

**Detailed Magnetometer Survey
Land West of Sweeter's Copse,
Alfold, Surrey**

**NGR: 504082 134540
(TQ 04082 34540)**

ASE Project No: 7342

OASIS ID: archaeol6-205068

ASE Report No. 2015063

**By John Cook BSc (Hons) AIFA
and Catherine Douglas BA (Hons)**

February 2015

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Abstract

Archaeology South East was commissioned by Catesby Property Group to undertake a magnetometry and fieldwalking survey on land to the west of Sweeter's Copse, Surrey. The survey covered approximately 7.2 hectares and took place on the 17th-19th February 2015. The survey area consisted of open fields bounded by the Loxwood Road to the west and by mature trees to the west and north and by semi-natural woodland to the east - Sweeter's Copse.

A series of positive anomalies representative of discrete features such as pits and ditches, and two roughly semi-circular shaped positive anomalies may represent archaeological features. A possible east-west aligned linear feature does not appear on available historic mapping of the site and may, therefore, represent an earlier boundary ditch. However, these anomalies may also relate to in filled natural features or geological variations.

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 Catesby Property Group to undertake a magnetometry and fieldwalking survey on land to the west of Sweeter's Copse, Surrey, hitherto referred to as 'the survey area' (centred on NGR: 504082 134540; Fig. 1).

1.1.2 A Desk-Based Assessment was prepared by ASE in 2014.

1.1.3 A Written Scheme of Investigation (WSI) for the survey was prepared by ASE in February 2015. All work was carried out in accordance with this document.

1.1.4 This report deals solely with the geophysics survey. The fieldwalking results will be reported on in due course.

1.2 Geology and topography

1.2.1 According to the British Geological Survey (BGS 2015) the natural geology of the site comprises Weald Clay Formation (Sandstone), which is seen across the majority of the site. There is an area of Mudstone towards the area of Sweeter's Copse to the east, and an over laying area of Alluvium to the north west of the site: they correspond with the line of a small stream that defines the field boundaries and forms the eastern boundary.

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; project managed by Darryl Palmer (fieldwork) and by Jim Stevenson (post fieldwork).

2.0 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 The following information is taken from the Desk-Based Assessment (ASE 2014). For a more detailed historical background please refer to this document.

2.2 Prehistoric

2.2.1 Three prehistoric sites have been recorded on SHER within the Study Area:

- At Little Hammer Wood Field , c. 0.7km to the east of the Site, 37 pieces of flint were recovered during the construction of a golf course, including 19 secondary flakes, 1 primary flake, 1 blade core, 2 core rejuvenating flakes and 5 complete or partial blades.
- During the extension to Wildwood Country Club, Horsham Road, c. 0.6km to the north east of the Site, a number of burnt flints were recovered during a watching brief, suggesting prehistoric activity in the area, but little else was noted in conditions not ideal for archaeological observation.
- A flint core, probably Mesolithic in date, a few burnt flints and two pieces of iron slag were found by Surrey County Council during site watching of site topsoil removal, c. 50m from the north western corner of the site.

2.3 Romano-British

2.3.1 One Romano-British entry has been recorded on SHER within the Study Area – An Alexandrian billon, a tetradrachm of Carus was found at Waynde, Alfold Crossways, c. 0.5km to the north of the Site. Nothing of the find or its whereabouts is known.

2.4 Anglo-Saxon

2.4.1 One site of Anglo-Saxon date has been recorded on SHER within the Study Area – the Grade I Listed Church of St Nicholas Church. The original Church is said to date to circa 1100, the south aisle to 1190, and the north aisle to c.1290. The Church was rebuilt in 1845 and has a 15th century bellcage.

2.5 Medieval

2.5.1 One medieval site is recorded on SHER within the study area: a Grade II Listed Building - Alfold Park Farm, which lies c. 0.8km to the west to the Site. The house, partly modernised, is timbered with a later Tudor chimney.

2.6 Post-medieval

- 2.6.1 Twenty three entries are recorded in the study area dating to the post-medieval period. One of these refers to a milestone located within the Village of Alfold, c. 0.6km south of the Site.
- 2.6.2 Ten entries refer to Listed Buildings located within Alfold c. 0.3 – 0.5km to the south of the Site, of these seven are Grade II Listed Buildings, and three are Grade II* Listed Buildings.
- 2.6.3 Five entries refer to Grade II Listed Buildings located c. 0.4km to the north, at Alford Crossways.
- 2.6.4 Three entries refer to Grade II Listed Buildings located between the two villages, c. 0.3km – 0.5km from the Site.
- 2.6.5 Two entries refer to locally listed buildings, located within Alfold, c. 0.4km from the site.

2.7 Additional site information

- 2.7.1 Local archaeologist Judy English undertook an informal fieldwalk of the site in December 2013 and noted concentrations of pottery (probably medieval in origin) and struck flint across the site (*pers comm*, Nick Truckle).

3.0 SURVEY METHODOLOGY

3.1 Geophysical survey

3.1.1 A fluxgate gradiometer (magnetometry) survey was undertaken in the area depicted in Figures 1 and 2 (NGR 504082 134540).

3.1.2 The field work was undertaken on 17th - 19th February 2015 when the weather was cold and sunny with occasional heavy 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. Figures 3, 4 and 5 display the processed survey data.

3.5 Data presentation

3.5.1 Data is presented using images exported from Geoplot into Autocad software and inserted into the geo-referenced site grid. Data is presented (Figures 3-4) as raw data, processed data greyscale plots and

interpolated data (Figure 5).

4.0 GEOPHYSICAL SURVEY RESULTS (Figures 5 and 6)

4.1 Description of site

4.1.1 The site is located near the village of Alfold. It is bounded by the Loxwood Road to the west and by mature trees to the west and north and by semi-natural woodland to the east - Sweeter's Copse. The site itself consists of open fields and measures c. 7.2ha.

4.1.2 According to the British Geological Survey the natural geology of the site comprises Weald Clay Formation (Sandstone), which is seen across the majority of the site. There is an area of Mudstone towards the area of Sweeter's Copse to the east, and an over laying area of Alluvium to the north west of the site: they correspond with the line of a small stream that defines the field boundaries and forms the eastern boundary.

4.2 Survey limitations

4.2.1 A dense thicket in the eastern part of the site was omitted from the survey. Where ground cover formed a physical barrier or where combined with ground conditions were considered to pose a health and safety risk these areas were omitted from the survey (Figure 2).

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 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 6)**
- Magnetometry results
- 4.4.1 Possible archaeological features were identified across the area in the form of discrete moderate positive anomalies and moderate positive linear anomalies which may represent cut features such as pits and ditches. However these anomalies may also relate to in filled natural features or modern agricultural activity.
- 4.4.2 A strong positive linear anomaly in Field 1, aligned roughly east-west is not shown on available historic mapping, therefore may represent an earlier field boundary ditch (A1).
- 4.4.3 Two moderate positive anomalies aligned north-west – south-east (A2) (A3) and two parallel linear moderate positive anomalies (A4) and a further two parallel moderate positive anomalies (A5) may relate to cut features such as ditches, although these features may be the result of ploughing, or other modern agricultural activity. The moderate positive anomalies at A6 may relate to geological variation.
- 4.4.3 A semi-circle shaped moderate positive anomaly was identified in the north-west corner of Field 2 (B1), and a roughly circular shaped weak positive anomaly was identified in the north end of Field 1 (C1). These anomalies may represent cut features, although they may also relate to in filled natural features or more modern agricultural activity.
- 4.4.4 A weak amorphous positive anomaly covering a fairly large area may represent a change in geology (C2). The ground surface was more waterlogged in this part of the site. It may relate to an area of Alluvium shown on the British Geological Survey mapping (BGS 2014) just to the North.
- 4.4.5 Linear weak positive anomalies on a northeast-southwest alignment at the north end of Field 1 may represent a cut feature such as a ditch, (C3), although they are slightly amorphous in nature, therefore may

reflect a geological feature or variations in the geology.

- 4.4.6 A number of bipolar anomalies across the area (D1, Field 1 and D2, Field 2) are likely to indicate discrete ferrous objects, such as modern material in the near surface. Occasional pieces of slag were identified on the ground surface throughout the survey, so it is possible that some of the bipolar anomalies relate to more buried slag in the near surface.
- 4.4.7 Areas of magnetic disturbance were identified along the west edge, and in a small area along the north-east edge of Field 1, (E1), resulting from the surrounding metal fences, or from ferrous metals within the undergrowth.
- 4.4.8 An area of magnetic debris in Field 2 is likely to relate to ground disturbance.

5.0 CONCLUSION

5.1 Discussion

- 5.1.1 Possible archaeological features were represented by discrete and linear positive anomalies, a semi-circle shaped anomaly and a circular shaped anomaly (A1-A5, B1 and C1-C3). It is entirely possible, however, that these anomalies may relate to in-filled natural features or more modern agricultural activity and are not definitively of archaeological origin.
- 5.1.2 Historic mapping shows the field boundaries have remained much the same from the late 1800's; no other boundaries are shown within the site boundary on available historic mapping. It is possible therefore that the east-west linear anomaly in Field 1 (A1) represents an earlier field boundary.
- 5.1.3 An amorphous moderate positive anomaly in Field 2 (C2) may indicate a change in geology, or perhaps a geological feature such as a palaeochannel.
- 5.1.4 Some of the anomalies identified may be the result of more recent agricultural activity, infilling of natural features or combination of these. For this reason the geophysical anomalies would need to be tested by invasive techniques (e.g. targeted trial trenching) to assess their precise nature.

Bibliography

ASE 2014. *Land West of Sweeter's Copse, Alfold, Surrey: Historic Environment Desk-Based Assessment*

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Ordnance Survey 1870 1:1,800 Map of Alfold, Surrey, accessed 02.03.14
<http://digimap.edina.ac.uk/ancientroam/historic>

Acknowledgements

Archaeology South-East would like to thank Catesby Property Group for commissioning the survey.

SMR Summary Form

Site Code	ALF 15					
Identification Name and Address	Land West of Sweeter's Copse, Alfold					
County, District &/or Borough	Surrey					
OS Grid Refs.	TQ 504082 134540					
Geology	Weald Clay					
Arch. South-East Project Number	7342					
Type of Fieldwork	Eval.	Excav.	Watching Brief	Standing Structure	Survey	Other
Type of Site	Green Field	Shallow Urban	Deep Urban	Other		
Dates of Fieldwork	Eval.	Excav.	WB.	17th – 19th February 2015		
Sponsor/Client	Catesby Property Group					
Project Manager	Darryl Palmer					
Project Supervisor	John Cook					
Period Summary	Palaeo.	Meso.	Neo.	BA	IA	RB
	AS	MED	PM	Other Unknown Modern		
<p>100 Word Summary.</p> <p>Archaeology South East was commissioned by Catesby Property Group to undertake a magnetometry and fieldwalking survey on land to the west of Sweeter's Copse, Surrey. The survey covered approximately 7.2 hectares and took place on the 17th-19th February 2015. The survey area consisted of open fields bounded by the Loxwood Road to the west and by mature trees to the west and north and by semi-natural woodland to the east - Sweeter's Copse.</p> <p>A series of positive anomalies representative of discrete features such as pits and ditches, and two roughly semi-circular shaped positive anomalies may represent archaeological features. A possible east-west aligned linear feature does not appear on available historic mapping of the site and may, therefore, represent an earlier boundary ditch. However, these anomalies may also relate to in filled natural features or geological variations.</p>						

OASIS form

OASIS ID: archaeo16-205068

Project details

Project name	Detailed Magnetometer Survey: Land West of Sweeter's Copse, Alfold
Short description of the project	<p>Archaeology South East was commissioned by Catesby Property Group to undertake a magnetometry and fieldwalking survey on land to the west of Sweeter's Copse, Surrey. The survey covered approximately 7.2 hectares and took place on the 17th-19th February 2015. The survey area consisted of open fields bounded by the Loxwood Road to the west and by mature trees to the west and north and by semi-natural woodland to the east - Sweeter's Copse.</p> <p>A series of positive anomalies representative of discrete features such as pits and ditches, and two roughly semi-circular shaped positive anomalies may represent archaeological features. A possible east-west aligned linear feature does not appear on available historic mapping of the site and may, therefore, represent an earlier boundary ditch. However, these anomalies may also relate to in filled natural features or geological variations.</p>
Project dates	Start: 17-02-2015 End: 19-02-2015
Previous/future work	No / Not known
Type of project	Recording project
Site status	None
Current Land use	Cultivated Land 3 - Operations to a depth more than 0.25m
Monument type	CHURCH Early Medieval
Significant Finds	FLINT CORE Mesolithic
Investigation type	"Geophysical Survey"
Prompt	Planning condition
Solid geology	WEALD CLAY
Drift geology	ALLUVIUM
Techniques	Magnetometry

Project location

Country England
Site location SURREY WAVERLEY ALFOLD Land West of Sweeter's Copse
Study area 7.20 Hectares
Site coordinates TQ 504082 134540 50.9003690533 0.139225952854 50 54 01
N 000 08 21 E Polygon

Project creators

Name of Organisation Archaeology South-East
Project brief originator Archaeology South-East
Project design originator Surrey County Council
Project director/manager Darryl Palmer
Project supervisor John Cook
Type of sponsor/funding body Client
Name of sponsor/funding body Catesby Property Group

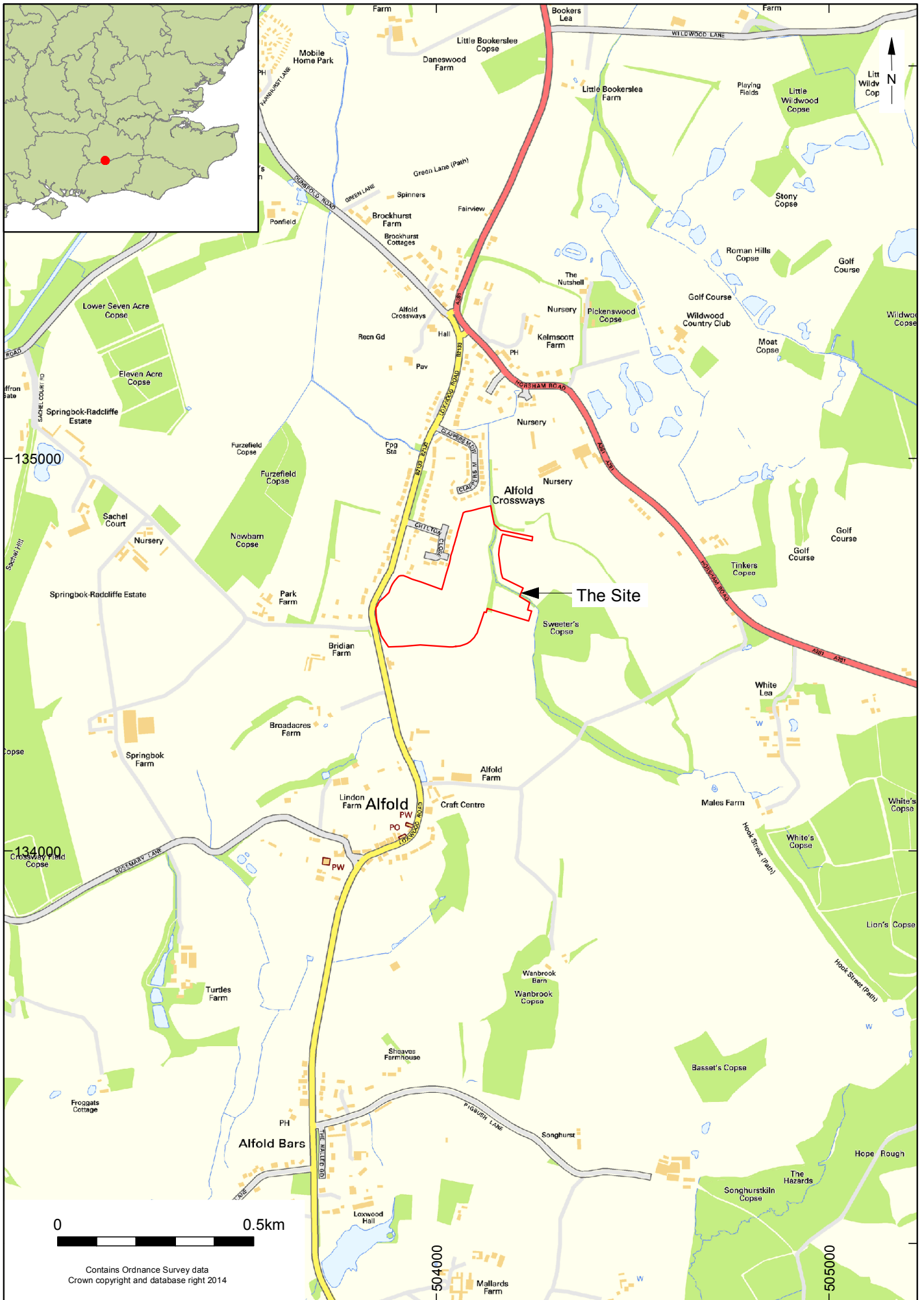
Project archives

Physical Archive Exists? No
Digital Archive recipient Local Museum
Digital Contents "Survey"
Digital Media available "Geophysics", "Images raster / digital photography", "Text"
Paper Archive recipient Local Museum
Paper Media available "Plan", "Report", "Survey "

Entered by Catherine Douglas (catherine.douglas@ucl.ac.uk)
Entered on 2 March 2015

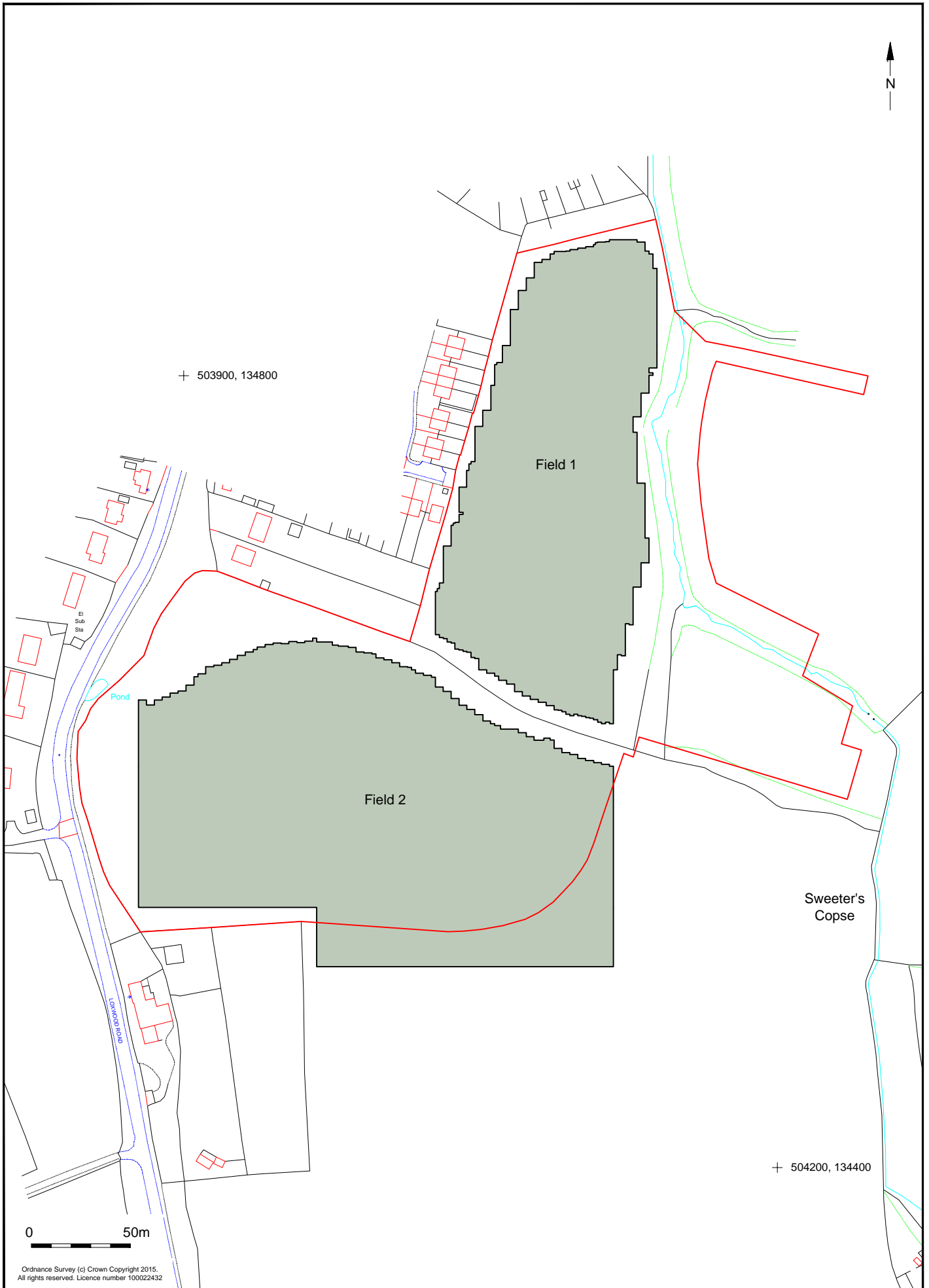
Appendix 1
Included on C.D

1. Raw Magnetometry Data



Contains Ordnance Survey data
Crown copyright and database right 2014

© Archaeology South-East		Land west of Sweeter's Copse, Alföld		Fig. 1
Project Ref: 7342	Feb 2015	Site location		
Report Ref: 2015063	Drawn by: JLR			

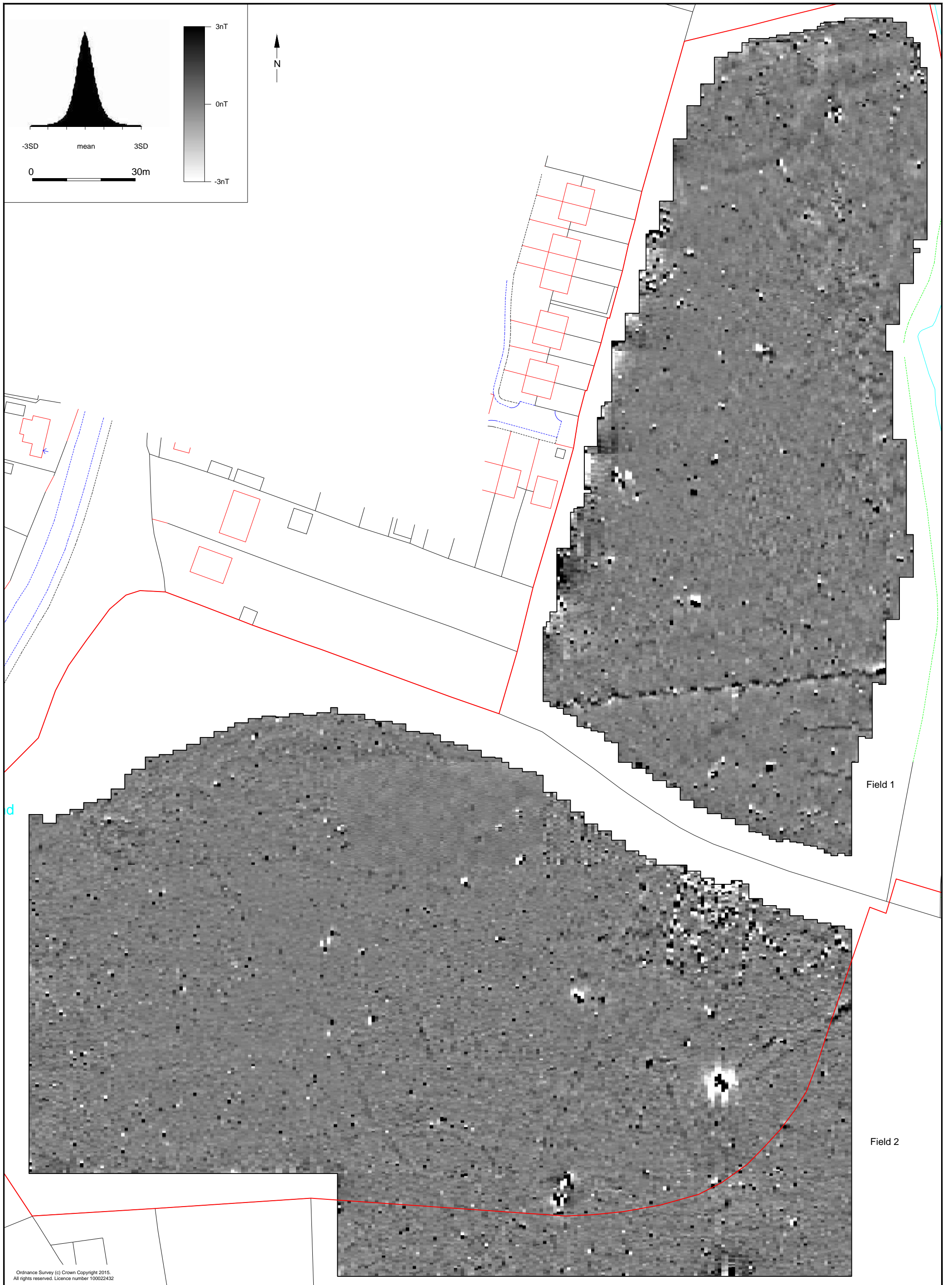


© Archaeology South-East		Land west of Sweeter's Copse, Alford	Fig. 2
Project Ref: 7342	Feb 2015	Location of geophysics survey	
Report Ref: 2015063	Drawn by: JLR		



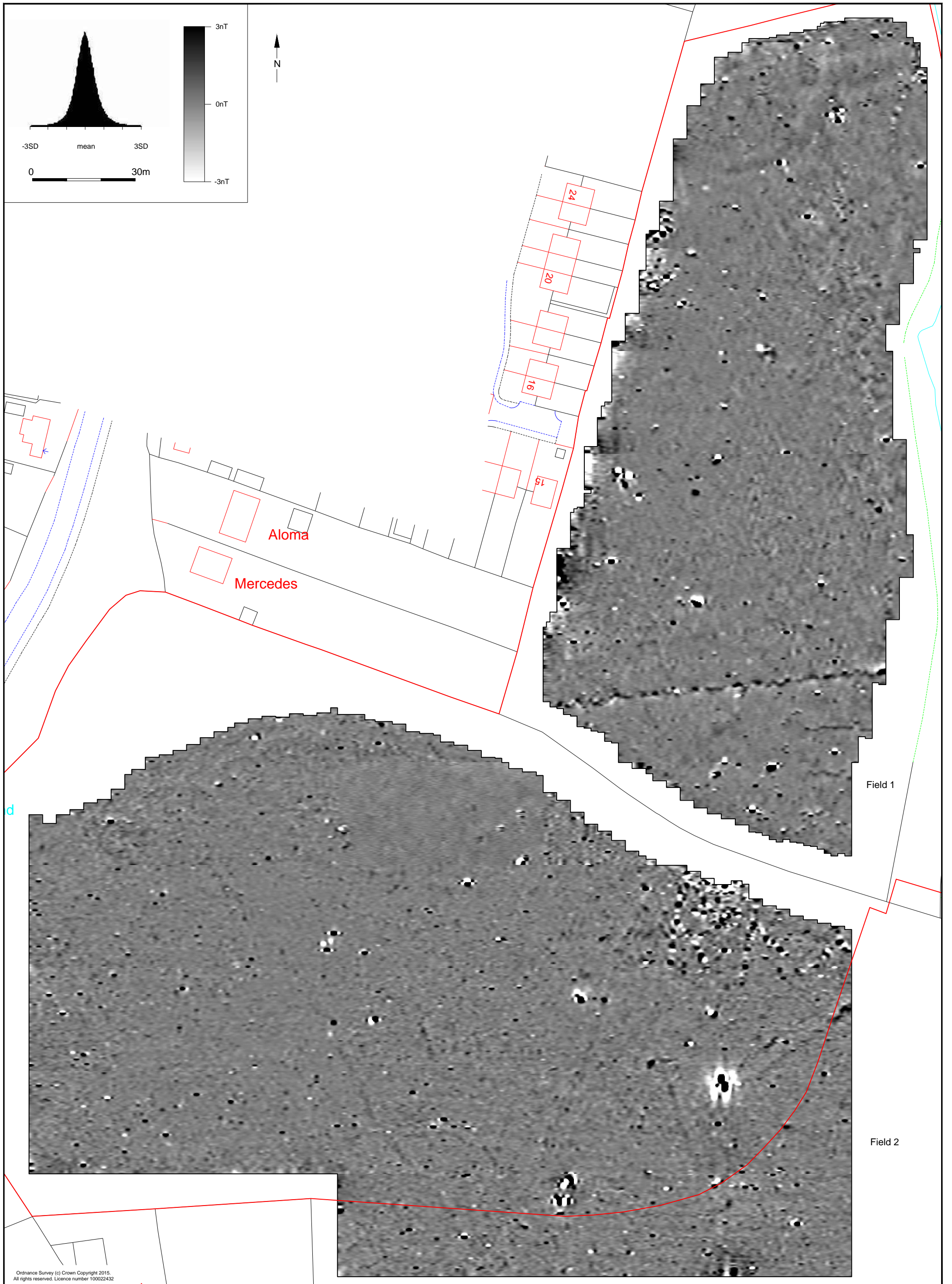
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© Archaeology South-East		Land west of Sweeter's Copse, Alfold	Fig. 3
Project Ref: 7342	Feb 2015	Raw data	
Report Ref: 2015063	Drawn by: JLR		



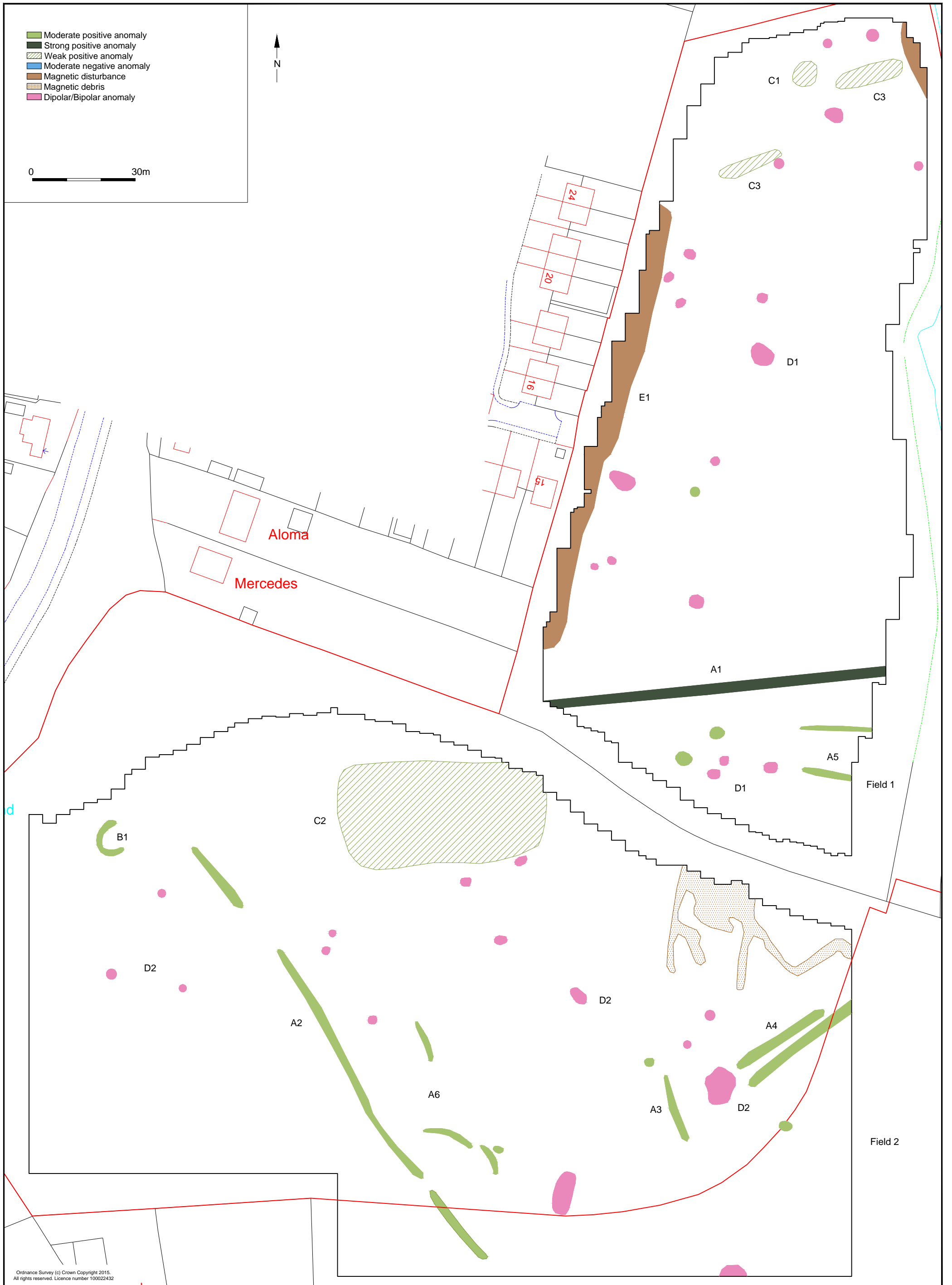
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© Archaeology South-East		Land west of Sweeter's Copse, Alfold	Fig. 4
Project Ref: 7342	Feb 2015	Processed data	
Report Ref: 2015063	Drawn by: JLR		



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© Archaeology South-East		Land west of Sweeter's Copse, Alfold	Fig. 5
Project Ref: 7342	Feb 2015	Interpolated data	
Report Ref: 2015063	Drawn by: JLR		



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© Archaeology South-East		Land west of Sweeter's Copse, Alfold	Fig. 6
Project Ref: 7342	Feb 2015	Interpretation	
Report Ref: 2015063	Drawn by: JLR		

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