Archaeological Services
University of Durham

Radlett Strategic Rail Freight Interchange, St Albans, Hertfordshire

geophysical surveys

for
CgMs Consulting
on behalf of
Helioslough Ltd

Report 1733
October 2007

Archaeological Services
Durham University
South Road
Durham DH1 3LE
Tel: 0191 334 1121
Fax: 0191 334 1126
archaeological.services@durham.ac.uk
www.durham.ac.uk/archaeological.services

Radlett Strategic Rail Freight Interchange, St Albans, Hertfordshire

geophysical surveys

Report 1733

October 2007

Archaeological Services Durham University

for

CgMs Consulting

Morley House, 26 Holborn Viaduct, London EC1A 2AT

on behalf of

Helioslough Ltd

Contents

1. Summary

The project

1.1 This report presents the results of geophysical surveys conducted in advance of the proposed development of a Strategic Rail Freight Interchange on the former Radlett Aerodrome site, and associated works, south of St Albans. The works comprised 13 geomagnetic surveys totalling approximately 34 hectares.

1.2 The works were commissioned by CgMs Consulting on behalf of Helioslough Ltd and conducted by Archaeological Services in accordance with instructions provided by CgMs.

Results

1.3 Traces of possible former ridge and furrow cultivation and a possible former field boundary or ditch have been detected in part of Plot 4.

1.4 The courses of a number of utilities have been recorded, together with apparent dumps of highly magnetic material.

2. Project background

Location (Figures 1 & 2)

2.1 The planning application area comprises land on and around the former Radlett Aerodrome on the south side of St Albans, Hertfordshire (NGR centre: TL 155 038). It is bounded by the M25 motorway to the south, Park Street to the west, Sopwell in the north and London Colney to the east. As much of the area has previously been used for mineral extraction only limited areas were suitable for archaeological geophysical prospection. Thirteen surveys have been undertaken, totalling approximately 34 hectares, in Plots 1, 2 and 4.

Development proposal

2.2 A planning application submitted by Helioslough Ltd is for the development of a Strategic Rail Freight Interchange (SRFI), which includes distribution buildings with associated road, rail and other infrastructure works including parking for up to 1665 cars and 617 lorries, landscaping and a new relief road on the Park Street/Frogmore junction. The overall proposals involve 419 hectares to include additional landscaping and other works on sites adjacent to the Aerodrome to provide public access to open land and community forest.

Objective

2.3 The principal aim of the surveys 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 surveys have been undertaken in accordance with instructions provided by CgMs Consulting, following discussions with Simon West, Keeper of Field Archaeology at St Albans Museums.

Dates

2.5 Fieldwork was undertaken between 10th and 27th September 2007. This report was prepared between 28th September and 15th October 2007.

Personnel

2.6 Fieldwork was conducted by Aidan Bell, Edward Davies, Lorne Elliott (Supervisor) and Natalie Swann. This report was prepared by Duncan Hale with illustrations by David Graham. The Project Manager was Duncan Hale.

Archive/OASIS

2.7 The site code is **SAR07**, for **S**t **A**lbans **R**adlett 20**07**. The survey archive will be supplied on CD to CgMs Consulting for deposition with the project archive. 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 **archaeol3-32561**.

3. Archaeological and historical background

3.1 An archaeological desk-based assessment was undertaken by CgMs and submitted as Appendix 11.A1 of an Environmental Statement for the development proposal (CgMs 2006). The information is not repeated here, suffice to say that numerous substantial Iron Age and Roman sites are well-known in the St Albans area. In summary, the assessment established that the study site had high potential for prehistoric and Roman remains to be present in those areas not previously subject to gravel extraction.

4. Landuse, topography and geology

4.1 Surveys were undertaken in 13 land parcels, typically pasture and scrub, though parts of Plot 4 (Areas 4e, 4g & 4h) appeared to be set-aside. The vegetation in Area 4g was such that it prevented survey of most of that field.

4.2 The majority of the site lies on a relatively flat plateau overlooking the River Ver to the north and west. At its northern end beside the A414, the site lies at 89m OD dropping to 73m OD at the southern end beside the M25. The north-western corner of the site drops quite sharply from 85m OD to 68m OD beside the River Ver. However, the topography of the majority of the site to the west of the railway has been altered following gravel extraction and therefore has been artificially lowered in the area of the airfield (*ibid*.).

4.3 The solid geology within the study area comprises Chalk (IGS 1979 1:625,000 scale). Further detail is provided by the British Geological Survey Map Sheet 239 (Hertford) which indicates that the geology within the Ver Valley in the north-western part of the study site comprises Valley Gravel, Glacial Gravel and Upper Chalk on the valley slopes and Alluvium within the valley bottom. The north-western part of the study site comprises Boulder Clay, the central and southern parts of the study site comprises Glacial Gravel (except where quarrying has taken place) and within the central part of the study site there is a localised area of Brickearth (CgMs 2006).

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 resistance, 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 the desktop 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 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 each survey area.

5.6 The survey locations were recorded and tied-in to known, mapped Ordnance Survey points using a Trimble Pathfinder Pro XRS global positioning system (GPS) with real-time correction providing sub-metre accuracy.

5.7 Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601-2 dual fluxgate gradiometers except in Area 1d and Areas 4g/h, where the same measurements were determined using a Geoscan FM256 dual fluxgate gradiometer system. 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.

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

Data processing

5.9 Geoplot v.3 software was used to process the geophysical data and to produce continuous tone greyscale images of the raw (unfiltered) data. The greyscale images and interpretations are presented in Figures 3-8. In the greyscale images, 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. Trace plots have not been provided in this instance, due to the size of some of the surveys and the absence of likely archaeological features.

5.10 The following basic processing functions have been applied to each dataset:

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.
destagger	corrects for displacement of anomalies caused by alternate zig-zag traverses.
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 Colour-coded geophysical interpretation plans are 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

General comments

5.12 Colour-coded archaeological interpretation plans are provided.

5.13 The locations of telegraph poles and service covers on the drawings are approximate and should not be used for measuring purposes.

5.14 Small, discrete dipolar magnetic anomalies have been detected in all of the survey areas. These almost certainly reflect items of near-surface ferrous and/or fired debris, such as horseshoes and brick fragments, and in most cases have little or no archaeological significance. A sample of these is shown on the geophysical interpretation plans, however, they have been omitted from the archaeological interpretation plans and the following discussion.

Plot 1 Areas 1a-1c

5.15 These surveys were undertaken along the proposed course of an access road. A broad band of very intense dipolar magnetic anomalies aligned east-west in Area 1a almost certainly reflects the presence of a substantial ferrous pipe. A similar though smaller anomaly at the northern end of this transect almost certainly reflects a large ferrous object.

5.16 A band of small dipolar magnetic anomalies in Areas 1b and 1c represents the clinker and rubble hardcore of an existing farm track.

Plot 1 Area 1d

5.17 Area 1d was surveyed in order to investigate the origins of possible parchmarks noted on aerial photographs, however, no features of likely archaeological significance were identified.

5.18 A band of small dipolar magnetic anomalies traversing the area north-east/south-west represents the hardcore of an existing farm track. A ferrous service pipe was almost certainly detected along the western edge of the survey. Large discrete dipolar magnetic anomalies detected elsewhere in this area are likely to reflect near-surface ferrous debris.

Plot 2

5.19 A band of small dipolar magnetic anomalies traversing the area north-west/south-east corresponds to an existing clinker track.

5.20 The land to the west of the track comprises grassland and appears to contain a typical low concentration of small ferrous and/or fired litter. The land to the east of the track, however, is covered with poor quality scrub vegetation and appears to have been used as a dump for highly magnetic materials, perhaps a backfilled gravel pit.

Plot 4 Areas 4a-4h

5.21 No features of likely archaeological significance were identified in Plot 4. A series of very weak, parallel positive magnetic anomalies aligned broadly north-south in Area 4d could possibly represent traces of former ridge and furrow cultivation. A possible former field boundary has also been detected in 4d as a positive magnetic anomaly, aligned broadly parallel to the possible ridge and furrow traces.

5.22 A number of service pipes and/or cables have almost certainly been detected throughout Plot 4. These are highlighted in Figure 8, though the locations of service covers and telegraph poles are only given as approximate.

5.23 A concentration of dipolar magnetic anomalies spanning Areas 4e and 4f probably reflects the dumping of ferrous and/or fired materials there.

6. Conclusions

6.1 Geomagnetic surveys have been undertaken at various locations within an area proposed for Radlett SRFI and associated parkland on the south side of St Albans, Hertfordshire.

6.2 Virtually no evidence for archaeological activity has been identified in the 34ha of surveys, although possible traces of ridge and furrow and a possible former field boundary were detected in part of Area 4d.

6.3 The courses of a number of utilities have been recorded, together with apparent dumps of highly magnetic material.

7. Sources

CgMs 2006 Archaeological Desk Based Assessment. Appendix 11.A1 in *Land in and around Former Aerodrome: Environmental Statement*, Helioslough Ltd

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

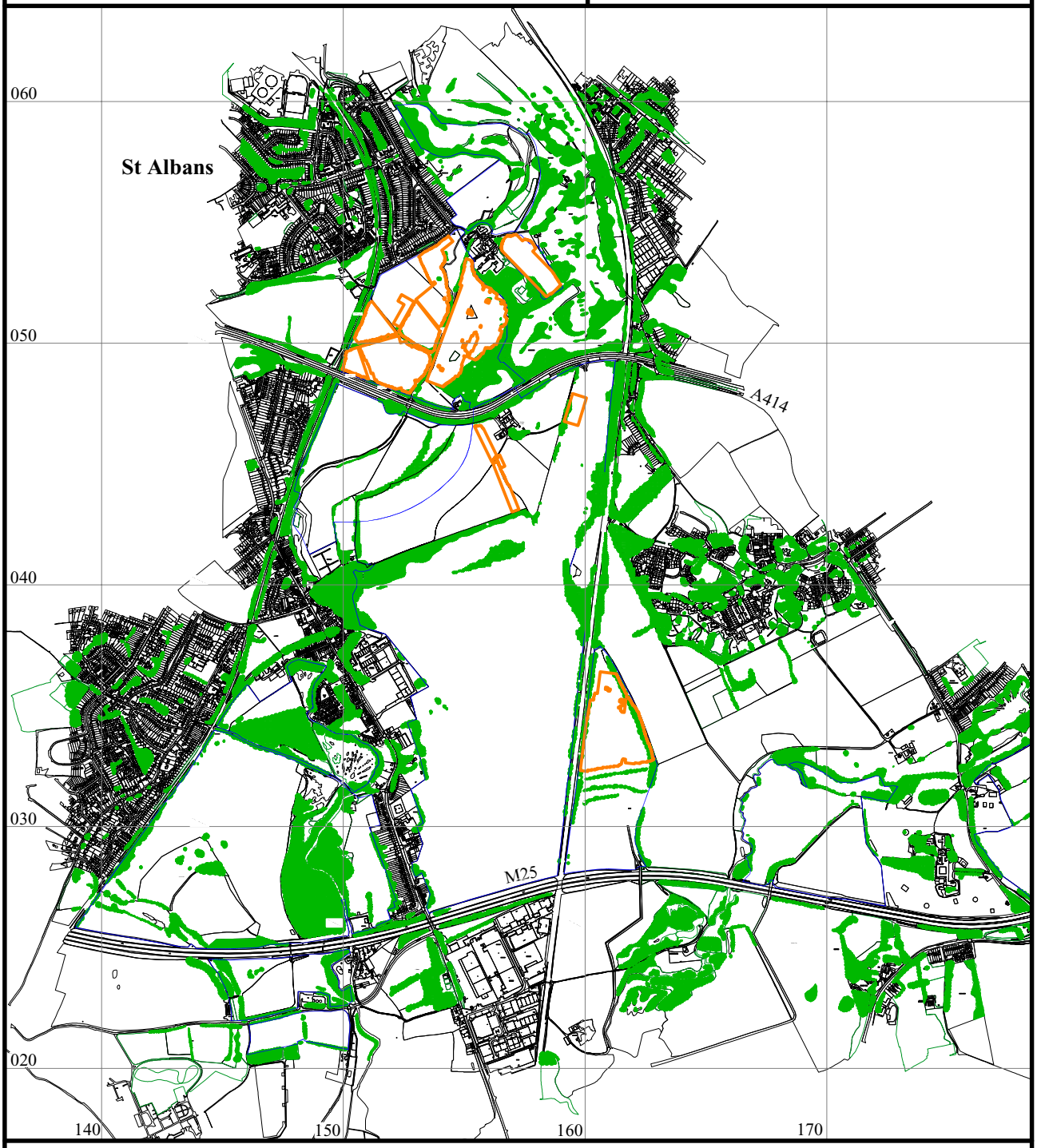
Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733
Figure 1
Location map

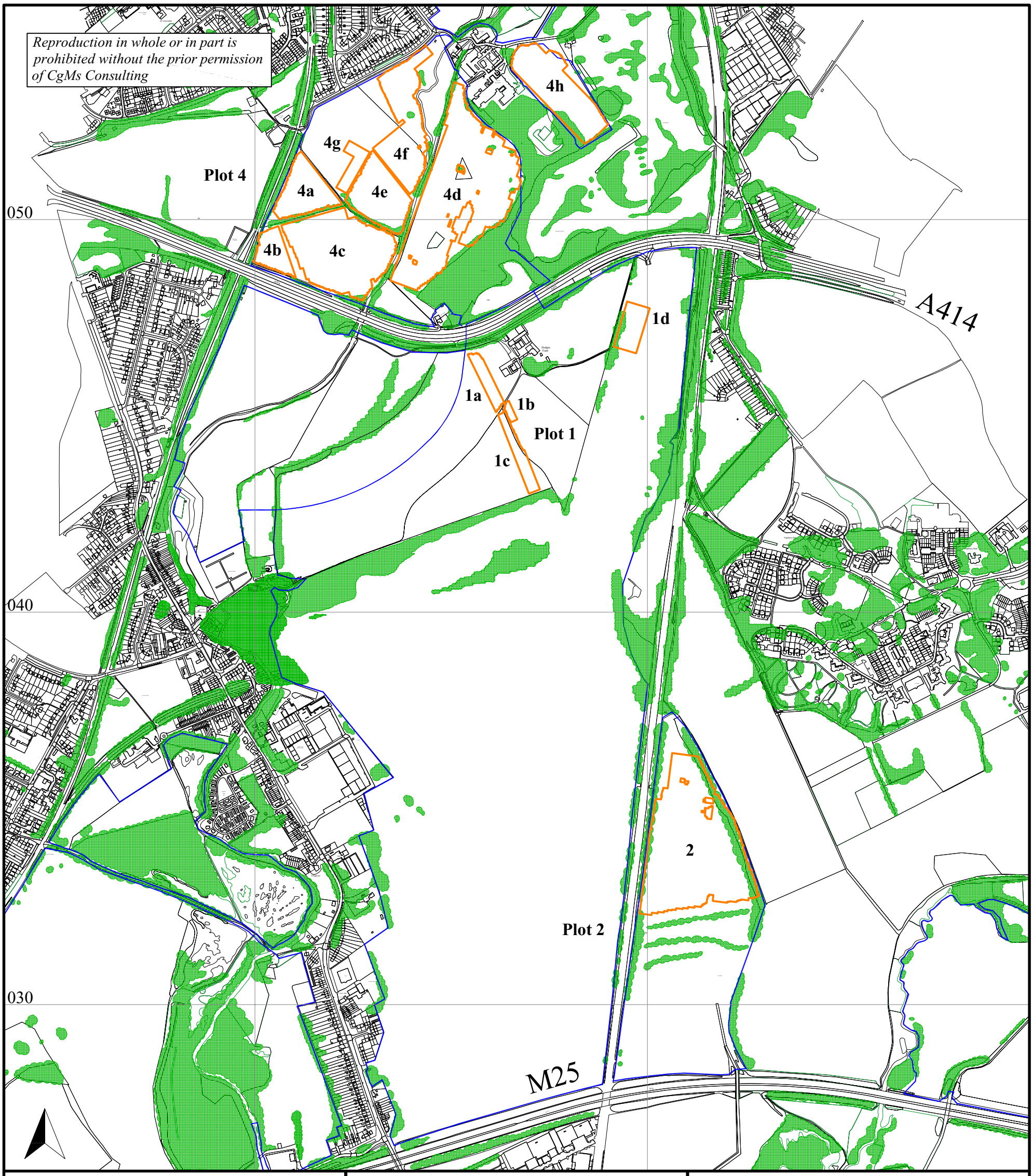
for
CgMs Consulting
on behalf of
Helioslough Ltd



survey

0 1km

scale 1:25 000 - for A4 plot



Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 2

Location of the surveys

for
CgMs Consulting
on behalf of
Helioslough Ltd

0 500m

scale 1:10 000 - for A3 plot

outline of survey area

Chalkdell Wood

NORTH ORBITAL ROAD
A414

Hedges Farm

Stables

Area 1a

Area 1b

Area 1c

Area 1d

Plot 1

Plot 2

Area 2

049
048
047
046
045
044
043
037
036
035
034
033
032
156
157
158
159
160
161
162

outline of survey area

plot boundary

5.00
4.17
3.33
2.50
1.67
0.83
0.00
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

0 50m

scale 1:1250 - for A1 plot

for
CgMs Consulting
on behalf of
Helioslough Ltd

Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 3

Plots 1 & 2, geophysical surveys

Chalkdell Wood

NORTH ORBITAL ROAD
A414

Hedges Farm

Stables

Area 1a

Area 1b

Area 1c

Area 1d

Plot 1

Plot 2

Area 2

049
048
047
046
045
044
043
037
036
035
034
033
032

156 157 158 159 160 161 160 161 162

outline of survey area

plot boundary

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

0 50m

scale 1:1250 - for A1 plot

for
CgMs Consulting
on behalf of
Helioslough Ltd

Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 4

Plots 1 & 2, geophysical interpretation

Chalkdell Wood

NORTH ORBITAL ROAD
A414

Hedges Farm

Stables

Area 1a

Area 1b

Area 1c

Area 1d

telegraph pole

service cover

Plot 1

Plot 2

Area 2

049
048
047
046
045
044
043

156 157 158 159 160 161

037
036
035
034
033
032

160 161 162

outline of survey area

plot boundary

service pipes

ferrous/fired materials

existing track

0 50m

scale 1:1250 - for A1 plot

for
CgMs Consulting
on behalf of
Helioslough Ltd

Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 5

Plots 1 & 2, archaeological interpretation

Plot 4

Area 4a

Area 4b

Area 4c

Area 4d

Area 4e

Area 4f

Area 4g

Area 4h

outline of survey area

plot boundary

5.00
4.17
3.33
2.50
1.67
0.83
0.00
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

0 50m

scale 1:1250 - for A1 plot

for
CgMs Consulting
on behalf of
Helioslough Ltd

Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 6

Plot 4, geophysical surveys

Plot 4

Area 4a

Area 4b

Area 4c

Area 4d

Area 4e

Area 4f

Area 4g

Area 4h

outline of survey area

plot boundary

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

0 50m

scale 1:1250 - for A1 plot

for
CgMs Consulting
on behalf of
Heliosloughh Ltd

Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 7

Plot 4, geophysical interpretation

for
CgMs Consulting
on behalf of
Helioslough Ltd

Archaeological Services
University of Durham

Radlett SRFI, St Albans, Hertfordshire

geophysical surveys

Report 1733

Figure 8

Plot 4, archaeological interpretation