Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

for
Andrew Josephs Ltd

on behalf of
SITA UK Ltd

Report 1414
March 2006

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16 South Terrace, Sowerby, Thirsk, North Yorkshire YO7 1RH
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Contents

1. Summary

The project

1.1 This report presents the results of geophysical surveys conducted in advance of a proposed development at Seghill, Cramlington. The works comprised magnetometer surveys of 32ha, approximately 50% of the proposed development area which was available for survey.

1.2 The works were commissioned by Andrew Josephs Ltd on behalf of SITA UK Ltd, and conducted by Archaeological Services in accordance with a Written Scheme of Investigation prepared by Archaeological Services Durham University and approved by the Archaeological Officers of Northumberland and Tyne and Wear County Councils.

Results

1.3 Evidence of ridge and furrow cultivation has been found throughout much of the study area indicating extensive farming from the medieval period to present day. Additional soil-filled features provide evidence for field boundaries associated with this earlier cultivation of the land.

1.4 Several additional soil-filled features have been identified across the site, almost certainly reflecting former ditches and gullies.

1.5 The presence/absence of artefact scatters and potentially significant individual artifacts were noted for each survey area.

Recommendations

1.6 It is likely that a programme of evaluation trenching will be required in advance of development.

2. Project background

Location (Figure 1)

2.1 The study area is located at Seghill, Cramlington and spans the boundary between Northumberland and North Tyneside (NGR centre: NZ 305 735). The study area, not including the proposed access road, was approximately 75ha in size of which a sample 32ha have been subject to magnetometer survey; this comprised 50% of the land available for survey.

Development proposal

2.2 A planning application has been submitted for an extension to the existing landfill site at Seghill, Cramlington. (Northumberland planning ref: 05/00151/CCMEIA; Tyne and Wear planning ref: 05/02405/FUL). The area of the access road to the west has not been surveyed due to open-cast mining of the area in the 1970s.

Objective

2.3 The principal aim of the surveys was to determine the nature and extent of any sub-surface features of potential archaeological significance 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. A further objective of the works was to record any significant artefacts visible on the surface during the magnetometer survey such as flint scatters and worked stone.

Methods statement

2.4 The surveys have been undertaken in accordance with a brief from Northumberland County Council and a Written Scheme of Investigation prepared by Archaeological Services and approved by both Northumberland and Tyne and Wear County Councils.

Dates

2.5 Fieldwork was undertaken between 14th February and 6th March 2006. This report was prepared between 7th and 16th March 2006.

Personnel

2.6 Fieldwork was conducted by Edward Davies, David Graham and Louise Robinson, and supervised by Graeme Attwood. This report was prepared by Graeme Attwood, with illustrations by Martin Railton. The Project Manager was Duncan Hale.

Archive/OASIS

2.7 The site code is **SHC06**, for **S**eg**h**ill, **C**ramlington 20**06**. The survey archive will be transferred to the NCC SMR. Archaeological Services Durham University 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 **archaeol3-13557**.

3. Archaeological and historical background

3.1 The archaeological and historical background of the proposed development area has been discussed in a desk-based assessment undertaken by The Archaeological Practice (Carlton 2005).

3.2 Cropmark and aerial photograph evidence of the surrounding area indicate that there is late prehistoric or Romano-British activity within the vicinity of the site. Finds in the form of querns also point towards some domestic use of the landscape at this time.

3.3 The earliest documentary evidence of the site dates to the 12th century and records the villages of Backworth and Holywell, which currently border the development area.

3.4 A further settlement, Wolf Hill was abandoned sometime in the 19th century and is thought to lie within the area of interest. Wolf Hill is first noted in the 14th century.

3.5 Industrial expansion and development in the surrounding area is known to have taken place from the 19th century including the expansion of coal mines, and construction of brickworks and railways.

4. Landuse, topography and geology

4.1 At the time of survey the proposed development area comprised 12 fields of arable land, not including the proposed access route. The fields that are affected by the development of an access road to the new site were not surveyed as they were subject to open-cast mining in the 1970s.

4.2 The survey area was predominantly level at a mean elevation of *c*.45m OD.

4.3 The underlying solid geology of the area comprises Westpahlain coal measures, overlain by boulder clay and morainic drift.

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* (David1995); 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 desktop assessment and existing aerial photographic cropmark evidence, 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 the 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 Three test areas were initially surveyed to test the effectiveness of the technique in the area; these consisted of small surveys in Areas 1, 2 and 3. Having confirmed the potential of the technique for detecting features of potential archaeological significance the surveys were extended to cover 50% of the study area.

5.6 A 30m grid was established across each survey area and tied-in to known, mapped Ordnance Survey points using a Leica TR307 total survey station instrument equipped with a datalogger and *Penmap* software.

5.7 Measurements of vertical geomagnetic field gradient were determined using Geoscan FM36 and FM256 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.

5.8 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 both continuous tone greyscale images and trace plots of the raw data. The greyscale images and interpretations are presented in Figures 2-38; the trace plots are provided in Appendix I. 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.

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.

Low pass filter – is useful for smoothing data or for enhancing larger weak features.

Interpolate – increases the number of data points in a survey, to match sample and traverse intervals and so create a smoother appearance to the data. In this instance the gradiometer data have been interpolated to 0.5 x 0.25m intervals.

Interpretation: anomaly types

5.11 Colour-coded geophysical interpretation plans are provided for each survey area. 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

5.12 Colour-coded archaeological interpretation plans are provided for each survey area.

5.13 Discrete dipolar magnetic anomalies have been detected across all 12 survey areas. These almost certainly reflect small items of near-surface ferrous and/or fired debris. A representative sample of these anomalies is indicated on the interpretation plans.

Area 1, Wolf Hill (Figures 3-5)

5.14 Weak positive magnetic linear anomalies aligned in a north-south direction are likely to reflect the remains of ridge and furrow cultivation. These occur at *c.*6m intervals.

5.15 Two weak positive magnetic linear anomalies in the southern half of the survey indicate the likely presence of land drains.

5.16 Four weak positive magnetic curvilinear anomalies in the northern part of the survey may reflect the presence of soil-filled features such as ditches or gullies.

Area 2 (Figures 6-8)

5.17 An extremely weak positive magnetic anomaly detected in the south-west corner of the survey may indicate the presence of a former ditch.

5.18 Strong linear positive magnetic anomalies aligned north-south almost certainly indicate the former presence of ridge and furrow cultivation.

Area 3 (Figures 9-11)

5.19 A weak positive magnetic linear anomaly was detected aligned north-south in the central part of the survey. This may reflect the presence of an earlier field boundary or track.

5.20 A similar positive magnetic anomaly in the south-east of the survey may also reflect an earlier field boundary.

5.21 Two sub-circular positive magnetic anomalies in the north possibly indicate the presence of ring-ditches.

5.22 A number of very weak linear positive magnetic anomalies may reflect the presence of soil-filled features such as ditches.

Area 4 (Figures 12-14)

5.23 A large dipolar anomaly is present at the western edge of the survey. This is almost certainly caused by ferrous debris in the ground.

5.24 Three small curvilinear positive magnetic anomalies were detected. These may indicate the presence of small ditches and gullies.

5.25 Two linear positive magnetic anomalies in the north-eastern corner of the survey area indicate the presence of soil-filled features, possibly the remains of ridge and furrow cultivation.

Area 5 (Figures 15-17)

5.26 Several narrow and widely-spaced linear positive magnetic anomalies aligned in a north-east/south-west direction may reflect land drains. North-south aligned anomalies may reflect ridge and furrow remains.

5.27 A single curvilinear positive magnetic anomaly in the south-east could indicate the presence of a soil-filled feature.

Area 6 (Figures 18-20)

5.28 A series of equally spaced linear positive magnetic anomalies orientated north-south almost certainly represents the remains of ridge and furrow cultivation. The extent of the ridge and furrow may be marked by a pair of perpendicular linears to the north forming a headland and/or trackway.

5.29 Two linear negative magnetic anomalies were detected at the extreme north of the survey. These could reflect land drains.

Area 7 (Figures 21-23)

5.30 Several very weak positive linear magnetic anomalies were detected in this survey; these may represent the presence of soil-filled features such as ditches or gullies.

5.31 Regular linear positive magnetic anomalies are present on an east-west orientation; these almost certainly reflect earlier ridge and furrow cultivation.

Area 8 (Figures 24-26)

5.32 Regular linear positive magnetic anomalies are present on a north-south orientation. These almost certainly reflect ridge and furrow remains.

5.33 A positive magnetic anomaly traverses the survey area on a north-south alignment. This may reflect a soil-filled feature such as a former field boundary.

Area 9 (Figures 27-29)

5.34 A very weak curvilinear positive magnetic anomaly detected in the west may reflect a soil-filled feature. A linear positive magnetic anomaly traverses the south-western corner of the survey area and may indicate the presence of a ditch feature.

5.35 A series of parallel positive magnetic anomalies aligned broadly north-south almost certainly reflect ridge and furrow remains.

Area 10 (Figures 30-32)

5.36 A group of weak positive magnetic anomalies in the central part of the survey may indicate the presence of soil-filled features.

5.37 The ridge and furrow remains detected in Areas 8 and 9 continue throughout this survey area.

Area 11 (Figures 33-35)

5.38 A chain of intense dipolar magnetic anomalies in the north may indicate the presence of a service pipe within the survey area.

Area 12 (Figures 36-38)

5.39 Two sets of regularly-spaced positive magnetic linear anomalies almost certainly indicate the presence of former ridge and furrow cultivation. These two sets are orientated perpendicular to each other and are separated by a pair of parallel positive magnetic anomalies. These anomalies are likely to reflect a pair of soil-filled features and may indicate the presence of a double-ditched trackway.

5.40 A discontinuous chain of small intense dipolar magnetic anomalies transects the survey area in the south. This may reflect a former fence line.

6. Artefact scatters

6.1 The locations of artefact scatters and potentially significant individual artefacts observed during the surveys were recorded as follows:

Area 1 Concentrations of pottery (mostly post-medieval), glass and clay pipe were noted across the field, particularly in the eastern half.

Area 2 Pottery and glass sherds noted across the survey area, together with a few clay pipe fragments.

Area 3 An even scatter of post-medieval pot and clay pipe across survey area.

Areas 4, 5 & 6 Ground surface obscured by brassica crop in these fields.

Area 7 No quantities of any find type observed.

Area 8 Relatively high density of post-medieval pottery observed in eastern half of survey area; glass and brick fragments also observed.

Area 9 Low levels of post-medieval pot observed in eastern half of survey area.

Area 10 Very low levels of post-medieval pottery observed.

Area 11 Field under snow at time of survey.

Area 12 Very low levels of post-medieval pottery observed.

7. Conclusions

7.1 Geophysical surveys have been undertaken across approximately 50% of the proposed development area, excluding the proposed access route to the west.

7.2 Evidence of ridge and furrow cultivation has been found at most locations, indicating extensive farming of the area from the medieval period to present day.

7.3 Several probable soil-filled features have been identified across the study area. Some of these provide evidence for earlier field systems and trackways while others could be ring-ditches.

7.4 A number of these features may require further investigation by means of trial trenching to determine their exact extent and nature.

8. Sources

Carlton, RJ 2005 *Seghill Landfill Extension, North Tyneside*, unpublished report for Axis by The Archaeological Practice 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

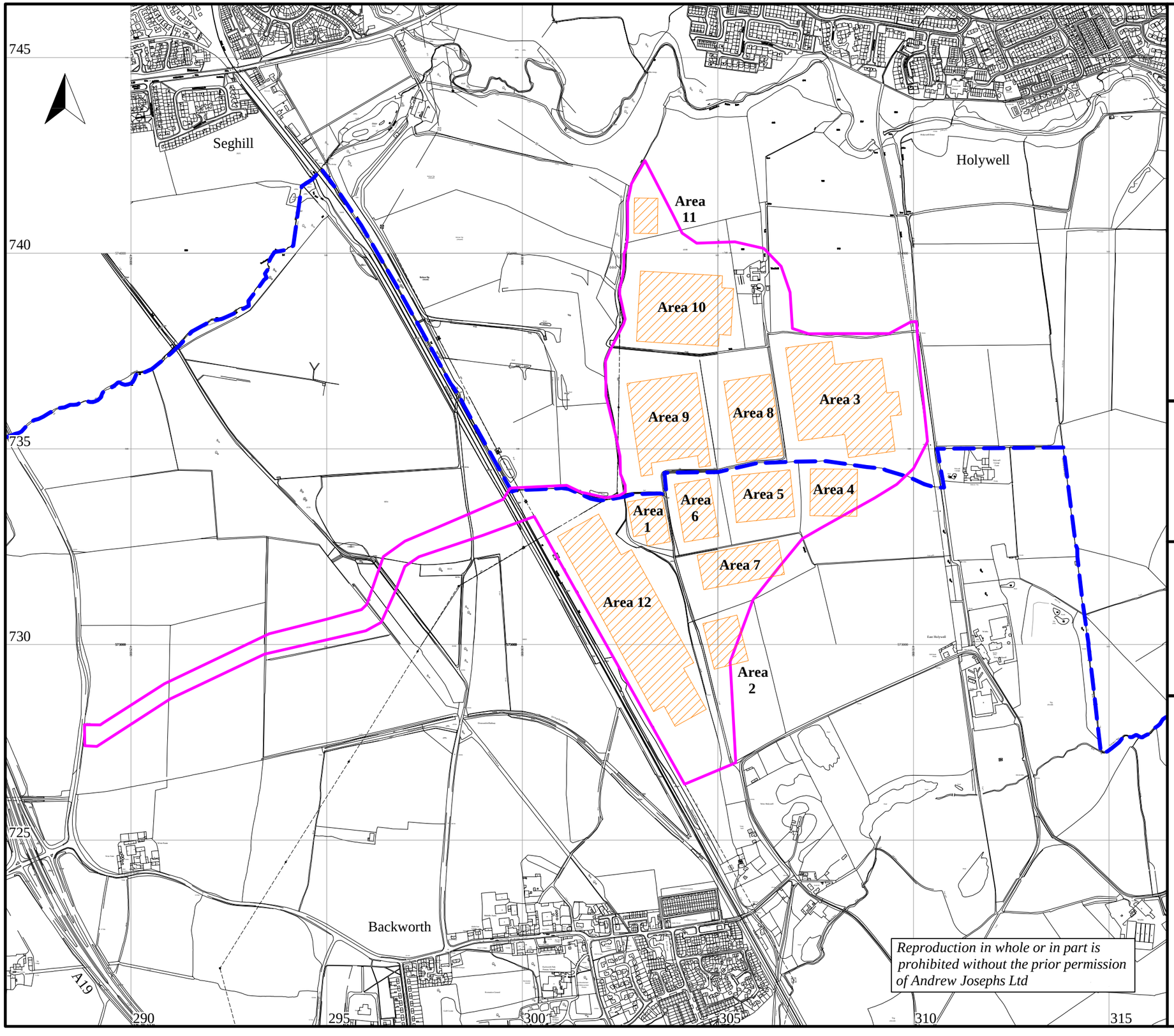

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Figure 1

Location map

on behalf of
Andrew Josephs Ltd

0 500m

scale 1:10 000 - for A3 plot

outline of study area

county boundary

survey area

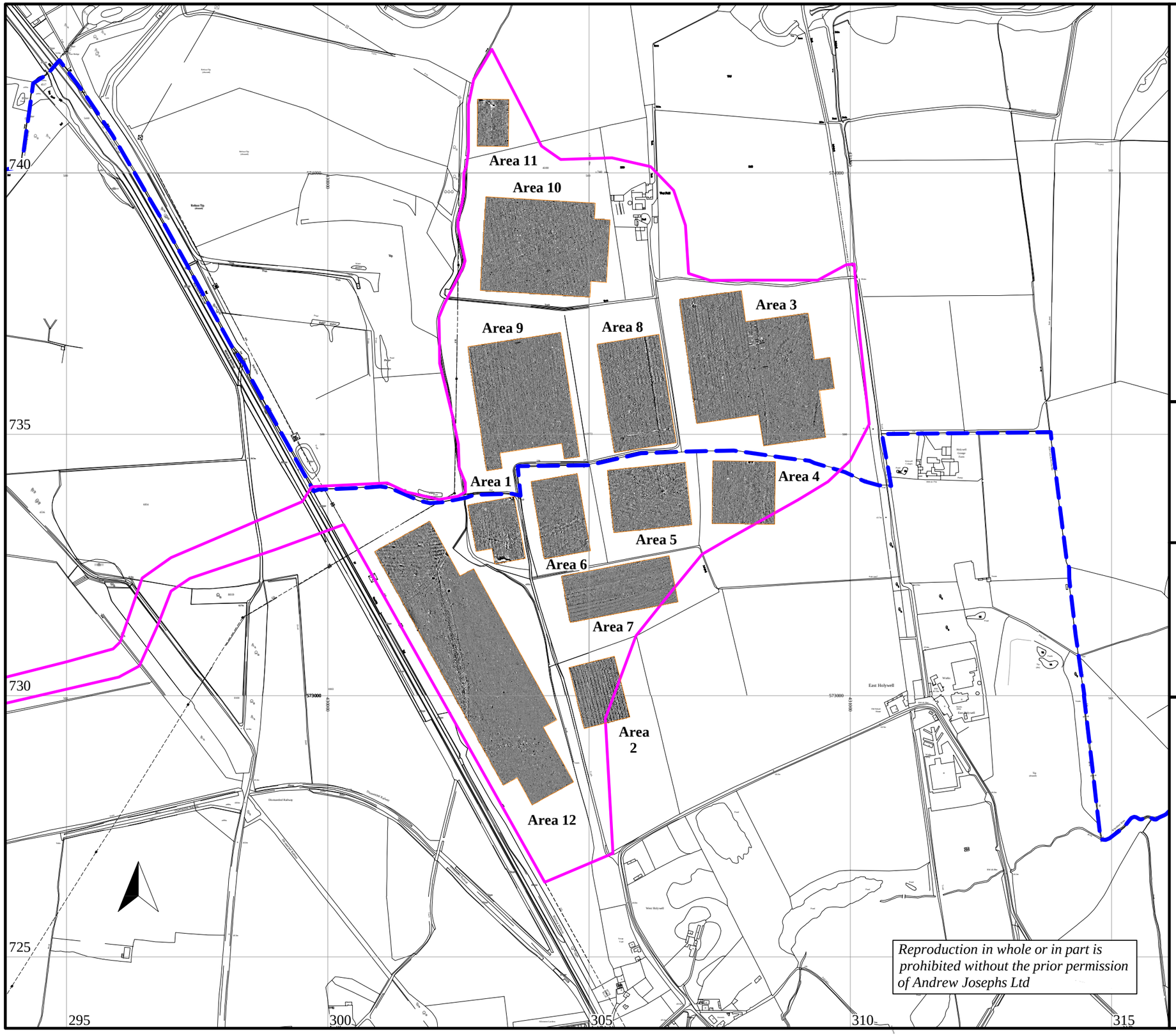

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Figure 2

Geophysical surveys

on behalf of
Andrew Josephs Ltd

0 500m

scale 1:10 000 - for A3 plot

outline of study area

county boundary

outline of survey area

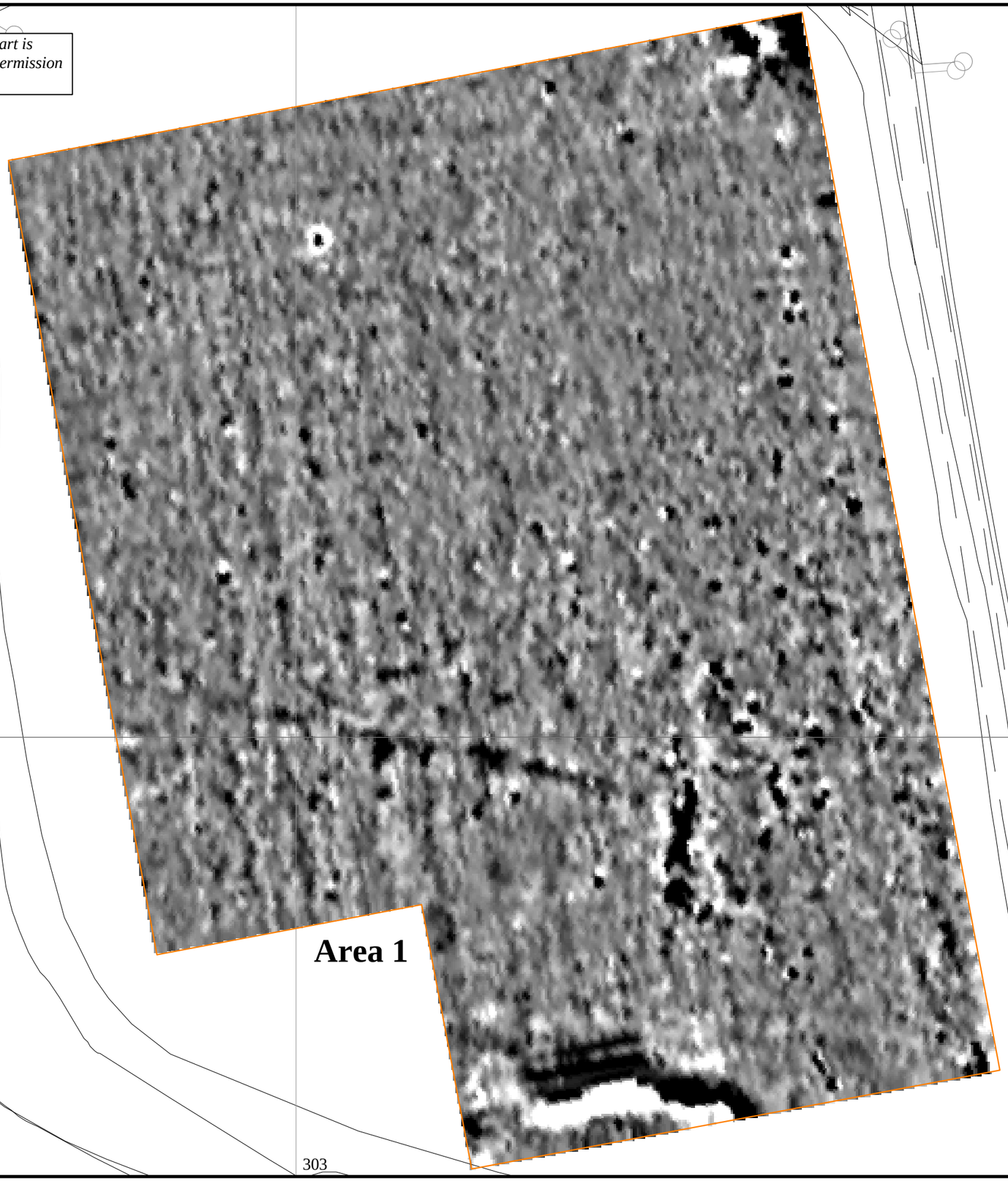

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Figure 3

Area 1, geophysical survey

on behalf of
Andrew Josephs Ltd

0 25m

scale 1:500 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

733

303

Area 1

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Figure 4

Area 1, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 25m

scale 1:500 - for A3 plot

outline of survey area

positive magnetic anomalies

dipolar magnetic anomalies

733

303

Area 1

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Figure 5

Area 1, archaeological interpretation

on behalf of
Andrew Josephs Ltd

0 25m

scale 1:500 - for A3 plot

outline of survey area

soil-filled features

possible land drains

orientation of ridge and furrow

731

730

729

304

305

306

Area 12

Area 2

Issues

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Figure 6

Area 2, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

731

730

729

304

305

306

Area 12

Area 2

Issues

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Figure 7

Area 2, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

731

730

729

304

305

306

Area 12

Area 2

Issues

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Figure 8

Area 2, archaeological interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow

possible field boundary

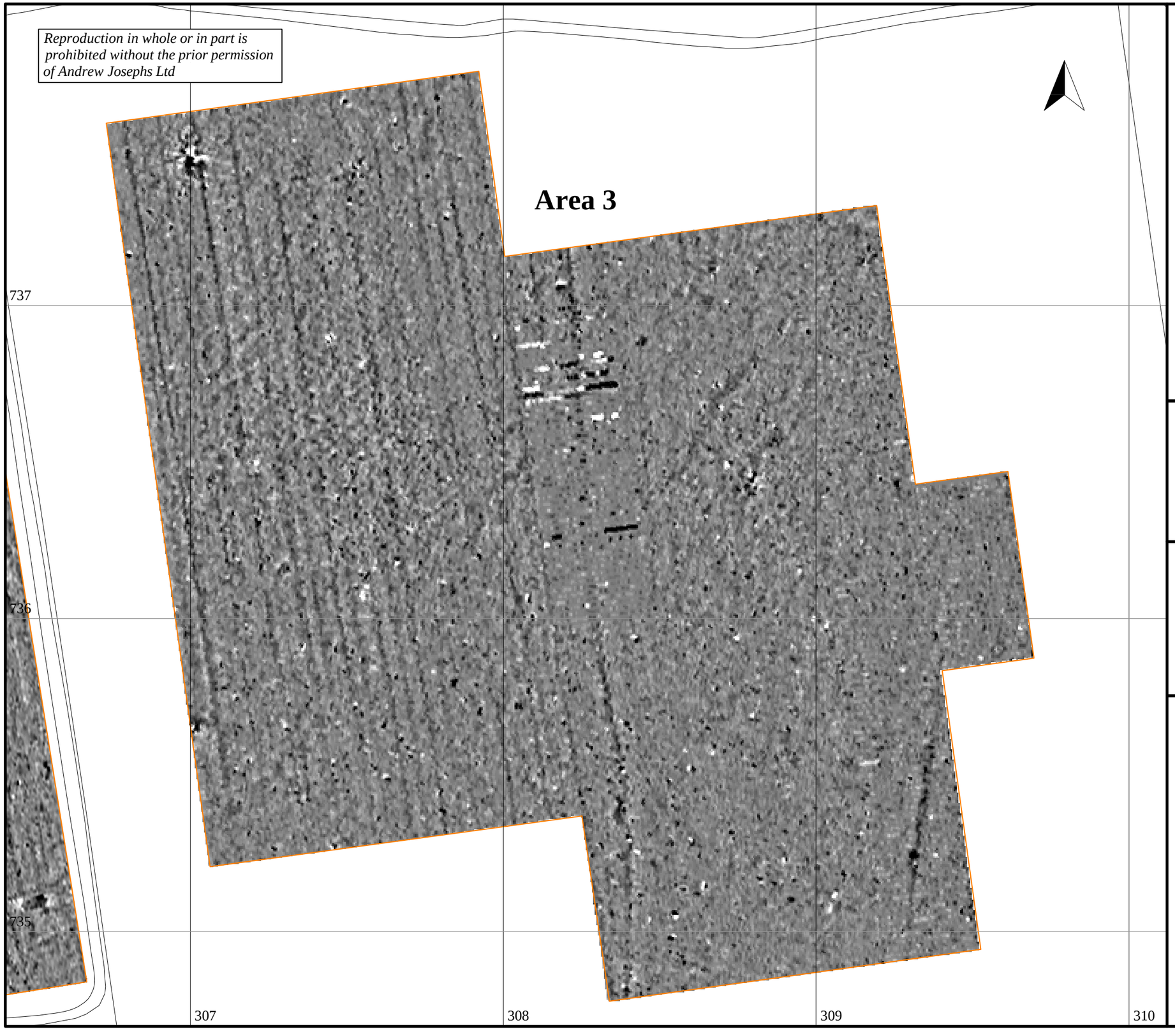

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Figure 9

Area 3, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

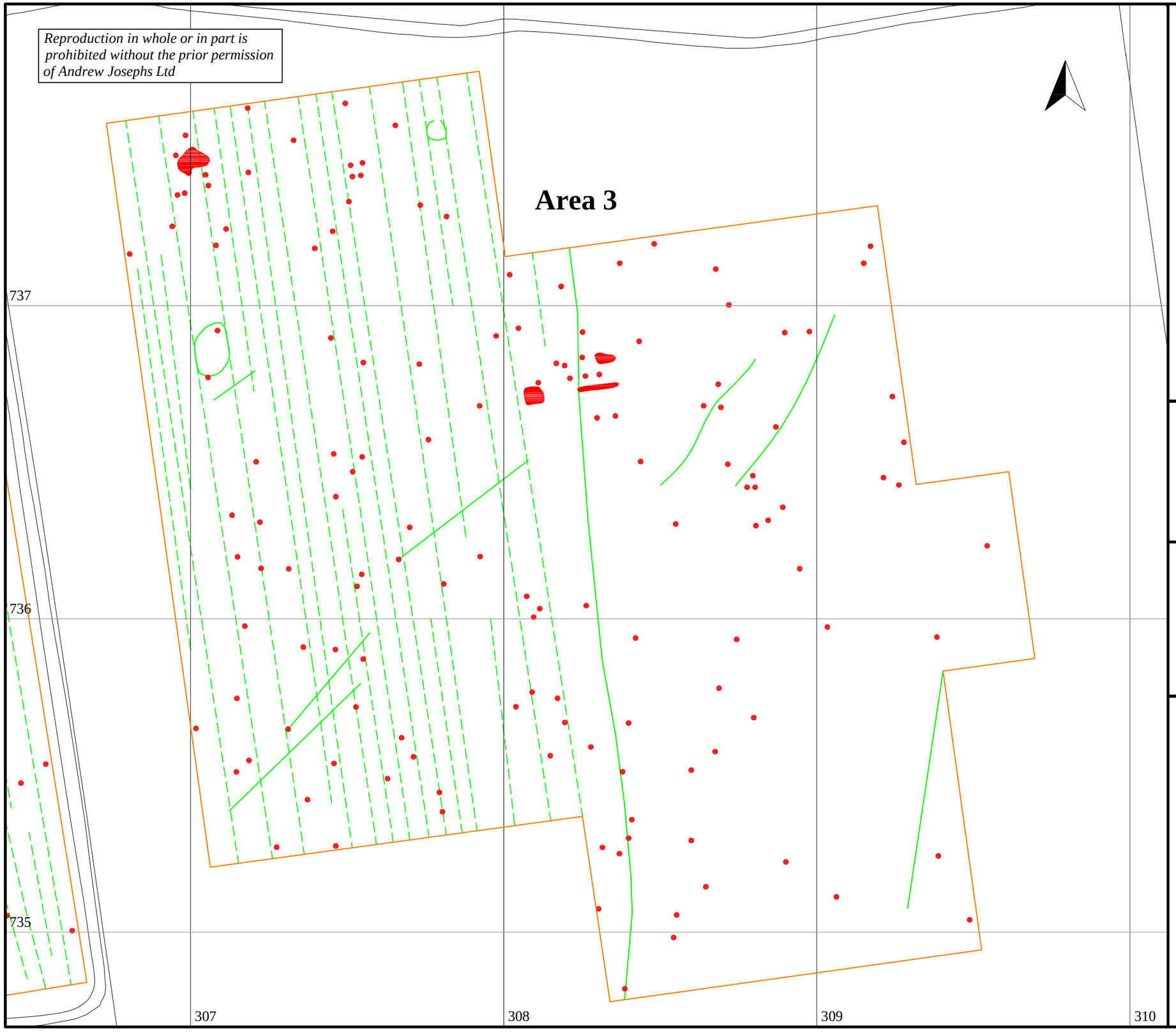

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Figure 10

Area 3, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

dipolar magnetic anomalies

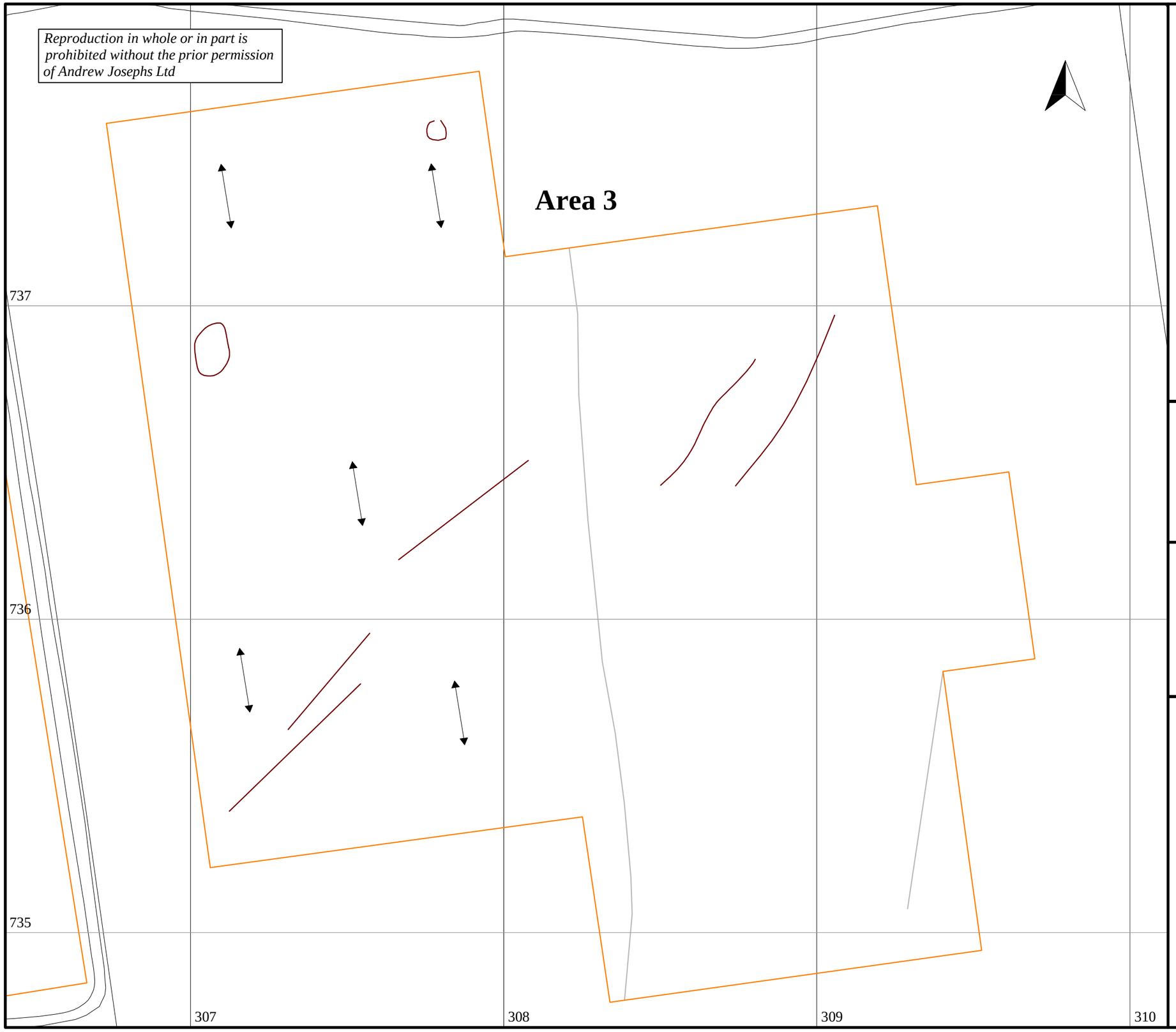

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Figure 11

Area 3, archaeological interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1250 - for A3 plot

- outline of survey area
- soil-filled features
- orientation of ridge and furrow
- possible field boundary

735

734

733

307

308

309

Area 3

Area 4

Area 5

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Figure 12

Area 4, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

3.60
3.01
2.41
1.82
1.23
0.63
0.04
-0.55
-1.15
-1.74
-2.33
-2.93
-3.52 nT

735

734

733

307

308

309

Area 3

Area 4

Area 5

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Figure 13

Area 4, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

dipolar magnetic anomalies

735

734

733

307

308

309

Area 3

Area 4

Area 5

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Figure 14

Area 4, archaeological interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

- outline of survey area
- soil-filled features
- possible land drains
- orientation of ridge and furrow
- possible field boundary

735

734

733

305

306

307

Def

Area 8

Area 6

Area 5

Area 4

Area 7

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Figure 15

Area 5, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

4.53
3.78
3.03
2.28
1.54
0.79
0.04
-0.71
-1.45
-2.20
-2.95
-3.70
-4.44 nT

735

734

733

305

306

307

Def

Area 8

Area 6

Area 5

Area 4

Area 7

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Figure 16

Area 5, geophysical interpretation

on behalf of
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0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

735

734

733

305

306

307

Def

Area 8

Area 5

Area 6

Area 4

Area 7

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Figure 17

Area 5, archaeological interpretation

on behalf of
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0 50m

scale 1:1000 - for A3 plot

- outline of survey area
- soil-filled features
- possible land drains
- orientation of ridge and furrow
- possible field boundary

Area 9

Area 8

CH

Def

734

Def

Area 5

Area 6

Area 1

Area 7

304

305

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Figure 18

Area 6, geophysical survey

on behalf of
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0 50m

scale 1:1000 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

Area 9

Area 8

CH

Def

734

Def

Area 5

Area 6

Area 1

Area 7

304

305

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Figure 19

Area 6, geophysical interpretation

on behalf of
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0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

Area 9

Area 8

CH

Def

734

Def

Area 5

Area 6

Area 1

Area 7

304

305

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Figure 20

Area 6, archaeological interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

- outline of survey area
- soil-filled features
- possible land drains
- orientation of ridge and furrow

Area 5

Area 6

Area 7

738

732

731

305

306

307

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Figure 21

Area 7, geophysical survey

on behalf of
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0 50m

scale 1:1000 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

Area 5

Area 6

Area 7

733

732

731

305

306

307

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Report 1414

Figure 22

Area 7, geophysical interpretation

on behalf of
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0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

Area 5

Area 6

Area 7

733

732

731

305

306

307

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Report 1414

Figure 23

Area 7, archaeological interpretation

on behalf of
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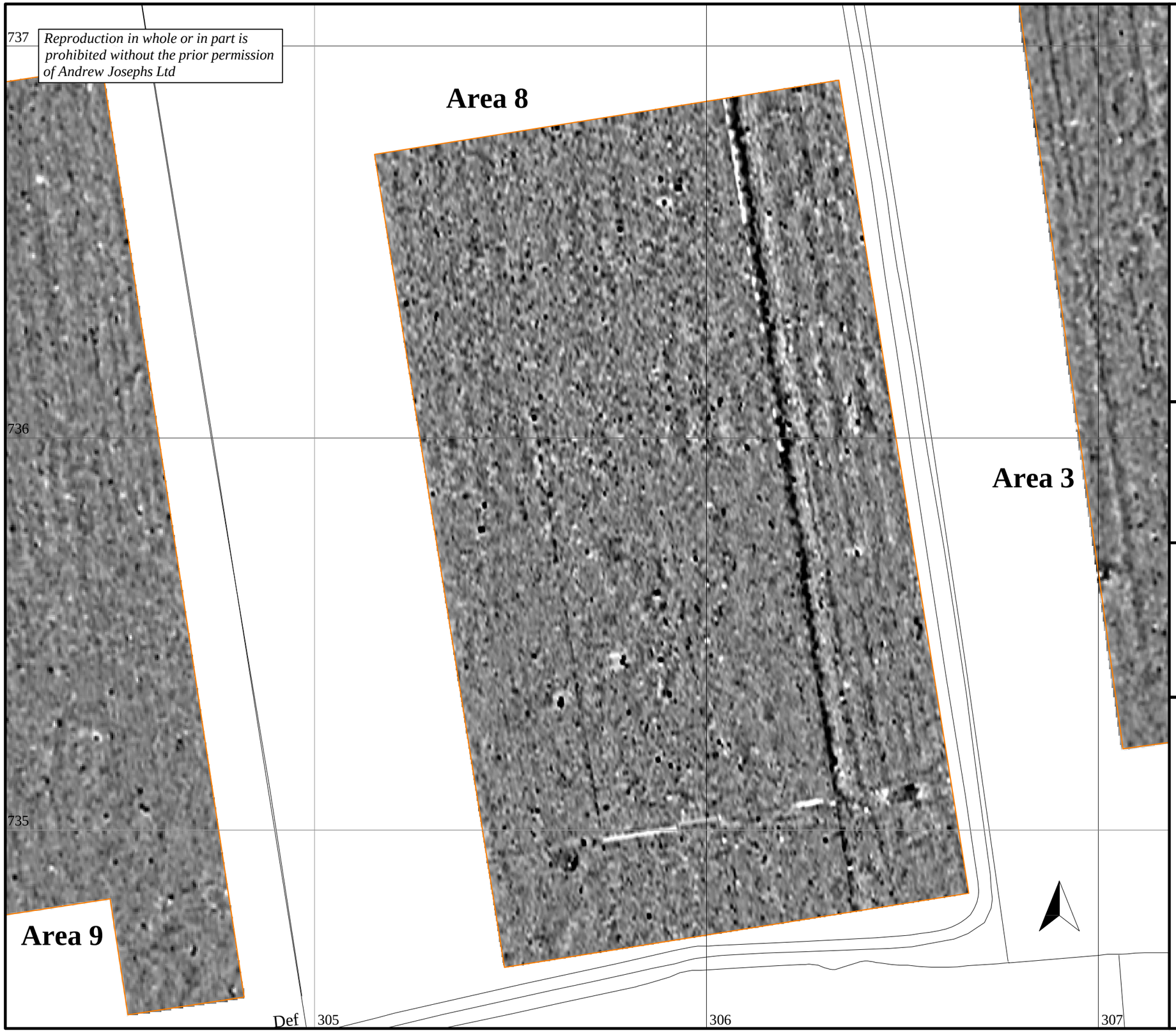
0 50m

scale 1:1000 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow



Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 24

Area 8, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

737

736

735

Area 8

Area 3

Area 9

Def

305

306

307

Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 25

Area 8, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

dipolar magnetic anomalies

737

736

735

Area 8

Area 3

Area 9

Def

305

306

307

Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 26

Area 8, archaeological interpretation

on behalf of
Andrew Josephs Ltd

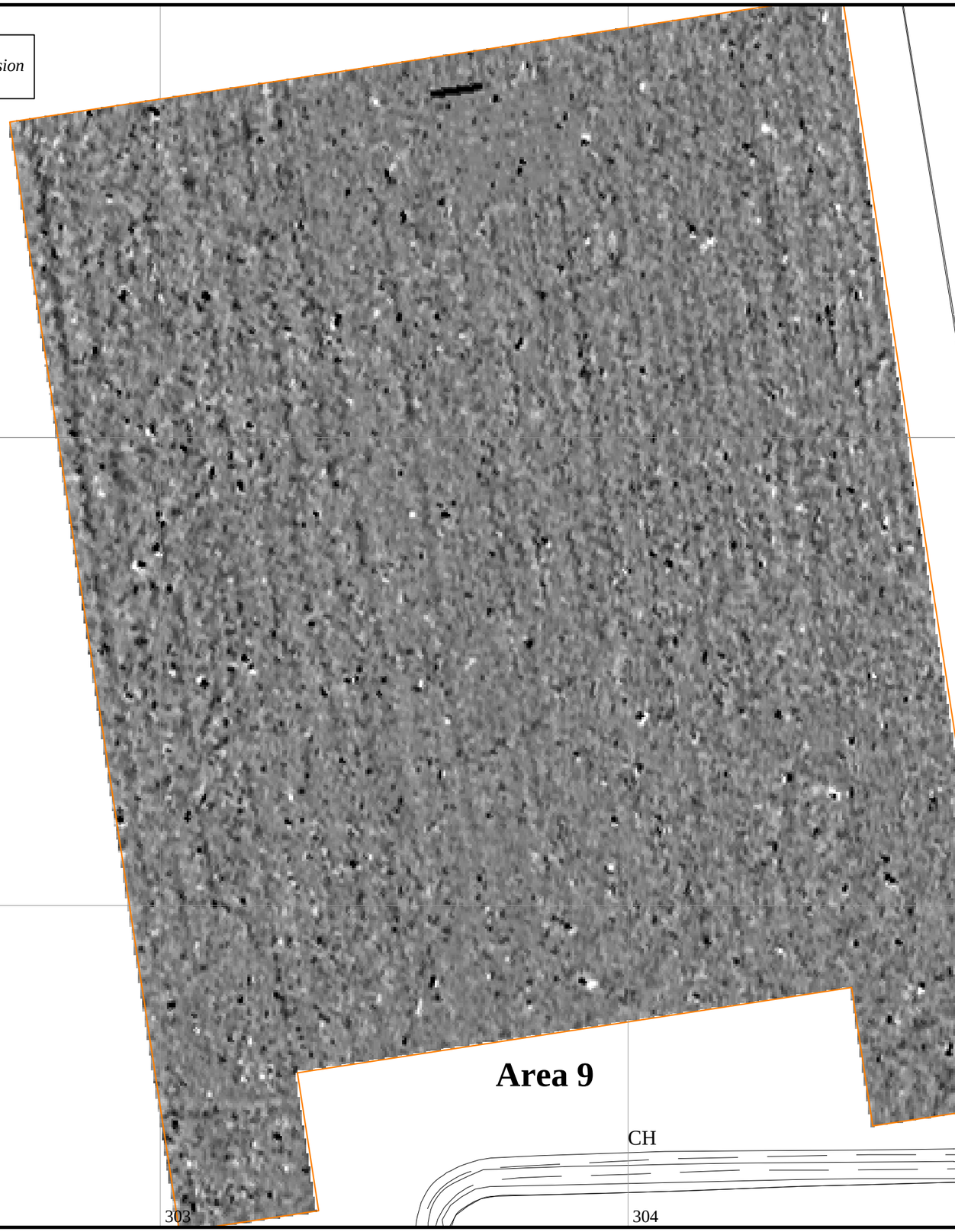
0 50m

scale 1:1000 - for A3 plot

outline of survey area

possible field boundary

orientation of ridge and furrow



Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 27

Area 9, geophysical survey

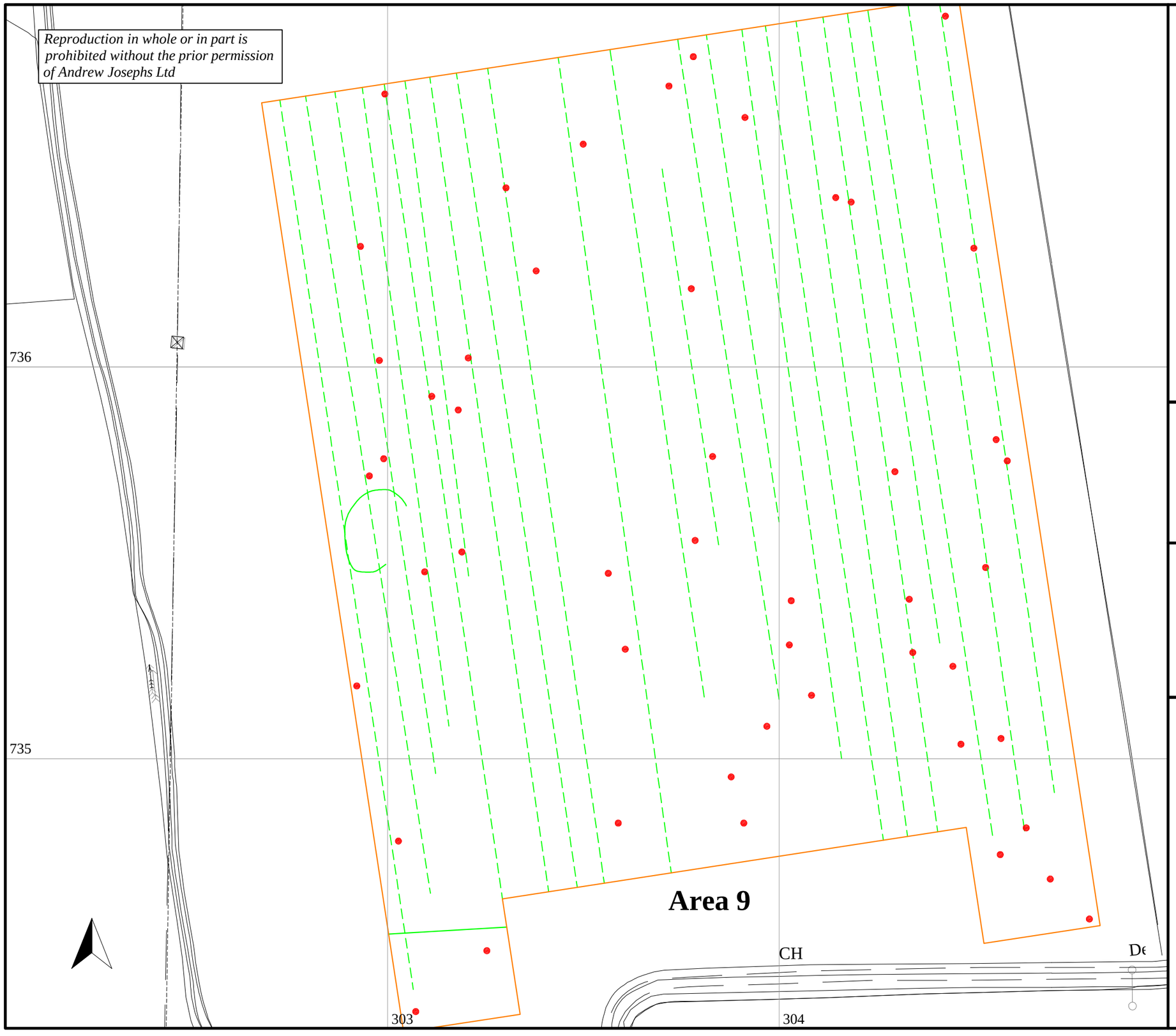
on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT



Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 28

Area 9, geophysical interpretation

on behalf of
Andrew Josephs Ltd

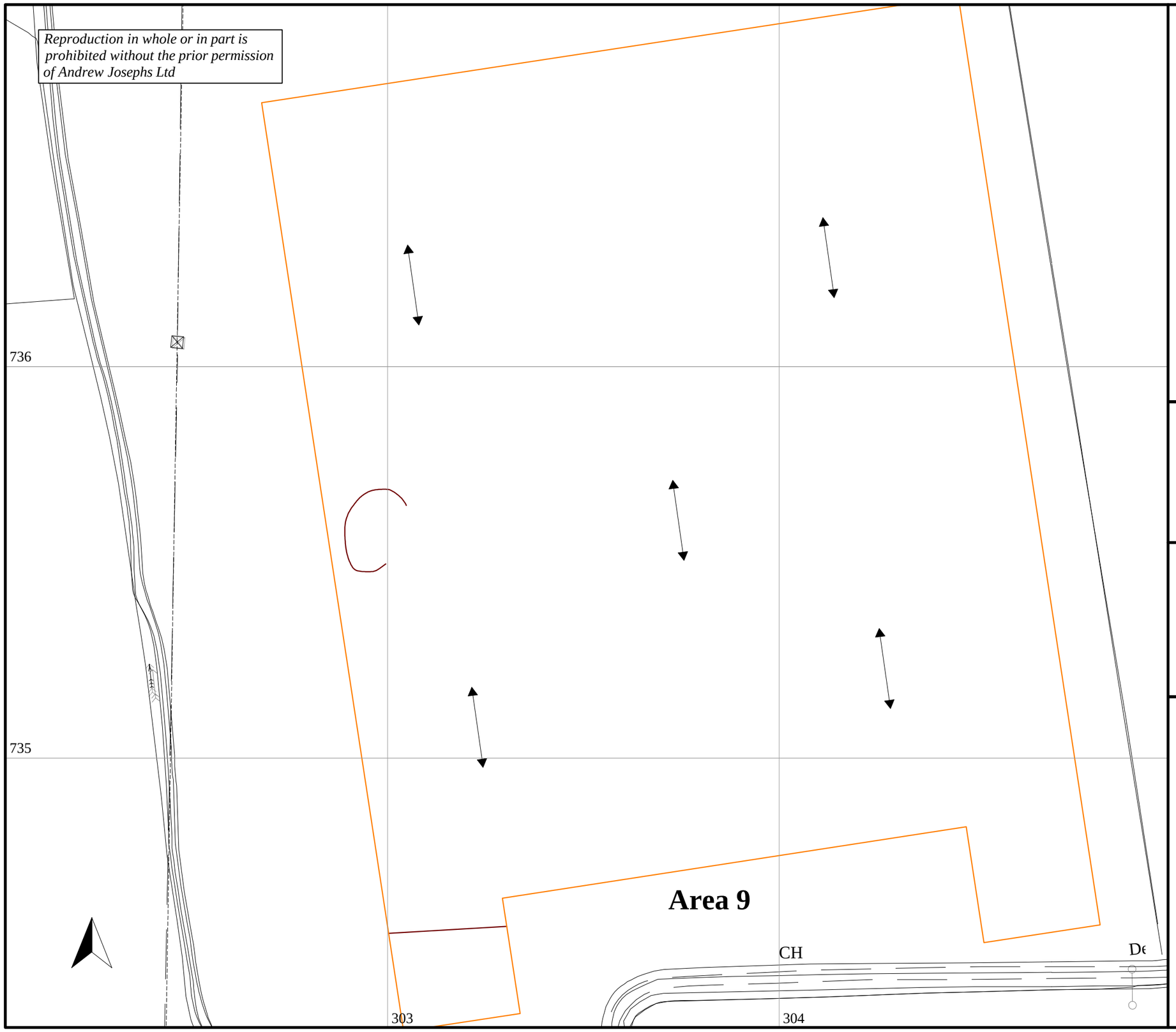
0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

dipolar magnetic anomalies



Archaeological Services
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Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 29

Area 9, archaeological interpretation

on behalf of
Andrew Josephs Ltd

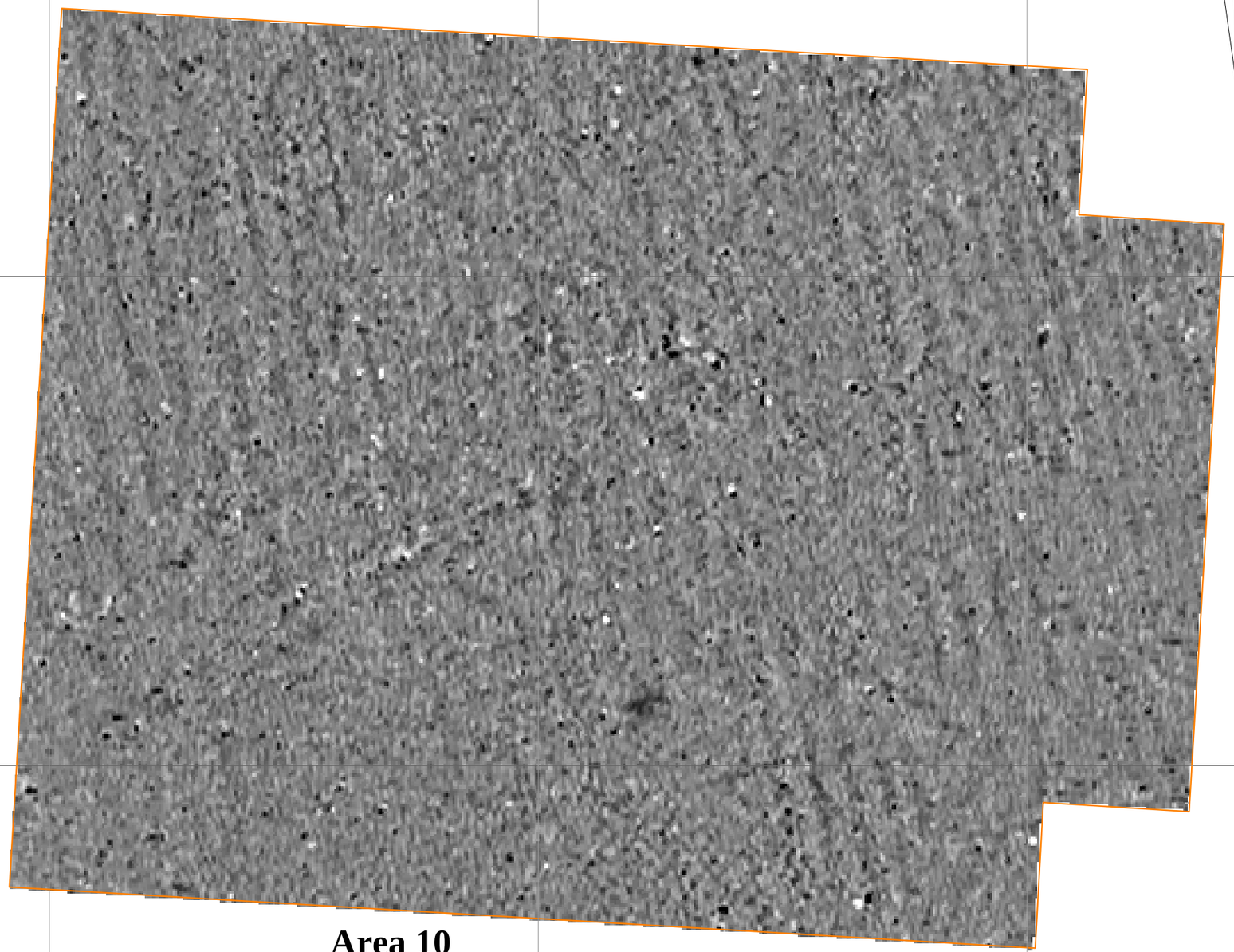
0 50m

scale 1:1000 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow



739

738

Area 10

Track

303

304

305

Archaeological Services
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Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 30

Area 10, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

3.20
2.68
2.15
1.62
1.09
0.56
0.03
-0.50
-1.03
-1.56
-2.09
-2.62
-3.15 nT

739

738

Area 10

Track

303

304

305

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Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 31

Area 10, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1000 - for A3 plot

outline of survey area

positive magnetic anomalies

dipolar magnetic anomalies

739

738

Area 10

Track

303

304

305

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University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 32

Area 10, archaeological interpretation

on behalf of
Andrew Josephs Ltd

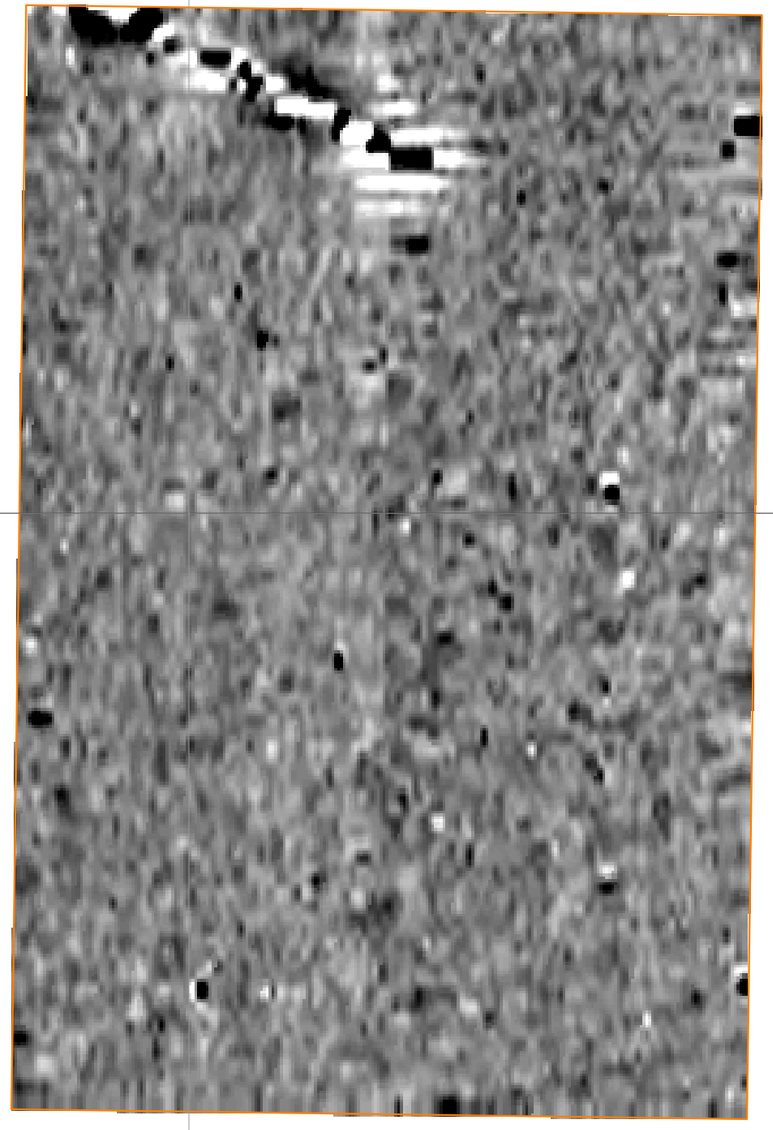
0 50m

scale 1:1000 - for A3 plot

outline of survey area

soil-filled features

orientation of ridge and furrow



741

303

Area 11

Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 33

Area 11, geophysical survey

on behalf of
Andrew Josephs Ltd

0 25m

scale 1:500 - for A3 plot

outline of survey area

5.00
4.17
3.33
2.50
1.67
0.83
0
-0.83
-1.67
-2.50
-3.33
-4.17
-5.00 nT

741

303

Area 11

Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 34

Area 11, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 25m

scale 1:500 - for A3 plot

outline of survey area

dipolar magnetic anomalies

741

303

Area 11

Archaeological Services
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Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 35

Area 11, archaeological interpretation

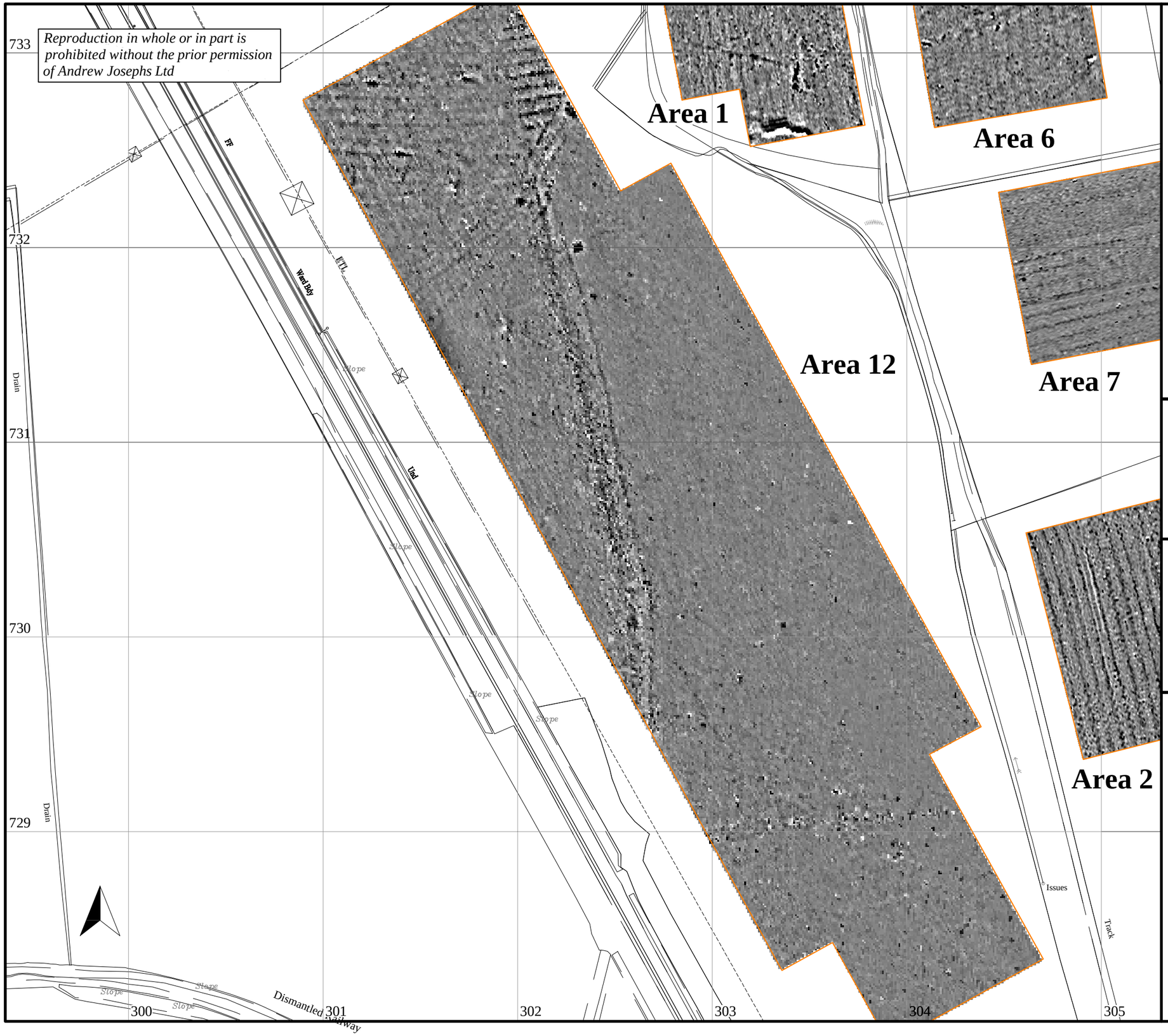
on behalf of
Andrew Josephs Ltd

0 25m

scale 1:500 - for A3 plot

outline of survey area

possible service pipe



Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 36

Area 12, geophysical survey

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

3.00
2.50
2.00
1.50
1.00
0.50
0
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00 nT

733
732
731
730
729

300 301 302 303 304 305

Area 1
Area 6
Area 12
Area 7
Area 2

FP
Ward Bdy
Fence
Slope
Drain
Und
Issues
Track
Dismantled Railway

Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 37

Area 12, geophysical interpretation

on behalf of
Andrew Josephs Ltd

0 50m

scale 1:1250 - for A3 plot

outline of survey area

positive magnetic anomalies

negative magnetic anomalies

dipolar magnetic anomalies

733
732
731
730
729

Area 1
Area 6
Area 12
Area 7
Area 2

FP
ETL
Ward Bdy
Slope
Drain
Und
Dismantled Railway
Issues
Track

300 301 302 303 304 305

Archaeological Services
University of Durham

Land at Seghill, Cramlington, Northumberland and Tyne and Wear

geophysical surveys

Report 1414

Figure 38

Area 12, archaeological interpretation

on behalf of
Andrew Josephs Ltd

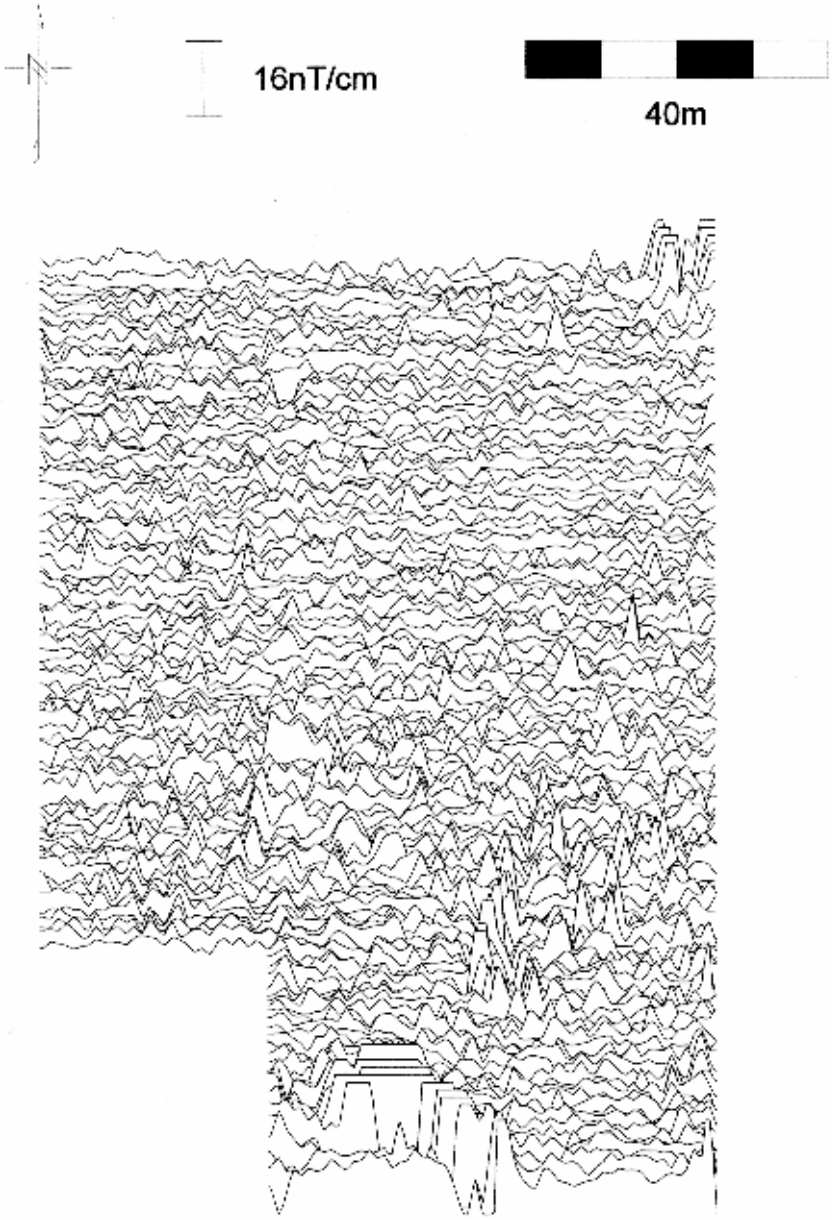
0 50m

scale 1:1250 - for A3 plot

- outline of survey area
- soil-filled features
- possible land drains
- orientation of ridge and furrow
- possible field boundary

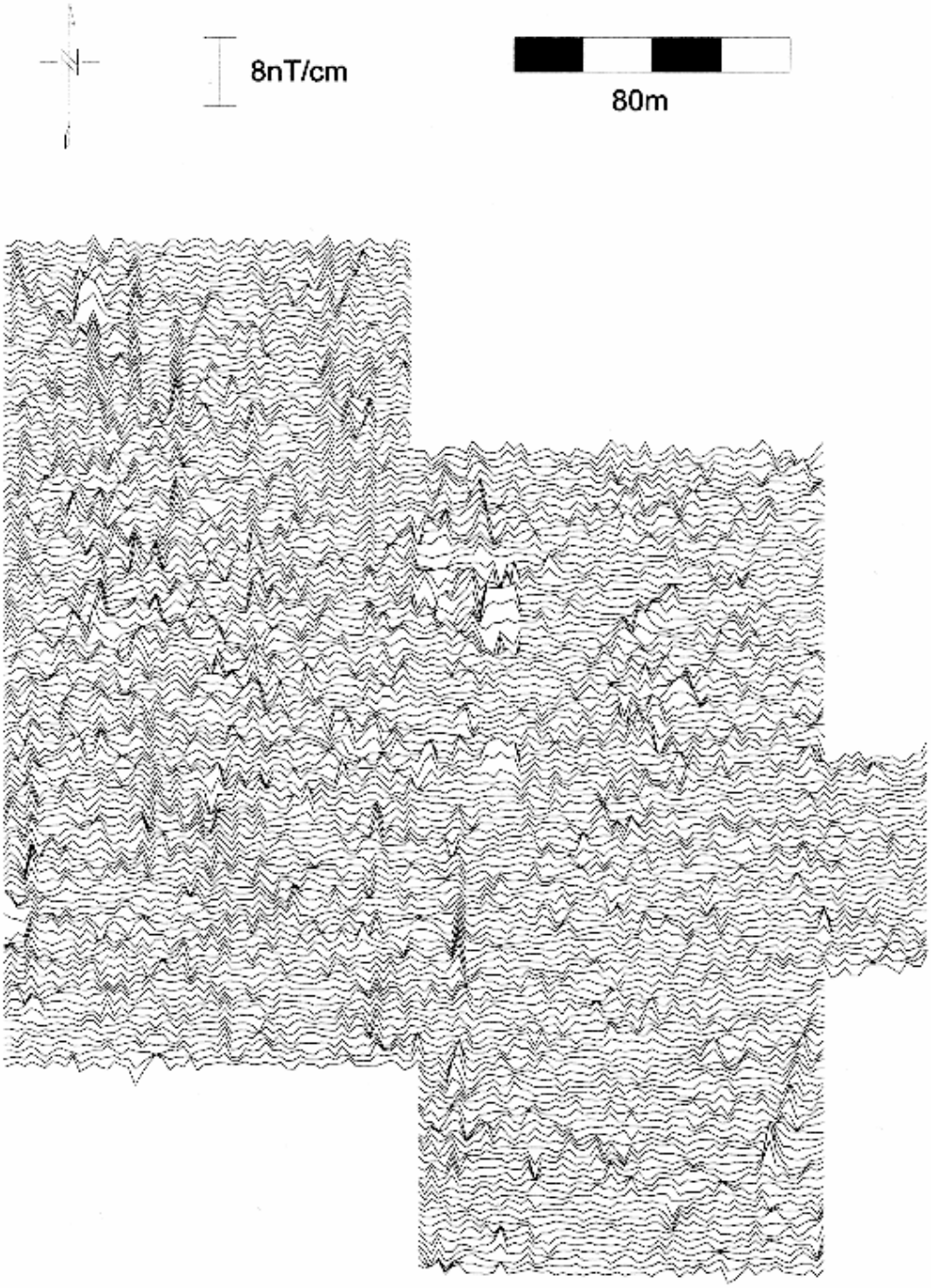
Appendix I: Trace plots of geophysical data

Area 1, 1:1000 @ A4

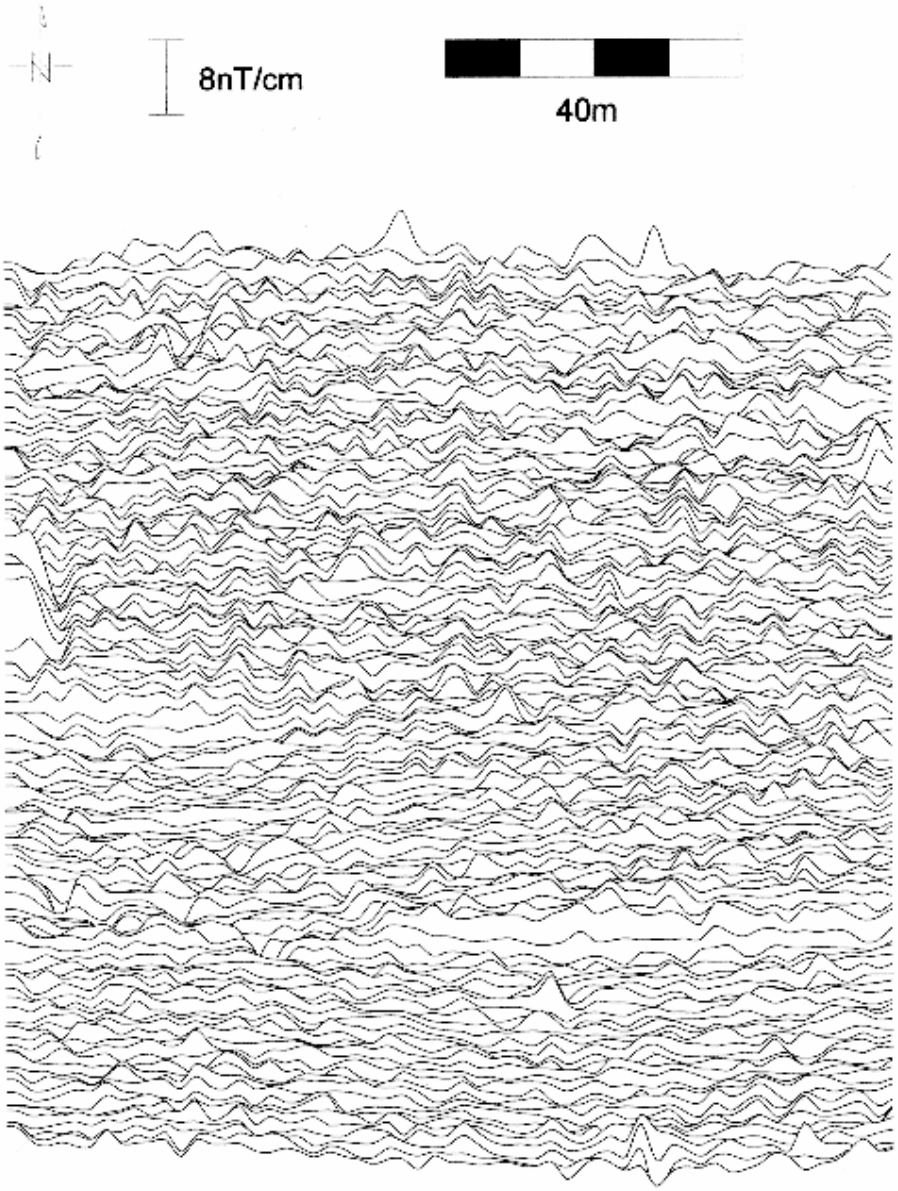


Area 2, 1:1000 @ A4

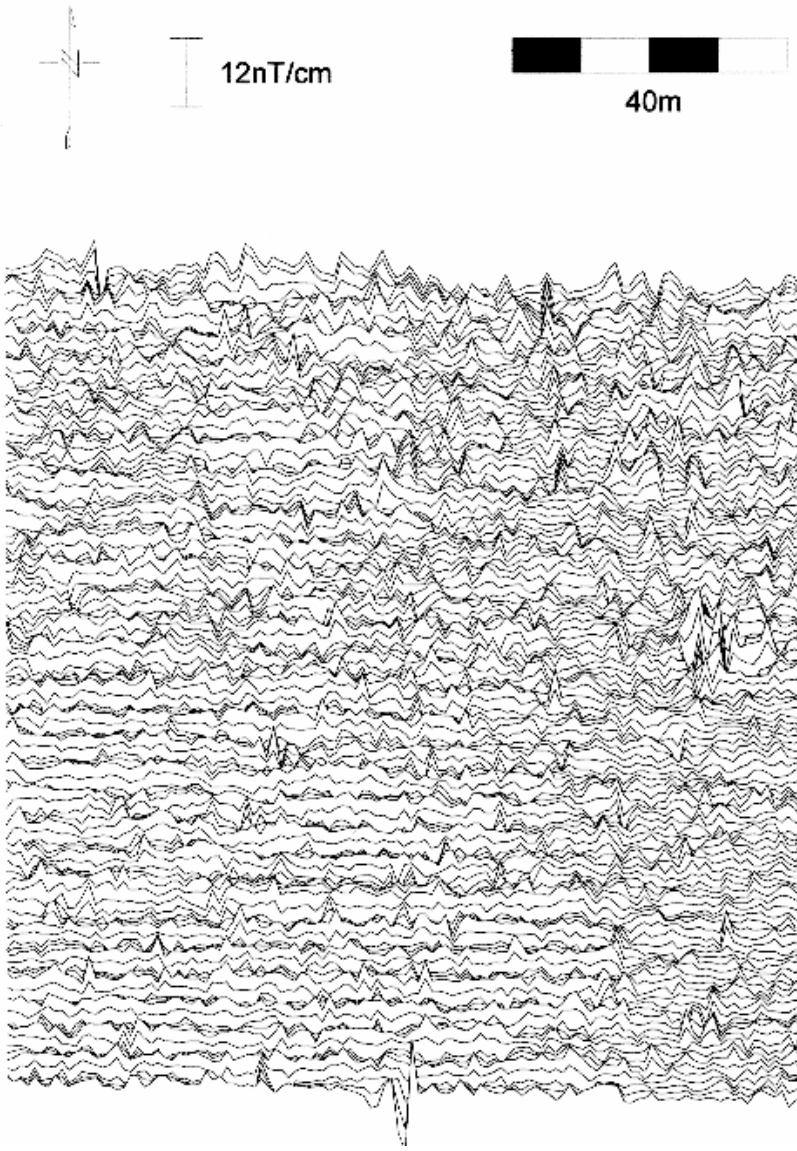
Area 3, 1:2000 @ A4



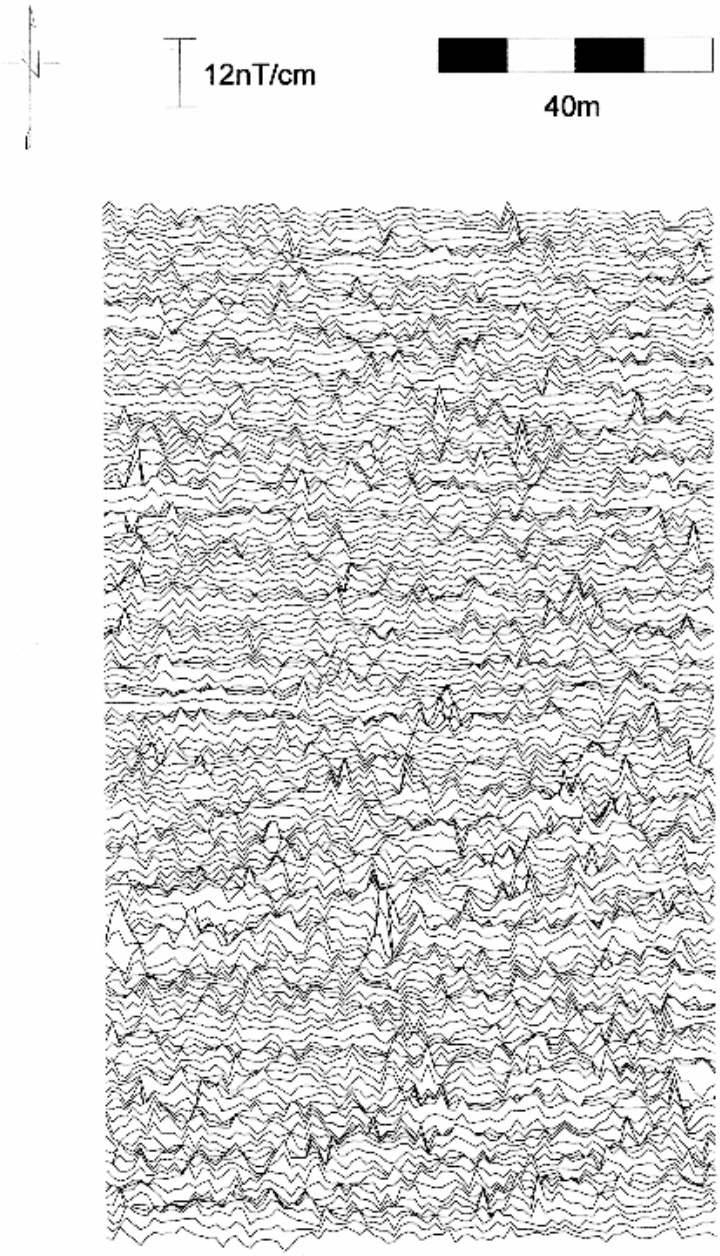
Area 4, 1:1000 @ A4



Area 5, 1:1000 @ A4



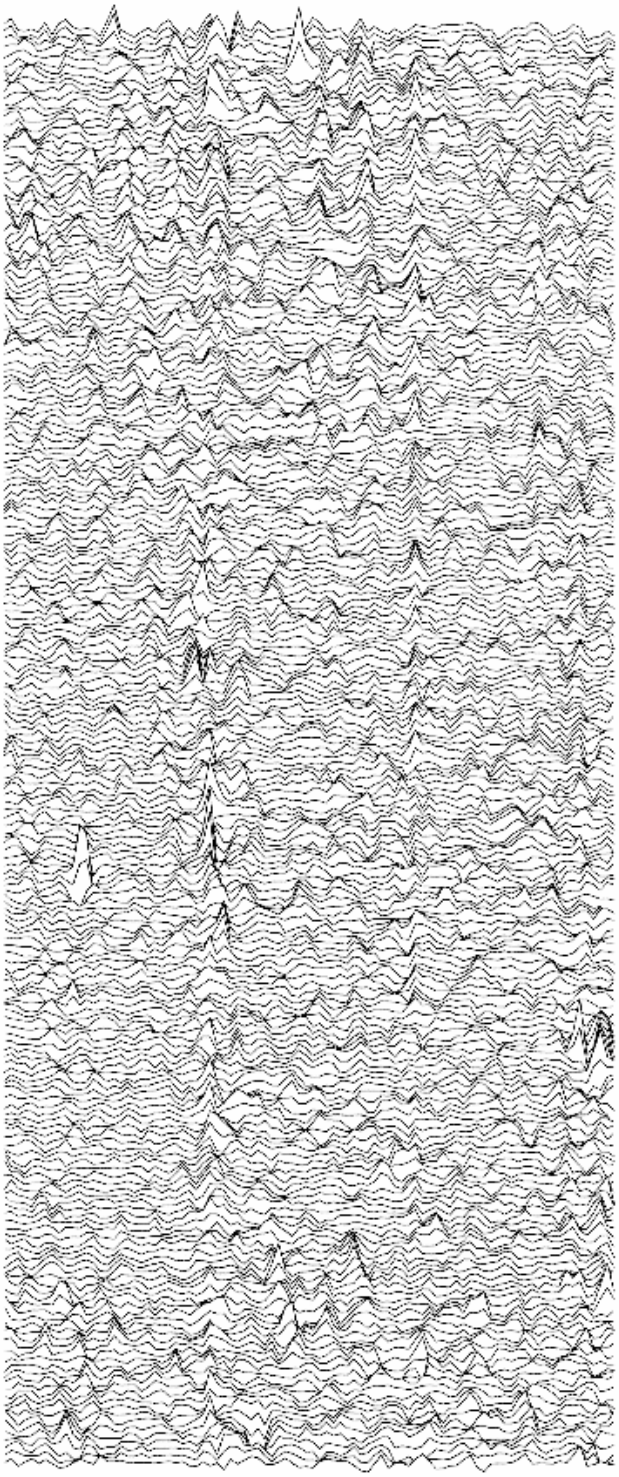
Area 6, 1:1000 @ A4



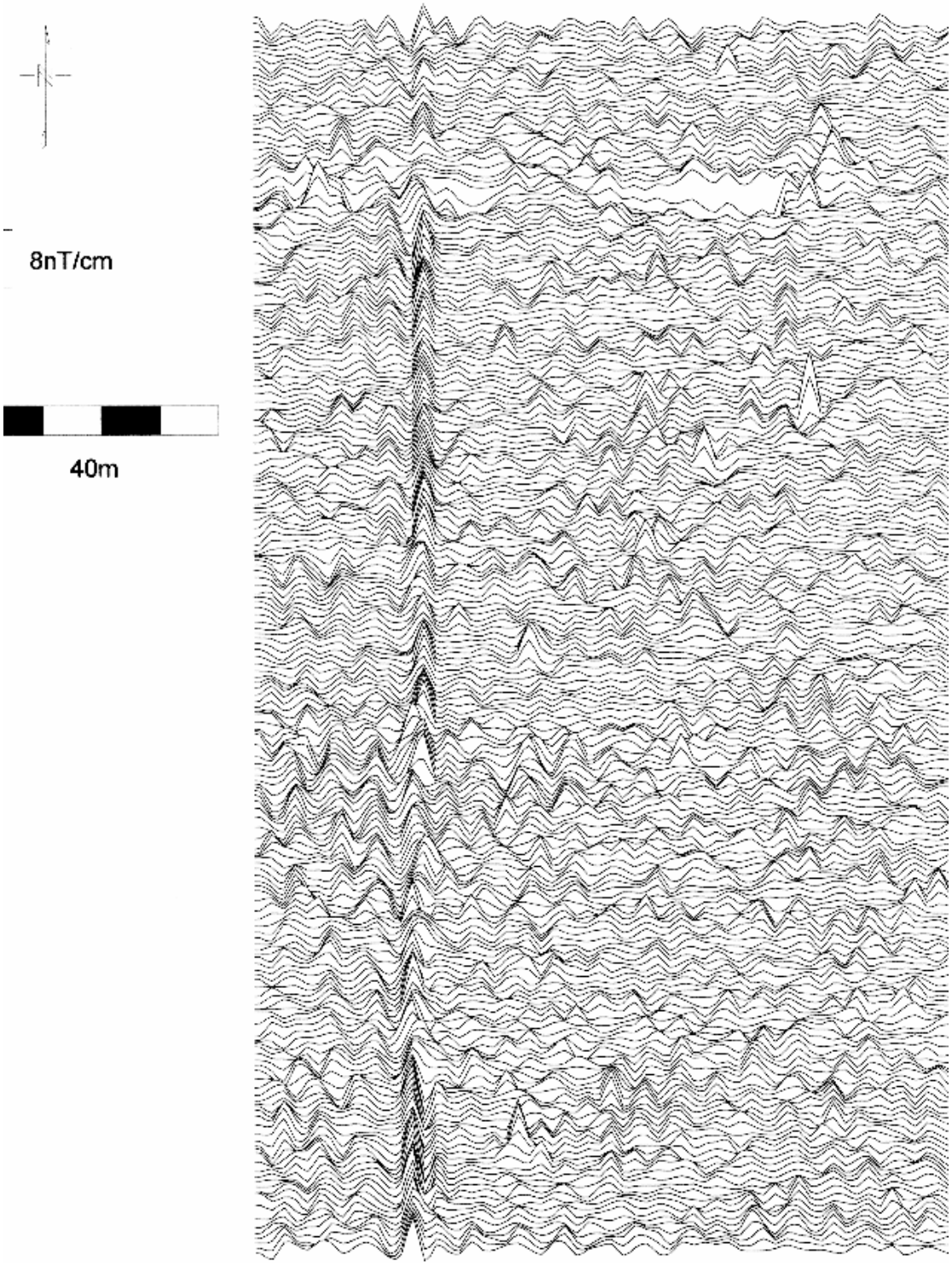
Area 7, 1:1000 @ A4

8nT/cm

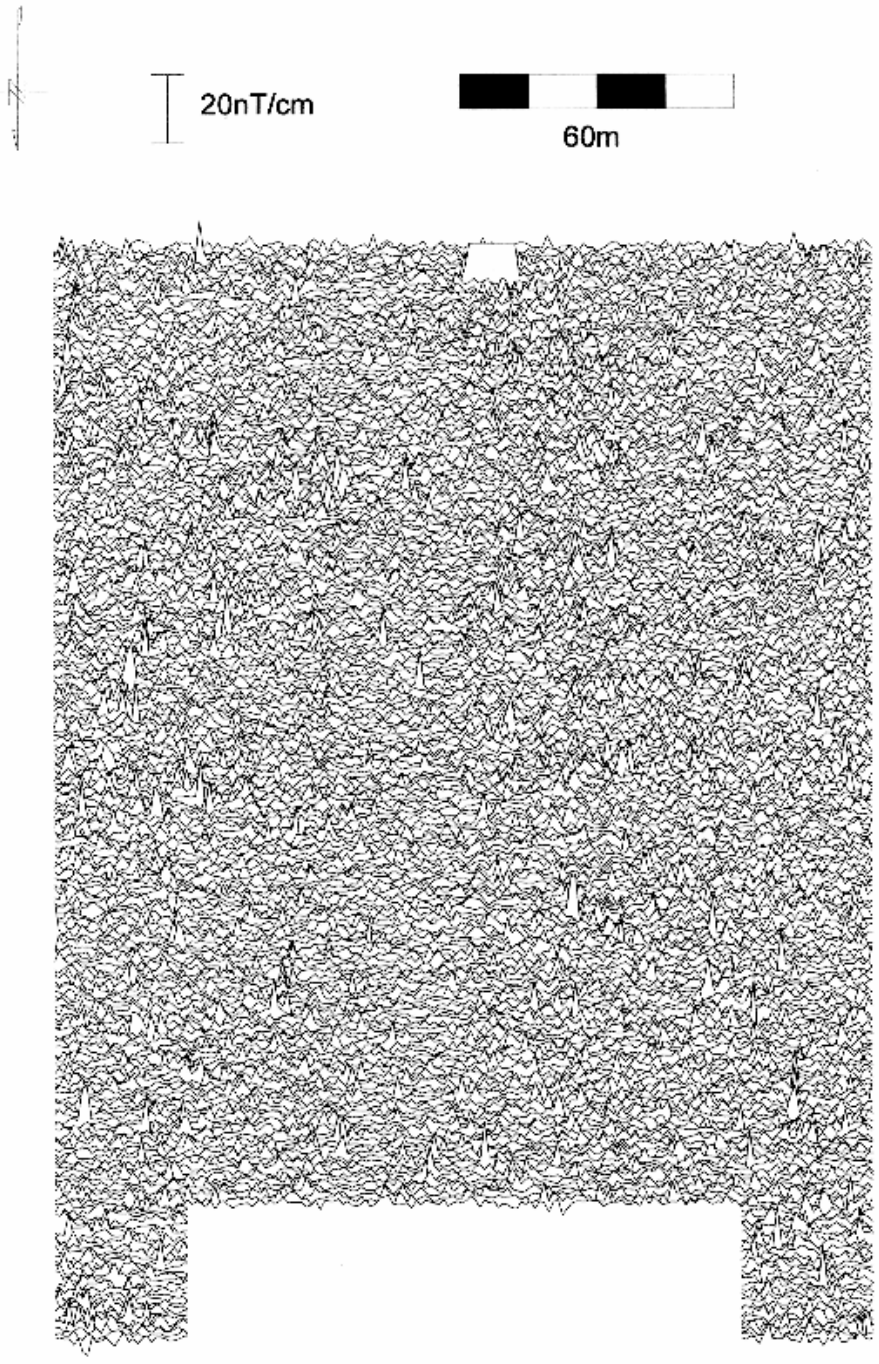
40m



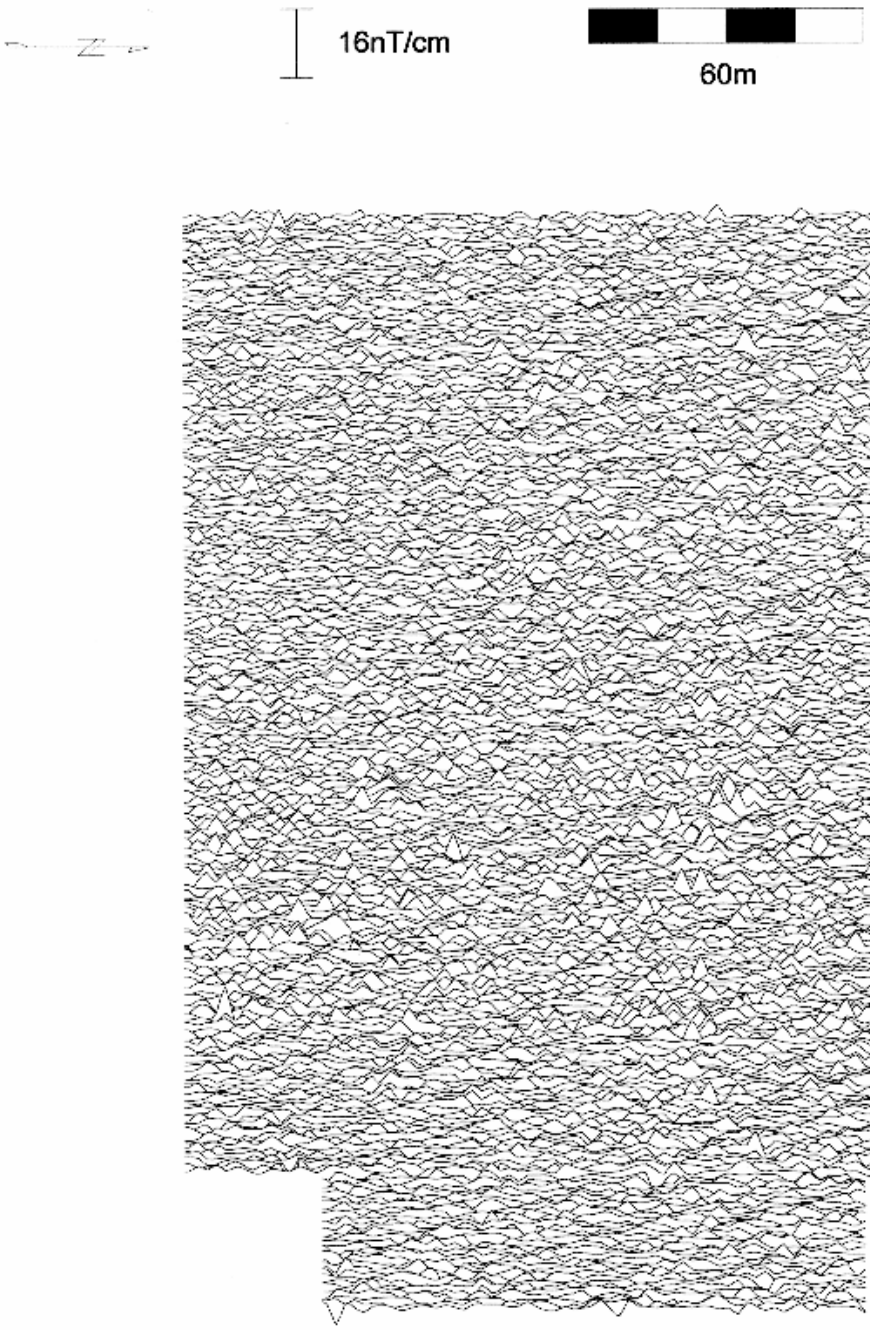
Area 8, 1:1000 @ A4



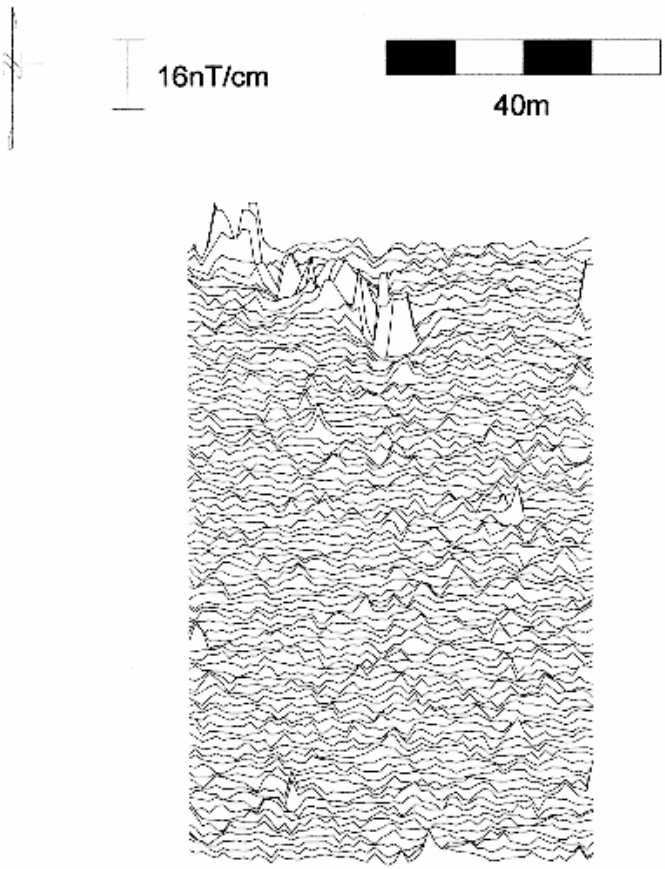
Area 9, 1:1500 @ A4



Area 10, 1:1500 @ A4



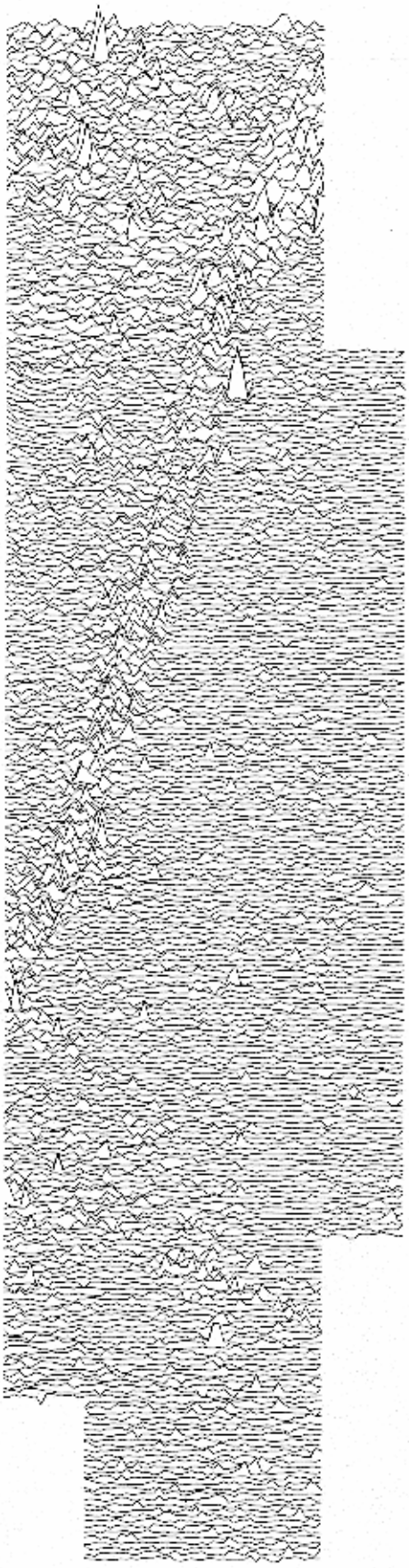
Area 11, 1:1000 @ A4



Area 12, 1:2500 @ A4

16nT/cm

100m



Appendix II: Project brief

Planning ref: 05/00151/CCMEIA
NCCCT ref: BV8/2; 4894
Grid ref: NZ 304 736

LAND AT SEGHILL, CRAMLINGTON, NORTHUMBERLAND

Application to extend landfill site

Brief for an Archaeological Geophysical Survey

Introduction

A planning application has been submitted for the extension of an existing landfill site at Seghill, Cramlington, Northumberland. (Fig 1).

The site is located in a wider archaeological landscape containing sites ranging from cropmarked enclosures of probable prehistoric and Romano-British date to post-medieval industrial sites. A detailed summary of the potential of the site is provided by a recent archaeological desk-based assessment undertaken by the Archaeological Practice Ltd. (their ref AP05/15; NCCCT ref BV8/2; 4605). This document formed the basis of Section 15 ('Archaeology and Heritage') of the applicant's Environmental Statement and was also included in unabridged form as an appendix.

The most significant archaeological evidence relating to past human activity within or in close proximity to the application area may be broadly summarised as follows:

- *Bee-hive shaped querns of late Iron-Age or Romano-British date.* ***These finds are strongly indicative of late prehistoric settlement and are almost certainly associated with the large number of settlement enclosures known in the area from aerial photographs.***
- *Medieval villages of Backworth and Holywell.* ***These villages are first documented in the 12th century. It is likely that the boundary between these two villages passes through the application area.***
- *Wolf Hill.* ***The site of a settlement first noted (as Wolf Law) in the 14th century and abandoned in the 19th century.***
- *West Field.* ***A farmstead present from at least 1820 which have earlier origins.***
- *19th century mining and ancillary activity.* ***Mining activity is known to have taken place within and adjacent to the site from at least the 19th century. Other activities associated with mining include brickworks, residential developments and the construction of railway lines.***

In view of both the quantity and quality of prehistoric features and deposits already identified within the locality, there is a high potential for similar remains to be present within the application area. Although there is as yet no evidence for earlier prehistoric activity within the application area, the proximity of the area to the coast, and in particular the estuarine zone around Seaton Sluice will have been attractive to prehistoric populations from the earliest times. Potential exists, therefore, for earlier prehistoric remains to be identified within the application area.

Northumberland County Council Conservation Team has advised the County Minerals, Waste & Development Control Office that the archaeological potential of the site should be further investigated prior to the determination of this planning application. It has been agreed that the first strand of this evaluation should

take the form of a geophysical survey.

This brief constitutes Northumberland County Council Conservation Team's justification for the investigation, its objectives and the strategy and procedures to apply to the programme of geophysical survey. *This brief does not constitute the 'written scheme of investigation'.*

The brief is intended to establish the project parameters to enable an archaeological consultant or contractor to tender for the work and once commissioned to prepare and submit an appropriate Method Statement, Project Design or Specification to the Conservation Team for approval prior to work commencing. The project design should be based on a thorough study of all relevant background information, in particular any assessment or evaluation reports or, in their absence, data held or referenced in Northumberland Sites and Monuments Record Office (SMR).

The extent of the development (Fig 1) has been taken from plans attached to the planning application. The archaeological consultant or contractor will need to confirm the extent of the development with the developer as part of the specification.

Site Specific Requirements

The geophysical survey is designed to discover whether there are any archaeological constraints on the planned development. The purpose of the geophysical survey is to quickly evaluate an area to identify the presence or absence of possible archaeological remains, their location and, if possible, a tentative interpretation of function and date. The results of the survey will help to identify specific anomalies that may warrant further archaeological evaluation, the most likely form of which would be a programme of trial trenching.

The geophysical survey should comprise one of the following:

Option 1

Optional sample grids

Where previous geophysical surveys produced poor, or no results, or where there is some uncertainty about the quality of the results that a such a survey might provide for other reasons (ie geology or alluvial cover) sample blocks measuring 20m by 20m amounting to one grid or a maximum 5% sample should be located both over known or possible anomalies and in "blank" areas to establish whether geophysical survey will be produce useful results over a wider area.

The archaeological desk-based assessment has identified the potential for industrial waste material associated with coal extraction and brick manufacture to be spread over parts of the site. The potential for such deposits to influence the results of the geophysical survey should be considered if following this option.

Careful consideration must be made to the appropriate geophysical technique taking into account the individual circumstances of the site. The three main techniques which can be tested at this stage are:

- Magnetometry (fluxgate gradiometer)
- Magnetic susceptibility
- Resistivity

Where sample grids have been employed and the results suggest that the site is not suitable for geophysical survey no further work should be carried out. This decision should be taken in consultation with Planning Authority's archaeological advisor.

Stage 2

Should the Stage 1 geophysical blocks produce positive results, the geophysical survey should progress to Stage 2, comprising 50% of the proposed development area in **staggered linear transects.**

Should the Stage 1 survey not produce useful results, no further geophysical survey should be carried out and the Assistant County Archaeologist should be contacted to discuss the requirement for a programme of trial trenching.

Option 2

Scanning

The whole of the proposed development area should be scanned recording the location of possible geophysical anomalies. This should identify where detailed survey can be targeted.

2.4.2 Optional sample grids

Where scanning produced poor, or no results, or where there is some uncertainty about the quality of the results that a geophysical survey might provide sample blocks measuring 20m by 20m amounting to one grid or a maximum 5% sample should be located both over known or possible anomalies and in "blank" areas to establish whether geophysical survey will be produce useful results over a wider area. Careful consideration must be made to the appropriate geophysical technique taking into account the individual circumstances of the site. The three main techniques which can be tested at this stage are:

- Magnetometry (fluxgate gradiometer)
- Magnetic susceptibility
- Resistivity

Where sample grids have been employed and the results suggest that the site is not suitable for geophysical survey no further work should be carried out. This decision should be taken in consultation with Planning Authority's archaeological advisor.

Detailed survey

Detailed survey should comprise 50% of the proposed development area comprising blocks measuring 20m by 20m. These should be targeted at anomalies identified during the scanning assessment and also randomly at "Blank" areas to proved the absence or otherwise of archaeological features.

The plan of the location of the 50% sample should be agreed with the Planning Authority's archaeological advisor prior to the commencement of detailed survey.

If sample grids have been surveyed and have not produce useful results, no further geophysical survey should be carried out and the Assistant County Archaeologist should be contacted to discuss the requirement for a programme of trial trenching.

Access arrangements should be confirmed with the commissioning architect.

General Standards

All work will be carried out in compliance with the codes of practice of the Institute of Field Archaeologists (IFA) [1] ***and will follow the IFA Standard and Guidance for Archaeological Field Evaluation*** [2] ***and the English Heritage Guidelines for Geophysical Survey*** [3]***. Archaeological contractors must be able to prove that they have appropriate experience and current insurance to undertake the work.***

[1] Institute of Field Archaeologists, 2000, Code of Conduct

[2] Institute of Field Archaeologists, 2001, Standard and Guidance for archaeological field evaluation

[3] David A, 1995. *Geophysical Survey in archaeological field evaluation*. English Heritage Research and Professional Services Guideline No. 1

All staff must be suitably qualified and experienced for their project roles.

Contingency

In some circumstances a programme of geophysical survey may, in answering the questions posed, also raise others of an unexpected nature. Every attempt should be made to deal with the problem by agreed modification of the specification while fieldwork is in progress.

A contingency sum should be allowed for an additional geophysical survey block to be positioned to address particular issues which arise once the initial data has been processed. The contingency should comprise a further 5% of the total application area. **Failure to make this allowance, where appropriate, may necessitate further evaluation work being recommended to the local authority and a delay in the decision making process.**

The activation of the contingency must only be undertaken after discussion with, and with the agreement of the County Archaeological Officer. A representative of the developer/owner etc should be present at such discussions.

Post excavation work, archive, and report preparation

Site Archive

The archive must be deposited in the appropriate local museum, within **6 months** of completion of the post-excavation work and report. This should comprise:

i) A copy of the report
ii) Raw data and original illustrations that are not included in the report
iii) A digital copy of the report and illustrations, where appropriate

Before the commencement of fieldwork, contact should be made with the landowners and with the appropriate local museum to make the relevant arrangements. Details of land ownership should be provided by the developer. Details of the appropriate museum can be provided by the Assistant County Archaeologist.

Northumberland County Council will require confirmation that the archive had been submitted in a satisfactory form to the relevant museum.

Report

The geophysical survey is the second stage in a multi-staged programme of archaeological work and has been requested prior to the determination of planning permission. The results of this stage of survey should be used to inform the location of archaeological evaluation trenches. A brief for the execution of trenching works is provided as a separate document.

Due to the strict deadlines laid out in the planning system, the archaeological contractor or consultant should submit copies of the report to Northumberland County Council Conservation Team and their client within 20 working days of being commissioned to carry out the work, unless agreed in advance with all relevant parties.

The Conservation Team require <u>two copies</u> of the report (one bound and one unbound)

Each page and paragraph should be numbered within the report and illustrations cross-referenced within the text.

The report should include as a minimum the following:

i) Planning application number, Northumberland County Council Conservation Team reference, OASIS reference number and an 8 figure grid reference
ii) A location plan of the site at an appropriate scale of at least 1:10 000
iii) A location plan showing the location of the blocks of geophysical survey. This must be at a recognisable planning scale, and located with reference to the national grid, to allow the results to be accurately plotted on the Sites and Monuments Record
iv) Copies of the following plots:
    i) trace
    ii) grey scale
    iii) interpretative
v) A summary statement of the results

vi) A discussion and interpretation of the results of the survey

vii) Any variation to the above requirements should be approved by the planning authority prior to work being submitted

OASIS

Northumberland County Council Conservation Team and SMR support the Online Access to Index of Archaeological Investigations (OASIS) Project. The overall aim of the OASIS project is to provide an online index to the mass of archaeological grey literature that has been produced as a result of the advent of large scale developer funded fieldwork.

The archaeological consultant or contractor must therefore complete the online OASIS form at http://ads.ahds.ac.uk/project/oasis/. If the contractors are unfamiliar with OASIS, they are advised to contact Northumberland SMR prior to completing the form. Once a report has become a public document by submission to or incorporation into the SMR, Northumberland SMR will validate the OASIS form thus placing the information into the public domain on the OASIS website. **The archaeological consultant or contractor must indicate that they agree to this procedure within the specification/project design/written scheme of investigation submitted to Northumberland County Council Conservation Team for approval**

Publication

A summary should be prepared for 'Archaeology in Northumberland' and submitted to Sarah MacLean, Northumberland Historic Records Officer, by December of the year in which the work is completed.

A short report of the work should also be submitted to a local journal if appropriate.

Monitoring

The County Archaeologist must be informed on the start date and timetable for the evaluation** in advance **of work commencing.

Reasonable access to the site for the purposes of monitoring the archaeological scheme will be afforded to the County Archaeologist or his/her nominee at all times.

Regular communication between the archaeological contractor, the County Archaeologist and other interested parties must be maintained to ensure the project aims and objectives are achieved.

Further Guidance

Any further guidance or queries regarding the provision of a specification should be directed to:

Nick Best
Assistant County Archaeologist
Northumberland County Council
County Hall
Morpeth
Northumberland
NE61 2EF

Tel: 01670 534057
Fax: 01670 533086
e-mail: nbest@northumberland.gov.uk

23/08/05

FOR COPYRIGHT REASONS, ALL MAPS SUPPLIED BY NORTHUMBERLAND COUNTY COUNCIL MUST BE RETURNED TO THEM ON COMPLETION OF THE PROJECT