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LAND NORTH OF THE SHADE, SOHAM, CAMBRIDGESHIRE

GEOPHYSICAL SURVEY

Authors: Mark Blagg-Newsome (Fieldwork & Report) Dr David Bescoby (Report) Lauren Wilson (Background Research)	
NGR: TL 5887 7471	Report No: 5171
District: East Cambridgeshire	Site Code: ECB4769
Approved: Claire Halpin MCIfA Signed:	Project No: 6747
	Date: 18th July 2016

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OASIS SUMMARY SHEET

Project details			
Project name	*Land North of The Shade, Soham, Cambridgeshire*		
In July 2016, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on 3.8 hectares of land north of The Shade, Soham, Cambridgeshire (NGR TL 5887 7471). The survey was commissioned to inform and support a planning application for a proposed residential development consisting of approximately 90 dwellings (Cambridgeshire County Council Planning Ref. 12/00247/OUM). *The survey identified a series of NE-SW positive linear anomalies in the south-eastern portion of the survey area (**1**). These probably represent the ploughed-out remnants of ridge and furrow cultivation. These ridge and furrow appear to respect the footpath in the middle of Field B (**2**), which could indicate that the footpath has an ancient field boundary antecedent. A very weak small linear response forming an inverted 'L' shape (**3**) may also be of archaeological origin. The geophysical survey also identified several parallel weakly positive linear anomalies in the northern field that probably relate to modern ploughing activity (**4**), along with three very weak anomalies (**5**, **6** & **7**), which may relate to field drains.*			
Project dates (fieldwork)	*4th-5th July 2016*		
Previous work (Y/N/?)	*N*	Future work	*Trial trenching*
P. number	*6747*	Site code	*ECB4769*
Type of project	*Geophysical Survey*		
Site status	-		
Current land use	*Agricultural land*		
Planned development	*Residential development*		
Main features (+dates)	*Six parallel NE-SW linear anomalies represent probable ridge and furrow (**1**).* *Ridge and furrow respects footpath (**2**), which may have ancient field boundary precursor.* *A weakly negative, angled linear anomaly (**3**) may also be of archaeological origin.* *Eight parallel NE-SW weakly positive linear anomalies probably related to modern plough scars (**4**).* *Three weakly positive linear anomalies (**5**, **6** & **7**) may represent drainage features.*		
Significant finds (+dates)	-		
Project location			
County/ District/ Parish	*Cambridgeshire*	*East Cambridgeshire*	*Soham*
HER/ SMR for area	*Cambridgeshire Historic Environment Record (CHER)*		
Post code (if known)	*CB7 5DE*		
Area of site	*c.3.8ha*		
NGR	*TL 5887 7471*		
Height AOD (max/ min)	*c.5m AOD*		
Project creators			
Brief issued by	*Andy Thomas, Historic Environment Team, CCC*		
Project supervisor/s	*Mark Blagg-Newsome*		
Funded by	*CJ Murfitt Ltd*		
Full title	*Land North of The Shade, Soham, Cambridgeshire: Geophysical Survey*		
Authors	*Blagg-Newsome, M., Bescoby, D. and Wilson, L.*		
Report no.	*5171*		
Date (of report)	*July 2016*		

LAND NORTH OF THE SHADE, SOHAM, CAMBRIDGESHIRE

GEOPHYSICAL SURVEY

SUMMARY

In July 2016, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on 3.8 hectares of land north of The Shade, Soham, Cambridgeshire (NGR TL 5887 7471). The survey was commissioned to inform and support a planning application for a proposed residential development consisting of approximately 90 dwellings (Cambridgeshire County Council Planning Ref. 12/00247/OUM).

*The survey identified a series of NE-SW positive linear anomalies in the south-eastern portion of the survey area (**1**). These probably represent the ploughed-out remnants of ridge and furrow cultivation. These ridge and furrow appear to respect the footpath in the middle of Field B (**2**), which could indicate that the footpath has an ancient field boundary antecedent. A very weak small linear response forming an inverted 'L' shape (**3**) may also be of archaeological origin. The geophysical survey also identified several parallel weakly positive linear anomalies in the northern field that probably relate to modern ploughing activity (**4**), along with three very weak anomalies (**5**, **6** & **7**), which may relate to field drainage.*

1 INTRODUCTION

1.1 In July 2016, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on 3.8 hectares of land north of The Shade, Soham, Cambridgeshire (NGR TL 5880 7470). The survey was commissioned to inform and support a planning application for a proposed residential development consisting of approximately 90 dwellings (Cambridgeshire County Council Planning Ref. 12/00247/OUM).

1.2 The project was carried out in accordance with a brief issued by Cambridgeshire County Council Historic Environment Team (HET; Andy Thomas, dated 20th May 2016), and a specification compiled by AS (dated 25th May 2016) and approved by CCC HET. The geophysical survey was carried out in accordance with the Historic England document *Geophysical Survey in Archaeological Field Evaluation* (2008), and CIfA, *The use of Geophysical Techniques in Archaeological Evaluations* and *CIfA Standard and Guidance for Archaeological Geophysical Survey (2014).*

Objectives

1.3 The investigation of the site by geophysical survey was designed to determine the nature, extent and significance of sub-surface features in order to inform and target further trial trench evaluation of the site.

Planning policy context

1.4 The National Planning Policy Framework (NPPF 2012) states that those parts of the historic environment that have significance because of their historic, archaeological, architectural or artistic interest are heritage assets. The NPPF aims to deliver sustainable development by ensuring that policies and decisions that concern the historic environment recognise that heritage assets are a non-renewable resource, take account of the wider social, cultural, economic and environmental benefits of heritage conservation, and recognise that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. The NPPF requires applications to describe the significance of any heritage asset, including its setting that may be affected in proportion to the asset's importance and the potential impact of the proposal.

1.5 The NPPF aims to conserve England's heritage assets in a manner appropriate to their significance, with substantial harm to designated heritage assets (i.e. listed buildings, scheduled monuments) only permitted in exceptional circumstances when the public benefit of a proposal outweighs the conservation of the asset. The effect of proposals on non-designated heritage assets must be balanced against the scale of loss and significance of the asset, but non-designated heritage assets of demonstrably equivalent significance may be considered subject to the same policies as those that are designated. The NPPF states that opportunities to capture evidence from the historic environment, to record and advance the understanding of heritage assets and to make this publicly available is a requirement of development management. This opportunity should be taken in a manner proportionate to the significance of a heritage asset and to impact of the proposal, particularly where a heritage asset is to be lost.

2 DESCRIPTION OF THE SITE

2.1 The site lies near the north-western tip of Soham, between The Shade and the A142. The plot of land is an irregular shape and fronts The Shade to the south-west and Northfield Road to the north-east. To the south-east, the site abuts residential properties whilst further fields lie to the north-east. A business park lies to the north.

2.2 The site lies at approximately 5m AOD in a fenland environment, with the landscape to the south-west of the town scattered with drainage channels. The Soham Lode drain runs along the south-western border of the town, running into the River Great Ouse 5km to the north-west.

2.3 The underlying geology forms part of the Gault formation, a mudstone formed in the Cretaceous period. The overlying soil type is a lime-rich, loamy and clayey soil with impeded drainage.

3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Prehistory

3.1 Excavations at Cloverfield Drive prior to development *c.*400m to the south-west (ECB2139) revealed the area had been pasture, with field wells from the Bronze Age through to the Anglo-Saxon period (CHER MCB16867). Further to the south an evaluation and subsequent excavation revealed Late Bronze Age pottery, animal bone and burnt flint, as well as Late Iron Age pottery and a field system (CHER MCB19766).

Romano-British

3.3 South of the main town, approximately 2km south east of the site, excavations along Fordham Road found a series of Roman enclosure ditches and pits of probable 2nd-century date (Sutherland 2002), which may have been associated with a possible dwelling. Excavations at the former Fordham Road Allotments recorded Bronze Age and Roman enclosures, in conjunction with possible evidence for Roman timber buildings and a metalled surface or trackway (Connor 2001). Subsequent excavations of this site recorded ovens, corn-driers and a possible kiln representing agricultural yards or compounds for the collection and processing of produce, situated to the south of metalled road on the shoreline of the fen island (Quinn & Newton 2014, 5). Pastureland with field wells still occupied the area to the south-west during this period, as confirmed by excavations at Cloverfield Drive (ECB2139).

Medieval

3.4 A settlement at Soham was certainly well established by the late Saxon period. Allegedly an abbey and monastery was founded here in the 7th century, although investigation at the church found no evidence of a structure predating the extant church (12th century) (Hatton 1998). Late Saxon or Saxo-Norman occupation evidence has been found throughout Soham, with principal sites investigated at Pratt Street, *c.*1km south of the site (Hatton & Last 1997) and nearby at Station Road (Heawood 1997). The Anglo-Saxon period is the last period in which the area around Cloverfield Road remained as pasture.

3.5 Before the fens were drained, Soham was a seaport town with water links to Kings Lynn and The Wash via the River Ouse. Within Soham, goods yard and old docks are evident. The mere has been claimed to be one of the largest in England, possibly second only to Whittlesey Mere in south England (www.soham.org.uk/history).

3.6 As with the present town layout, medieval Soham probably extended from the southeast to northwest, comprising networks of closes and crofts off the main road. In the Medieval period two houses were built on the Cloverfield Road site, associated with wells that contained large amounts of pottery,

wooden objects and leather shoes (CHER MCB16867). However further to the south-east remained agricultural, and field systems and scattered pottery were found *c.*980m to the south (CHER MCB19766). Medieval sherds have been uncovered *c.*160m to the north-east (CHER 07103) and a medieval windmill lies to the north (CHER 06946).

Post-medieval

3.7 Evaluations to the south-west revealed a post-medieval field system or drainage system possibly relating to the draining of Soham Mere (CHER CM15241). A post-medieval brick kiln is recorded on the 1841 tithe map *c.*570m to the north-west (CHER 07088).

Undated

3.8 Over the road from the site, undated ditches were uncovered during the evaluation prior to the building of the new school. Identified as drainage ditches, each was on a different alignment, so not thought to be related, and no finds were present (CHER MCB19797).

4 METHOD OF WORK

Introduction

4.1 The magnetic survey was performed using a dual sensor Grad601-2 Magnetic gradiometer manufactured by Bartington instruments Ltd. The gradiometer measures small distortions in the earth's magnetic field caused by the presence of magnetically susceptible buried objects. The instrument is extremely stable and capable of detecting changes in magnetic field strength of the order of 0.03 nanoTesla (nT/m).

Survey Methodology

4.2 Grid squares measuring 30m x 30m were set out across the entirety of the survey area, forming a grid network – see **Fig. 3**. The exact spatial location of the survey grid was recorded using a Leica GS09 GPS smart rover. Geophysical data were collected systematically in a zig-zag pattern within each grid square along traverses spaced at 1 m apart. The gradiometers were configured to record measurements at 0.25m intervals along each traverse, giving a total of 3600 measurements per grid square.

4.3 The entire site margin was overgrown, preventing effective survey up to the site boundary. In addition, areas of overgrown vegetation were present within the survey area in Fields B and C, which have resulted in blank spots in the data.

Data Processing

4.4 The remedial processing of the data can enhance anomalous responses caused by potential archaeological features and eliminate magnetic noise from natural/modern sources. Data processing also allows for the correction of spatial errors introduced during the survey and inherent instrument heading errors. The survey data were processed using Terrasurveyor LITE software, where the following data processing routines were applied:

Despike: Removal of random, high amplitude 'iron spikes' present in the data caused by ferrous debris in the near surface.

Destripe: Removal of striping effects from the raw data caused by discrepancies between different sensors and walking directions.

Destagger: Correction of the displacement of anomalies caused by alternate zig-zag traverses.

Clip: Clipping the data replaces all values outside a specified minimum and maximum with those values. This reduces the large dynamic range of the data, improving the visibility of weaker magnetic anomalies. The data were clipped to -3nT and +3nT.

Interpolation: Finally the overall appearance of the data were improved (smoothed) by adding interpolated data points between each traverse using a binomial function.

Display and interpretation

4.5 The processed data are displayed as a greyscale magnetic map (**Fig. 5**) and the interpretation of anomalous magnetic responses undertaken manually with recourse to documented responses from subsequently excavated features along with reference to Cambridgeshire HER and historic map data. A graphical interpretative plan of the site identifying potential archaeological features (**Fig. 6**) was then produced in AutoCAD LT2015.

5 RESULTS

5.1 The unprocessed data from the magnetic survey are shown in **Fig. 4**, displayed as an x-y trace plot indicating the overall range of magnetic values recorded within the study area. A greyscale plot of the processed data, following the application of the data processing methodology described in 4.4, is shown in **Fig. 5**. The processed data revealed several anomalies indicative of archaeological features, including potential ridge and furrow linear anomalies (**1**), a footpath/ boundary, which is still in use as a right of way (**2**), as well as a series of linear anomalies most likely indicative of modern plough scars (**3**). All these features are plotted in **Fig. 6**, with their interpretation

described below.

Archaeological Anomalies

5.2 In the south-eastern portion of the site, the survey revealed a total of six positive linear trending anomalies of probable archaeological origin, orientated NE-SW (**1**). They run across the two southern fields (B and C), are approximately 58m to 150m in length, and are most likely representative of ploughed-out remnants of ridge and furrow cultivation. These linears appear to respect the footpath (**2**) running across the middle of the south-western field, which may indicate that the path respects a previous field boundary. The anomaly runs N-S and is *c*.49m in length.

5.3 In the south-eastern corner of Field A, a weak negatively trending linear response was recorded, following an approximate NE-SW alignment for *c*.15m before turning sharply to the NE and running for a further 10m (**3**). The very faint nature of this response, occurring over an area of disturbed ground (see below), make interpretation difficult, although it could conceivably be derived from surviving archaeological deposits.

Modern Disturbance

5.4 In Field A, a series of weakly positive linear trending anomalies were observable in the data (**4**). These were aligned NE-SW, running between *c*.18m and *c*.89m in length. The parallel and weakly positive nature of these anomalies suggests that they represent plough scars from modern cultivation.

5.5 Three further very weak, narrow linear anomalies were also detected in each of the fields surveyed (**5**, **6** & **7**). Anomalies (**5**) and (**6**) appear broadly parallel and it is possible these reflect the presence of some form of field drainage.

5.6 In Fields A and B, there were several patches of dense vegetation that were still able to be surveyed. However, a degree of magnetic interference is observable in the data (**8**), due to difficulties in orientating the magnetometers accurately. These areas of increased magnetic noise may potentially be obscuring other weaker magnetic responses derived from the sub-surface.

5.7 All the boundaries in the survey produced a degree of magnetic disturbance (**9**), due to the presence of wire fencing. This disturbance is particularly prevalent in the south-eastern portion of Field A, where it is exacerbated by the presence of metal buildings in close proximity to the east of the field, displayed as a bipolar magnetic response. In the northern part of Field C, magnetic disturbance results from the presence of a metallic trough by the fence line, creating a larger halo effect than the surrounding boundary disturbance (**10**). All these magnetic responses have the potential to mask weaker sub-surface responses.

5.8 Numerous high amplitude magnetic spikes can be seen in the data (**11**). Each of these discrete magnetic spikes consists of a well defined dipolar response. Their high amplitudes suggest the presence of ferrous debris in the plough soil.

6 CONCLUSIONS

6.1 The geophysical survey has identified several anomalies which could be of archaeological origin. These were six parallel NE-SW positively trending linear magnetic responses consistent with the remains of ridge and furrow (**1**). These appear to respect a footpath (**2**), which could indicate an older origin for this anomaly. A very weak, negative linear anomaly forming an inverted 'L' shape (**3**), might also be of archaeological significance.

6.2 In the most northern field in the survey area (Field A), a series of weakly NE-SW positive linear trending anomalies were observable in the data (**4**). The parallel and weakly positive nature of these anomalies is suggestive of modern ploughing activity. Three further very faint and narrow positive anomalies may relate to field drainage (**5**, **6** & **7**).

6.3 The relatively clear magnetic contrasts seen in the data indicate that the underlying geology and site formation processes were conducive to magnetic gradiometer survey. However, there were areas of the site which could not be surveyed due to standing vegetation, as well as large areas of magnetic interference around the site boundaries (**9**, **10**) and areas of disturbed ground (**8**). All of these could have inhibited the recognition of further anomalies of archaeological origin.

ACKNOWLEDGEMENTS

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Web resources

www.soham.org.uk/history

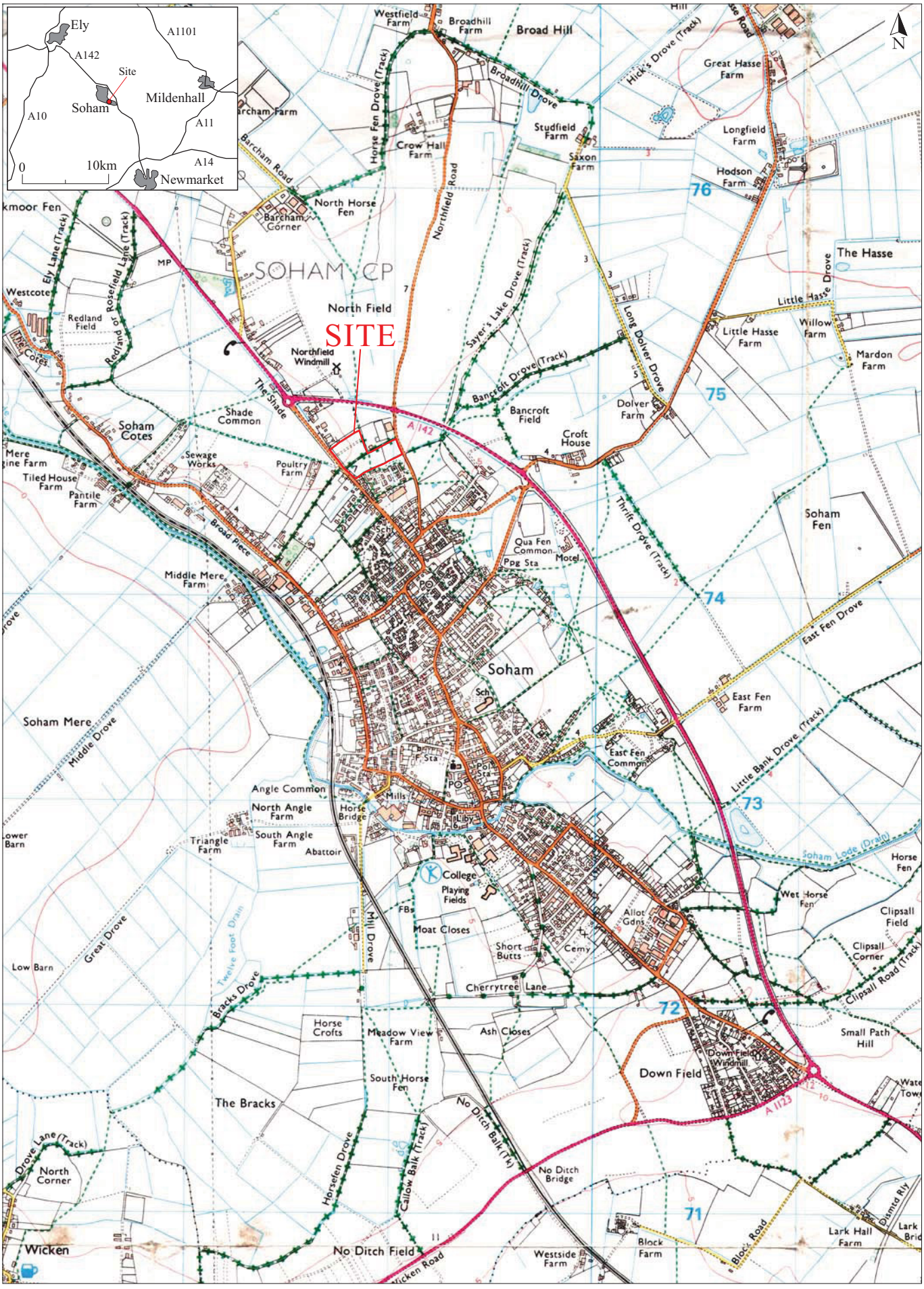

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Fig. 1 Site location plan

Scale 1:25,000 at A4

The Shade, Soham, Cambridgeshire (P6747)

Reproduced from the Ordnance Survey 1:2500 map with the permission of Her Majesty's Stationery Office. © Crown copyright Archaeological Solutions Ltd Licence number 100036680.

0 1:2500 150m

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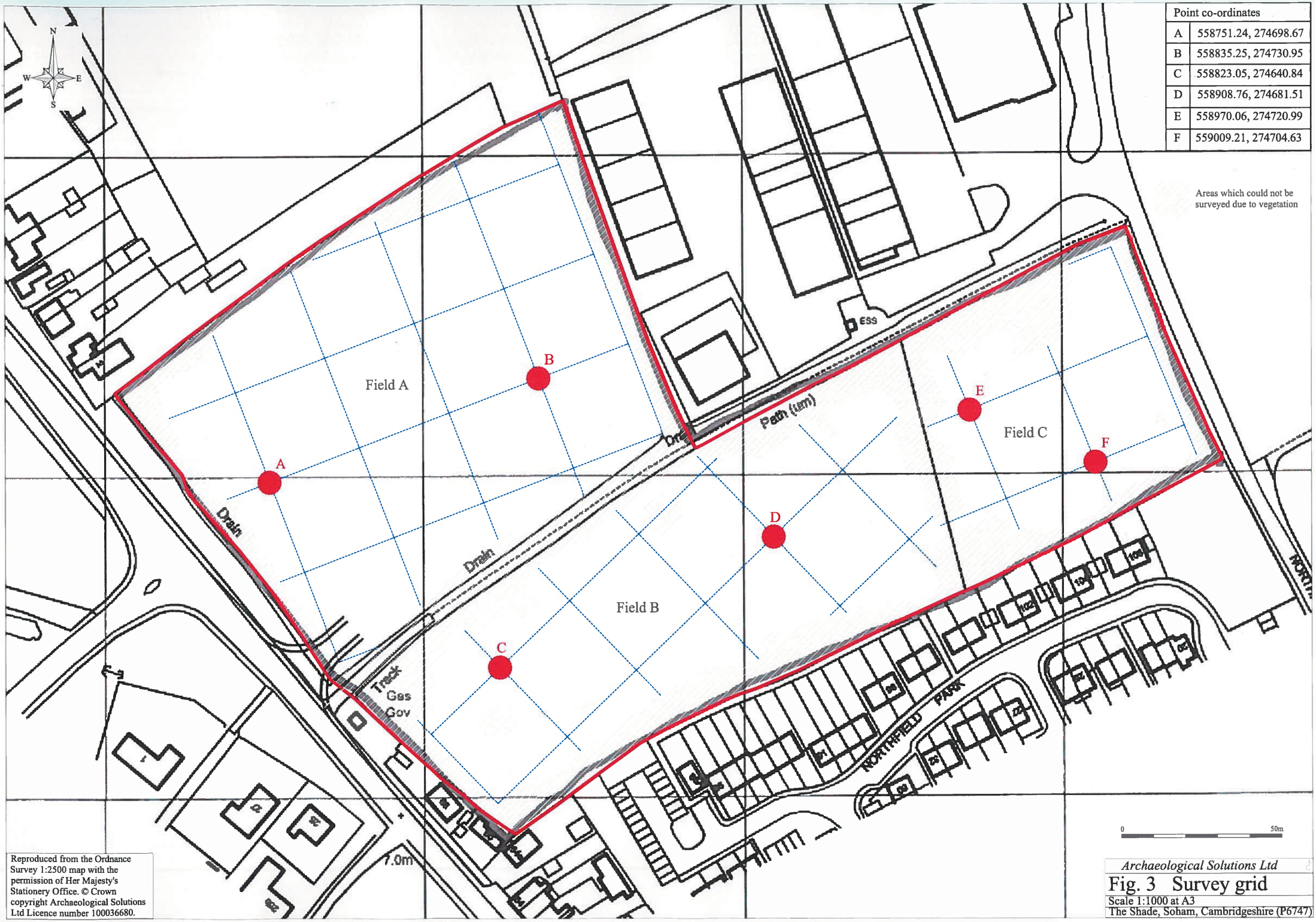
Fig. 2 Detailed site location plan

Scale 1:2500 at A4

The Shade, Soham, Cambridgeshire (P6747)



Point co-ordinates	
A	558751.24, 274698.67
B	558835.25, 274730.95
C	558823.05, 274640.84
D	558908.76, 274681.51
E	558970.06, 274720.99
F	559009.21, 274704.63

Areas which could not be surveyed due to vegetation

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Fig. 3 Survey grid

Scale 1:1000 at A3

The Shade, Soham, Cambridgeshire (P6747)

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Fig. 4 X-Y plot of gradiometer data

Scale 1:1000 at A3

The Shade, Soham, Cambridgeshire (P6747)

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Fig. 5 Minimally processed gradiometer data

Scale 1:1000 at A3

The Shade, Soham, Cambridgeshire (P6747)

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Fig. 6 Interpretation plot

Scale 1:1000 at A3

The Shade, Soham, Cambridgeshire (P6747)