

**A Detailed Magnetometer Survey at
Howard of Effingham School (Site 1), Effingham, Surrey**

**NGR: 512125 153960
(TQ 12125 53960)**

ASE Project No: 6839

OASIS ID: archaeol6-186087

ASE Report No. 2014260

By John Cook BSc (Hons) AIFA

July 2014

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Abstract

Archaeology South East was commissioned by Berkeley Homes (Southern) Ltd to undertake a detailed fluxgate gradiometer survey at Howard of Effingham School, Effingham, Surrey. The survey took place on the 25th July 2014. The survey area covered approximately 0.7 hectares and comprised a sports field.

Evidence for archaeological features within the magnetic survey was relatively sparse. However, the survey did successfully detect several linear and discrete anomalies of possible archaeological origin. In general, the possible archaeological anomalies identified within the survey are indistinct. This may be due to the features themselves being ephemeral, overburden between the magnetometer and the feature, the result of more recent agricultural activity, infilling of natural features or a combination of these.

Much of the magnetic debris and disturbance observed within the survey is undoubtedly related to modern activity.

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.

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1.0 INTRODUCTION

1.1 Site background

1.1.1 Archaeology South-East was commissioned by Berkeley Homes (Southern) Ltd to conduct a Magnetometer survey on a site totalling approximately 0.7 hectares of land at Howard of Effingham School, Effingham, Surrey hitherto referred to as 'the site' (NGR. 512125 153960; Fig.1).

1.2 Geology and topography

1.2.1 According to the British Geological Survey (2014) the site lies over bedrock geology of Lambeth Group – clay, silt and sand. No superficial deposits are recorded.

1.3 Aims of geophysical investigation

1.3.1 The purpose of the geophysical survey was to detect any buried archaeological anomalies that might provide a measurable magnetic response.

1.4 Scope of report

1.4.1 The scope of this report is to report on the findings of the survey. The project was conducted by John Cook and Chris Russel; project managed by Paul Mason (fieldwork) and by Jim Stevenson (post fieldwork).

2.0 ARCHAEOLOGICAL BACKGROUND

2.1 The Desk Based Assessments

2.1.1 This survey forms part of a series of archaeological investigations across the site. Two Archaeological Desk-Based Assessments of the overall site have been undertaken (ASE 2014a and b). The full historical background for the site is presented therein and is not repeated here.

3.0 SURVEY METHODOLOGY

3.1 Geophysical survey

3.1.1 A fluxgate gradiometer (magnetometry) survey was undertaken in the areas depicted in Figure 2 (NGR 512125 153960).

3.1.2 The field work was undertaken on Friday 25th July 2014 when the weather was warm and dry with occasional rain showers.

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; 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.

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 MEAN TRAVERSE was then applied to survey data. This removes stripe effects within grids and ensures that the survey grid edges match. Figure 4 displays the processed survey data.

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 and interpretation is presented (Figures 3-6) as raw data and processed

data greyscale plots.

4.0 GEOPHYSICAL SURVEY RESULTS (Figure 5)

4.1 Description of site

4.1.1 The survey area consisted of approximately 0.7 hectares of playing field to the east of Howard of Effingham School. A north west to south east linear bank or earthwork

4.2 Survey limitations

4.2.1 There were few physical obstructions encountered on site. Obstructions are noted in the results. Areas where physical obstructions form a barrier to survey, or a health and safety issue, have been omitted.

4.2.2 In addition to the physical limitations of the survey, 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.

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.

4.3.2 Positive Magnetic Anomalies

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

4.3.3 Negative Magnetic anomalies

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

4.3.4 Magnetic Disturbance

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

4.3.5 Magnetic Debris

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

4.3.6 Dipolar Anomalies

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.

4.3.7 Bipolar Anomalies

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.

4.3.8 Thermoremanence

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

4.4 Interpretation of fluxgate gradiometer results (Figure 5)

4.4.1 Field 1 was situated in the east of the survey area and was under cultivation for wheat over level ground.

4.4.2 Evidence for archaeological activity comprises moderate positive linear anomalies (A1) and weak positive linear anomalies (A2). These anomalies may represent cut features of an archaeological origin such as ditches. However, these anomalies may also relate to in-filled natural features or more modern agricultural activity. A single negative anomaly (A3) in the east of the survey may represent a former earthwork or compacted ground.

4.4.3 Bipolar anomalies with associated magnetic disturbance are observed in Field 1 (A4) and (A5). These anomalies correspond to below ground services such as pipes and cables. Additional bipolar anomalies with associated magnetic disturbance (A6) are observed in the north east corner of the survey area and may relate to ground disturbance, made ground or former structural remains. Further areas of magnetic disturbance relate to nearby metallic objects such as wire fences (A7).

4.4.4 Areas of magnetic debris in the east of the site (A8) may indicate ground disturbance or made ground, possibly associated with the anomalies at (A6) or the earthwork visible running north west to south east along the eastern edge of the survey.

4.4.5 A thin scattering of dipolar anomalies across the area (A9) may represent archaeological features such as kilns or ovens, but more likely they indicate discrete ferrous objects.

5.0 CONCLUSION

5.1 Discussion

5.1.1 The most significant possible archaeological features noted in the survey were possible cut features. These anomalies are likely to relate features such as former boundaries, trackways or ditches. However, these features may also relate to infilled natural features or modern activity. A single negative area anomaly may relate to a former earthwork or compacted ground. However, negative magnetic anomalies may also relate to the bipolar attribute of large positive anomalies.

5.2 Summary

5.2.1 Evidence for archaeological features within the magnetic survey was sparse. However, the survey did successfully detect several linear and discrete anomalies of possible archaeological origin (A1), (A2), (A3) and possibly (A9). Areas of magnetic disturbance may mask underlying features with a weaker magnetic signature.

5.2.2 In general, the possible archaeological anomalies identified within the survey are indistinct. This may be due to the features themselves being ephemeral, overburden between the magnetometer and the feature, the result of more recent agricultural activity, infilling of natural features or a combination of these. Much of the magnetic debris and disturbance observed within the survey is undoubtedly related to modern activity.

Acknowledgements

Archaeology South-East would like to thank Berkeley Homes (Southern) Ltd for commissioning the survey.

Bibliography

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BGS 2014 British Geological Survey, Geology of Britain Viewer, accessed 11.0.2014. <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Clark, A. 1996. Seeing Beneath the Soil. (2nd edition). London: Routledge.

SMR Summary Form

Site Code	-					
Identification Name and Address	Detailed Magnetometer Survey at Howard of Effingham School, Surrey					
County, District &/or Borough	Surrey					
OS Grid Refs.	512125 153960					
Geology	Lambeth Group – clay, silt and sand					
Arch. South-East Project Number	6839					
Type of Fieldwork	Eval.	Excav.	Watching Brief	Standing Structure	Survey	Other
Type of Site	Green Field	Shallow Urban	Deep Urban	Other Sports field		
Dates of Fieldwork	Eval.	Excav.	WB.	25th July 2014		
Sponsor/Client	Berkeley Homes (Southern) Ltd					
Project Manager	Paul Mason					
Project Supervisor	John Cook					
Period Summary	Palaeo.	Meso.	Neo.	BA	IA	RB
	AS	MED	PM	Other Modern		
<p>100 Word Summary.</p> <p><i>Archaeology South East was commissioned by Berkeley Homes (Southern) Ltd to undertake a detailed fluxgate gradiometer survey at Howard of Effingham School, Effingham, Surrey. The survey took place on the 25th July 2014. The survey area covered approximately 0.7 hectares and comprised a sports field. Evidence for archaeological features within the magnetic survey was sparse. However, the survey did successfully detect several linear and discrete anomalies of possible archaeological origin. Areas of magnetic disturbance may mask underlying features with a weaker magnetic signature. In general, the possible archaeological anomalies identified within the survey are indistinct. This may be due to the features themselves being ephemeral, overburden between the magnetometer and the feature, the result of more recent agricultural activity, infilling of natural features or a combination of these. Much of the magnetic debris and disturbance observed within the survey is undoubtedly related to modern activity.</i></p>						

OASIS form

OASIS ID: archaeol6-186087

Project details

Project name	A Detailed Magnetometer Survey at Howard of Effingham School (Site 1), Effingham, Surrey
Short description of the project	Archaeology South East was commissioned by Berkeley Homes (Southern) Ltd to undertake a detailed fluxgate gradiometer survey at Howard of Effingham School, Effingham, Surrey. The survey took place on the 25th July 2014. The survey area covered approximately 0.7 hectares and comprised a sports field. Evidence for archaeological features within the magnetic survey was sparse. However, the survey did successfully detect several linear and discrete anomalies of possible archaeological origin. Areas of magnetic disturbance may mask underlying features with a weaker magnetic signature. In general, the possible archaeological anomalies identified within the survey are indistinct. This may be due to the features themselves being ephemeral, overburden between the magnetometer and the feature, the result of more recent agricultural activity, infilling of natural features or a combination of these. Much of the magnetic debris and disturbance observed within the survey is undoubtedly related to modern activity.
Project dates	Start: 25-07-2014 End: 25-07-2014
Previous/future work	Yes / Not known
Any associated project reference codes	6839 - Contracting Unit No.
Type of project	Field evaluation
Site status	None
Current Land use	Community Service 1 - Community Buildings
Methods & techniques	"Geophysical Survey"
Development type	Public building (e.g. school, church, hospital, medical centre, law courts etc.)
Solid geology (other)	LAMBETH GROUP-CLAY, SILT AND SAND
Drift geology (other)	NONE RECORDED
Techniques	Magnetometry

Project location

Country	England
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Site location	SURREY GUILDFORD EFFINGHAM Howard of Effingham School
Postcode	KT24 5JR
Study area	0.70 Hectares
Site coordinates	TQ 12125 53960 51.2732255061 -0.392426527133 51 16 23 N 000 23 32 W Point

Project creators

Name of Organisation	Archaeology South East
Project brief originator	Archaeology South East
Project design originator	Archaeology South-East
Project director/manager	Paul Mason
Project supervisor	John Cook
Type of sponsor/funding body	Developer

Project archives

Physical Archive Exists?	No
Digital Archive recipient	n/a
Digital Contents	"Survey"
Digital Media available	"Geophysics","Images raster / digital photography","Survey","Text"
Paper Archive recipient	n/a
Paper Contents	"Survey"
Paper Media available	"Report","Survey ","Unpublished Text"

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	A Detailed Magnetometer Survey at Howard of Effingham School

(Site 1), Effingham, Surrey

Author(s)/Editor(s) Cook, J.

Date 2014

Issuer or publisher ASE

Place of issue or
publication Portslade

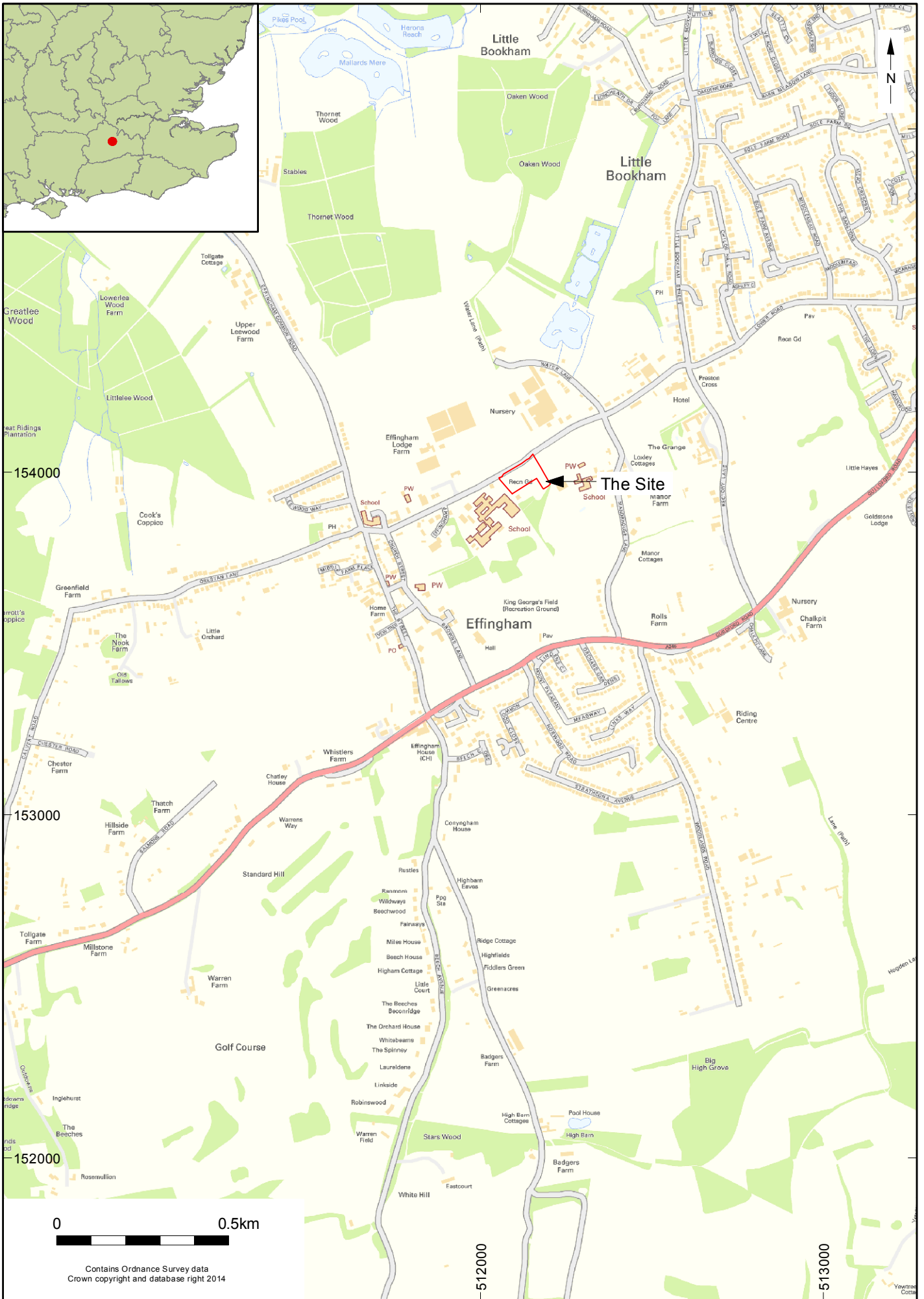
Entered by John Cook (john.cook@ucl.ac.uk)

Entered on 29 July 2014

Appendix 1

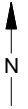
Included on C.D

1. Raw Magnetometry Data
2. Positive and negative trace plots



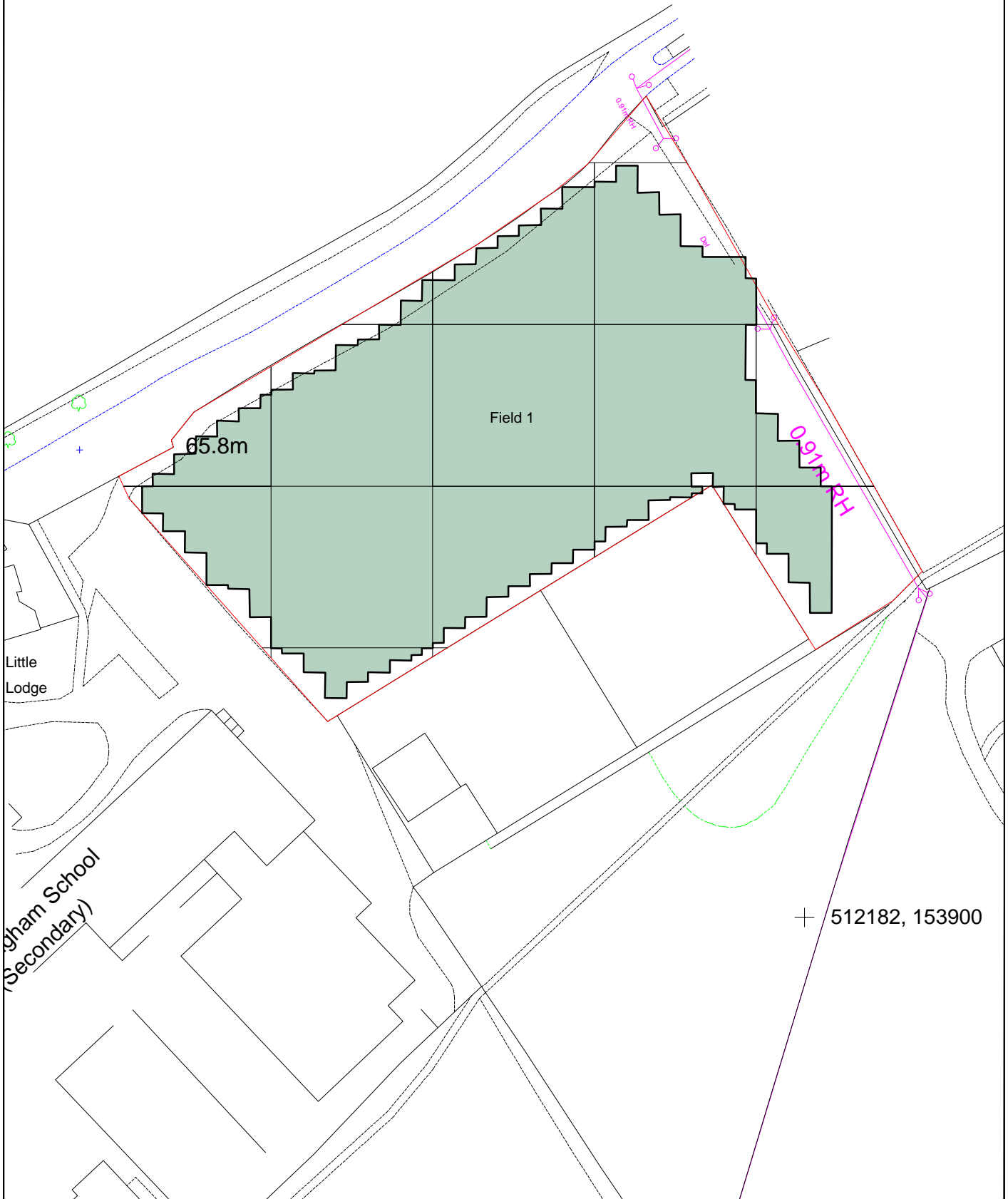
Contains Ordnance Survey data
Crown copyright and database right 2014

© Archaeology South-East		Howard of Effingham School		Fig. 1
Project Ref: 6839	July 2014	Site location		
Report Ref: 2014260	Drawn by: JC			



+ 512042, 154073

+ 512182, 154073



Little Lodge

gham School (Secondary)

65.8m

Field 1

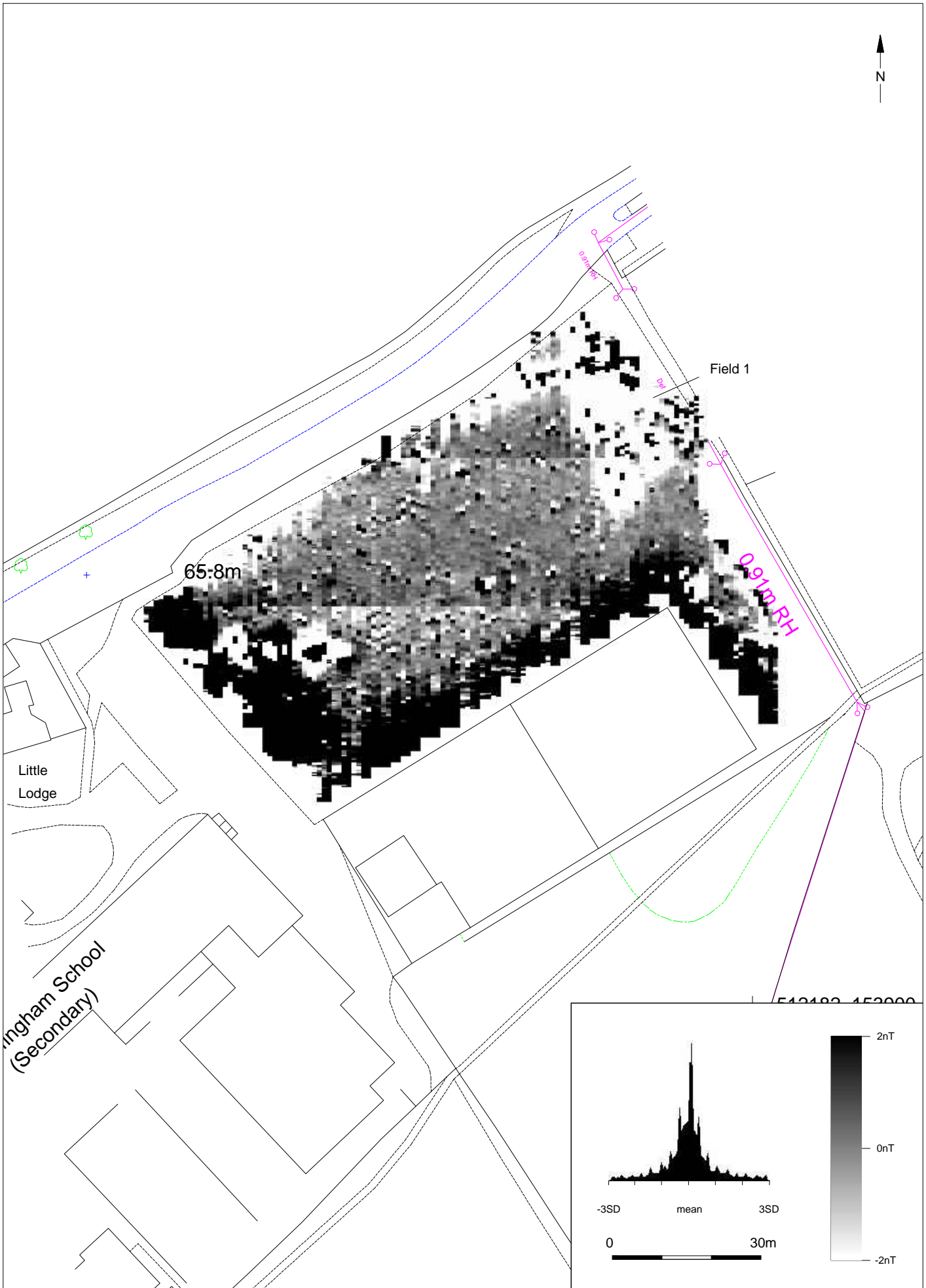
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+ 512182, 153900

© Archaeology South-East		Howard of Effingham School		Fig.2
Project Ref: 6839	July 2014	Geophysics Location Site 1		
Report Ref: 2014260	Drawn by: JC			



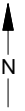
© Archaeology South-East		Howard of Effingham School		Fig.3
Project Ref: 6839	July 2014	Raw data		
Report Ref: 2014260	Drawn by: JC			



© Archaeology South-East		Howard of Effingham School		Fig.4
Project Ref: 6839	July 2014	Processed Data		
Report Ref: 2014260	Drawn by: JC			

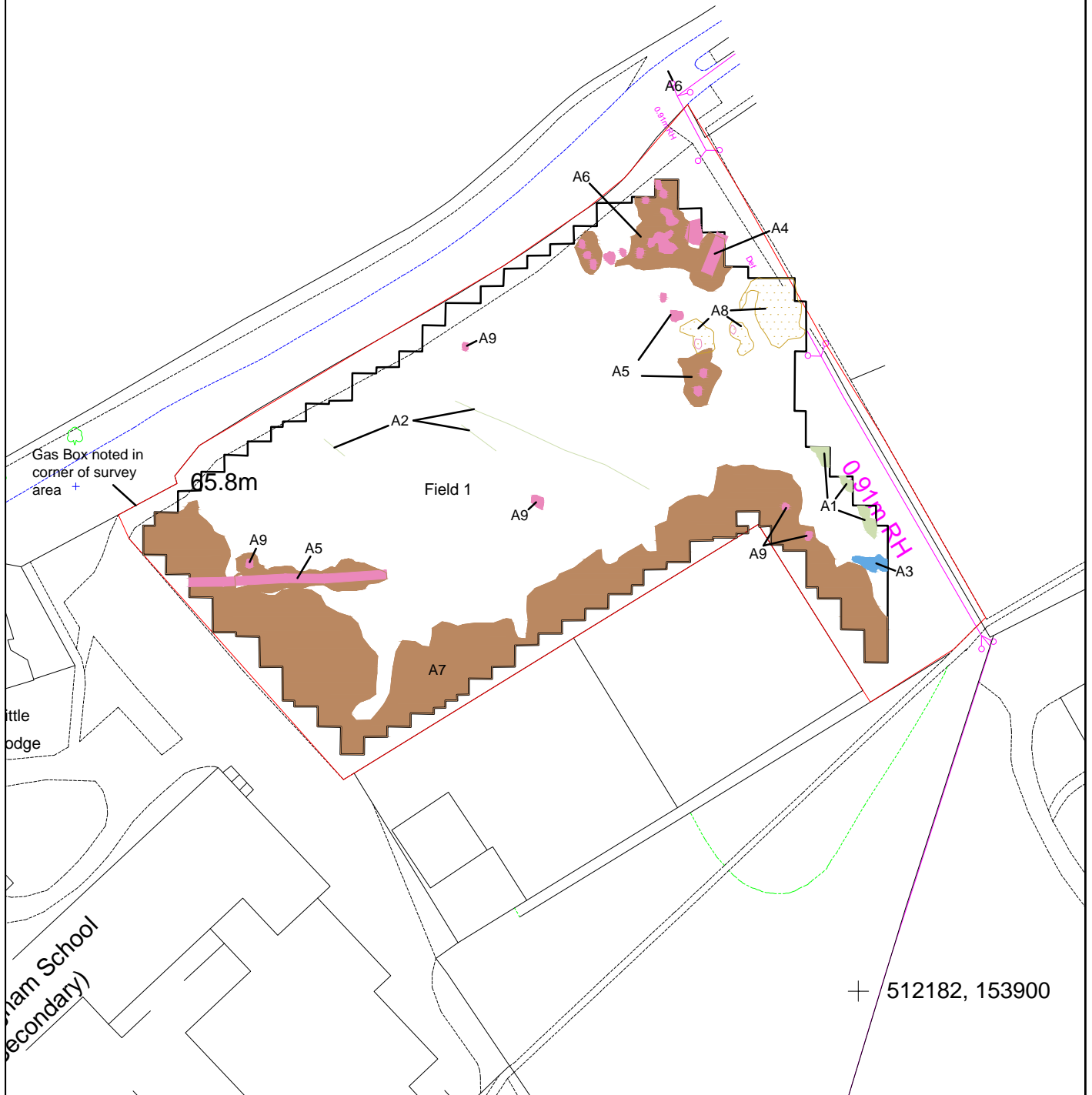
- Moderate positive anomaly (Possible archaeology)
- Weak positive anomaly (Possible archaeology)
- Moderate negative anomaly
- Weak negative anomaly
- Magnetic disturbance
- Magnetic debris
- Dipolar/Bipolar anomaly (Modern)
- Thermoremanent anomaly
- Linear anomaly land drain/former field boundary
- Linear positive anomaly possible agricultural origin
- Area positive anomaly possible agricultural origin

0 30m



+ 512042, 154073

+ 512182, 154073



© Archaeology South-East		Howard of Effingham School	Fig.5
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Fig. 6a Site shot looking north east



Fig. 6b Site shot facing East



Fig. 6c Gas "box" and boundary fences

© Archaeology South-East		Howard of Effingham School	Fig.6
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