

ARCHAEOLOGICAL
SERVICES
DURHAM UNIVERSITY

on behalf of
Bett Homes

Addington Drive
Wallsend
North Tyneside

geophysical survey

report 2805
December 2011

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1. Summary

The project

- 1.1 This report presents the results of a geophysical survey conducted in advance of proposed development at the former Hadrian Park First School, Addington Drive, Wallsend, North Tyneside. The works comprised the geomagnetic survey of approximately 2ha of land.
- 1.2 The works were commissioned by Bett Homes and conducted by Archaeological Services Durham University.

Results

- 1.3 Hardcore for a small sportssurface or building foundation was indentified in the north-eastern part of the survey area.
- 1.4 Land drains were identified across the northern part of the survey area.

2. Project background

Location (Figure 1)

- 2.1 The survey area was located to the west of Hadrian's Park Primary School (NGR centre: NZ 31141 69140), Addington Drive, Wallsend, North Tyneside. It was roughly rectangular in plan, and covered an area of approximately 2.3ha. To the north, south and west are residential developments and to the east was the playing field and buildings of Hadrian Park Primary School.

Development proposal

- 2.2 The proposed development is the construction of residential properties with access roads and services.

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 survey 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 relation to the development.

Methods statement

- 2.4 The surveys have been undertaken in accordance with instructions from the client and in line with national standards and guidelines (paragraph 5.1).

Dates

- 2.5 Fieldwork was undertaken on the 5th December 2011. This report was prepared for 14th December 2011.

Personnel

- 2.6 Fieldwork was conducted by Catrin Jenkins (Supervisor) and Stephanie Piper. The geophysical data were processed by Richie Villis. This report was prepared by Natalie Swann, with illustrations by Tony Liddell, and edited by Duncan Hale, the Project Manager.

Archive/OASIS

- 2.7 The site code is **WAD11**, for **W**allsend **A**ddington **D**rive **2011**. The survey archive will be supplied on CD to the client for deposition with the project archive in due course. Archaeological Services Durham University is registered with the **Online AccesS** to the **Index of archaeological investigationS** project (**OASIS**). The OASIS ID number for this project is **archaeol3-115696**.

3. Historical and archaeological background

- 3.1 An archaeological desk-based assessment has been undertaken for the site (Archaeological Services 2011). The results of the assessment are summarised below.
- 3.2 There is no direct evidence for prehistoric or Roman activity within the proposed development area, but there is evidence that the surrounding area was exploited in these periods, and this exploitation may have extended into the proposed development area.

- 3.3 Archaeological deposits relating to the medieval and post-medieval period may survive over the northern part of the site. This evidence is likely to relate to agricultural activity and is unlikely to be of archaeological significance.
- 3.4 No conclusive evidence for mining has been identified, although the surrounding landscape was heavily exploited.
- 3.5 The northern part of the site may have been subject to landscaping, although geotechnical works do not indicate made-ground over the area. Landscaping may have truncated or removed any archaeological deposits that were present. The southern part of the site was built over in the late 20th century and this may also have truncated any underlying remains.

4. Landuse, topography and geology

- 4.1 At the time of the survey the proposed development area comprised a former playing field, now overgrown.
- 4.2 The proposed development area slopes from approximately 65m OD in the north-west corner to 60m OD in the south, with a pronounced east to west aligned terrace across the centre of the field and evidence of ground reduction along the northern boundaries.
- 4.3 The underlying solid geology of the area comprises Carboniferous sandstone of the Pennine Middle Coal Measures, overlain by Devensian till.

5. Geophysical survey

Standards

- 5.1 The surveys and reporting were conducted in accordance with English Heritage guidelines, *Geophysical survey in archaeological field evaluation* (David, Linford & Linford 2008); the Institute for Archaeologists (IfA) *Standard and Guidance for archaeological geophysical survey* (2011); the IfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service *Guide to Good Practice: Geophysical Data in Archaeology* (Schmidt & Ernenwein 2011).

Technique selection

- 5.2 Geophysical survey enables the relatively rapid and non-invasive identification of sub-surface features of potential archaeological significance and can involve a suite of complementary techniques such as magnetometry, earth electrical resistance, ground-penetrating radar, electromagnetic survey and topsoil magnetic susceptibility survey. Some techniques are more suitable than others in particular situations, depending on 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 the desk-based assessment, it was considered likely that cut features such as ditches and pits might 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 the types of feature mentioned above. This technique involves the use of hand-held magnetometers to detect and record 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 Leica GS15 global navigation satellite system (GNSS) with real-time kinematic (RTK) corrections typically providing 10mm accuracy.
- 5.6 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 dual fluxgate gradiometers. A zig-zag traverse scheme was employed and data were logged in 30m grid units. The instrument sensitivity was nominally 0.03nT, the sample interval 0.25m and the traverse interval 1m, thus providing 3,600 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 raw (minimally processed) data. The greyscale image and interpretations are presented in Figure 2; the trace plot is provided in Figure 3. 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 geomagnetic data:

<i>clip</i>	clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic
<i>zero mean traverse</i>	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
<i>destagger</i>	corrects for displacement of geomagnetic anomalies caused by alternate zig-zag traverses
<i>interpolate</i>	increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

Interpretation: anomaly types

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

<i>positive magnetic</i>	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
<i>dipolar magnetic</i>	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

- 5.11 A colour-coded archaeological interpretation is provided.
- 5.12 A series of parallel positive magnetic anomalies, aligned approximately north-south, was detected in the northern part of the survey area. These anomalies almost certainly reflect land drains.
- 5.13 A relatively strong, rectangular magnetic anomaly was detected towards the north-east corner of the survey area; this is likely to reflect hardcore for a sports surface or the foundations of a small building.
- 5.14 Small, discrete dipolar magnetic anomalies were detected across the survey area. These almost certainly reflect items of near-surface ferrous and/or fired debris, such as horseshoes and brick fragments. Two pairs of intense dipolar magnetic anomalies in the northern part of the survey area are likely to reflect metal sockets for goal posts.
- 5.15 The intense dipolar magnetic anomalies detected along the eastern, northern and western edges of the survey area reflect the metal fences there.

6. Conclusions

- 6.1 Approximately 2ha of geomagnetic survey was undertaken on land north of the former Hadrian Park First School, Addington Drive, Wallsend, North Tyneside, prior to proposed development.
- 6.2 Hardcore for a small sports surface or building foundation was identified in the north-eastern part of the survey area.
- 6.3 Land drains were identified across the northern part of the survey area.

7. Sources

- Archaeological Services 2011 *Addington Drive, Wallsend, Tyne and Wear: archaeological desk-based assessment and building recording*. Unpublished report **2777**, Archaeological Services Durham University
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