Archaeological Services
University of Durham

Land at Kenilworth Road, Scunthorpe, North Lincolnshire

geophysical survey

on behalf of
ARCUS

Report 1580
November 2006

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Contents

1. Summary

The project

1.1 This report presents the results of a geophysical survey conducted in advance of a proposed development at Kenilworth Road, Scunthorpe. The works comprised a magnetometer survey of approximately 0.5ha.

1.2 The works were commissioned by ARCUS and conducted by Archaeological Services in accordance with a brief provided by North Lincolnshire Council Sites and Monuments Record Office.

Results

1.3 Several weak anomalies are identified as being of possible archaeological origin.

2. Project background

Location (Figure 1)

2.1 The study area is located at Kenilworth Road, Scunthorpe, North Lincolnshire (NGR: SE 9026 1003) and comprises approximately 0.5ha of land which is bounded by housing to the north, east and south and by Kenilworth Road to the west.

Development proposal

2.2 A planning application has been submitted for a development of flats with local amenities, car parking and a programme of landscaping.

Objective

2.3 The principal aim of the survey was to assess the nature and extent of any sub-surface features of potential archaeological significance within the proposed development area, so that an informed decision may be made regarding the nature and scope of any further scheme of archaeological works that may be required in advance of development.

Methods statement

2.4 The survey has been undertaken in accordance with a brief (Appendix II) provided by North Lincolnshire Council Sites and Monuments Record Office (NLSMR).

Dates

2.5 Fieldwork was undertaken on the 27th November 2006. This report was prepared between 28th and 29th November 2006.

Personnel

2.6 Fieldwork was conducted by Graeme Attwood (Supervisor) and Lorne Elliott. This report was prepared by Graeme Attwood with illustrations by David Graham. The Project Manager was Duncan Hale.

Archive/OASIS

2.7 The site code is **SKR06**, for **S**cunthorpe **K**ennilworth **R**oad 20**06**. The survey archive will be supplied on CD to ARCUS, for deposition with the project archive, and the NLSMR. Archaeological Services is registered with the **O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S** project (OASIS). The OASIS ID number for this project is **archaeol3-20856**.

3. Archaeological and historical background

3.1 An archaeological excavation took place in 1948 during the construction of bungalows adjacent to the proposed development area. Roman pottery fragments and building remains were discovered as well as evidence that iron smelting was undertaken in the vicinity of the proposed development area during the Roman period.

4. Landuse, topography and geology

4.1 At the time of survey the proposed development area comprised an area of short grass used for public recreation. A number of telegraph poles were present and a footpath crosses the northern edge of site. The northern, eastern and southern edges of site were bounded by metal railings.

4.2 The survey area was predominantly level at a mean elevation of *c*.35m OD.

4.3 The underlying solid geology of the area comprises Lower Jurassic Frodingham Ironstone, which is overlain by blown sand.

5. Geophysical survey

Standards

5.1 The surveys and reporting were conducted in accordance with English Heritage Research and Professional Services Guideline No.1, *Geophysical survey in archaeological field evaluation* (David 1995); the Institute of Field Archaeologists Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service *Geophysical Data in Archaeology: A Guide to Good Practice* (Schmidt 2001).

Technique selection

5.2 Geophysical surveying enables the relatively rapid and non-invasive identification of potential archaeological features within landscapes and can involve a variety of complementary techniques such as magnetometry, electrical resistivity, ground-penetrating radar and electromagnetic survey. Some techniques are more suitable than others in particular situations, depending on a variety of site-specific factors including the nature of likely targets; depth of likely targets; ground conditions; proximity of buildings, fences or services and the local geology and drift.

5.3 In this instance, based on previous work, it was considered likely that cut features, such as ditches and pits, would be present on the site, and that other types of feature such as trackways, wall foundations and fired structures (for example kilns and hearths) might also be present.

5.4 Given the anticipated shallowness of targets and the non-igneous geological environment of the study area a geomagnetic technique, fluxgate gradiometry, was considered appropriate for detecting each of the types of feature mentioned above. This technique involves the use of hand-held magnetometers to detect and record minute anomalies in the vertical component of the Earth's magnetic field caused by variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can reflect archaeological features.

Field methods

5.5 A 30m grid was established across the survey area and tied-in to known, mapped Ordnance Survey points using a Trimble Pathfinder Pro XRS global positioning system (GPS) and subsequent RINEX calibration.

5.6 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 fluxgate gradiometers with automatic datalogging facilities. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was set to 0.1nT, the sample interval to 0.25m and the traverse interval to 1.0m, thus providing 3600 sample measurements per 30m grid unit.

5.7 Data were downloaded on-site into a laptop computer for initial processing and storage and subsequently transferred to a desktop computer for processing, interpretation and archiving.

Data processing

5.8 Geoplot v.3 software was used to process the geophysical data and to produce both a continuous tone greyscale image and a trace plot of the data. The greyscale image and interpretations are presented in Figures 2-4; the trace plot is provided in Appendix I. In the greyscale image, positive magnetic anomalies are displayed as dark grey and negative magnetic anomalies as light grey. A palette bar relates the greyscale intensities to anomaly values in nanoTesla.

5.9 The following basic processing functions have been applied to the data:

Clip	clips, or limits data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic.
Zero mean traverse	sets the background mean of each traverse within a grid to zero; for removing striping effects in the traverse direction and removing grid edge discontinuities.
Despike	locates and suppresses random iron spikes in gradiometer data.
Low pass filter	for enhancing larger weak features.
Interpolate	increases the number of data points in a survey to match sample and traverse intervals. In this instance the gradiometer data have been interpolated to 0.25m x 0.25m intervals.

Interpretation: anomaly types

5.11 A colour-coded geophysical interpretation plan is provided. Two types of geomagnetic anomaly have been distinguished in the data:

positive magnetic — regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches.

dipolar magnetic — paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths.

Interpretation: features

5.12 A colour-coded archaeological interpretation plan is provided in Figure 4.

5.13 Several small positive magnetic anomalies have been detected. These typically reflect relatively high magnetic susceptibility soils within cut features such as pits and ditches. These could have an archaeological origin.

5.14 The only other anomalies detected here are small, discrete dipolar magnetic anomalies. These almost certainly reflect items of near-surface ferrous and/or fired debris, such brick fragments and tin cans. The ferrous nature of the railings is also evident around the edges of the survey area**.**

6. Conclusions

6.1 A geomagnetic survey has been carried out on land at Kenilworth Road, Scunthorpe.

6.2 Several weak anomalies have been identified which could be of archaeological interest.

7. Sources

David, A, 1995 *Geophysical survey in archaeological field evaluation,* Research and Professional Services Guideline **1**, English Heritage

Gaffney, C, Gater, J & Ovenden, S, 2002 *The use of geophysical techniques in archaeological evaluations*, Technical Paper **6**, Institute of Field Archaeologists

Schmidt, A, 2001 *Geophysical Data in Archaeology: A Guide to Good Practice*, Archaeology Data Service, Arts and Humanities Data Service