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LAND TO THE SOUTH OF PRETYMAN AVENUE, BACTON, SUFFOLK

GEOPHYSICAL SURVEY

Authors: Keeley-Jade Diggons Dr John Summers Dr David Bescoby	
NGR: TM 05600 66900	Report No: 5595
District: Mid Suffolk	Site Code: BAC050
Approved: Claire Halpin MCIfA	Project No: 7551
	Date: 7th June 2018 Revised 11th June 2018

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Project details			
Project name	*Land to the South of Pretyman Avenue, Bacton, Suffolk*		
In May 2018, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on land to the south of Pretyman Avenue, Bacton, Suffolk (NGR TM 05600 66900; Site code BAC050). The survey was carried out in response to advice issued by Suffolk County Council Archaeological Service Conservation Team (SCC AS-CT). It provides for further information in association with a planning application to redevelop land south of Pretyman Avenue, Bacton, for residential use. *The survey identified a single WNW-ESE positive linear anomaly (**1**) of probable archaeological origin. Other linear anomalies recorded by the survey represent historic field boundaries and modern activity. A well defined sub-circular area of elevated magnetic values (**2**) might also be of archaeological origin, along with a much smaller and weaker circular response (**3**).*		
Project dates (fieldwork)	*23rd-25th May 2018*		
Previous work (Y/N/?)	*N*	Future work	*TBC*
P. number	*7551*	Site code	*BAC050*
Type of project	*Geophysical Survey*		
Site status	-		
Current land use	*Arable land*		
Planned development	*Residential*		
Main features (+dates)	*Positive linear anomaly (**1**) on WNW-ESE orientation, measuring* c.*105m. Sub-circular area of weakly positive magnetic values measuring c.38m E-W and c.20m N-S (**2**).*		
Significant finds (+dates)	-		
Project location			
County/ District/ Parish	*Suffolk*	*Mid Suffolk*	*Bacton*
HER/ SMR for area	*Suffolk Historic Environment Record*		
Post code (if known)	-		
Area of site	c.*7ha*		
NGR	*TM 05600 66900*		
Height AOD (max/ min)	*c.60m AOD*		
Project creators			
Brief issued by	*SCC AS-CT*		
Project supervisor/s	*Keeley-Jade Diggons*		
Funded by	*ESCO Developments Ltd, J Green, S Copping and A Gooderham*		
Full title	*Land to the South of Pretyman Avenue, Bacton, Suffolk: Geophysical Survey*		
Authors	*Diggons, K., Summers, J.R. and Bescoby, D.*		
Report no.	*5595*		
Date (of report)	*June 2018*		

LAND TO THE SOUTH OF PRETYMAN AVENUE, BACTON, SUFFOLK

GEOPHYSICAL SURVEY

SUMMARY

In May 2018, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on land to the south of Pretyman Avenue, Bacton, Suffolk (NGR TM 05600 66900; Site code BAC050). The survey was carried out in response to advice issued by Suffolk County Council Archaeological Service Conservation Team (SCC AS-CT). It provides for further information in association with a planning application to redevelop land south of Pretyman Avenue, Bacton, for residential use.

*The survey identified a single WNW-ESE positive linear anomaly (**1**) of probable archaeological origin. Other linear anomalies recorded by the survey represent historic field boundaries and modern activity. A well defined sub-circular area of elevated magnetic values (**2**) might also be of archaeological origin, along with a much smaller and weaker circular response (**3**).*

1 INTRODUCTION

1.1 In May 2018, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on land to the south of Pretyman Avenue, Bacton, Suffolk (NGR TM 05600 66900; Site code BAC050).

1.2 The survey was carried out in response to advice issued by Suffolk County Council Archaeological Service Conservation Team (SCC AS-CT). It provides for further information in association with a planning application to redevelop land south of Pretyman Avenue, Bacton, for residential use (NGR TM 05600 66900). The evaluation is required by the LPA, based on advice from SCC AS-CT. The survey was carried out in accordance with SCC AS-CT guidelines (*Requirements for a Geophysical Survey, updated March 2017*) and a specification compiled by AS (dated 17th May 2018) and approved by SCC AS-CT. 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 principal objectives for the evaluation include:*

- *To establish whether any archaeological deposit exists in the area, with*

particular regard to any which are of sufficient importance to merit preservation in situ.

- *To identify the date, approximate form and purpose of any archaeological deposit within the application area, together with its likely extent.*

- *To provide sufficient information to construct an archaeological conservation strategy dealing with preservation, the recording of archaeological deposits, working practices, timetables and orders of cost.*

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 to the south of Pretyman Avenue at Bacton, on the southern edge of the village. It comprises a field situated to the south (rear) of the houses that front Pretyman Avenue and Cedar Close, is bordered by the Stowmarket to Norwich railway line on its eastern side, and has open fields to its south and west. There is a moated enclosure just outside the south-west

corner of the site. The site is in predominantly arable use, and extends to some 7ha.

3.2 The proposed development site is located at approximately 60m AOD on a low plateau cut at regular intervals by small stream valleys. The superficial geology consists of chalky till of the Lowestoft Formation. The solid bedrock geology comprises Crag Group Sand.

3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 The Suffolk Historic Environment Record (HER) confirms that the site is within an area of archaeological potential. It is adjacent to a medieval moated site (HER BAC 006). The medieval Church of St Mary lies to the north west (HER BAC 014). Multi-period finds scatters are recorded in the area surrounding the proposed development site (HER BAC 027). In summary:

Metal detecting followed by geophysical survey in fields in Wyverstone parish, north-east of Bacton Middle School and approximately 800m to the north-west of the proposed development site, identified an enclosure containing roundhouses (WYV 010a). A multi-period metalwork scatter was found in fields to the west of the proposed development site which included bronze coins, one an Iceni-type stater (BAC 027). Other finds from this area which include fragments of brooches and finger rings were of Iron Age, Roman and medieval date. Similar multi-period finds including Iceni coins were recovered during a metal detecting rally in fields more than 1km south-east of the proposed development site (BAC 043). Iron Age metalwork fragments were also recovered from fields centred on 650m east of the proposed development site (BAC 020).

Adjacent to the site of the roundhouse enclosure identified through geophysical survey in Wyverstone parish, were also found anomalies indicating the plan of a Roman villa. Prior to the geophysical survey an artefact scatter including box tile, painted wall plaster, large and small tessera and opus signinum was identified during a rapid walk over, which indicated evidence for a high status building (almost certainly a villa complex). Pottery, oyster shells and a variety of metal detected finds were also recovered from this location, along with two Iron Age coins (WYV 010b). A single abraded sherd of Roman grey ware was recovered from the topsoil of an archaeological evaluation 200m north-west of the development site (BAC 028).

An Early Anglo-Saxon brooch and a few fragments of other multi-period metalwork were found in fields between 500m and 1km south of the proposed development site (BAC 032). A medieval D-shaped moated site is located adjacent to Pulman's Farm and borders the south-west end of the proposed development site (BAC 006). A second incomplete medieval moat is located at The Manor some 530m to the north-west (BAC 009). A third incomplete medieval moat is located 780m east of the proposed development site at Elm Grove Farm in Cotton (COT 008). A church is recorded at Bacton in the

Domesday survey, the existing Church of St Mary's, located 230m north-west of the proposed development site dates mainly to the 14th and 15th centuries and is Grade I listed (BAC 014). A small scatter of finds including lava quern and glazed medieval sherds were found in a drainage trench opposite the church (BAC 021a). A Grade II listed 13th century timber-framed aisled hall with 16th and 17th century extensions and alterations stands close to the church and approximately 335m north-west of the proposed development site (BAC 030). A decorated silver annular brooch with four knobs on the frame was found during metal detecting in fields approximately 700m south-west of the proposed development site (BAC 048).

A circular area named `Mill Hill' shown on the 1st edition OS map of 1885 is located 300m south-west of the proposed development site (BAC 015). A scatter of post-medieval finds including animal bone, pottery, roof tile and fragments of a glass drinking vessel were found at the same location as the medieval pottery and quern opposite the church (BAC 021b). Post-medieval pits and a pottery scatter were identified during a watching brief north of Manor Farm some 570m to the north-west of the proposed development site. The scatter included one sherd of medieval date with the remaining sherds and tile fragments of 18th to 20th century date (BAC 038).

A green is shown and named Carters Green on Hodskinson's map of 1783, which is now named Ford's Green (BAC 020). Situated approximately 420m east of the south-eastern corner of the proposed development site, its boundaries are largely still preserved as ditch lines, while a few properties of unknown age now lie around the edge, but the original green is now mostly infilled. The current archaeological evidence from Suffolk suggests a 12th century origin for many of the settlements around greens, which is consistent with place name evidence.

4 METHOD OF WORK

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).

4.2 Magnetic gradiometer survey was selected due to its efficiency in providing easily interpretable data over a large site area. The instrument offers the ability to rapidly cover a survey area and responds to a wide variety of anomalies caused by past human activity (e.g. Historic England, 2008, 20-24).

Survey Methodology

4.3 Grid squares measuring 30m x 30m were set out across the entirety of the survey area using an RTK GPS rover (**Fig. 3**). Geophysical data were

collected systematically in a zig-zag pattern within each grid square along traverses spaced at 2m apart (1m sensor spacing). The gradiometers were configured to record measurements at 0.25m intervals along each traverse, giving a total of 3600 measurements per grid square.

4.4 A single grid square was selected for re-survey on a daily basis to demonstrate the consistency of the data throughout the survey and provide confidence in the reliability of the data gathered. These data are presented in Appendix 1, having been subjected to the same processing regime as the main survey.

4.5 During the survey, the machines were 'zeroed' in a magnetically quiet part of the survey area. This was carried out at the beginning of each day's survey and after the completion of every 4-6 grid squares. This allows the sensors to remain balanced throughout the survey, counteracting the effects of change in ambient temperature. To allow the equipment to stabilise, it was left to stand for *c.*30 minutes prior to the commencement of survey each day to equalise with ambient temperature.

4.6 A strip of land in the east of the survey area contained an advanced cereal crop and could not be surveyed. This area amounted to 1.86ha.

Data Processing

4.7 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:

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 -2nT and +2nT.

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

Display and interpretation

4.8 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 historic map data. A graphical interpretative plan of the site identifying potential archaeological features (**Fig. 6**) was then produced in AutoCAD LT2012.

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 dynamic 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 4.7, is shown in **Fig. 5**. The processed data revealed a number of anomalies of possible archaeological, historical and modern origin, which are plotted in **Fig. 6**, with their interpretation described below.

Archaeological Anomalies

5.2 A single positive linear anomaly (**1**) on a WNW-ESE orientation, measuring 105m in length, was present in the eastern part of the survey. Its date of origin is uncertain but it appears to be cut by historic boundary (**4**) which, accompanied by its orientation, suggests that it is not associated with the historic land divisions identified.

5.3 To the north, a large sub-circular anomaly measuring c.38m E-W and c.20m N-S was recorded (**2**), defined by an area of low amplitude positive magnetic readings with a broad corresponding negative component to the north. Such a response is potentially indicative of an infilled type feature with a shallow profile or a spread of magnetically enhanced material. While this may denote an archaeological origin, a geomorphologically derived feature cannot be ruled out.

5.4 Within the central portion of the survey a much smaller weakly positive and poorly defined circular magnetic anomaly was identified (**3**), measuring c.10m in diameter. Similarly this appears to reflect the remains of an infilled type feature with a shallow profile and potentially archaeological in origin.

Historical Anomalies

5.5 A ‘T-shaped’ positive linear anomaly (**4**) on a NNE-SSW and WNW-ESE orientation ran through the survey. This anomaly corresponds with boundaries marked on the 1885 Ordnance Survey map (**Fig. 7**). A further

portion of a positive linear anomaly (**5**) on an ENE-WSW orientation was present in the southern-most extent of the survey. This also corresponds with a boundary marked on the 1885 OS map (**Fig. 7**).

Modern Anomalies

5.6 Striping within the data can be seen on a NE-SW orientation across the survey, particularly in the eastern half of the area. The clearest linear features within this group have been highlighted as (**6**) and are likely to represent plough scarring.

5.7 A large positive response with a negative halo (**7**) is indicative of vertical ferrous metal and may represent the remains of a fence post or another feature associated with historic boundary (**4**).

5.8 Magnetic disturbance (**8**) was present in the data along the northern boundary of the site. This was caused by modern fencing in this area.

5.9 Fourteen dipolar responses (**9**) were identified across the survey area. The majority of these are probably not archaeologically significant, and represent modern ferrous material within the near subsurface.

6 CONCLUSIONS

6.1 The magnetic gradiometer survey at Pretyman Avenue has recorded a positive linear anomaly of probable archaeological origin (**1**). This anomaly is undated but is on an approximate alignment between the church in the NW and a now infilled underpass below the railway line (**Fig. 7**). However, no direct relationship can be proven from the present dataset.

6.2 A large sub-circular anomaly (**2**) indicative of an area of infilling material or simply a spread of magnetically enhanced material, may also reflect some form of archaeological activity, although a geomorphological source should also be considered. A much smaller weakly positive circular anomaly (**3**) to the SW may also represent an infilled feature of some kind. From the survey data alone it is not possible to determine the origin or date of these detected features. The landowner is not aware of any recent activities that could have resulted in these anomalies. It is possible that they could be associated with railway construction activities but again this is conjectural at present.

6.3 Further strong linear anomalies (**4** and **5**) have been identified as historic field boundaries recorded on historic mapping.

6.4 The magnetic contrast within the data was good and indicates that the survey results are representative of sub-surface anomalies within the survey area. The archaeological and historical anomalies were clear within the processed data and the resolution of modern plough scars, which can often

be faint, was also clear. Magnetic interference and disturbance was limited to a small band along the northern boundary, which has not had a significant impact on the survey.

ACKNOWLEDGEMENTS

Archaeological Solutions Limited would like to thank the clients, ESCO Developments Ltd, J Green, S Copping and A Gooderham, for funding the survey, and Mr Jon Jennings of Cheffins for assistance.

AS is pleased to acknowledge the advice and input of Suffolk County Council Archaeological Service Conservation Team (SCC AS-CT), in partocaurlMs Rachael Abraham.

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Historic England (English Heritage), 2008. *Geophysical Survey in Archaeological Field Evaluation*.

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: archaeol7-317674

Project details

Project name	Land to the South of Pretyman Avenue, Bacton, Suffolk, GEOPHYSICAL SURVEY
Short description of the project	In May 2018, Archaeological Solutions Ltd carried out a magnetic gradiometer survey on land to the south of Pretyman Avenue, Bacton, Suffolk (NGR TM 05600 66900; Site code BAC050). The survey was carried out in response to advice issued by Suffolk County Council Archaeological Service Conservation Team (SCC AS-CT). It provides for further information in association with a planning application to redevelop land south of Pretyman Avenue, Bacton, for residential use. The survey identified a single WNW-ESE positive linear anomaly (1) of probable archaeological origin. Other linear anomalies recorded by the survey represent historic field boundaries and modern activity. A well defined sub-circular area of elevated magnetic values (2) might also be of archaeological origin, along with a much smaller and weaker circular response (3).
Project dates	Start: 23-05-2018 End: 25-05-2018
Previous/future work	No / Not known
Any associated project reference codes	P7551 - Contracting Unit No.
Any associated project reference codes	BAC050 - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Other 15 - Other
Monument type	POSITIVE LINEAR ANOMALY MEASURING C.105M Uncertain
Significant Finds	NONE None
Methods & techniques	"Geophysical Survey"
Development type	planning application to redevelop land for residential use
Prompt	Suffolk County Council Archaeological Service Conservation Team
Position in the planning process	Not known / Not recorded
Solid geology (other)	Crag Group Sand
Drift geology (other)	chalky till of the Lowestoft Formation

Techniques	Other

Project location

Country	England
Site location	SUFFOLK MID SUFFOLK BACTON Land to the South of Pretyman Avenue, Bacton, Suffolk GEOPHYSICAL SURVEY
Study area	7 Hectares
Site coordinates	TM 05600 66900 52.261278301801 1.013093741104 52 15 40 N 001 00 47 E Point
Height OD / Depth	Min: 60m Max: 60m

Project creators

Name of Organisation	Archaeological Solutions Ltd
Project brief originator	SCC AS Conservation Team
Project design originator	Jon Murray
Project director/manager	Jon Murray
Project supervisor	Keeley-Jade Diggons
Type of sponsor/funding body	ESCO Developments Ltd
Name of sponsor/funding body	ESCO Developments Ltd, J Green, S Copping and A Gooderham

Project archives

Physical Archive Exists?	No
Digital Archive recipient	Suffolk HER
Digital Contents	"Survey"
Digital Media available	"Images raster / digital photography","Survey"
Paper Archive recipient	Suffolk HER
Paper Contents	"Survey"
Paper Media available	"Drawing","Photograph","Plan","Report","Survey "

Entered by	Kate Cooper (Admin@ascontracts.co.uk)
Entered on	2 July 2018

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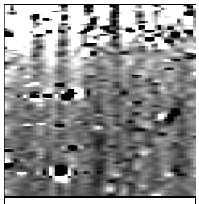
APPENDIX 1

Repeatability



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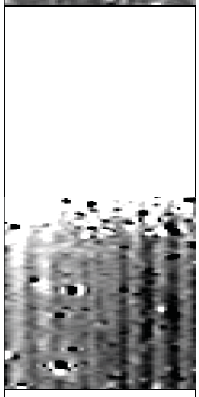

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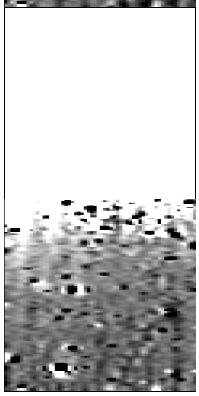

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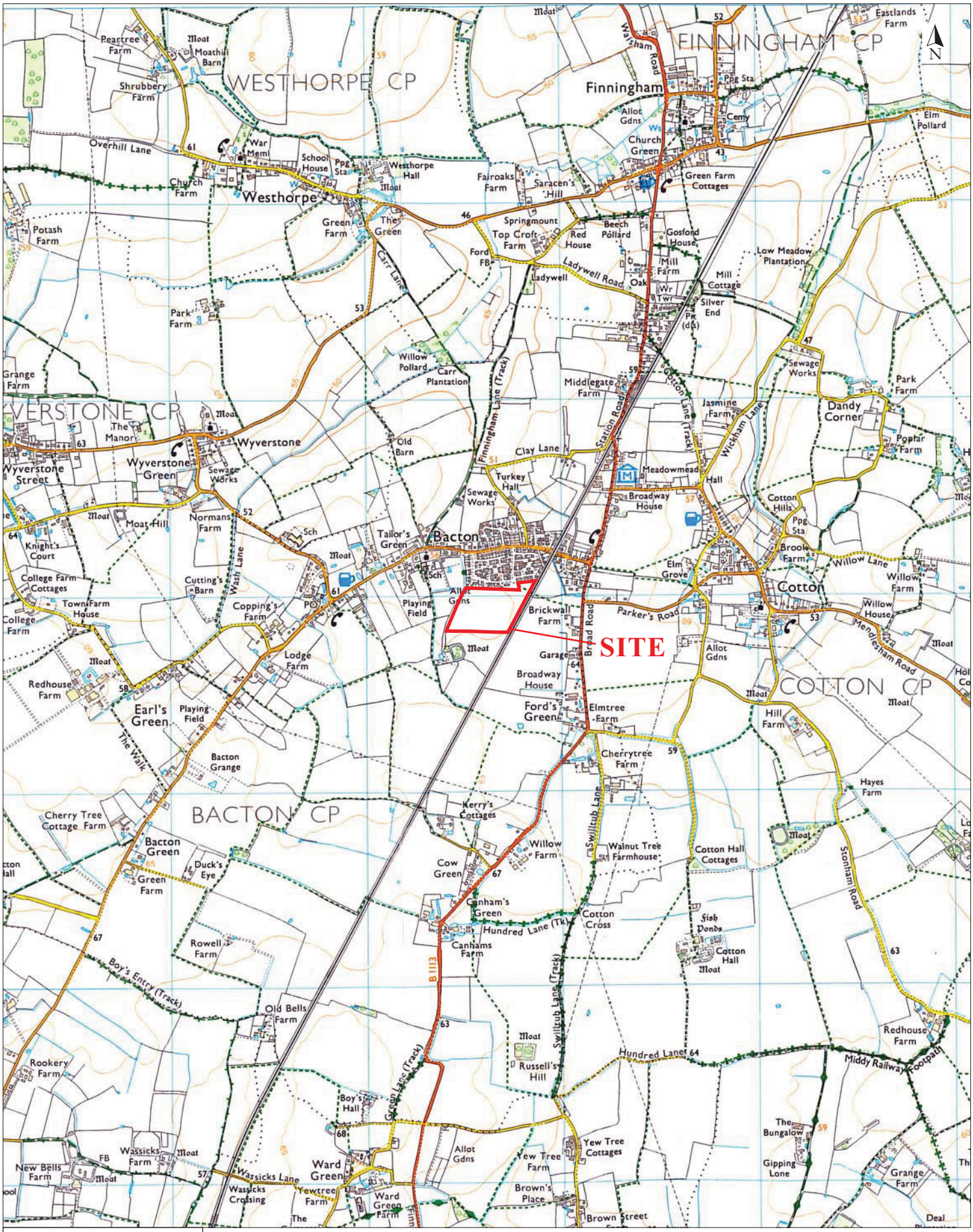

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Fig. 1 Site location plan

Scale 1:25,000 at A4

Pretyman Avenue, Bacton (P7551)

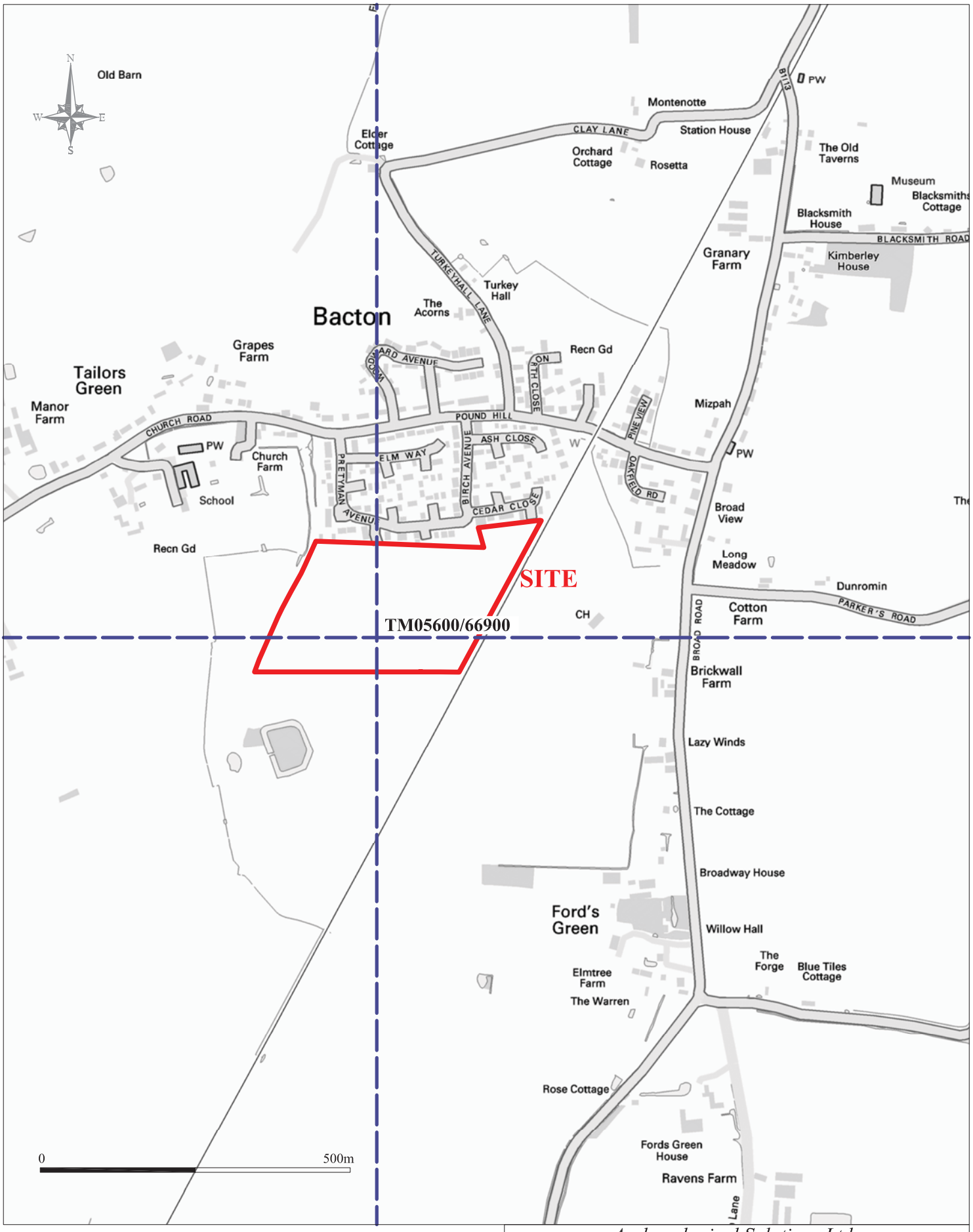

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Fig. 2 Detailed site location plan

Scale 1:8000 at A4

Pretyman Avenue, Bacton (P7551)

Point co-ordinates	
A	605516.99, 266941.44
B	605666.99, 266941.44

N
W
E
S

A

B

Unsurveyable area

0 75m

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Fig. 3 Survey grid

Scale 1:1250 at A3

Pretyman Avenue, Bacton (P7551)

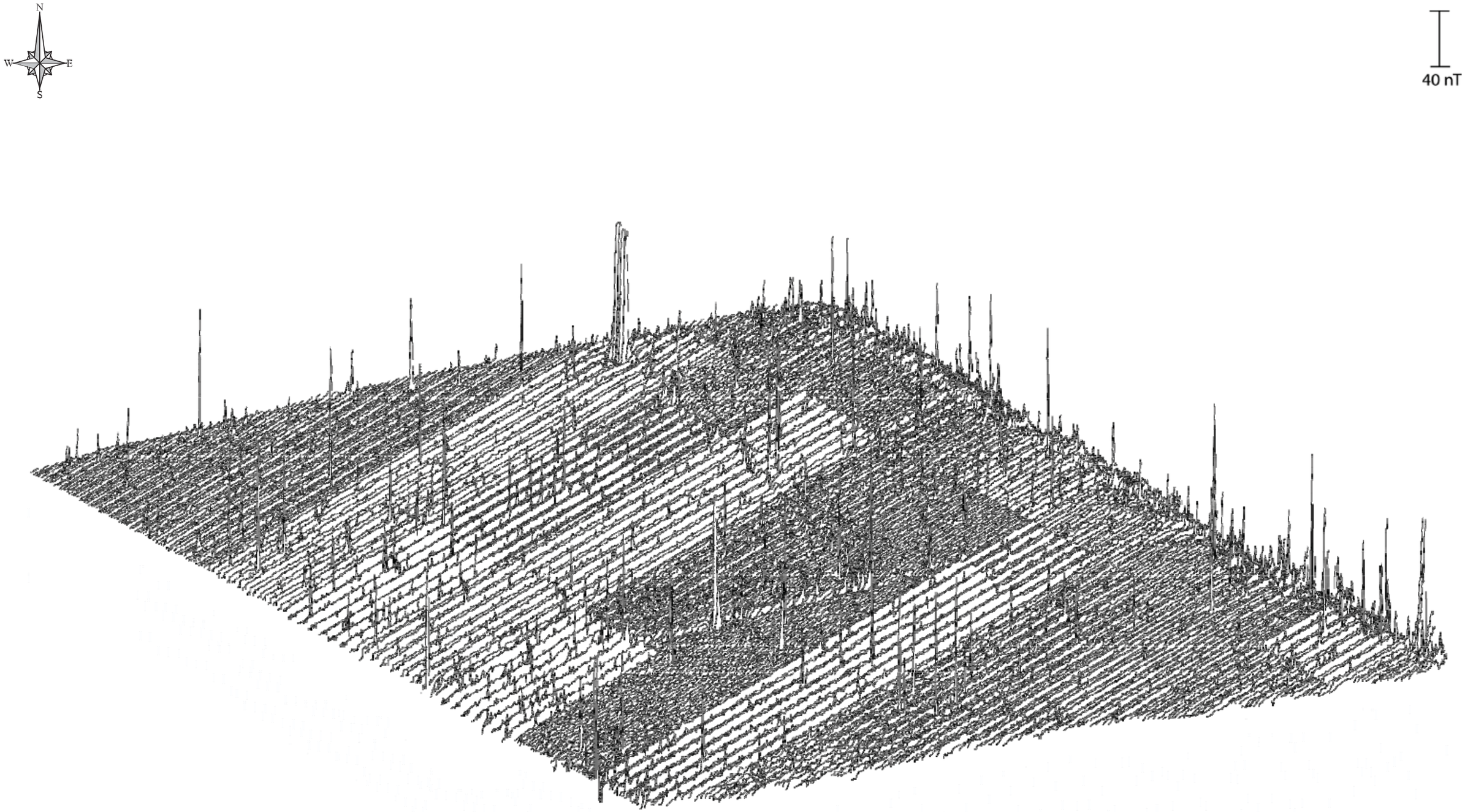

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Fig. 4 X-Y plot of gradiometer data

Pretyman Avenue, Bacton (P7551)

N

W E

S

Plotting parameters
Maximum +2nT (Black)
Minimum -2nT (White)

0 75m

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Fig. 5 Minimally processed gradiometer data

Scale 1:1250 at A3

Pretyman Avenue, Bacton (P7551)

N

W E

S

KEY	
ARCHAEOLOGY	
	Positive anomalies - probable cut features of archaeological origin
OTHER ANOMALIES	
	Linear anomalies - historic boundaries
	Linear anomalies - plough scar
	Magnetic disturbance/interference
	Magnetic Spikes - probable ferrous objects

1 2 3 4 5 6 7 8 9

0 75m

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Fig. 6 Interpretation plot

Scale 1:1250 at A3

Pretyman Avenue, Bacton (P7551)

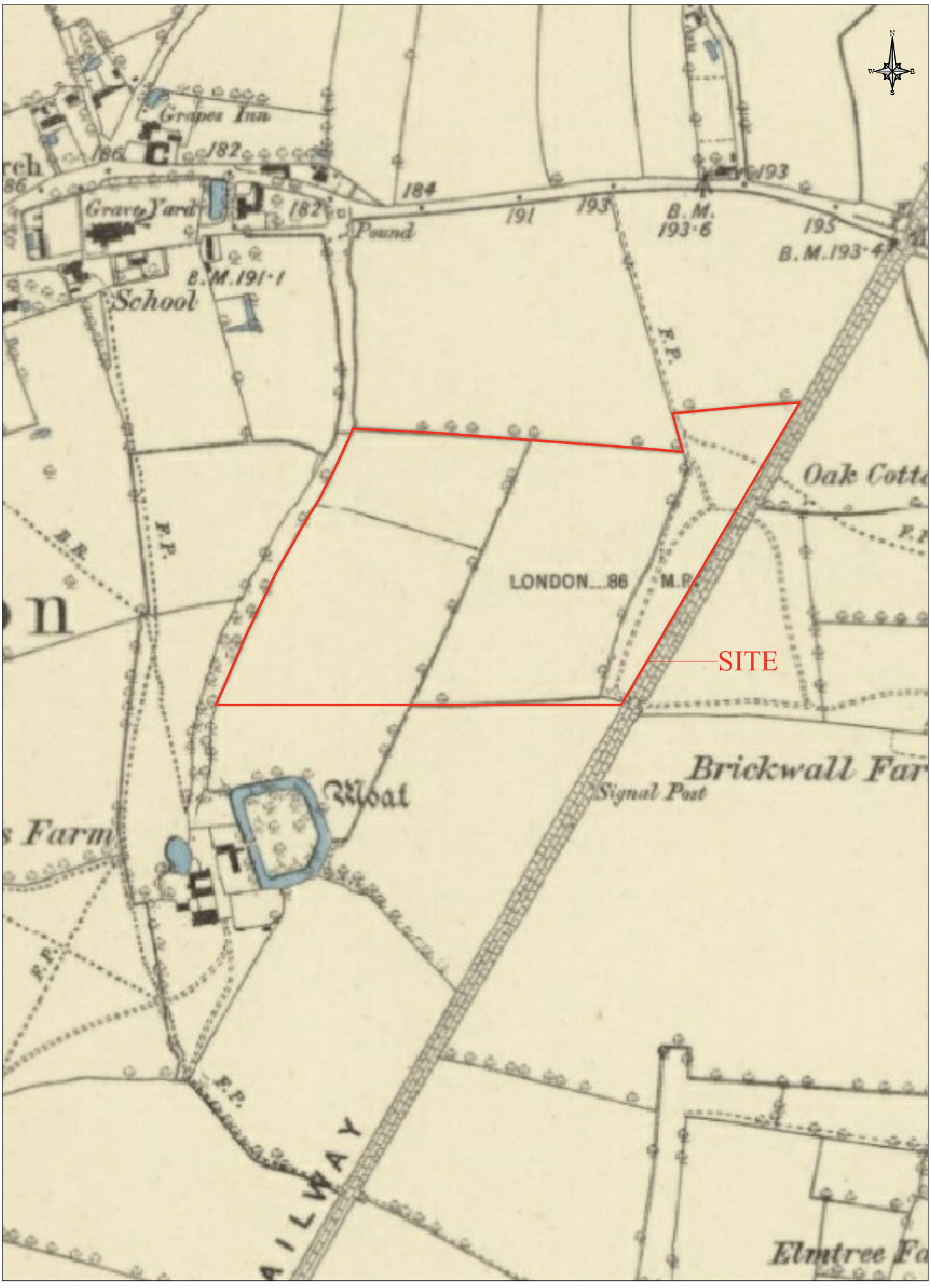

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Fig. 7 OS Map, 1885
Not to scale
Pretyman Avenue, Bacton (P7551)