Archaeology South-East

ASE

Detailed Magnetometer Survey
Land north of Headcorn Road, Staplehurst, Kent

NGR: 578847 143984
(TQ 78847 43984)

Maidstone Borough Council
Planning Reference: 14/505432/FULL

Site Code: HRS15
OASIS ID: archaeol6- 301044
ASE Project No: 7289
ASE Report No: 2017480

By John Cook

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Abstract

Archaeology South-East (ASE), the contracting division of The Centre for Applied Archaeology at the Institute of Archaeology, University College London (UCL), was commissioned by Bovis Homes Ltd to undertake a geophysical survey on Land north of Headcorn Road, Staplehurst, Kent, NGR 578847 143984. The work was undertaken between Wednesday 8th and Friday 10th November 2017.

Evidence for possible archaeological features was represented by moderate positive anomalies. Though they could have an archaeological origin, they may equally be the result of the natural geology. Positive and negative linear anomalies in the south of the site may relate to former field boundaries or, along with two dipolar anomalies, a former service such as a drainage pipe. Areas of magnetic debris are likely to be caused by ground disturbance or made ground such as that caused by a former building or areas of consolidation in field entrances. A service, with corresponding magnetic disturbance, is noted running along a field boundary in the south of the site. In addition, on the opposite side of the same boundary is observed an anomaly that relates to an inspection cover. Ploughing is indicated by parallel anomalies aligned with the field boundaries.

Statement of Indemnity

Geophysical survey is the collection of data that relate to subtle variations in the form and nature of soil and which relies on there being a measurable difference between buried archaeological features and the natural geology. Geophysical techniques do not specifically target archaeological features and anomalies noted in the interpretation do not necessarily relate to buried archaeological features. As a result, magnetic and earth resistance detail survey may not always detect sub-surface archaeological features. This is particularly true when considering earlier periods of human activity, for example those periods that are not characterised by sedentary social activity.

CONTENTS

1.0 INTRODUCTION

1.1 Site background

1.1.1 Archaeology South-East (ASE) have been commissioned by Bovis Homes Ltd (hereafter 'the client') to undertake archaeological investigations, encompassing geophysical survey and trial trench evaluation, on land north of Headcorn Road, Staplehurst, Kent, (hereafter 'the site') centred on NGR 578847 143984; Figure 1.

1.1.2 ASE produced a Desk-Based Assessment (DBA) to accompany a planning application for the site (ASE 2012). Planning Consent has subsequently been granted by Maidstone Borough Council (MBC) for residential development to provide 167 dwellings, areas of public open space, associated landscaping and infrastructure (Planning Reference 14/505432/FULL). Condition 10 of the Planning Consent states:

The development shall not 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 specification and timetable which has been submitted to and Approved by the Local Planning Authority. Reason: To ensure that features of archaeological interest are properly examined and recorded.

1.1.3 Consultation between ASE and the Kent County Council (KCC) Archaeologist (in her capacity as advisor to MBC) established that a programme of archaeological trial trench would initially be required in order to establish the archaeological potential of the site. Accordingly, ASE produced a Written Scheme of Investigation (WSI) for a trial trench evaluation (ASE 2015) which was submitted to the KCC Archaeologist and MBC prior to the commencement of fieldwork.

1.1.4 Subsequently, Bovis Homes have instructed ASE to undertake a geophysical survey for the site in order to better understand the archaeological potential of the site ahead of construction and allow trial trenches to be targeted in an informed way. The trial trench WSI (ASE 2015) will be updated to reflect the results of the geophysical survey and be re-submitted to the KCC Archaeologist and MBC prior to the commencement of the associated fieldwork.

1.2 Geology and topography

1.2.1 According to the online British Geological Survey 1:50,000 mapping, the bedrock geology of the site consists of Weald clay formation - mudstone. No superficial geology was recorded (BGS 2017).

1.2.2 The survey area consisted of approximately 7 hectares of grassland, split into small paddocks, to the north of Headcorn Road, Staplehurst on a generally level ground (Figure 2).

1.3 Aims of geophysical investigation

1.3.1 The geophysical survey comprised a detailed magnetometer survey within all

accessible areas (as shown on Figure 2). The survey aimed to detect anomalies of possible archaeological origin within the boundaries of the survey area. The features detected were naturally limited to those features that produce a measurable response to the instrumentation used.

1.3.2 The general aim of this programme of geophysical survey is to obtain a better understanding of the archaeological potential of the site. This work will allow the positioning of trial trenches illustrated in ASE's approved WSI (ASE 2015) to be updated and agreed with KCC Archaeologist and MBC.

1.3.3 The geophysical survey comprised a detailed magnetometer survey within all accessible areas shown on Figure 2. The survey aimed to detect any anomalies of an archaeological origin that are within the boundaries of the survey area.

1.4 Scope of report

1.4.1 The scope of this report is to detail the findings of the survey. The project was conducted by John Cook with the assistance of Sophie Morrish. The project was managed by Vasilis Tsamis (fieldwork) and Andy Margetts (post-fieldwork).

2.0 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 A DBA has already been prepared by ASE (ASE 2012) and is summarised below and the reader is directed to the DBA for more detailed information.

2.2 Prehistoric

2.2.1 No finds of Palaeolithic, Mesolithic or Neolithic material are recorded within a 1km radius of the site. However, one Early Bronze Age find was recorded (a flint barbed-and-tanged arrowhead found in 1985).

2.2.2 No Iron Age sites have been recorded within the Study Area.

2.3 Roman

2.3.1 A Roman Road, running from Rochester through Maidstone and continuing onto Hastings has been recorded within the Study Area.

2.3.2 A Roman coin of Probus (AD 276 – 282) was found, adjacent to the Roman Road at Staplehurst in 1989.

2.4 Anglo-Saxon and Medieval

2.4.1 No sites or finds of Anglo-Saxon or early medieval date are recorded within a 1km radius of the site.

2.4.2 Hawkenbury Moated site is situated within the Study Area and dates back to medieval times.

2.4.3 Tumblers timber framed house was built in the 16th or early 17th century. It is a Grade II Listed Building.

2.5 Post-medieval/Modern

2.5.1 Eleven Listed Buildings of post-medieval date have been recorded within the Study Area: Turley House, Crabtree Farmhouse, Spilshill Court, Slaney Place, two barns (one about 15m and the other about 40m west of Slaney Place), the Railway Tavern, the Martyrs' Memorial, Pilgrim Cottage, Sorrento and the Railings about 30m east of Sorrento.

2.5.2 Six other post-medieval sites are also present within the Study Area: Smock Mill (east of the church), Staplehurst Railway Station, an assemblage of china and bottle fragments from Hodges Place (High Street, Staplehurst), an air-raid shelter, a Milestone and the London to Dover Railway

2.6 The Archive

2.6.1 The digital and paper archive derived from this project will be housed at Archaeology South-East's Sussex offices and will be combined with any further archive generated in the event of further fieldwork being required.

3.0 SURVEY METHODOLOGY

3.1 Geophysical survey

3.1.1 A fluxgate gradiometer (magnetometry) survey was undertaken across approximately 7ha of land as depicted on Figure 2. The work was undertaken between Wednesday 8th and Friday 10th November 2017 during cold and breezy weather with the occasional shower.

3.2 Applied geophysical instrumentation

3.2.1 The Fluxgate Gradiometer employed was the Bartington Instrumentation Grad 601-2. The Grad 601-2 has an internal memory and a data logger that store the survey data. This data is downloaded into a PC and is then processed in a suitable software package.

3.2.2 30m x 30m grids were set out using a GPS (see below). Each grid was surveyed with 1m traverses and samples were taken every 0.25m.

3.2.3 Data was collected along north-south traverses in a zigzag pattern beginning in the south west corner of each grid, following the contours of the site.

3.3 Instrumentation used for setting out the survey grid

3.3.1 The survey grid for the site was geo-referenced using a Leica Viva SmartRover. The GPS receiver collects satellite data to determine its position and uses the mobile phone networks to receive corrections, transmitting them to the RTK Rover via Bluetooth to provide a sub centimetre Ordnance Survey position and height. Each surveyed grid point has an Ordnance Survey position; therefore the geophysical survey can be directly referenced to the Ordnance Survey National Grid.

3.4 Data processing

3.4.1 All of the geophysical data processing was carried out using TerraSurveyor published by DW Consulting. Minimally processed data was produced using the following schedule of processing. Due to the very high positive readings of some of the magnetic disturbance, the values were replaced with a dummy value so as to avoid detrimentally affecting the dataset when further processed. The first process carried out upon the data was to apply a DESPIKE to the data set which removes the random ‘iron spikes’ that occur within fluxgate gradiometer survey data. A ZERO MEDIAN TRAVERSE was then applied to survey data. This removes stripe effects within grids and ensures that the survey grid edges match.

3.5 Data presentation

3.5.1 Data is presented using images exported from TerraSurveyor into AutoCAD software and inserted into the geo-referenced site grid. Data is presented as raw and processed data greyscale plots.

4.0 GEOPHYSICAL SURVEY RESULTS

4.1 Description of site

4.1.1 The survey area consisted of approximately 7 hectares of grassland, split into small paddocks, to the north of Headcorn Road, Staplehurst on a generally level ground (Figure 2).

4.2 Survey limitations

4.2.1 Physical obstructions encountered on site included areas of overgrown vegetation with hidden dips, wire fences and ground disturbance (Figures 2; 8 and 9). Obstructions for each area are noted in the results. In addition, the effectiveness of magnetometer surveys depends on a contrast between the absolute magnetic susceptibility of the topsoil to the underlying subsoil (Clark 1996). Features may also be difficult to detect where there has been significant primary silting and development of significant overburden. Areas where physical obstructions form a barrier to survey, or a health and safety issue, have been omitted. The site lies over Weald clay formation - mudstone. The response to magnetometer survey is generally average over mudstones; but results can be variable (English Heritage 2008).

4.3 Introduction to results

4.3.1 The results should be read in conjunction with the figures at the end of this report. The types of features likely to be identified are discussed below.

Positive Magnetic Anomalies

4.3.2 Positive anomalies generally represent cut features that have been in-filled with magnetically enhanced material.

Negative Magnetic Anomalies

4.3.3 Negative anomalies generally represent buried features such as banks or compacted ground that have a lower magnetic signature in comparison to the background geology.

Magnetic Disturbance

4.3.4 Magnetic disturbance is generally associated with interference caused by modern ferrous features such as fences and service pipes or cables.

Magnetic Debris

4.3.5 Low amplitude magnetic debris consists of a number of dipolar responses spread over an area and is indicative of ground disturbance.

Dipolar Anomalies

4.3.6 Dipolar anomalies are positive anomalies with an associated negative response. These anomalies are usually associated with discreet ferrous objects or may represent buried kilns or ovens.

Bipolar Anomalies

4.3.7 Bipolar anomalies consist of alternating responses of positive and negative magnetic signatures. Interpretation will depend on the strength of these responses; modern pipelines and cables typically produce strong bipolar responses.

Thermoremanence

4.3.8 Thermoremanence is most commonly encountered through the magnetizing of clay through the firing process although stones and soils can also acquire thermoremanence.

4.3.9 Magnetism from ferromagnetic materials (iron) and from thermoremanence are forms of permanent magnetism and in most cases a magnetometer will not enable the separation of anomalies into the two categories. The interpretation of these anomalies into either category relies on field strength within an area. Magnetic anomalies due to iron normally rise and fall rapidly, forming a 'spike' in the data.

4.4 Interpretation of fluxgate gradiometer results (Figures 3-7)

4.4.1 The interpretation of fluxgate gradiometer results should be read in conjunction with the figures at the end of the report. Specific examples of anomaly types may be numbered in the figures and text but not all anomalies are numbered.

4.4.2 Evidence of possible archaeological activity included the following described anomalies (Figure 7). The most obvious possible archaeological anomalies are the linear and discrete moderate positive anomalies and likely to be due to cut features such as pits and ditches (moderate coloured light green, strong dark green).

4.4.3 Areas of magnetic debris may relate to a scattering of near surface ferrous material, demolished buildings, former field boundaries, ground disturbance or made ground (dotted brown).

4.4.4 Dipolar anomalies (pink dots) may relate to possible thermoremanent magnetic enhancement, such as kilns or furnaces, or near surface ferrous (iron) objects.

4.4.5 Services are noted running in a north-northeast to south-southwest orientation in the south of the survey (pink lines).

4.4.6 Areas of magnetic disturbance caused by large nearby metallic objects (brown areas) may obscure any underlying archaeological features.

4.4.7 Plough marks create linear anomalies that may be mistaken for ditches but are noted when more obvious (dark green dashed lines).

5.0 CONCLUSIONS

5.1 Discussion

5.1.1 Evidence for possible archaeological features was represented by moderate positive anomalies (A1) (coloured light green on Figure 7). Though they could have an archaeological origin, they may equally be the result of the natural geology. Positive and negative linear anomalies (A2) may relate to a former field boundary or, along with two dipolar anomalies (A4), a former service such as a drainage pipe.

5.1.2 Areas of magnetic debris (A3) are likely to be caused by ground disturbance or made ground such as that caused by a former building or areas of consolidation in field entrances.

5.1.3 Dipolar anomalies (A4) may indicate thermoremanent features such as kilns or furnaces. However, these anomalies are more likely to represent near surface ferrous (iron) objects.

5.1.4 A service, with corresponding magnetic disturbance, is noted (A5) running along a field boundary in the south of the site. In addition, on the opposite side of the same boundary is observed an anomaly that relates to an inspection cover (Figure 9a).

5.1.5 Ploughing is indicated by parallel anomalies aligned with the field boundaries (A6).

5.1.6 Small areas of magnetic disturbance (A7) relate to nearby metallic objects such as field gates and water troughs (Figure 9c).

5.1.7 As regards the site specific research aims, a number of possible archaeological features were encountered across the site but the technique does not allow for specific dating of features.

Bibliography

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Acknowledgements

Archaeology South-East would like to thank Bovis Homes Ltd for commissioning the survey.

© Archaeology South-East		Land off Headcorn Road, Staplehurst, Kent	Fig. 1
Project Ref: 7289	Nov 2017	Site location	
Report Ref: 2017480	Drawn by: JLR		

578660, 144330

N

Ponds

Drain

Pond

Pond

Pond

Areas of vegetation

Geophysical survey grid

Pond

The Sticks

Areas of vegetation

Ponds

Pond

24.4m

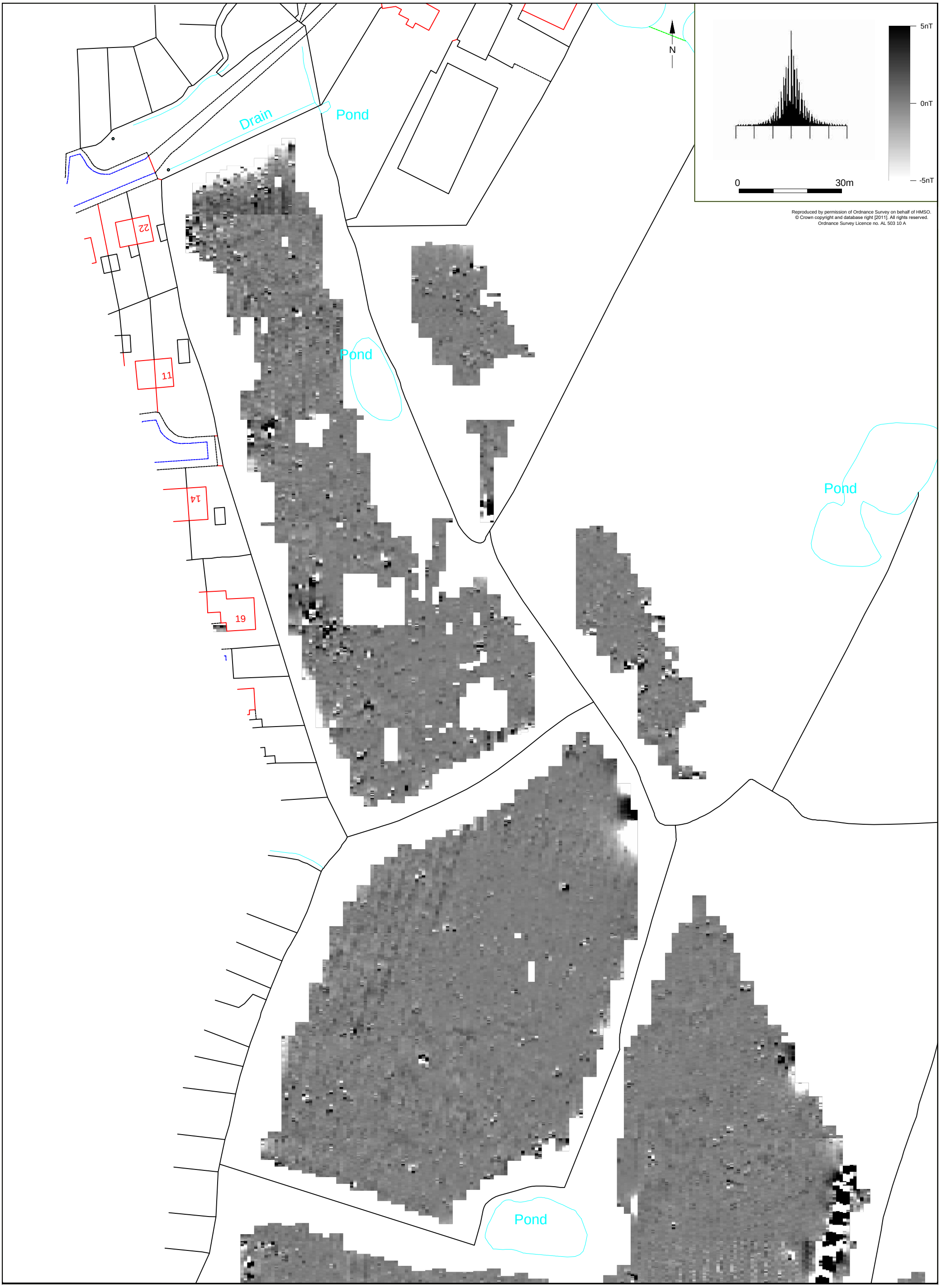
578670, 143820

0 50m

© **Archaeology South-East**		Land off Headcorn Road, Staplehurst, Kent	Fig. 2
Project Ref: 7289	November 2017	Location of geophysics survey area	
Report Ref: 2017480	Drawn by: JC		

© **Archaeology South-East**		Land off Headcorn Road, Staplehurst, Kent	Fig. 3
Project Ref: 7289	November 2017	Raw data - north	
Report Ref: 2017480	Drawn by: JC		

© **Archaeology South-East**		Land off Headcorn Road, Staplehurst, Kent	Fig. 4
Project Ref: 7289	November 2017	Raw data - south	
Report Ref: 2017480	Drawn by: JC		



© **Archaeology South-East**		Land off Headcorn Road, Staplehurst, Kent	Fig. 5
Project Ref: 7289	November 2017	Processed data - north	
Report Ref: 2017480	Drawn by: JC		

© **Archaeology South-East**		Land off Headcorn Road, Staplehurst, Kent	Fig. 6
Project Ref: 7289	November 2017	Processed data - south	
Report Ref: 2017480	Drawn by: JC		

578660, 144330

N

Strong positive anomaly(Possible archaeology)
Moderate positive anomaly (Possible archaeology)
Weak positive anomaly (Possible archaeology)
Moderate negative anomaly
Weak negative anomaly
Magnetic disturbance
Magnetic debris
Dipolar anomaly (Possible archaeology/Modern)
Possible thermoremanent anomaly
Linear anomaly former field boundary or land drain
Linear anomaly agricultural activity
Possible service

0 90m

Ponds
Drain
Pond
Pond
Pond
Pond
Ponds
Pond
22
11
14
19
A3
A1
A7
A6
A4
A5
A2
The Sticks
24.4m

578670, 143820

© Archaeology South-East		Land off Headcorn Road, Staplehurst, Kent	Fig. 7
Project Ref: 7289	November 2017	Interpretation	
Report Ref: 2017480	Drawn by: JC		

Fig. 8a Oblique Google Earth imagery

Fig. 8b Oblique Google Earth 3D imagery with geophysical survey data overlain

© **Archaeology South-East**		Land off Headcorn Road, Staplehurst, Kent	Fig. 8
Project Ref: 7289	November 2017	Google Earth images	
Report Ref: 2017480	Drawn by: JC		

Fig. 9a

Fig. 9b

Fig. 9c

Fig. 9d

Fig. 9e

Fig. 9f

© Archaeology South-East		Land off Headcorn Road, Staplehurst, Kent	Fig. 9
Project Ref: 7289	November 2017	Site photographs	
Report Ref: 2017480	Drawn by: JC		

HER Summary

HER enquiry number	N/A					
Site code	HRS15					
Project code	7289					
Planning reference	14/505432/FULL					
Site address	Land north of Headcorn Road, Staplehurst, Kent					
District/Borough	Kent					
NGR (12 figures)	578847 143984					
Geology	Weald clay formation - mudstone					
Fieldwork type					**Survey**	
Date of fieldwork	8th to 10th November 2017					
Sponsor/client	Bovis Homes Ltd					
Project manager	Vasilis Tsamis					
Project supervisor	John Cook					
Project summary	*Archaeology South-East (ASE), the contracting division of The Centre for Applied Archaeology at the Institute of Archaeology, University College London (UCL), was commissioned by Bovis Homes Ltd to undertake a geophysical survey on Land north of Headcorn Road, Staplehurst, Kent, NGR 578847 143984. The work was undertaken between Wednesday 8th and Friday 10th November 2017.* *Evidence for possible archaeological features was represented by moderate positive anomalies. Though they could have an archaeological origin, they may equally be the result of the natural geology. Ploughing is indicated by parallel anomalies aligned with the field boundaries.*					
Museum/Accession No.	N/A					

OASIS FORM

OASIS ID: archaeol6-301044

Project details	
Project name	Detailed Magnetometer Survey Land north of Headcorn Road, Staplehurst, Kent
Short description of the project	Archaeology South-East (ASE), the contracting division of The Centre for Applied Archaeology at the Institute of Archaeology, University College London (UCL), was commissioned by Bovis Homes to undertake a geophysical survey on Land north of Headcorn Road, Staplehurst, Kent, NGR 578847 143984. The work was undertaken between Wednesday 8th and Friday 10th November 2017. Evidence for possible archaeological features was represented by moderate positive anomalies. Though they could have an archaeological origin, they may equally be the result of the natural geology. Positive and negative linear anomalies in the south of the site may relate to a former field boundary or, along with two dipolar anomalies, a former service such as a drainage pipe. Areas of magnetic debris are likely to be caused by ground disturbance or made ground such as that caused by a former building or areas of consolidation in field entrances. A service, with corresponding magnetic disturbance, is noted running along a field boundary in the south of the site. In addition, on the opposite side of the same boundary is observed an anomaly that relates to an inspection cover. Ploughing is indicated by parallel anomalies aligned with the field boundaries.
Project dates	Start: 08-11-2017 End: 10-11-2017
Previous/future work	Not known / Yes
Any associated project reference codes	7289 - Contracting Unit No.
Any associated project reference codes	HRS15 - Sitecode
Type of project	Field evaluation
Site status	None
Monument type	NONE None
Significant Finds	NONE None
Methods & techniques	"Geophysical Survey"
Development type	Housing estate
Prompt	Planning condition

Position in the planning process	Not known / Not recorded
Solid geology	WEALD CLAY
Drift geology	Unknown
Techniques	Magnetometry
Project location	
Country	England
Site location	KENT MAIDSTONE STAPLEHURST Land north of Headcorn Road
Postcode	TN12 0DB
Study area	7 Hectares
Site coordinates	TQ 78847 43984 51.16652596911 0.558379678565 51 09 59 N 000 33 30 E Point
Project creators	
Name of Organisation	Archaeology South East
Project brief originator	Bovis Homes Ltd
Project design originator	ASE
Project director/manager	Vasilis Tsamis
Project supervisor	John Cook
Type of sponsor/funding body	Developer
Name of sponsor/funding body	Bovis Homes Ltd
Project archives	
Physical Archive Exists?	No
Digital Archive recipient	ASE

Digital Media available	"Geophysics","Images raster / digital photography"
Paper Archive recipient	ASE
Paper Media available	"Report","Unpublished Text"
Project bibliography 1	
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