

on behalf of CgMs Consulting

Land at Alconbury Huntingdon Cambridgeshire

geophysical survey

report 2670 May 2011



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Summary

The project

- 1.1 This report presents the results of a geophysical survey conducted in advance of proposed development of land at Alconbury, Huntingdon, Cambridgeshire. The works comprised four areas of geomagnetic survey totalling 115ha.
- 1.2 The works were commissioned by CgMs Consulting and conducted by Archaeological Services Durham University.

Results

- 1.3 Possible late Iron Age or early Roman enclosure ditches and a ring-ditch were identified in the north-east of Area 1.
- 1.4 An enclosed settlement, over one hectare in area, which may be associated with the medieval settlement of Owl End, was identified in the south-west of Area 1.
- 1.5 Possible rectilinear enclosure ditches have been identified in the southern part of Area 3 and the northern part of Area 4.
- 1.6 Possible soil-filled pit and ditch features have been identified in all of the survey areas.
- 1.7 Former agricultural practices, including former field systems, ridge and furrow and associated headlands, have been identified in all of the survey areas.
- 1.8 Disturbed ground and a former track, possibly associated with the development of RAF Alconbury, the East Coast Mainline or other works, were identified in Area 2.
- 1.9 An infilled pond, recorded by the Ordnance Survey, was detected in Area 2.
- 1.10 Services were detected in all four survey areas.
- 1.11 Land drains were detected in Areas 1 and 3.

Project background

Location (Figures 1 & 2)

2.1 The survey area was located immediately east of Alconbury Airfield, Huntingdon, Cambridgeshire (NGR centre: TL 2330 7539). Four surveys totalling 115ha were conducted in four land parcels. To the north-west was Alconbury Airfield, to the east was the East Coast Mainline railway, to the south was open farmland and the Ermine Business Park, and to the west was open farmland and the Stukeleys.

Development proposal

2.2 The proposal is for the redevelopment of Alconbury Airfield and adjacent land.

Objective

2.3 The principal aim of the survey was to assess the nature and extent of any subsurface 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 proposed development.

Methods statement

2.4 The surveys have been undertaken in accordance with current national standards and guidance (see para. 5.1 below).

Dates

2.5 Fieldwork was undertaken between 11th April and 13th May 2011. This report was completed during May 2011.

Personnel

2.6 Fieldwork was conducted by Jamie Armstrong, Edward Davies, Michelle de Grichy, Ludwig Fuchs, David Graham, Paul Murtagh, Natalie Swann and Richie Villis (Supervisor). The geophysical data were processed by Richie Villis. This report was prepared by Richie Villis, with illustrations by Janine Watson, and edited by Duncan Hale, the Project Manager.

Archive/OASIS

2.7 The site code is CHA11, for Cambridgeshire, Huntingdon, Alconbury 2011. The survey archive will be supplied on CD to the client for deposition with the Cambridgeshire Historic Environment Record (HER). 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 archaeol3-101195.

Historical and archaeological background

- 3.1 CgMs Consulting carried out a detailed archaeological desk-based assessment of Alconbury Airfield in 2006 (Chadwick & Dicks 2006), the results of which are summarised below.
- 3.2 A large number of prehistoric, Roman and medieval archaeological features have been identified in the wider area.

- 3.3 Ermine Street Roman road is located to the south-west of the survey areas.
- 3.4 The desk-based assessment states that "archaeological investigations for the proposed Rail Link to the East Coast Mainline recorded late Iron Age/early Roman settlement evidence" in the west corner of Area 2.
- 3.5 Priestley Wood moated site, a Scheduled Ancient Monument, is located in the north of the survey area, in between Areas 1 and 2. A manor house is thought to have stood on the site in the 13th century. Documentary evidence suggests that the manor and estate was granted by David, Earl of Huntingdon, to the Prestleys in 1219.
- 3.6 The medieval settlement of Owl End is located to the west of the moated manor, in the west of Area 1.
- 3.7 RAF Alconbury was opened in 1938 and transferred to US Air Force control in 1942, at which point the three runways were extended. After further runway extensions and general base expansion, the airfield ceased operations in 1995 and now has a range of uses including a vehicle distribution centre.
- 3.8 Archaeological Services conducted a scheme of geophysical survey works at the airfield in 2006 (Archaeological Services 2006). This concluded that no features of archaeological significance were identified within the survey areas.

4. Landuse, topography and geology

- 4.1 At the time of survey the proposed development area comprised four fields of arable land planted with wheat. Runway approach lights for the former airfield bisected Area 2 from north-west to south-east.
- 4.2 The area was predominantly level with a mean elevation of approximately 40m OD;
 Area 2 sloped gently down towards an open drain at its north edge.
- 4.3 The underlying solid geology of the area comprises Jurassic mudstone of the Oxford Clay Formation, which is overlain by Middle Pleistocene Till.

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) Draft Standard and Guidance for archaeological geophysical survey (2010); 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 (draft 2nd edition, Schmidt & Ernenwein 2010).

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 desktop evidence, 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 each survey area and tied-in to known, mapped Ordnance Survey points using a Trimble Pathfinder Pro XRS global positioning system with real-time correction.
- 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 was 0.25m and the traverse interval was 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 continuous tone greyscale images of the raw (minimally processed) data. In this instance, trace plots are only presented for selected parts of the surveys, typically where potentially significant features have been detected. A problem with large surveys is that the sheer number of traverses needing to be displayed means that there is not enough space in the plotting area to distinguish one trace from the next. Thus, it is not always practical (with such large datasets) for a survey report to provide a trace plot of the survey data in its entirety (see David, Linford & Linford 2008, p46).
- 5.9 The greyscale images and interpretations are presented in Figures 2-14; selected trace plots are provided in Figure 15. In the greyscale images, positive magnetic anomalies are displayed as dark grey and negative magnetic anomalies as light grey. Palette bars relate the greyscale intensities to anomaly values in nanoTesla.

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

clips 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

destagger corrects for displacement of geomagnetic anomalies caused

by alternate zig-zag traverses

despike locates and suppresses iron spikes in gradiometer data

interpolate 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

5.11 Colour-coded geophysical interpretation plans are provided. Three 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

negative magnetic regions of anomalously low or negative magnetic field

gradient, which may correspond to features of low magnetic susceptibility such as wall footings and other concentrations

of sedimentary rock or voids

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 Except where stated otherwise in the text below, positive magnetic anomalies are taken to reflect relatively high magnetic susceptibility materials, typically sediments in cut archaeological features (such as ditches or pits) whose magnetic susceptibility has been enhanced by decomposed organic matter or by burning.
- 5.14 Series of parallel, weak, positive magnetic anomalies which almost certainly reflect former ridge and furrow cultivation have been detected across each area.
- 5.15 Narrow, linear, weak negative magnetic anomalies have been detected across the survey areas. Except where stated below these correspond to the location of modern agricultural 'tramlines' on the ground. 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.
- 5.16 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.

Area 1 (Figures 2, 3, 4 & 5)

- 5.17 A number of positive magnetic anomalies almost certainly reflect features of archaeological origin in this area.
- 5.18 In the north-east corner of this area a series of linear and curvilinear positive magnetic anomalies has been detected. One of these curvilinear anomalies, c. 10m in diameter, could reflect the position of a ring-ditch associated with a roundhouse. A curvilinear positive magnetic anomaly to the north of this may reflect an enclosure ditch with an elongated entrance. These features may be related to the late Iron Age/early-Roman settlement evidence recorded in the desk-based assessment.
- 5.19 A series of rectilinear positive magnetic anomalies, covering an area of over one hectare, has been detected in the south-west of this area. These almost certainly reflect soil-filled ditch features. A number of discrete positive magnetic anomalies have also been detected in this area, which almost certainly reflect soil-filled pits. These features may be associated with the medieval settlement of Owl End, as identified by the desk-based assessment. The varying strength of these anomalies reflects variation in the fill, or survival, of these features.
- 5.20 The former ridge and furrow cultivation detected in this area is aligned broadly north/south. In the north-east corner of the area, where the ridge and furrow is more defined, a linear positive magnetic anomaly has been detected perpendicular to the ridge and furrow. This almost certainly reflects a headland associated with the former agricultural practice. An adjacent parallel positive magnetic anomaly has also been detected, which almost certainly reflects a former field boundary recorded by the OS. A negative magnetic anomaly between the headland and the field boundary almost certainly reflects a former track.
- 5.21 A number of narrow chains of weak dipolar and linear positive magnetic anomalies have been detected in this area. These correspond to former field boundaries as shown on OS maps between 1885 and 1976.
- 5.22 A series of regularly spaced, straight, weak positive magnetic anomalies has been detected aligned broadly north-east/south-west in the north-east of the survey area. This is likely to reflect a system of land drainage.
- 5.23 Three chains of strong dipolar magnetic anomalies have been detected: one aligned along the northern edge of the area, one aligned broadly north/south in the centre of the area, and one aligned broadly north-east/south-west in the east of the area. These almost certainly reflect ferrous services.

5.24 In addition to the small discrete dipolar magnetic anomalies, several much larger and stronger dipolar magnetic anomalies have also been detected. These probably reflect larger items of ferrous litter.

Area 2 (Figures 2, 6, 7 & 8)

- 5.25 A large concentration of strong dipolar magnetic anomalies has been detected in the north of this area. Large amounts of concrete and aggregate rubble were noted on the ground here. This may reflect an area of dumping, land-fill or other disturbance, possibly associated with the construction or development of the nearby runway at RAF Alconbury to the west, the East Coast Mainline to the east or other nearby works.
- 5.26 A broad band of dipolar magnetic anomalies has been detected aligned northeast/south-west, connecting the disturbed area to the corner of the current farm track. This almost certainly reflects a former metalled track or haul road associated with the dumped waste. This track is recorded on the OS maps until 1992.
- 5.27 Two linear positive magnetic anomalies have been detected in the south-east corner of this area. These almost certainly reflect former field boundaries as recorded by the OS until 1976.
- 5.28 Former ridge and furrow cultivation has been detected on two different alignments in this area. In the south of the area the ridge and furrow is aligned broadly northeast/south-west. In the south-east corner of the area, contained by the curvilinear former field boundary, the ridge and furrow is aligned broadly north-west/southeast. A linear positive magnetic anomaly has been detected at an angle to this, aligned parallel with the current farm track; this may reflect an agricultural headland.
- 5.29 A discrete 'L' shaped dipolar magnetic anomaly has been detected in the east of the area, close to the corner formed by the former field boundaries. This almost certainly corresponds to a relatively recently infilled pond, which was recorded by the OS in 1976.
- 5.30 Chains of dipolar magnetic anomalies have been detected in this area. These almost certainly reflect services. The north-west/south-east aligned double chain of dipolar magnetic anomalies and three pairs of perpendicular 'arms' reflect the locations of runway approach lights and associated cables. The north-west/south-east aligned dipolar magnetic anomaly detected in the north corner of the area is likely to reflect a service pipe.

Area 3 (Figures 2, 9, 10 & 11)

- 5.31 A number of positive magnetic anomalies have been detected in this area. These probably reflect soil-filled features.
- 5.32 Two curvilinear and one linear weak positive magnetic anomalies have been detected in the south-east of the area. These may reflect soil-filled features of archaeological origin, such as enclosure ditches.
- 5.33 Linear positive magnetic anomalies have been detected aligned broadly east/west in the centre of the area and north-east/south-west in the south of the area. These

- almost certainly reflect former field boundaries as shown by the OS maps until the 1970s.
- 5.34 Former ridge and furrow cultivation has been detected aligned in two directions in this area. Across much of the area it is aligned broadly north/south. In the south-east corner it is aligned broadly north-west/south-east. Linear positive magnetic anomalies have been detected at an angle to the former ridge and furrow cultivation, parallel to former field boundaries. These almost certainly reflect headlands associated with the former agricultural practice.
- 5.35 A north-east/south-west aligned chain of dipolar magnetic anomalies has been detected in the north of the area. This almost certainly reflects a ferrous service.
- 5.36 A series of regularly spaced, straight, weak positive magnetic anomalies has been detected aligned broadly north-west/south-east in the north of the survey area. This almost certainly reflects a system of land drainage.
- 5.37 Two discrete dipolar magnetic anomalies detected in the south-east corner of the area correspond to telegraph poles. The large dipolar magnetic anomaly detected in the centre of the east edge of the survey area reflects a double telegraph pole.

Area 4 (Figures 2, 12, 13 & 14)

- 5.38 A series of former field systems has been detected in this area. A number of linear positive magnetic anomalies and alignments of dipolar magnetic anomalies almost certainly reflect former field boundaries. Some of these are shown on OS maps between 1885 and 1981. Other similar features, not recorded on the cartographic evidence, are almost certainly also former field boundaries.
- 5.39 A number of linear and curvilinear positive magnetic anomalies have been detected in this area. Some of these may underlie the ridge and furrow and could reflect soilfilled ditch features of archaeological origin, perhaps the remains of enclosures; these could be associated with similar ditched features detected in the southern part of Area 3.
- 5.40 In the north-east of the area a series of linear and rectilinear positive magnetic anomalies has been detected. The anomalies form a roughly 35m square enclosure with smaller annexes and associated ditches.
- 5.41 Former ridge and furrow cultivation and associated headlands have been detected on several alignments in this area.
- 5.42 Chains of dipolar magnetic anomalies have been detected in the north-west and on the east edge of the area. These almost certainly reflect services.
- 5.43 Strong dipolar magnetic anomalies have been detected at the north-west edge of the area. These reflect the proximity of modern farm buildings, stables and metal cabins.
- 5.44 Eight regularly spaced dipolar magnetic anomalies have been detected, aligned north/south, in the east of the area. These reflect a line of telegraph poles.

6. Conclusions

- 6.1 Approximately 115ha of geomagnetic survey was undertaken at land at Alconbury, Huntingdon, Cambridgeshire, prior to proposed development.
- 6.2 Possible late Iron Age or early Roman enclosure ditches and a ring ditch were identified in the north-east of Area 1.
- 6.3 An enclosed settlement, over one hectare in area, which may be associated with the medieval settlement of Owl End, was identified in the south-west of Area 1.
- 6.4 Possible rectilinear enclosure ditches have been identified in the southern part of Area 3 and the northern part of Area 4.
- 6.5 Possible soil-filled pit and ditch features have been identified in all of the survey areas.
- 6.6 Former agricultural practices, including former field systems, ridge and furrow and associated headlands, have been identified in all of the survey areas.
- 6.7 Disturbed ground and a former track, possibly associated with the development of RAF Alconbury, the East Coast Mainline or other works, were identified in Area 2.
- 6.8 An infilled pond, recorded by the OS, was detected in Area 2.
- 6.9 Services were detected in all four survey areas.
- 6.10 Land drains were detected in Areas 1 and 3.

Sources

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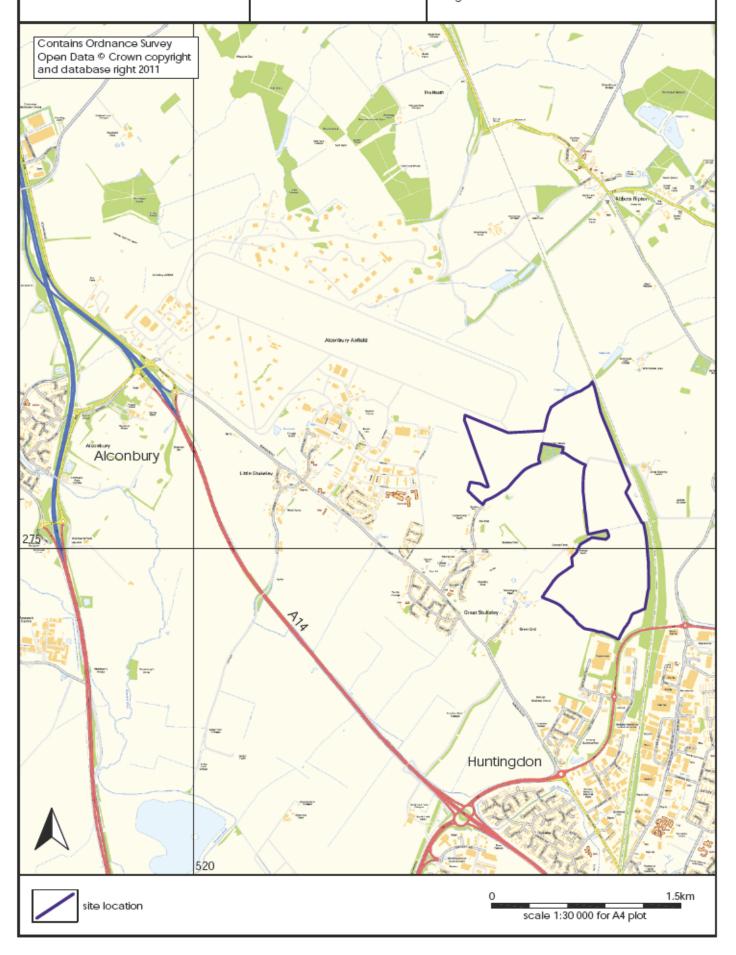
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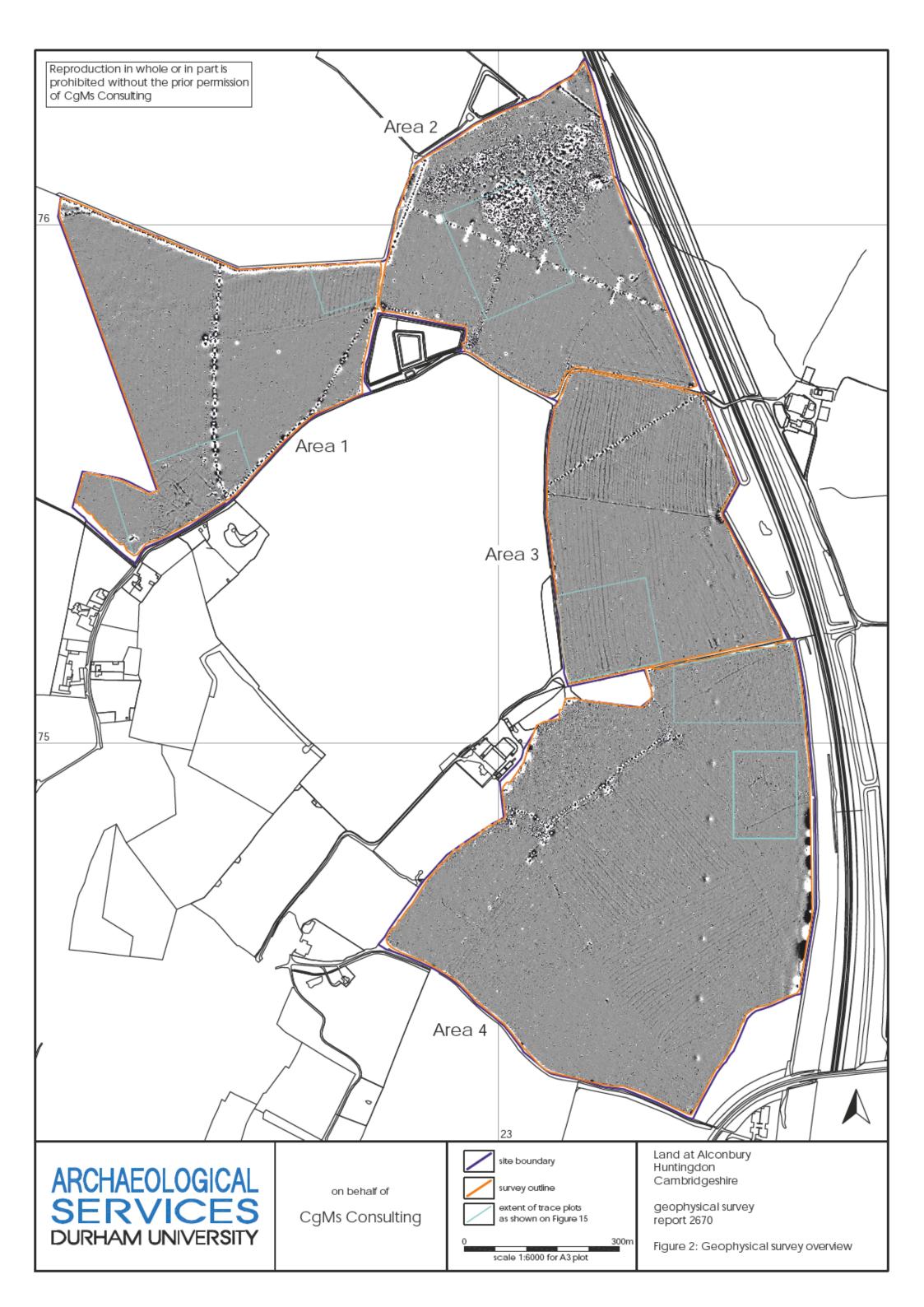
CgMs Consulting

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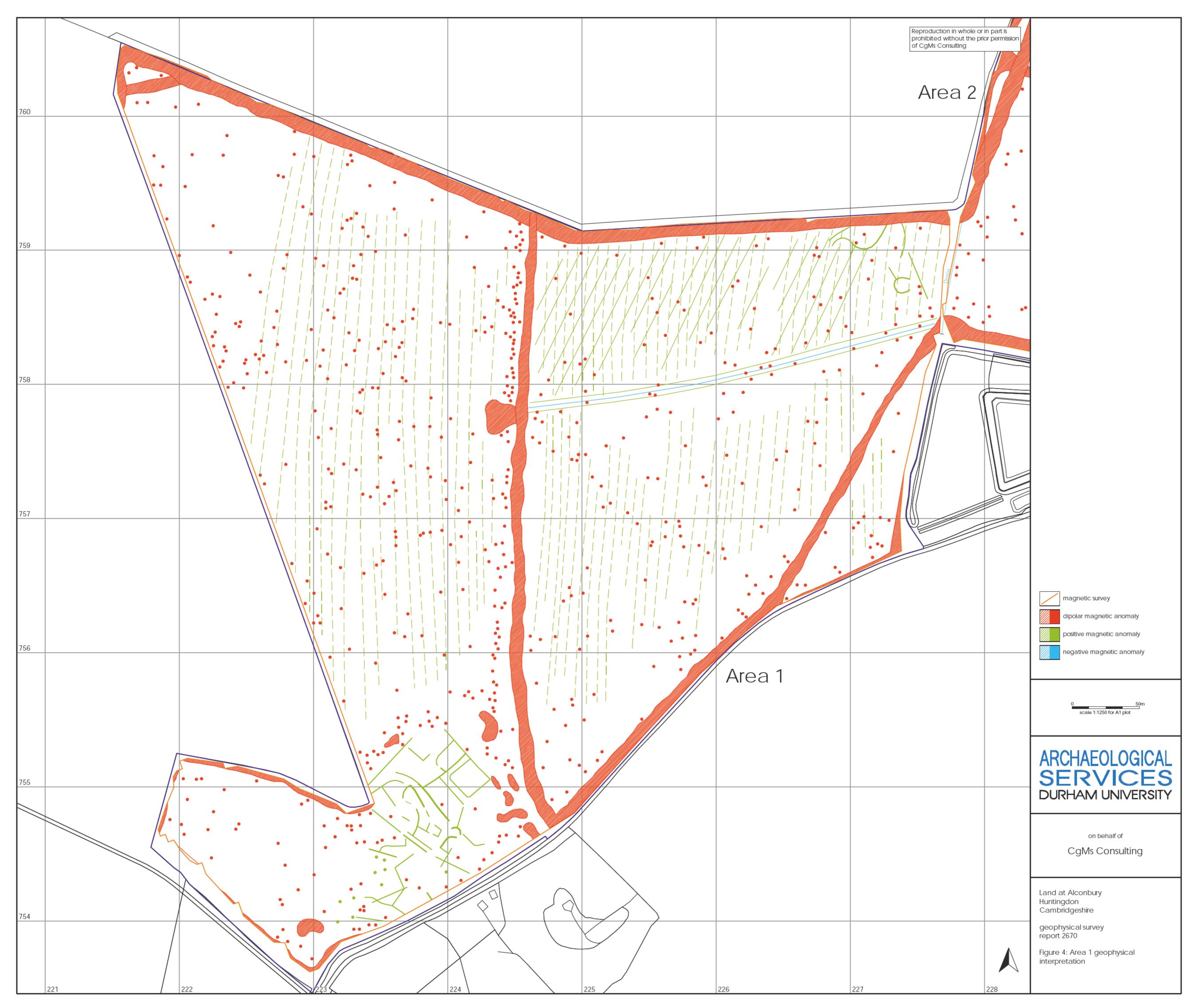
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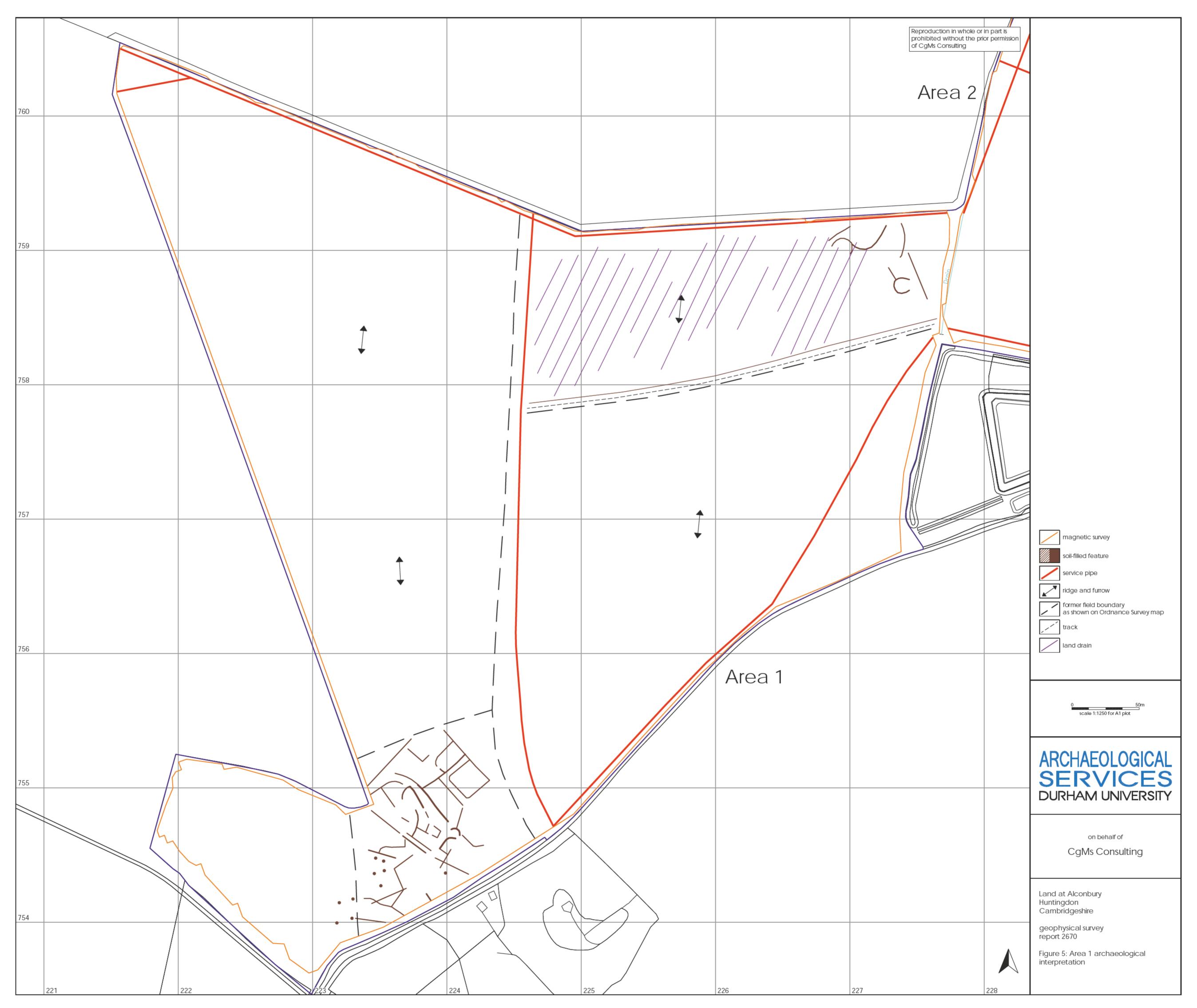
Figure 1: Site location

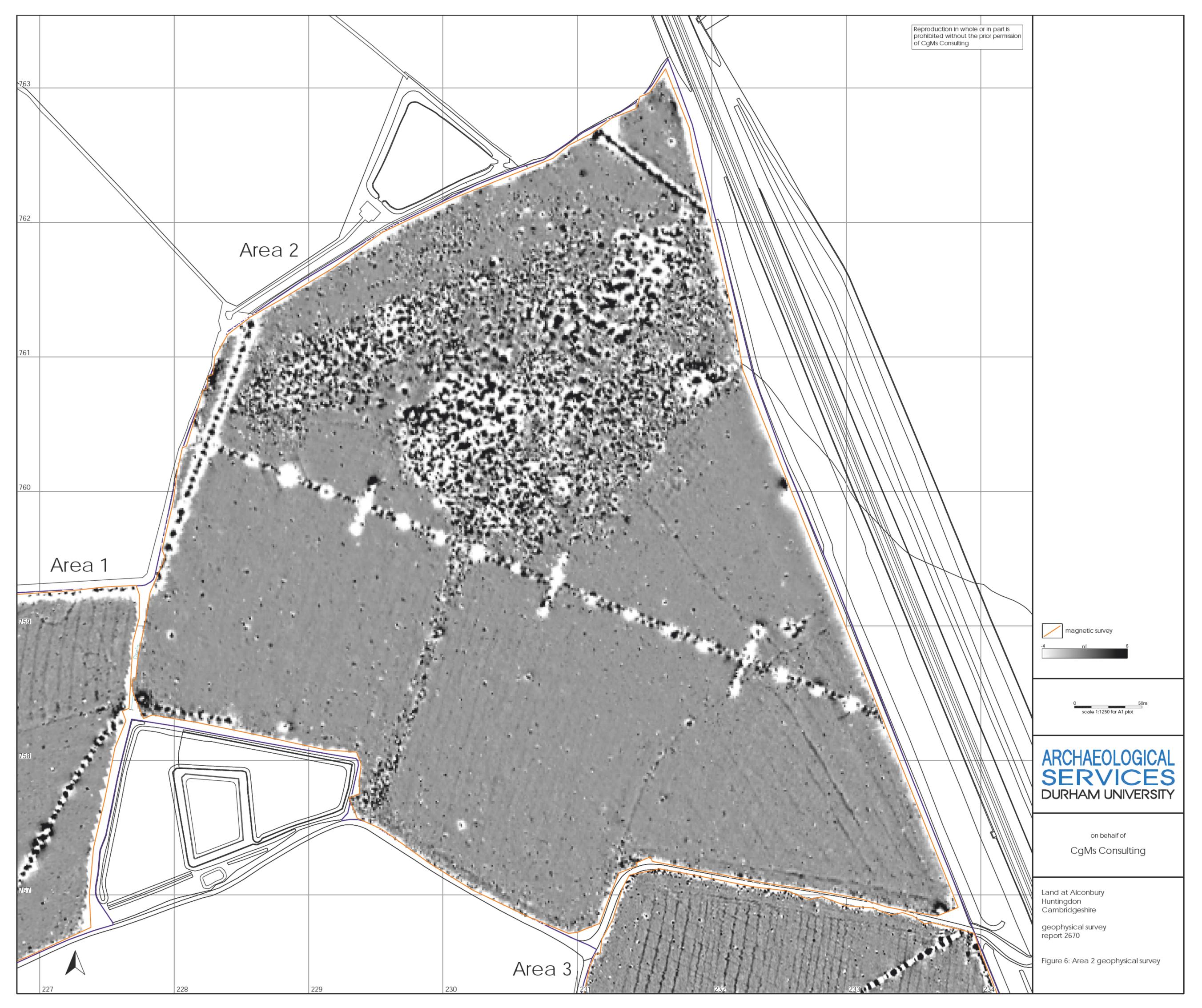


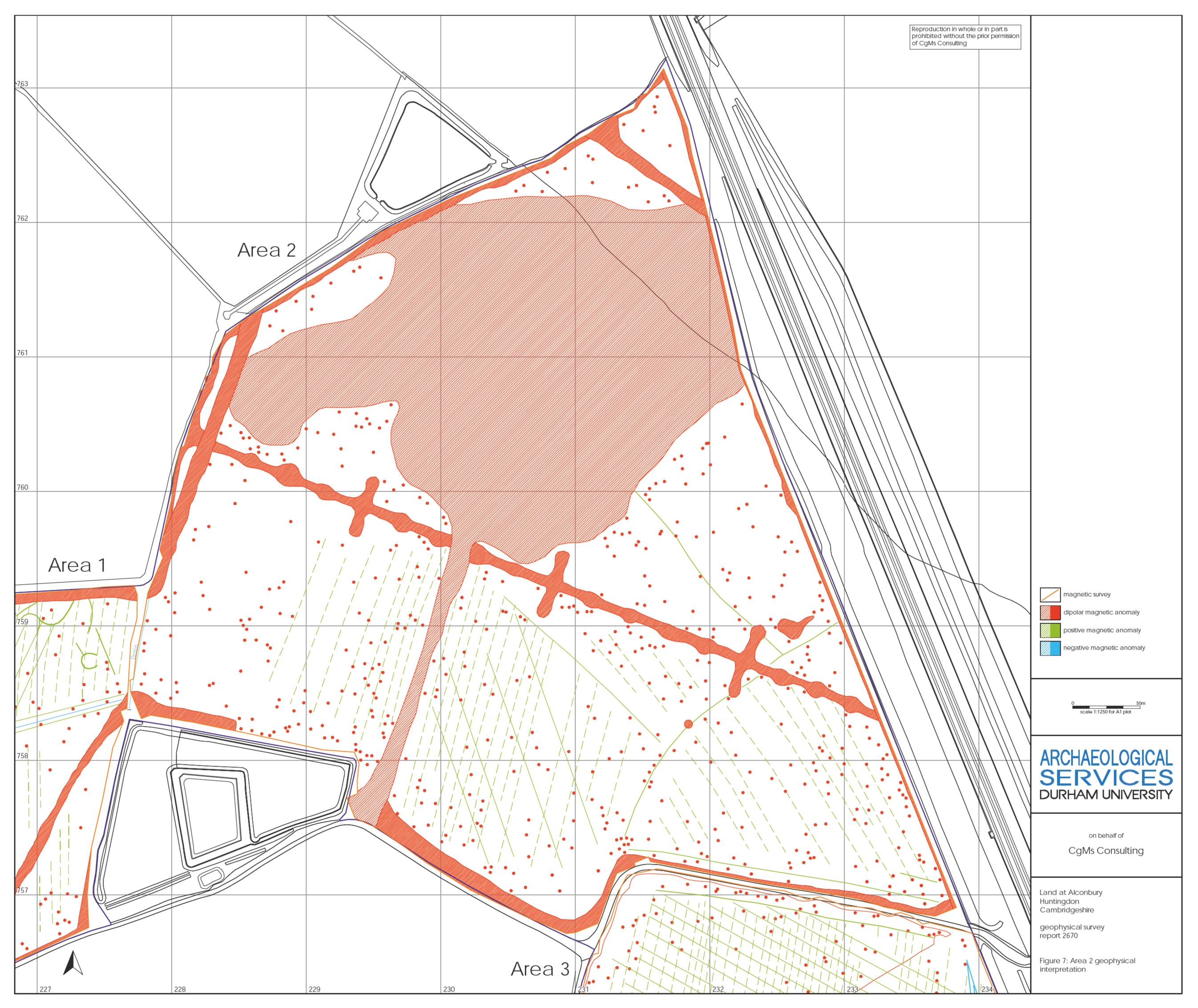


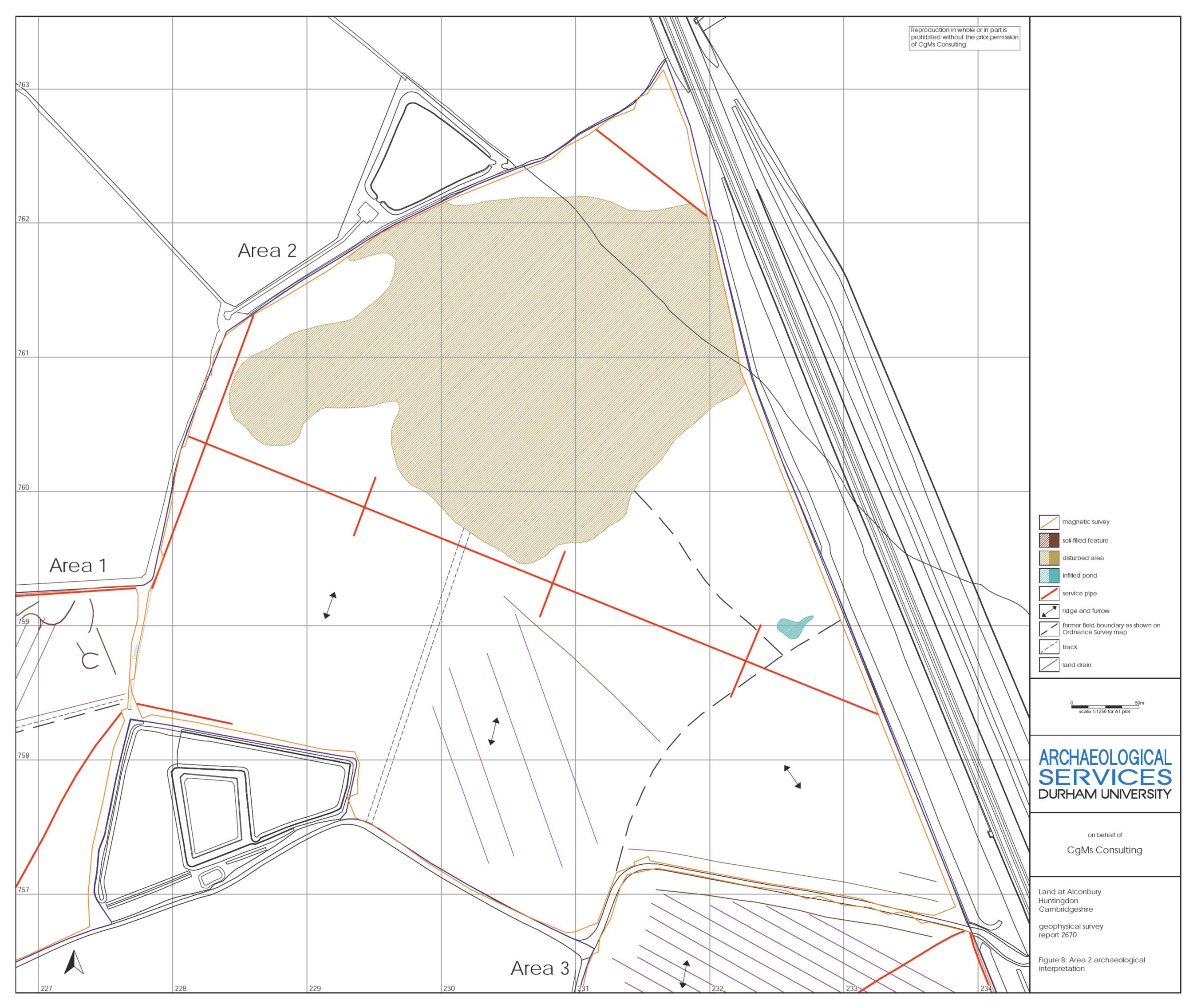


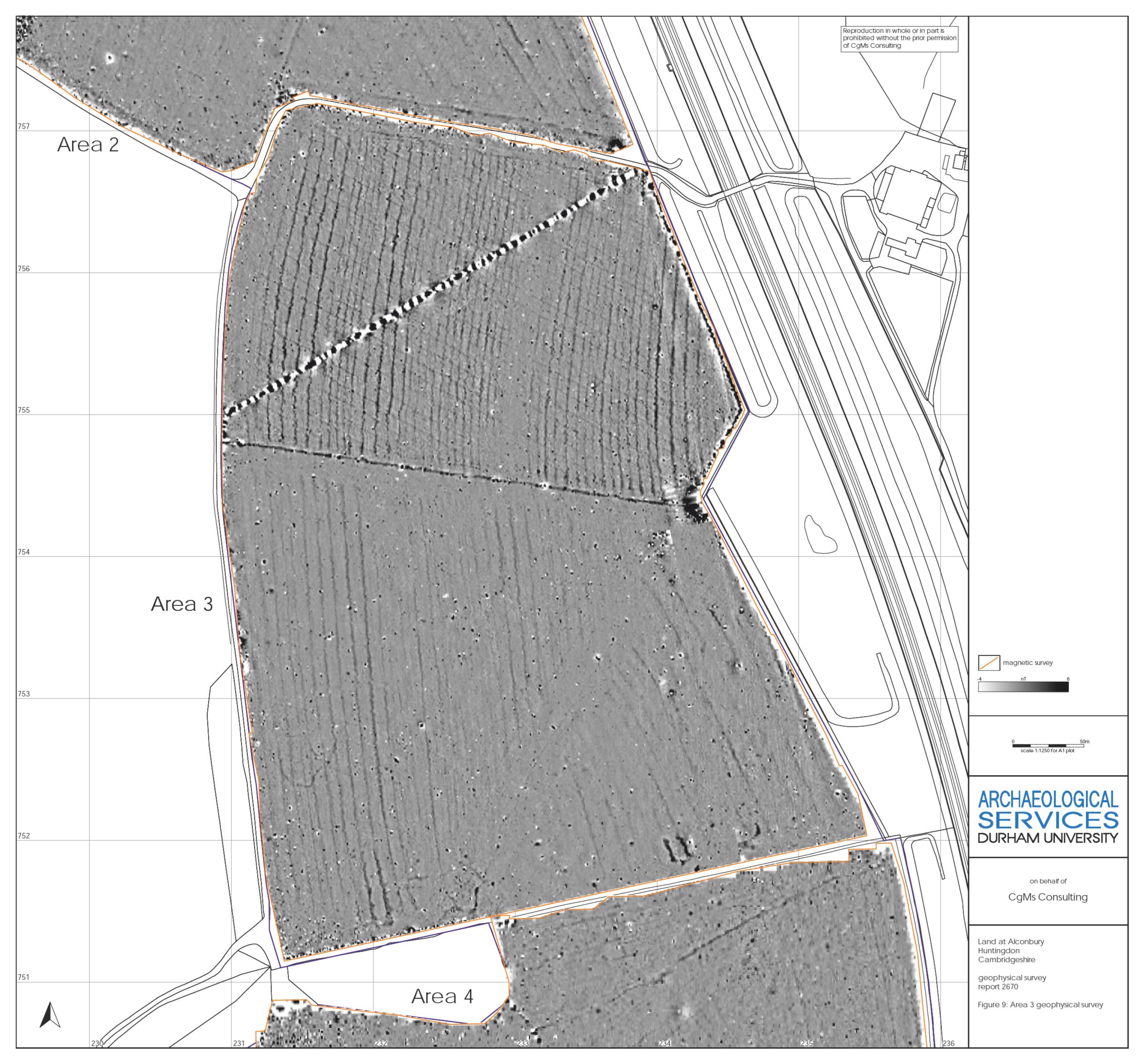


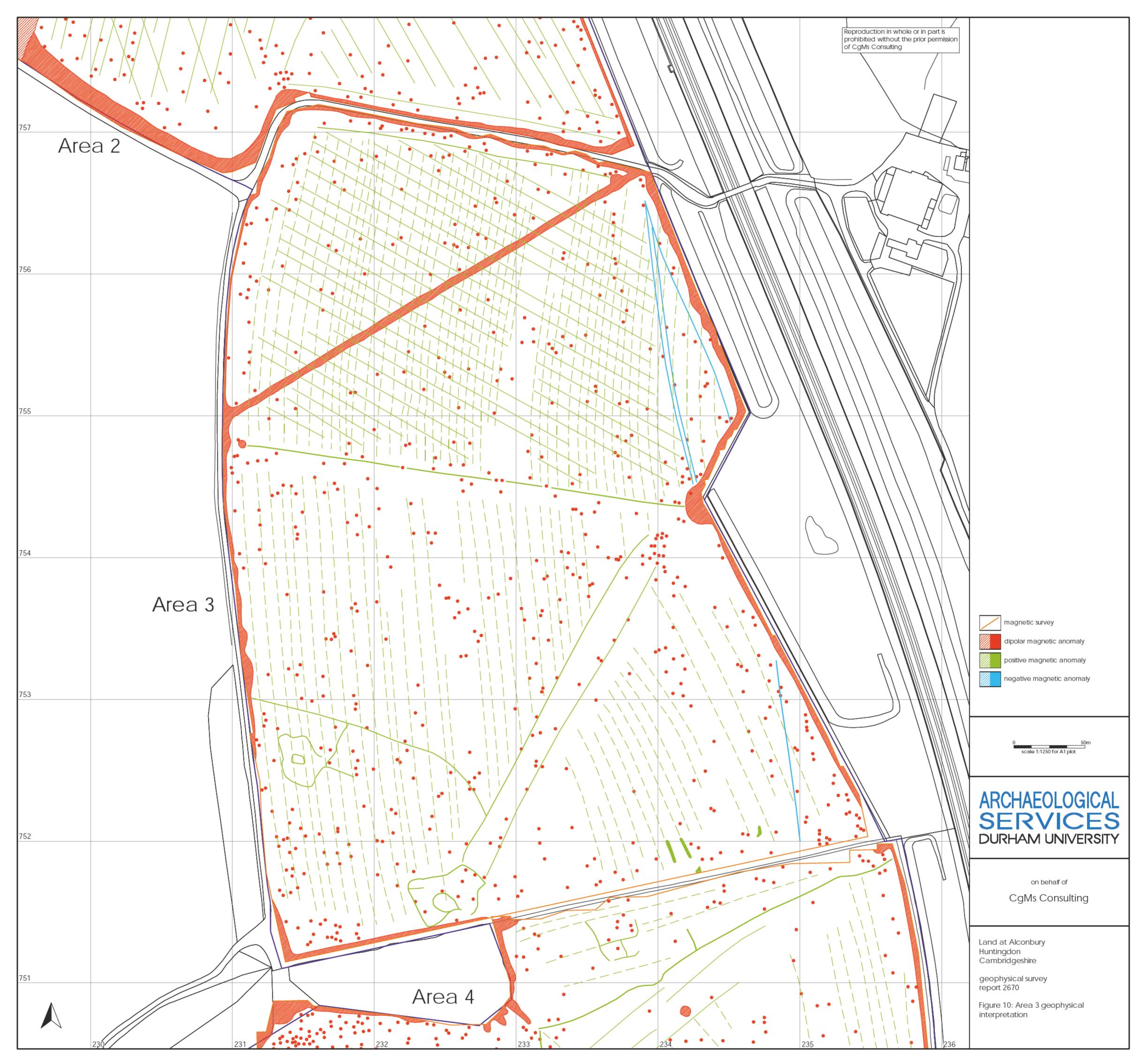


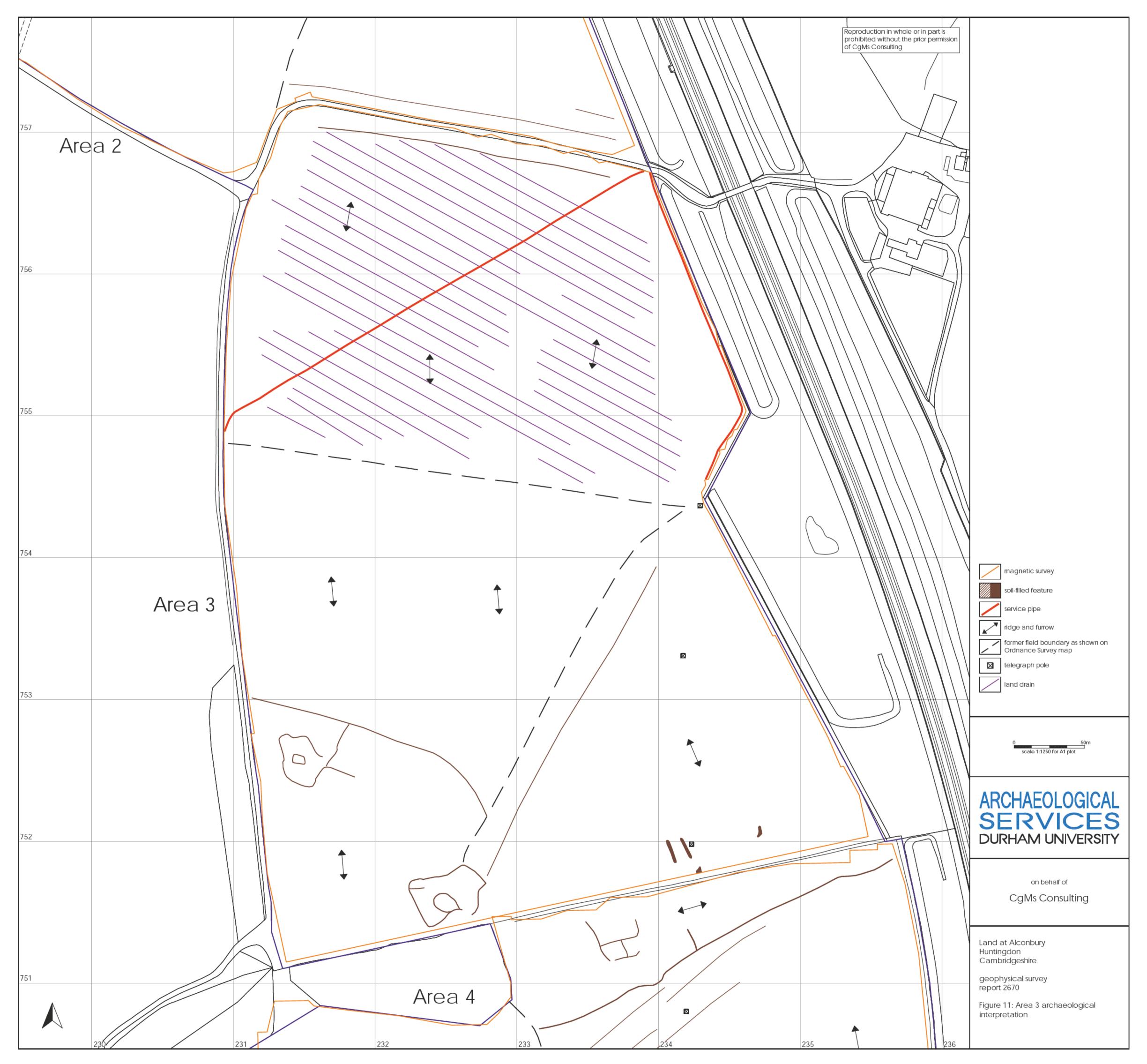


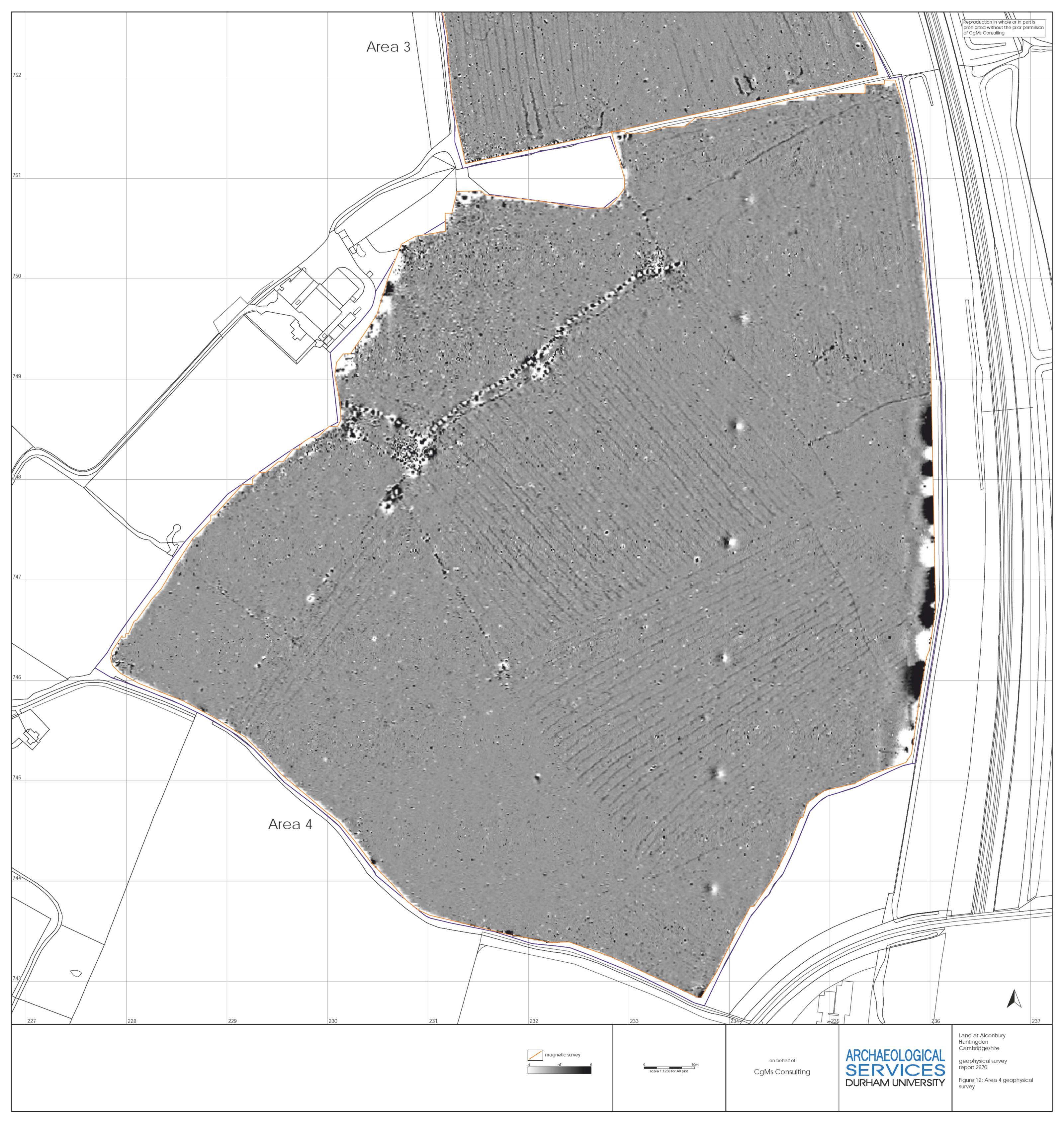


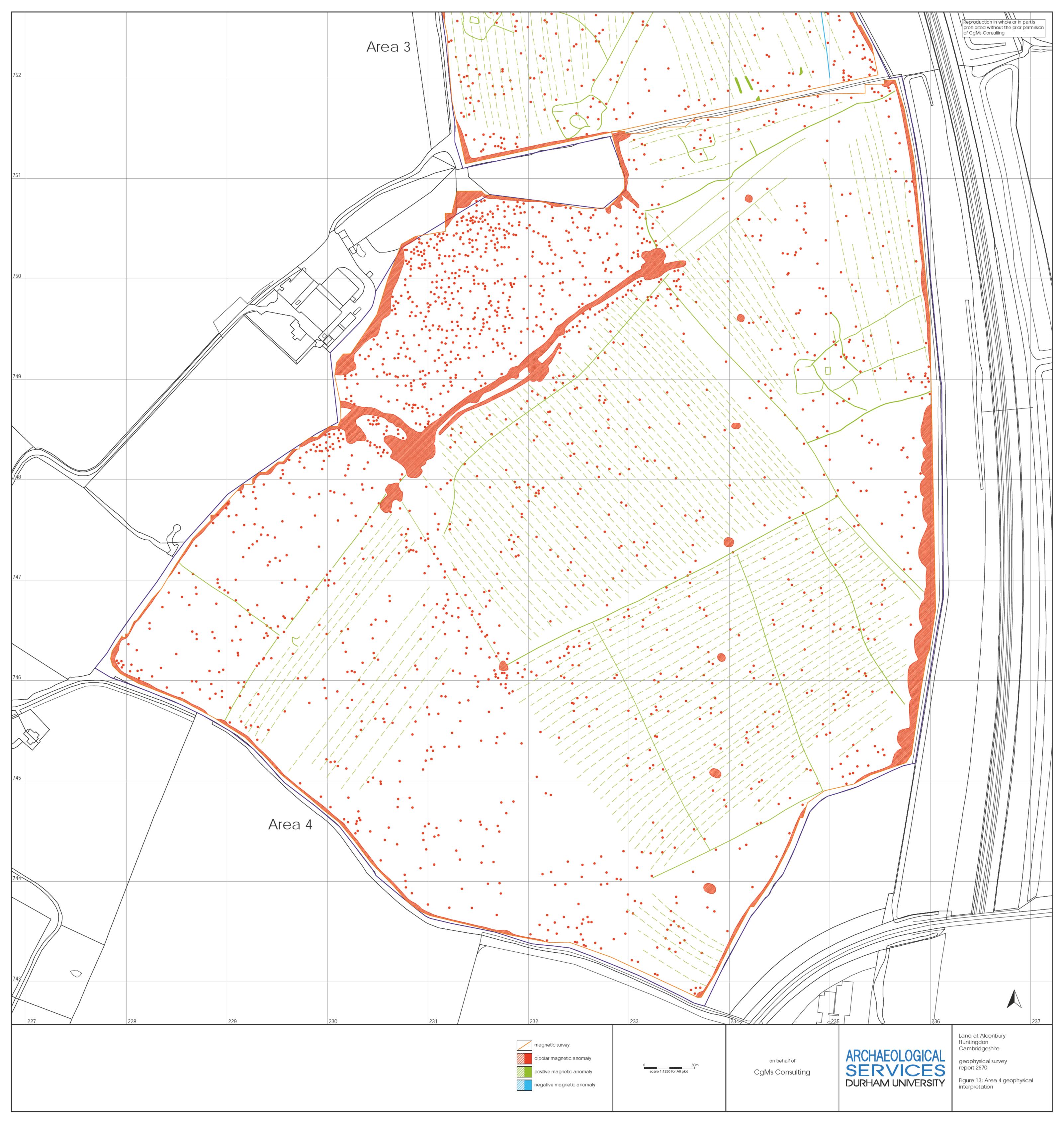


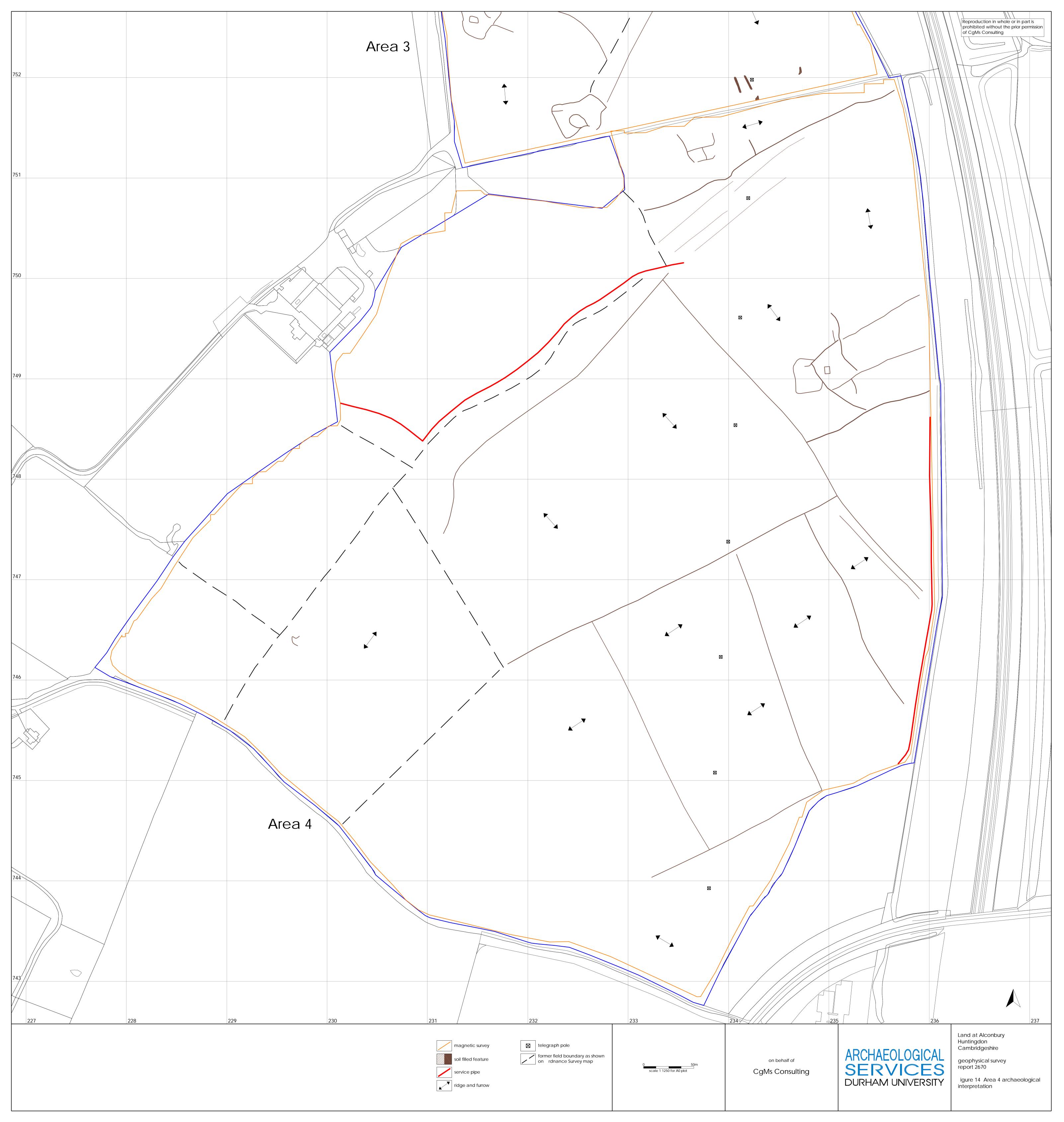














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Figure 15: Trace plots of geomagnetic data

