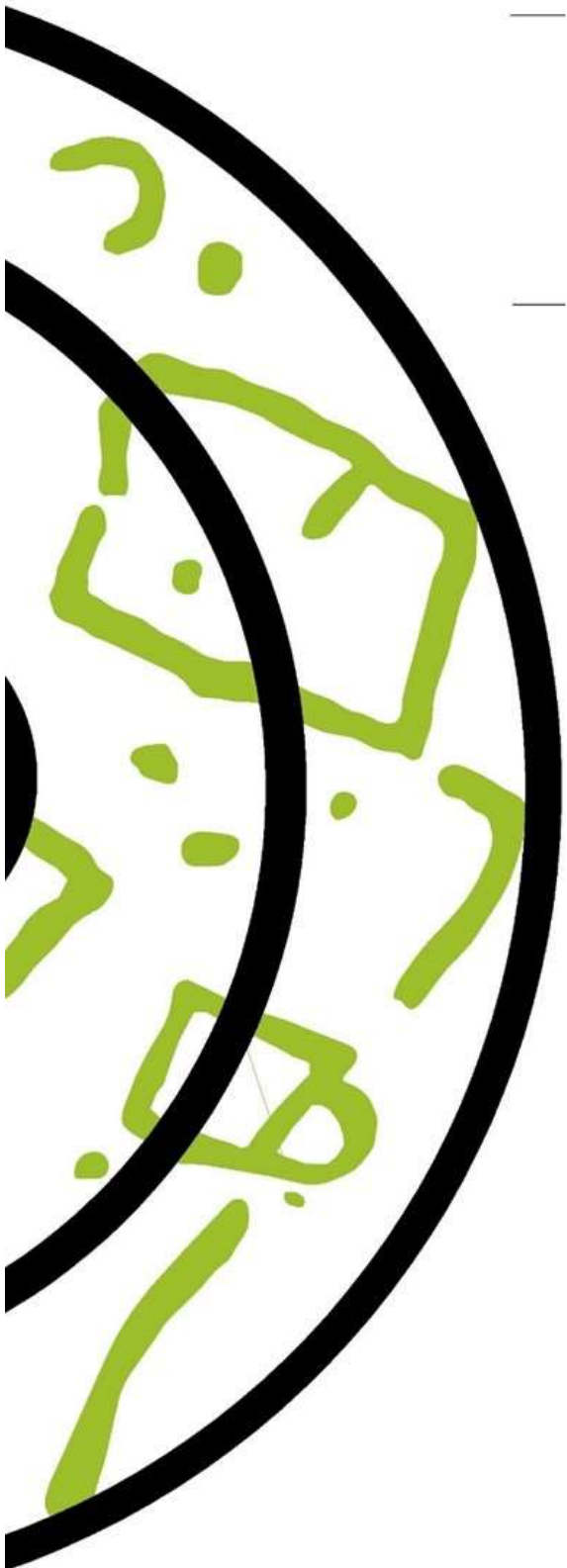




Gopsall House Farm, 15 Bilstone
Road, Twycross, CV9 3PP

GEOPHYSICAL SURVEY

Grid Ref: SK 34680 05642

Prepared for:

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1. SUMMARY

A detailed magnetic gradiometer survey was undertaken for Staniforth Architects in connection with a proposed development on land at Gopsall House Farm, 15 Bilstone Road, Twycross, CV9 3PP.

The survey recorded large areas of magnetic disturbance along the proposed trackway. Due to its location along the boundaries of fields and its current use as a trackway, it is likely that any archaeology in these areas has already been disturbed/removed. Other areas recorded a number of possible isolated features, which may form pits or geological features.

No definite archaeological features were seen in the survey.

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’ (CIfA 2014b).

2.2 Background

Contour Archaeology Ltd was commissioned by Staniforth Architects to undertake a detailed magnetometer survey on land at Gopsall House Farm, 15 Bilstone Road, Twycross, CV9 3PP.

2.3 Topography and Geology

Twycross is a small village and civil parish in the Hinckley and Bosworth district of Leicestershire. It is located 14km northwest of Hinkley and 11km south of Ashby-de-la-Zouch. Gopsall House Farm is located 1.2km northeast of the centre of Twycross, off Bilstone Road, centred on SK 34680 05642.

The site is located on solid geology of Gunthorpe Member-Mudstone. These sedimentary rocks are fluvial, lacustrine and marine in origin, deposited in lagoons or shallow seas, formed between 237 to 247 million years ago during the Triassic period. This deposit is overlain by Thrussington Till Member-Diamicton. These superficial deposits are glacial in origin, which are created by the action of ice and meltwater, they formed between 480,000 to 423,000 years ago during the Quaternary period (BGS, 2026).

3. GEOPHYSICAL SURVEY

3.1 Methods

The weather was cloudy with small patches of light rain but the overall conditions for the survey were good. The survey grid was located by a survey grade GPS.

The survey was undertaken in accordance with the European Archaeological Council Guidelines for the Use of Geophysics in Archaeology (2016) and ClfA (2014b) 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 (Clark 1996).

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 survey, data is transferred to the office for processing and presentation.

Processing and presentation of results

Processing is performed using specialist TerraSurveyor 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 if necessary.

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): -5 to 5nT.

3.2 Results

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

Discrete positive anomalies (Blue Circles)

Examples of discrete positive anomalies are highlighted and possibly represent pit features. However, these are somewhat isolated and are difficult to interpret on the basis of form alone. Moreover, a more natural reason cannot be ruled out.

Iron spikes (discrete bipolar anomalies) (Red Circles)

Iron-containing items within the topsoil elicit a distinctive localised bipolar (strong positive with a strong negative) response. Such items usually derive from relatively recent management or use of the land.

Magnetic disturbance (Orange Hatching)

Strong bipolar responses represent a scatter of ferrous material, possibly forming building debris, metal fencing, pathway and general debris.

Services (Pink Line)

A strong positive and negative linear feature was recorded in the southern part of the survey. This forms a service pipe/cable.

4. DISCUSSION

The survey recorded large areas of magnetic disturbance along the proposed trackway. Due to its location along the boundaries of fields and its current use as a trackway, it is likely that any archaeology in these areas has already been disturbed/removed. Other areas recorded a number of possible isolated features, which may form pits or geological features. No definite archaeological features were seen in the survey.

5. ACKNOWLEDGEMENTS

Contour Archaeology Ltd wishes to acknowledge Staniforth Architects who commissioned the project.

6. PERSONNEL

Project coordinator: Neil Jefferson

Geophysical Survey: Mateusz Berke and Florence Hall

Survey processing and reporting: Neil Jefferson and Mateusz Berke

7. BIBLIOGRAPHY

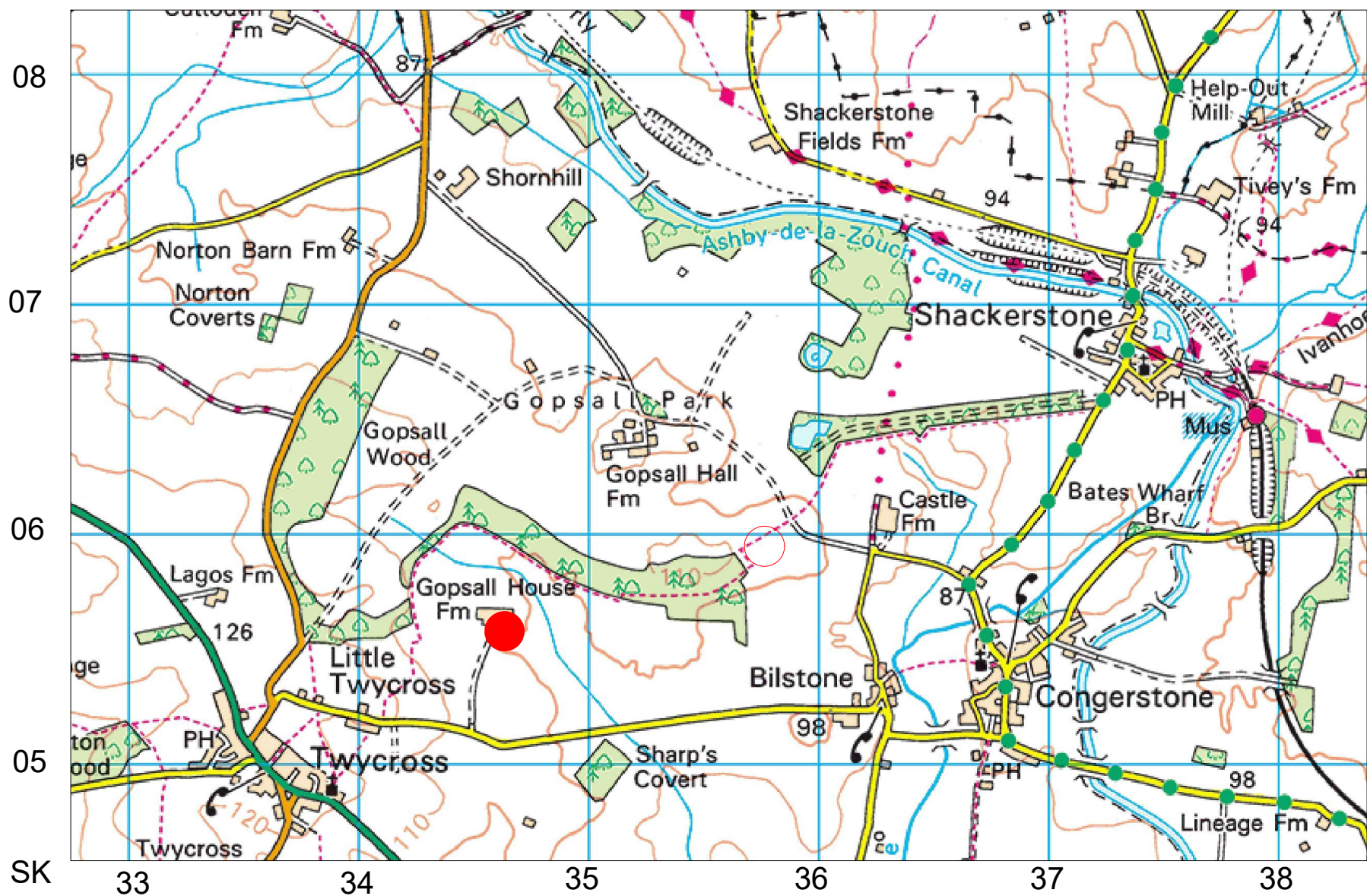
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0m — 500m ● Site Location

Figure 1 Site Location

1:25000 @ A4

