pre-construct geophysics LTD

ARCHAEOLOGICAL GEOPHYSICAL SURVEY

BELSTEAD HOUSE

SPRITES LANE, PINEWOOD

IPSWICH

SUFFOLK

NGR: TM 13000 42100

HER EVENT NO: ESF22810

OASIS NO: 203259

REPORT PREPARED

FOR ARCHAEOLOGY SOUTH-EAST

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Contents

Illustrations

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Non technical summary

A fluxgate gradiometer survey was undertaken on land at (and adjacent to) Belstead House, Sprites Lane, Pinewood, Ipswich in Suffolk.

The survey recorded a number of linear/curvilinear trends in the western part of the site. Some exhibit limited potential as buried ditches, although a natural origin is more likely for most examples (similarly for zones of weak variation recorded elsewhere).

Clearly defined modern responses include those induced by buried services, boundary fencing, electricity poles and paths, the latter including a path that lies in the south-western part of Belstead House grounds. It is likely that magnetically stronger variation in other areas similarly reflects modern and recent occupation.

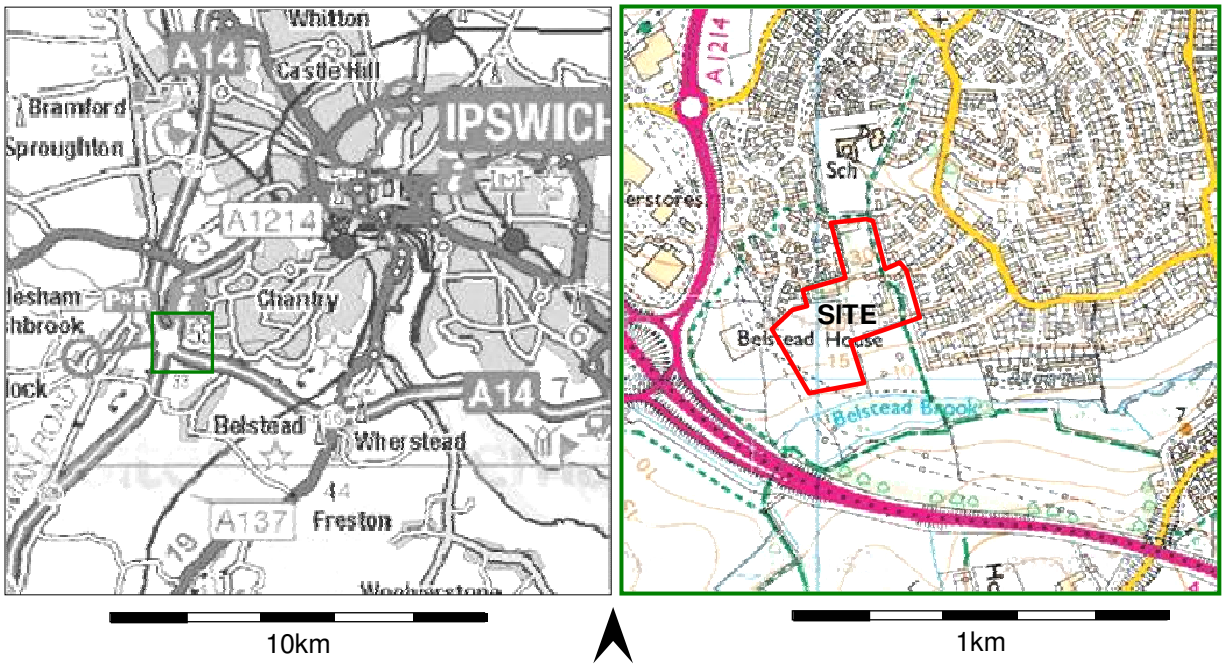

Fig.1: Location of site and survey

1.0 Introduction

Acting for on behalf of Wincer-Kievenaar, Archaeology South-East (ASE) commissioned Pre-Construct Geophysics Ltd to undertake a fluxgate gradiometer survey on land at, and to the west of, Belstead House, Sprites Lane, Pinewood, Ipswich in Suffolk (centred at NGR c.613000 242100).

The survey forms part of an archaeological evaluation prior to the determination of a planning application for the redevelopment of the site (Ref B/14/01377/OUT).

This report incorporates information that has been selectively extracted from a Written Scheme of Investigation for a Geophysical Survey (WSI) prepared by ASE (ASE, 2015).

2.0 Location and description (Figs. 1 – 2)

The c.4ha site lies at the south-western edge of Ipswich, at NGR TM 13000 42100 (Figs. 1 - 2). It encompasses the grounds of a former education and conference centre, Belstead House, and an area of permanent pasture to the south-west of the house. Parts of the house grounds/garden were unsuitable for survey.

3.0 Geology and topography

The solid geology comprises silty clay of the Thames Group, no overlying superficial deposits[1].

The site is situated on a generally south-facing slope (overlooking Belstead Brook) that descends from c.130m AOD at the north-eastern boundary to c.110m AOD at the southern edge.

4.0 Archaeological Context

Edited extracts of the DBA (ASE, 2014):

The development area overlooks the valley of Belstead Brook, in a position that was topographically favourable for early occupation. To the north of the site, urned and un-urned Bronze Age cremations and a small ring ditch were found at the Swiss Centre (SPT035), The northern half of the site lies immediately adjacent to an Iron Age and Roman settlement recently investigated at The Bridge School (HER no. BSD 018, Suffolk County Council Archaeology Field Team Report 2013/139). Further evidence for Iron Age and Roman activity in the wider vicinity of the site includes the discovery, in the late 1960's, of a number of Iron Age gold torcs on the Belstead Hills Estate (IPS079), while scatters of Roman pottery were found at the Belstead Junior Training Centre, in the area of what is now the Interchange Retail Park (WSH003).

5.0 Objectives

The objectives of the geophysical survey were to establish, by using non intrusive techniques;

- The nature, extent and location of any archaeological features, should any lie within the proposed development;

- The presence/absence of any modern features, such as services, that may impact on the survey results and any archaeological features in close proximity.

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6.0 Methodology

The survey methodology is based upon English Heritage guidelines: *'Geophysical Survey in Archaeological Field Evaluation'* (English Heritage, 2008).

Fluxgate Gradiometry is a non-intrusive scientific prospecting tool that is used to determine the presence/absence of some classes of sub-surface archaeological features (e.g. pits, ditches, kilns, and occasionally stone walls).

The use of gradiometry should help to establish the presence/absence of buried magnetic anomalies, which may reflect sub-surface archaeological features, and may therefore form a basis for a subsequent scheme of archaeological trenching.

The use of magnetic surveys to locate sub-surface ceramic materials and areas of burning, as well as magnetically weaker features, is well established, particularly on large green field sites. The detection of anomalies requires the use of highly sensitive instruments; in this instance the Bartington 601 Dual Fluxgate Gradiometer. This is accurately calibrated to the mean magnetic value of each survey area. Two sensors, mounted vertically and separated by 1m, measure slight, localised distortions of the earth's magnetic field, which are recorded by a data logger.

It should be noted that this technique only records magnetic variation (relative to natural background levels). As such, the magnetic response of archaeological remains will vary according to geology/pedology. Additionally, remains may be buried beyond the effective of 1 - 2m range of the instrumentation (e.g. sealed beneath alluvium).

The survey was undertaken on 3rd – 4th February 2015. The zigzag traverse method of survey was used, with readings taken at 0.25m intervals along 1.0m wide traverses.

The survey grid was established by Global Positioning Satellite using a Topcon GRS-1, with an accuracy of +/- 0.1m and subsequently geo-referenced on an Auto drawing of the site.

The data sets were processed using *Terrasurveyor 3*.

The raw data sets are presented as greyscale images on Fig. 4 (clipped to +/-10nT to enhance resolution).

The 'Despike' function was applied to reduce the effect of extreme readings induced by metal objects, and 'Destripe' to eliminate striping introduced by zigzag traversing. The data sets were clipped to +/- 20nT on the trace plots (Fig. 5) and +/-5nT on greyscale images (Fig. 2).

6.2 Character, interpretation and presentation of magnetic anomalies

The interpretation of geophysical survey results should only be regarded as an aid to establishing the true nature and origin of buried features. These can only be fully achieved by intrusive investigation

Anomalies considered to reflect modern ferrous-rich features and objects are highlighted as blue and/or pink on the interpretive images. These are characterised magnetically as dipolar 'iron spikes', often displaying strong positive (pink) and/or negative responses (blue). Examples include those deposited along existing or former boundaries (e.g. wire fencing), services and scatters of horseshoes, ploughshares etc across open areas. Ferro-enhanced (fired) materials such brick and tile (sometimes introduced during manuring or land drain construction) usually induce a similar, though predominately weaker response. Concentrations of such anomalies will often indicate rubble spreads, such as would be used to backfill ponds or redundant ditches, or indicate the blurred footprints of demolished structures.

On a cautionary note, fired clay associated with early activity (e.g. kilns, furnaces, tile spreads) has the same magnetic characteristics as modern brick/tile rubble. Therefore, the interpretation of such variation must consider the context in which it occurs.

Potential archaeological remains are highlighted as red, modern tracks and paths as yellow, services as blue and natural as green.

7.0 Results and discussion (Figs. 2 - 5)

The survey recorded a number of linear anomalies in the mid and southern parts of A1. Curvilinear examples are broadly 'parallel', possibly indicative of a shared origin. Not withstanding that elements of these include areas of relatively strong variation, most have been interpreted as potentially of natural responses (Fig. 3: dotted green lines). However, two examples that exhibit widespread stronger magnetic enhancement have been flagged as potential ditches (dotted red lines).

Elsewhere, further zones of relatively weak variation are probably also of natural origin. (e.g. zones boxed green).

The survey registered magnetic responses (of various strengths) along a current and former path/track in A1 and a path and former planting beds in Belstead House grounds (A4) (yellow lines).

Elsewhere stronger responses, highlighted as pink and/or blue, clearly (or probably) reflect miscellaneous modern ferrous-rich materials/objects, such as services (blue lines), electricity poles (EP), boundary fencing and likely near surface deposits of ceramic rubble etc.

8.0 Conclusions

The survey recorded a number of linear/curvilinear trends in the western part of the site. Some exhibit limited potential as buried ditches, although a natural origin is more likely for most examples (similarly for zones of weak variation recorded elsewhere).

Clearly defined modern responses include those induced by buried services, boundary fencing, electricity poles and paths, the latter including a path that lies in the south-western part of Belstead House grounds. It is likely that magnetically stronger variation in other areas similarly reflects modern and recent occupation.

9.0 Acknowledgements

Pre-Construct Geophysics would like to thank Archaeology South-East for this commission.

10.0 References

Archaeology South-East 2015 *Written Scheme of Investigation for Geophysical Survey at Belstead House, Sprites Lane, Pinewood, Ipswich, Suffolk.* ASE Project No: 8312. Unpublished.

English Heritage. 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage, London

[1] http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html, 1:50,000. British Geological Survey, Keyworth

612900, 242350

613200, 242350

612900, 241950

613200, 241950

A1

A2

A3

A4

BELSTEAD MEADOWS

BELSTEAD HOUSE

>5

nT

< -5

100m

SITE BOUNDARY

Fig. 2: Location of site and survey
Greyscale images of processed data

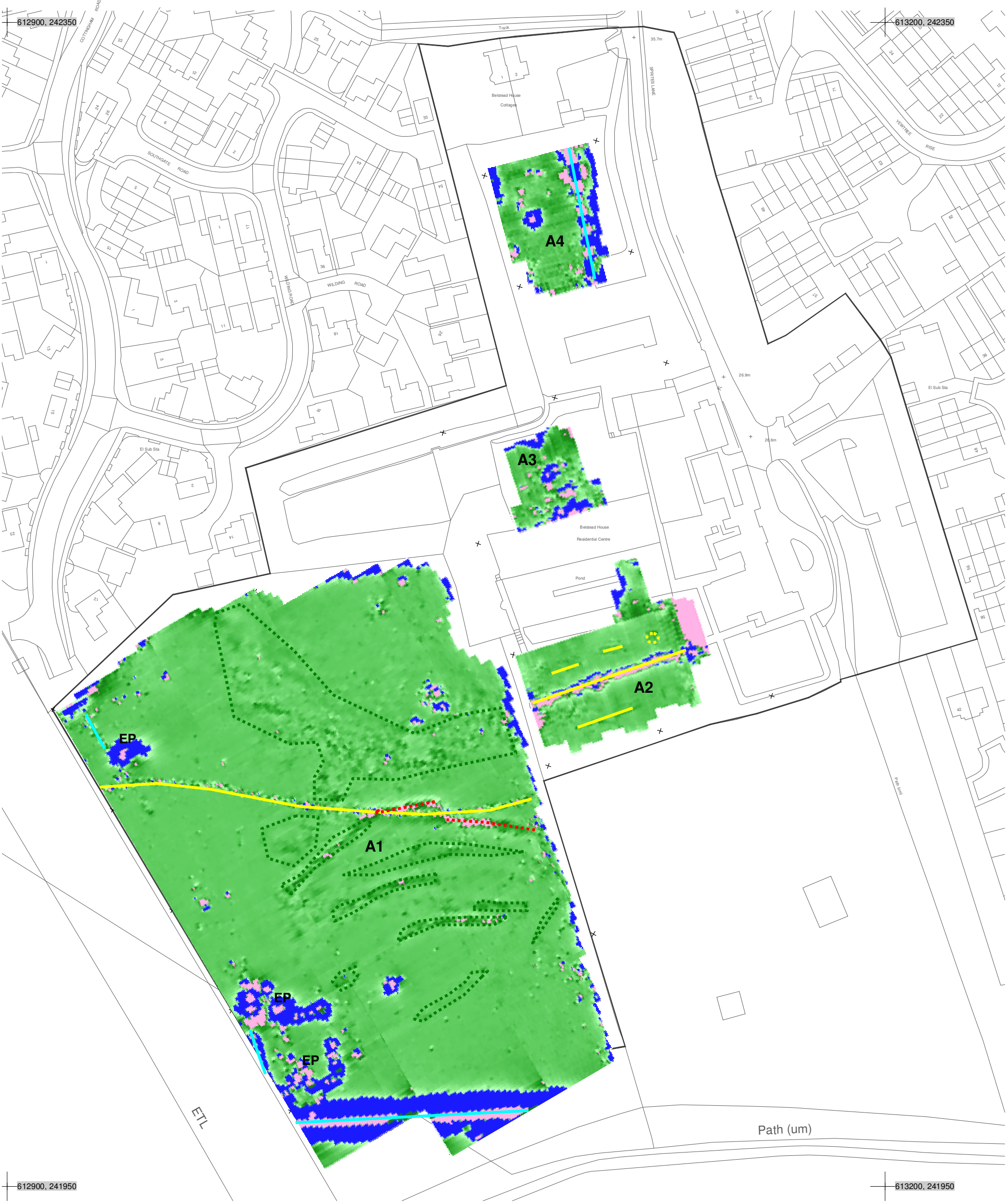

Fig. 3: Interpretation

Fig. 4: Greyscale images of unprocessed data

612900, 242350

613200, 242350

A4

A3

A2

30nT/cm

612900, 241950

613200, 241950

100m

Fig. 5: Trace plot images