LAND AT ASHTON ROAD OUNDLE NORTHAMPTONSHIRE

GEOPHYSICAL SURVEY

Work undertaken for
Persimmon Homes East Midlands

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Report produced by
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ARCHAEOLOGICAL PROJECT SERVICES

CONTENTS

List of Figures

1. SUMMARY

Detailed magnetic gradiometer survey was undertaken for John Martin & Associates acting on behalf of Persimmon Homes East Midlands Ltd, in connection with proposed residential development on land at Ashton Road, Oundle, Northants. The survey totalled 4ha.

Few clearly archaeological features were identified within the geophysical survey. However, a series of linear features probably representing ditched boundaries and/or a ditched enclosure are present. It is notable that the alignment of these matches well that of features recorded as cropmarks immediately to the east and these may well form part of that same wider landscape. A curvilinear anomaly within the enclosure is suggestive of a ring-ditch but the responses are somewhat different and the apparent form may be deceptive. One or two discrete pit-like features are also highlighted but the range of background variation is quite large and the interpretation of these is difficult on the basis of form alone. Modern disturbance is fairly widespread with very strong responses from buried items potentially masking subtler responses in several places.

2. INTRODUCTION

2.1 Definition of an Evaluation

Geophysical survey is a non-intrusive method of archaeological evaluation. Evaluation is defined as *'a limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site. If such archaeological remains are present Field Evaluation defines their character and extent, quality and preservation, and it enables an assessment of their worth in a local, regional, national or international context as appropriate'* (IFA 2008).

2.2 Background

Archaeological Project Services was commissioned by John Martin & Associates acting on behalf of Persimmon Homes East Midlands Ltd to undertake detailed magnetometer survey totalling 4ha on land at Ashton Road, Oundle, Northamptonshire. The survey was carried out between the 11th and 12th October 2012.

2.3 Topography and Geology

Oundle lies approximately 20km northeast of Kettering and 19km southwest of Peterborough in the northeast of Northamptonshire. Occupying an area of *c.* 4ha, the site is located on the southeastern side of Oundle, immediately to the west of the A605, which bypasses the town. The site is centred on grid reference TL 0407 8781 (Fig. 1).

Oundle is located on the west bank of the River Nene with the site located on the terrace gravel in a bend in the river. Being close to the urban area, soils have not been mapped by the Soil Survey of Great Britain. However, on the basis of nearby deposits, local soils are likely to be of the Sutton 1 Association, well drained calcareous loamy soils developing on river terrace gravel (Hodge *et al.* 1984, 314) above a solid geology of Great Oolite Limestone (GSGB 1951).

2.4 Archaeological Background

Previous desk-based assessment has outlined the archaeological background to the site (Murray 2012).

The assessment showed that remains of prehistoric date have been identified on the river gravels within the immediate area, with cropmark evidence of round barrows, ditches, trackways and enclosures and with artefact evidence suggestive of settlement of the Iron Age and Roman period.

Evidence of Saxon and medieval settlement was recorded on the fringe of the Study Area where it overlaps with the historic town centre to the west, whilst evidence of later agricultural and industrial practices was prevalent across the Study Area.

The study suggested that there is potential for remains of Iron Age and Roman date in the vicinity of the site with later field boundaries and quarry pits previously recorded within the site itself.

3. GEOPHYSICAL SURVEY

3.1 Methods

Location and layout of the survey area is shown in Figure 2. The field was rough pasture but in good condition for survey, the vegetation having recently been cut. Weather was generally dry.

Survey was undertaken in accordance with English Heritage (2008) and IfA (2010) guidelines and codes of conduct.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. This records subtle changes in the magnetic field resulting from differing features in the soil. Changes as small as 0.2 nanoTesla (nT) in an overall field strength of c. 49,000nT can be accurately detected using this instrumentation, although in practice instrument interference and soil noise can limit sensitivity.

The mapping of anomalies in a systematic manner allows interpretation of the type of material present beneath the surface. Strong magnetic anomalies are generated by buried iron-based objects or by kilns or hearths, usually resulting in a bipolar (positive/negative) response. More subtle positive anomalies representing pits and ditches can be seen where these contain more topsoil which is normally richer in magnetic iron oxides and provides a contrast with the natural subsoil (but this can vary depending on the nature of the underlying deposits). A negative anomaly may result from upcast bank material. Wall foundations can also show as negative anomalies where the stone is less magnetic than the surrounding soil, or as stronger positive and negative anomalies if of brick, but are not always responsive to the technique. It should be noted that not all features will be responsive and absence of anomalies does not necessarily indicate absence of archaeological features.

Magnetometers measure changes in the Earth's magnetic field. With two sensors configured as a gradiometer the recorded values indicate the difference between two magnetic measurements separated by a fixed distance. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame with a 1m separation between the sensing elements giving a strong response to deep anomalies.

Sampling interval and data capture
Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid. The Grad 601 has a typical depth of penetration of 0.5m to 1.0m although a greater range is possible where strongly magnetic objects have been buried in the site.

Readings are logged consecutively into the data logger which is downloaded daily either into a portable computer whilst on site or directly to the office computer. At the end of each job, data is transferred to the office for processing and presentation.

Processing and presentation of results
Processing is performed using specialist ArcheoSurveyor software. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves flattening the background levels with respect to adjacent traverses and adjacent grids (Destripe or zero mean traverse). Despiking is also performed to reduce the effect of the anomalies resulting from small iron objects often found on agricultural land. Further processing can then be carried out which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following are the processing techniques carried out on the processed gradiometer data used in this report:

1. DeStripe (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects)

2. Despike (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)
Parameters: X radius = 1; Y radius = 1; Threshold = 3SD; Spike replacement = mean

3. Clip (excludes extreme values allowing better representation of detail in the mid range): -6 to 6nT.

3.2 Results

The presentation of the data for the site involves a print-out of the raw or minimally processed data as greyscale and trace plots (Figs 3, 4; clipped for display but otherwise unprocessed), together with greyscale plots of the processed data (Fig. 5, 7). Magnetic anomalies have been identified and plotted onto interpretative drawings (Figs 6, 8) and are described below.

Positive linear anomalies
There are a number of positive anomalies of probable archaeological origin. A linear anomaly **A** runs north-south for a short way, disturbed along part of its length but probably continuing towards the northeastern field boundary. At its southern end it turns westwards possibly forming an enclosure against further north-south linear **B**. This, however, is somewhat less well defined and shadowed by a faint negative response and may be different in character. Within this potential enclosure is curvilinear anomaly **C**. The southern edge of this is better defined; the northern edge runs into an area of rather disturbed response and the apparent form may be deceptive.

Area positive anomalies
Two area positive anomalies (**D**, **E**) are highlighted. These are reasonably strong and fairly well defined without the bipolar response of the more obviously modern disturbance and possibly represent pit features.

Geological responses
Faint roughly parallel curvilinear responses across the western part of the field correspond roughly with a more low-lying area of the field and probably represent variation in background response.

Modern/magnetic disturbance
Strong bipolar responses occur along the northern boundary, close to the northeastern field entrance and more widely across the centre and south of the field. These probably reflect the presence of metallic items within the topsoil and along fencelines. Three very strong localised bipolar responses indicate the presence of larger buried items (**F**, **G**, **H**).

Iron spikes (discrete bipolar anomalies)
Iron items within the topsoil give a distinctive localised bipolar (strong positive with associated strong negative) response. Such items usually derive from relatively recent management or agricultural use of the land – broken or discarded pieces of agricultural machinery or other modern debris. These are fairly widely scattered with no particular concentrations.

4. DISCUSSION

Few clearly archaeological features have been identified within the geophysical survey. However, it is notable that the alignment of the linear features and possible enclosure matches well that of features recorded as cropmarks immediately to the east (Fig. 9) and these may well form part of that same wider landscape. A curvilinear anomaly within the enclosure is suggestive of a ring-ditch but the responses are somewhat different and the apparent form may be deceptive. One or two discrete pit-like features are also highlighted but the range of background variation is quite large and the interpretation of these is difficult on the basis of form alone. Modern disturbance is fairly widespread with very strong responses from buried items potentially masking subtler responses in several places.

5. ACKNOWLEDGEMENTS

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6. PERSONNEL

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