) 2014 ***Standard and guidance for archaeological geophysical survey*** [online document] Accessed 12 July 2017 from http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics_1.pdf

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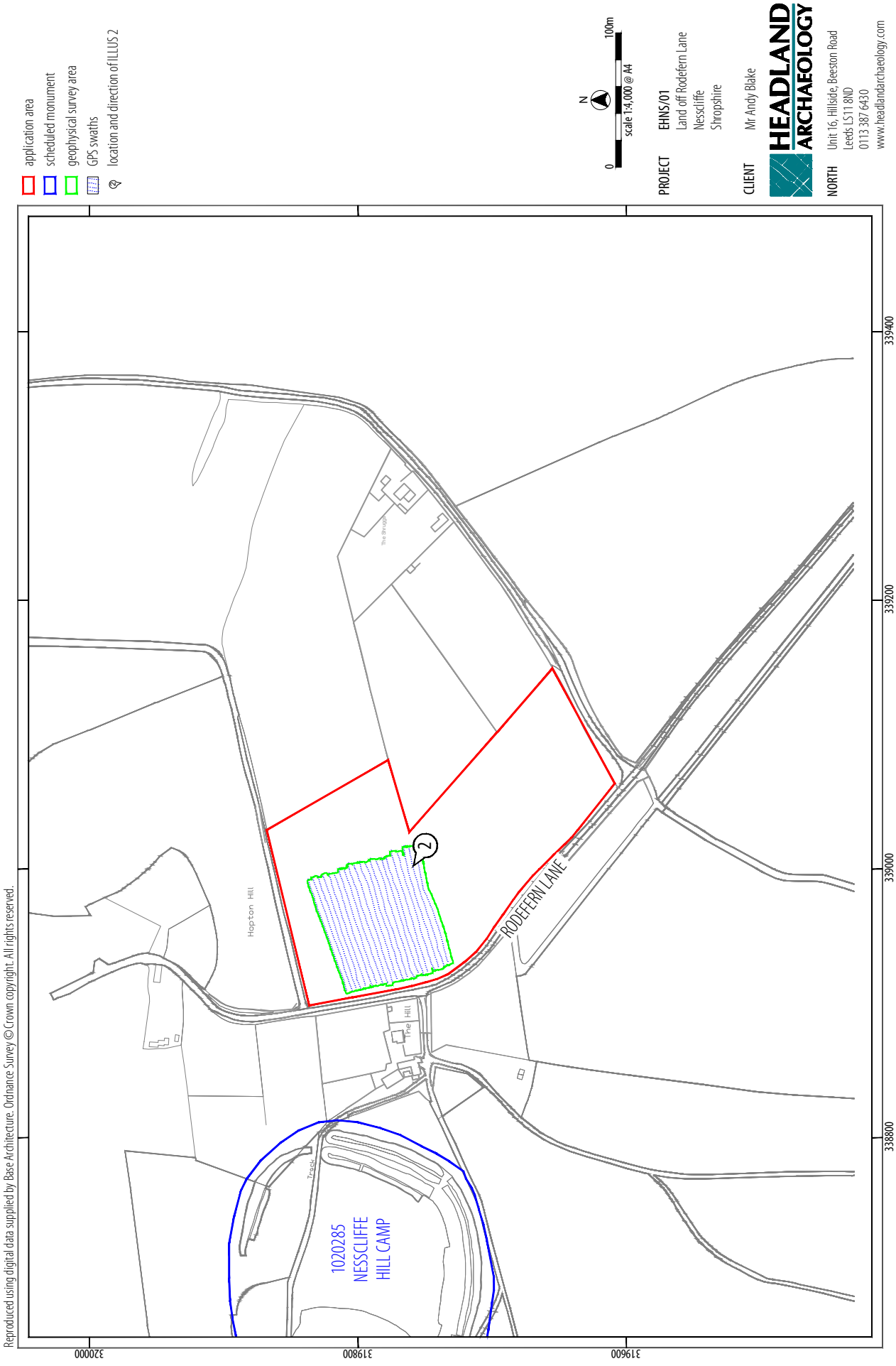
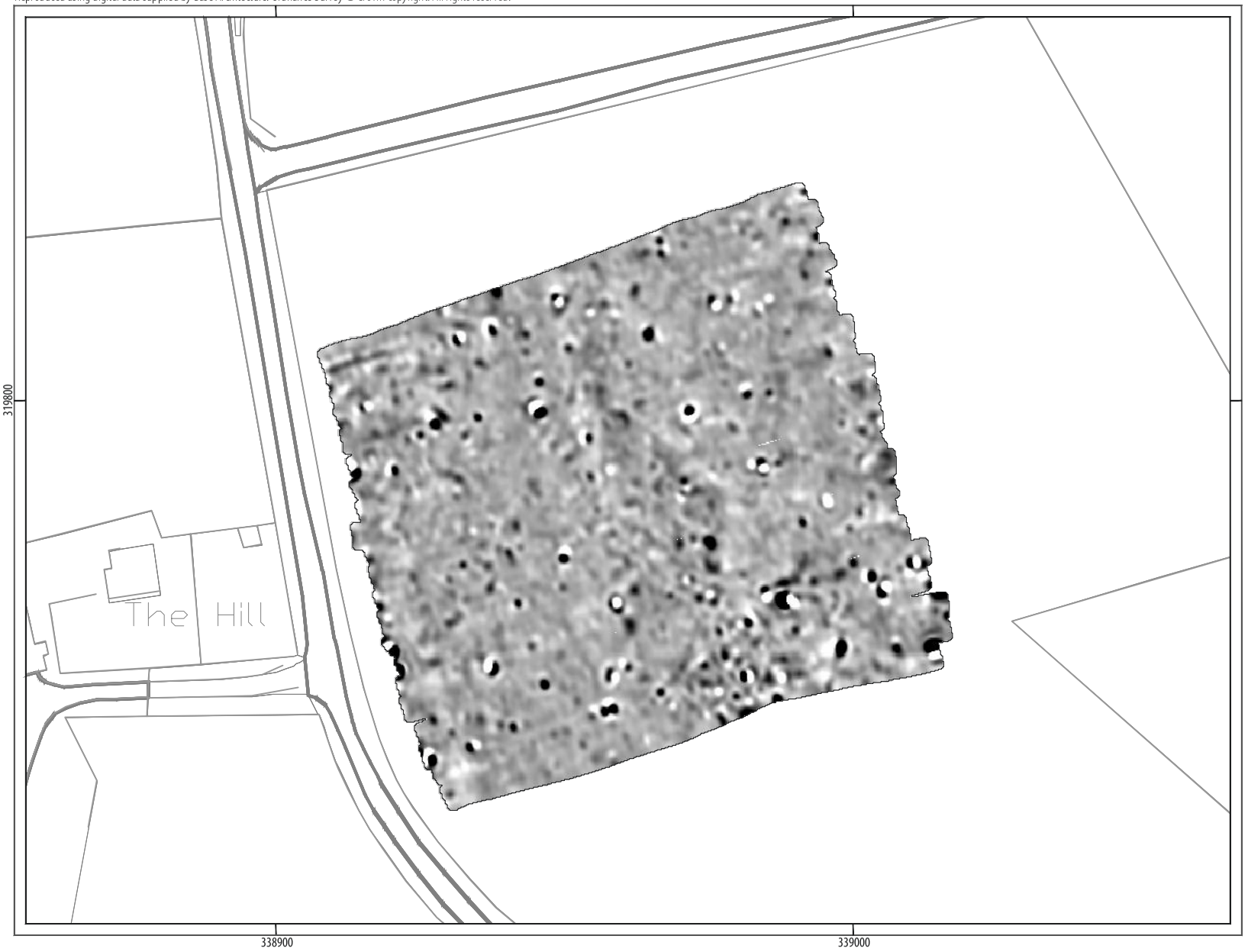


ILLUS 3 Survey location showing GPS swaths (1:4000)



nT
-1.0 2.0

N
0 25m
scale 1:1,000 @ A4

PROJECT EHNS/01
Land off Rodefern Lane
Nesscliffe
Shropshire

CLIENT Mr Andy Blake

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ILLUS 4 Processed greyscale magnetometer data (1:1,000)

6.0nT/cm

0 25m
scale 1:1,000 @ A4
N

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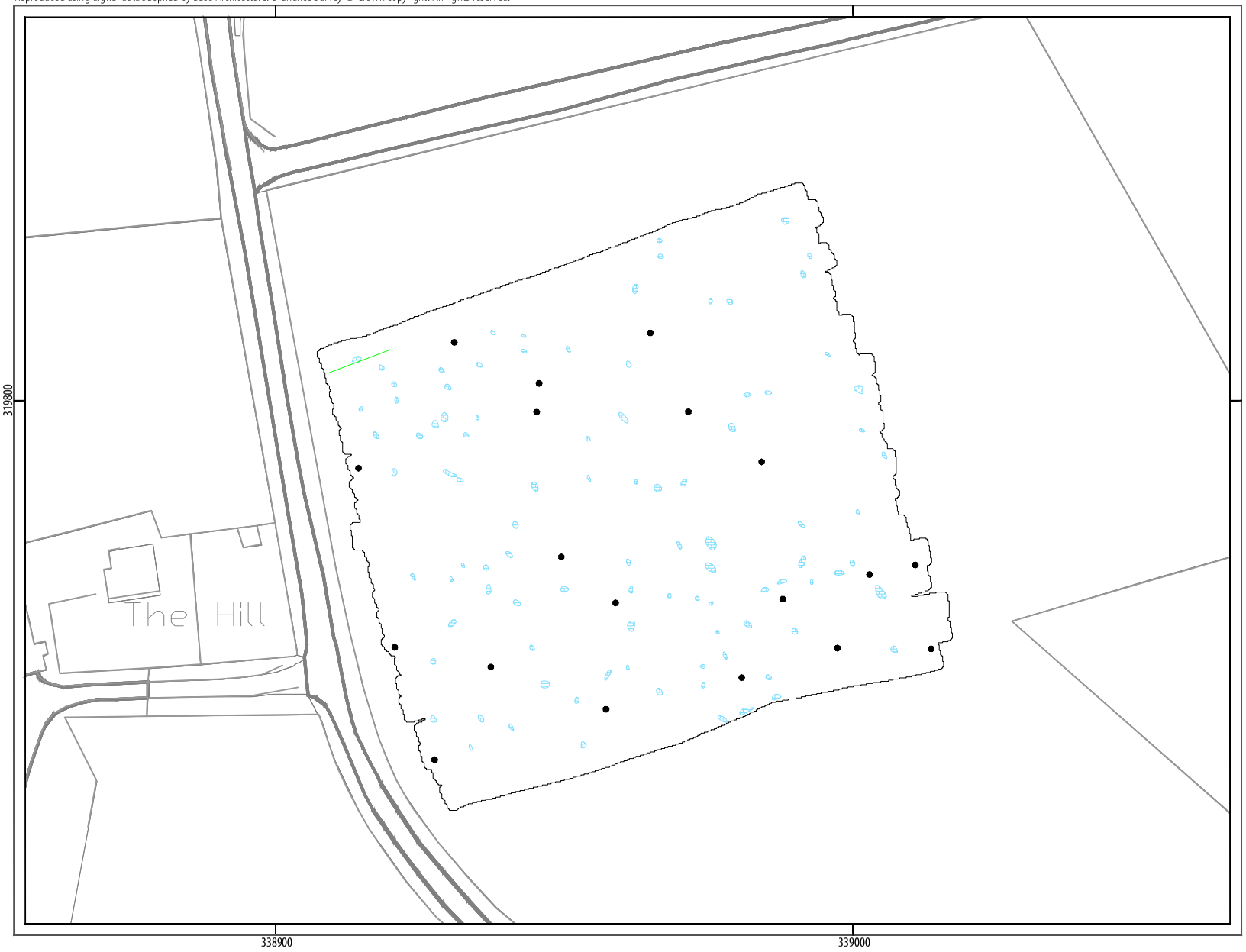
ILLUS 5 XY trace plot of minimally processed magnetometer data (1:1,000)



TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic enhancement	geology?
linear trend	agricultural

N

0 25m

scale 1:1,000 @ A4

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Land off Rodefern Lane
Nesscliffe
Shropshire

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ILLUS 6 Interpretation of magnetometer data (1:1,000)

7 APPENDICES

APPENDIX 1 MAGNETOMETER SURVEY

Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the Earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes) These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

APPENDIX 2 SURVEY LOCATION INFORMATION

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

APPENDIX 3 GEOPHYSICAL SURVEY ARCHIVE

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_3). The data will be stored in an indexed archive and migrated to new formats when necessary. In addition, the raw data will be deposited with the Archaeology Data Service (ADS) in accordance with Devon County Council's Specification for Geophysical Survey.

APPENDIX 4 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

APPENDIX 5 APPENDIX 5 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-294990

PROJECT DETAILS

Project name	LAND OFF RODEFERN LANE, NESSCLIFFE, SHROPSHIRE
Short description of the project	Headland Archaeology (UK) Ltd undertook a geophysical (magnetometer) survey of a 0.5 hectare site at Nesscliffe, Shropshire to fulfil the terms of a consented planning application. The site lies adjacent to Nesscliffe Hill Camp, an Iron Age Hill Fort that is also a Scheduled Monument. The survey has not identified any anomalies of likely archaeological origin and on this basis is assessed as having a very low archaeological potential.
Project dates	Start: 05-07-2017 End: 05-07-2017
Previous/future work	Not known / Not known
Any associated project reference codes	EHNS-01 - Contracting Unit No.
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 4 - Character Undetermined
Monument type	N/A None
Monument type	N/A None
Significant Finds	N/A None
Significant Finds	N/A None
Methods & techniques	"Geophysical Survey"
Development type	Rural residential
Prompt	National Planning Policy Framework - NPPF
Position in the planning process	After full determination (eg. As a condition)
Solid geology (other)	Tarporley Siltstone Formation
Drift geology (other)	None
Techniques	Magnetometry

PROJECT LOCATION

Country	England
Site location	SHROPSHIRE SHREWSBURY AND ATCHAM GREAT NESS Land off Rodefern Lane, Nesscliffe
Study area	0.5 Hectares
Site coordinates	SJ 4008 1878 52.762957808007 -2.888096806353 52 45 46 N 002 53 17 W Point

PROJECT CREATORS

Name of Organisation	Headland Archaeology
Project brief originator	Base Architects
Project design originator	Headland Archaeology
Project director/ manager	Harrison, S
Project supervisor	Bishop, R
Type of sponsor/ funding body	Developer

PROJECT ARCHIVES

Physical Archive Exists?	No
Digital Archive recipient	In house
Digital Contents	"Survey"
Digital Media available	"Geophysics","Text"
Paper Archive Exists?	No
Paper Media available	"Report"

PROJECT BIBLIOGRAPHY 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Land off Rodefern Lane, Nesscliffe, Shropshire
Author(s)/Editor(s)	Webb, A.
Date	2017
Issuer or publisher	Headland Archaeology
Place of issue or publication	Leeds
Description	A4 bound report

Entered by	David Harrison (david.harrison@headlandarchaeology.com)
Entered on	6 September 2017

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