
**LAND AT
BUTT LANE,
LACEBY,
NORTH EAST LINCOLNSHIRE
(LABL13)**

GEOPHYSICAL SURVEY

**Work undertaken for
Larkfleet Homes Ltd**

May 2013

**Report produced by
Andrew S. Failes BA (Hons) MA**

**OASIS Ref: archaeo11-154809
National Grid Reference: TA 2100 0710**

APS Report No: **63/13**

**ARCHAEOLOGICAL
PROJECT
SERVICES**



CONTENTS

| | | |
|------------|--|----------|
| 1. | SUMMARY | 1 |
| 2. | INTRODUCTION | 1 |
| 2.1 | DEFINITION OF AN EVALUATION | 1 |
| 2.2 | BACKGROUND | 1 |
| 2.3 | TOPOGRAPHY AND GEOLOGY | 1 |
| 3. | GEOPHYSICAL SURVEY | 1 |
| 3.1 | METHODS | 1 |
| 3.2 | RESULTS | 3 |
| 4. | DISCUSSION | 3 |
| 5. | ACKNOWLEDGEMENTS | 4 |
| 6. | PERSONNEL | 4 |
| 7. | BIBLIOGRAPHY | 4 |
| 8. | ABBREVIATIONS | 4 |

Appendix 1 The Archive

List of Figures

Figure 1 General location map

Figure 2 Site location map

Figure 3 Location and layout of survey areas

Figure 4 Minimally processed data greyscale plot: Area 1

Figure 5 Minimally processed data trace plot: Area 1

Figure 6 Processed data greyscale plot: Area 1

Figure 7 Minimally processed data greyscale plot: Area 2

Figure 8 Minimally processed data trace plot: Area 2

Figure 9 Processed data greyscale plot: Area 2

Figure 10 Processed data greyscale plot overlain on base map: Areas 1 & 2

Figure 11 Interpretative plot: Areas 1 & 2

1. SUMMARY

Detailed magnetic gradiometer survey was undertaken for Larkfleet Homes on land at Butt Lane, Laceby, North East Lincolnshire. Two adjacent irregular shaped areas were surveyed which encompassed an area of c. 4ha.

Magnetometer survey identified few anomalies of potential archaeological origin. A small cluster of vaguely linear and discrete positive anomalies occurred towards the northern boundary of survey area 2. These may represent cut features but no clear pattern is evident and little more can be said on the basis of form alone. It is suggested that these probably represent changes in the natural geology rather than archaeological features.

Magnetic disturbance is present around the majority of the edges of both survey areas, indicating fencing for the most part. A large response towards the northern boundary of Area 1 is probably associated with an adjacent, recently excavated pond. There is also a particularly strong signal in the northeast corner of Area 2 which represents a service. However, with the exception of occasional metal items in the topsoil there is little indication of modern disturbance across the field as a whole.

2. INTRODUCTION

2.1 Definition of an Evaluation

Geophysical survey is a non-intrusive method of archaeological evaluation. Evaluation is defined as ‘*a limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site. If such archaeological remains are present*

Field Evaluation defines their character and extent, quality and preservation, and it enables an assessment of their worth in a local, regional, national or international context as appropriate’ (IfA 2008).

2.2 Background

Archaeological Project Services was commissioned by *Larkfleet Homes* to undertake detailed magnetometer survey on land at Butt Lane, Laceby, North East Lincolnshire. The survey was carried out on the 14th to 15th of May 2013.

2.3 Topography and Geology

The survey area south of Butt Lane, Laceby, lies in North East Lincolnshire, approximately 6km southwest of Grimsby and 9km south-southwest of Cleethorpes (Fig 1). The investigation area lies in an unused field to the north of a housing development on fairly level land, centred on National Grid Reference TA 2100 0710 (Fig. 2). Soils at the site consist of Devensian glaciofluvial sands and gravels over Flamborough chalk formation (BGS 50000 scale digital geology).

3. GEOPHYSICAL SURVEY

3.1 Methods

Location and layout of the survey area is shown in Figure 3. The area comprised two adjacent irregular shaped parcels of land (Areas 1 & 2) located to either side of Blyth Way (Fig 3). Area 1 measured 1.253 ha, while Area 2 was slightly larger at 2.679 ha. The total area surveyed amounted to 3.932 ha. The land was disused pasture covered in long grass and in good condition for survey.

Survey was undertaken in accordance with English Heritage (2008) and IfA (2011)

guidelines and codes of conduct. The survey grid was laid out using differential GPS equipment using Ordnance Survey correction data to allowing accurate positioning and relocation where necessary.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. This records subtle changes in the magnetic field resulting from differing features in the soil. Changes as small as 0.2 nanoTesla (nT) in an overall field strength of c. 49,000nT can be accurately detected using this instrumentation, although in practice instrument interference and soil noise can limit sensitivity.

The mapping of anomalies in a systematic manner allows interpretation of the type of material present beneath the surface. Strong magnetic anomalies are generated by buried iron-based objects or by kilns or hearths, usually resulting in a bipolar (positive/negative) response. More subtle positive anomalies representing pits and ditches can be seen where these contain more topsoil which is normally richer in magnetic iron oxides and provides a contrast with the natural subsoil (but this can vary depending on the nature of the underlying deposits). A negative anomaly may result from upcast bank material. Wall foundations can also show as negative anomalies where the stone is less magnetic than the surrounding soil, or as stronger positive and negative anomalies if of brick, but are not always responsive to the technique. It should be noted that not all features will be responsive and absence of anomalies does not necessarily indicate absence of archaeological features.

Magnetometers measure changes in the Earth's magnetic field. With two sensors configured as a gradiometer the recorded

values indicate the difference between two magnetic measurements separated by a fixed distance. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame with a 1m separation between the sensing elements giving a strong response to deep anomalies.

Sampling interval and data capture

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid. The Grad 601 has a typical depth of penetration of 0.5m to 1.0m although a greater range is possible where strongly magnetic objects have been buried in the site.

Readings are logged consecutively into the data logger which is downloaded daily either into a portable computer whilst on site or directly to the office computer. At the end of each job, data is transferred to the office for processing and presentation.

Processing and presentation of results

Processing is performed using specialist ArcheoSurveyor software. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves flattening the background levels with respect to adjacent traverses and adjacent grids (Destripe or zero mean traverse). Despiking is also performed to reduce the effect of the anomalies resulting from small iron objects often found on agricultural land. Further processing can then be carried out which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following are the processing techniques carried out on the processed gradiometer data used in this report:

1. DeStripe (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects)

2. Despike (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)

Parameters: X radius = 1; Y radius = 1; Threshold = 3SD; Spike replacement = mean

3. Clip (excludes extreme values allowing better representation of detail in the mid range): -3 to 3nT.

3.2 Results

The presentation of the data for the site involves a print-out of the raw or minimally processed data as greyscale and trace plots (Figs 4-5 & 7-8; clipped for display but otherwise unprocessed), together with greyscale plots of the processed data (Figs 6, 9 & 10). Magnetic anomalies have been identified and plotted onto an interpretative drawing (Fig. 11) and are described below.

Linear positive anomalies

A few vaguely linear positive anomalies were identified towards the north of Area 2 and possibly indicate cut features. However, on the basis of form, these seem unlikely to represent ditches and are perhaps an indication of changes in the natural geology. A sharply defined narrow linear to the south of these is probably of relatively recent origin.

Discreet positive anomalies

A cluster of discreet positive anomalies, also located towards the north of Area 2, formed a roughly oval pattern. The oval patterning is novel, but unclear and probably not an indicator of archaeological origin for these responses. Although these anomalies could represent cut features, on

the basis of form and the variable nature of the response, this seems improbable.

Modern/magnetic disturbance

Strong bipolar responses occur along the northern, eastern and southern edges of Area 1. A relatively large response at the northern boundary of Area 1 is probably associated with an adjacent pond that has been recently excavated. In Area 2 strong bipolar responses were revealed along the northeastern, northwestern, western and southern boundary. The particularly strong response at the northwestern corner of Area 2 probably represents a service pipe.

Iron spikes (discrete bipolar anomalies)

Iron items within the topsoil give a distinctive localised bipolar (strong positive with associated strong negative) response. Such items usually derive from relatively recent management or agricultural use of the land – broken or discarded pieces of agricultural machinery or other modern debris. These are widely scattered across the site

4. DISCUSSION

Magnetometer survey identified few anomalies of potential archaeological origin. A number of vague linear and discreet positive anomalies towards the northern boundary of Area 2 may represent cut features, but no clear pattern is evident and considering the form and the variable nature of the response, it seems more probable that these represent variations in natural geology.

Magnetic disturbance is present around the majority of the edges of both survey areas, indicating the proximity of fencing for the most part. A large response towards the northern boundary of Area 1 is probably associated with an adjacent, recently excavated pond. There is also a

particularly strong signal in the northeast corner of Area 2 where a service pipe is probably present. However, with the exception of occasional metal items in the topsoil there is little indication of modern disturbance across the field as a whole.

5. ACKNOWLEDGEMENTS

Archaeological Project Services wishes to acknowledge the assistance of Tony Sibson who commissioned the project on behalf of Larkfleet Homes. Steve Malone (APS) edited the report along with Tom Lane (APS).

6. PERSONNEL

Project coordinator: Gary Taylor
Geophysical Survey: Andrew Failes,
Jonathon Smith
Survey processing and reporting: Andrew
Failes

7. BIBLIOGRAPHY

English Heritage, 2008 *Geophysical Survey in Archaeological Field Evaluation*.

IfA, 2008 *Standard and Guidance for Field Evaluation*.

IfA, 2011 *Standard and Guidance for Geophysical Survey*.

8. ABBREVIATIONS

APS Archaeological Project Services

BGS British Geological Survey

IfA Institute for Archaeologists

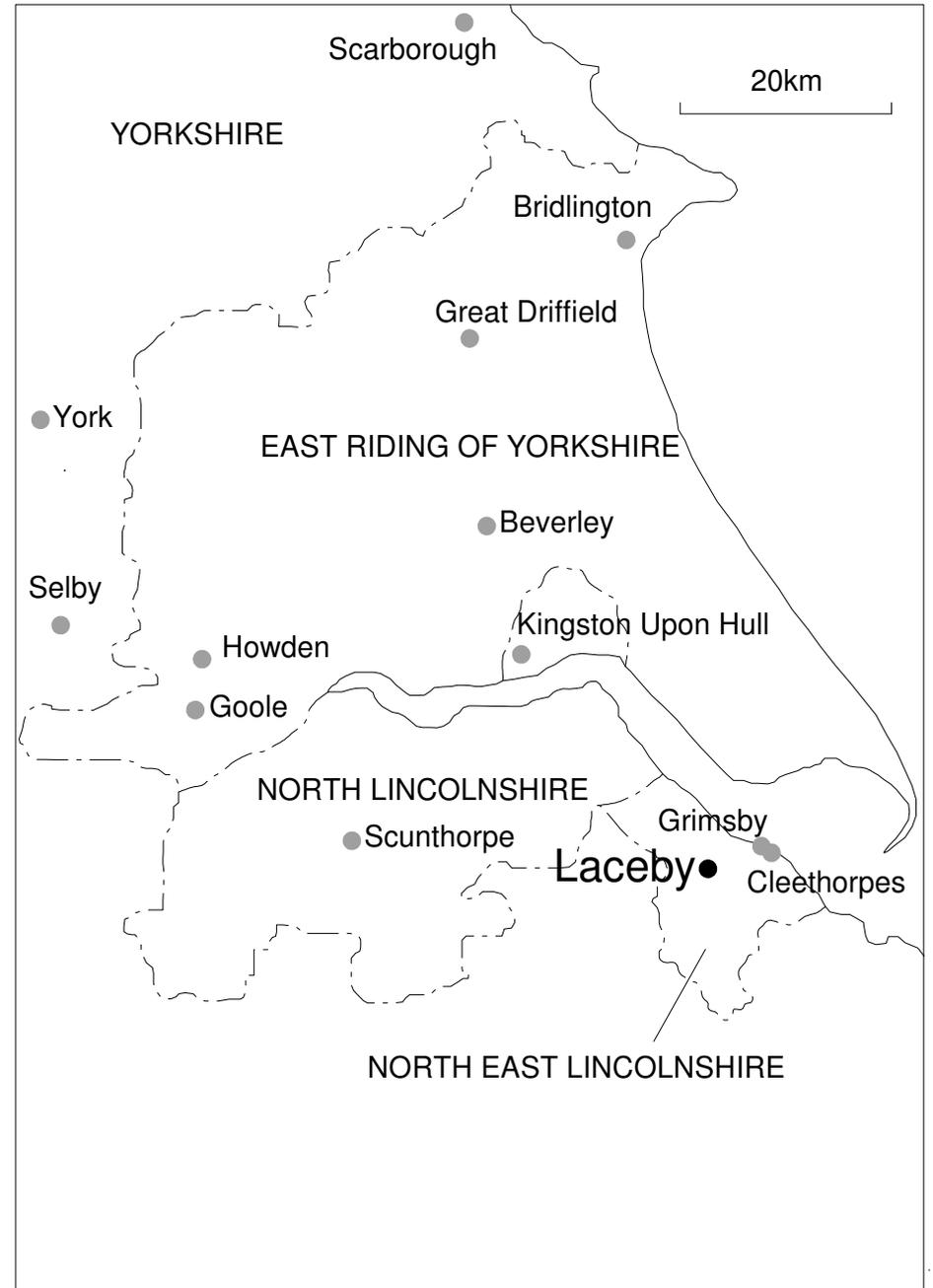


Figure 1 General location map

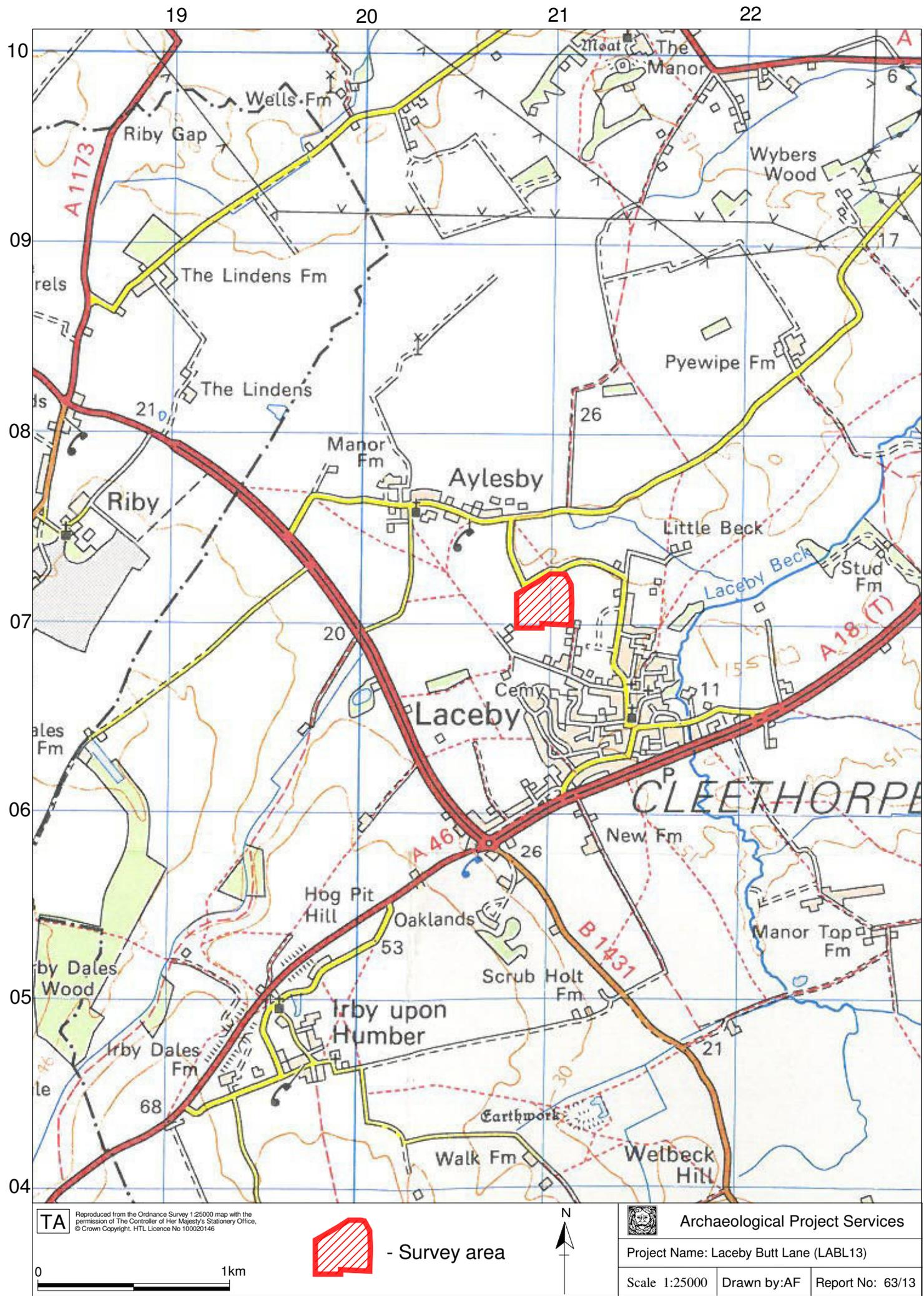


Figure 2 - Site location map

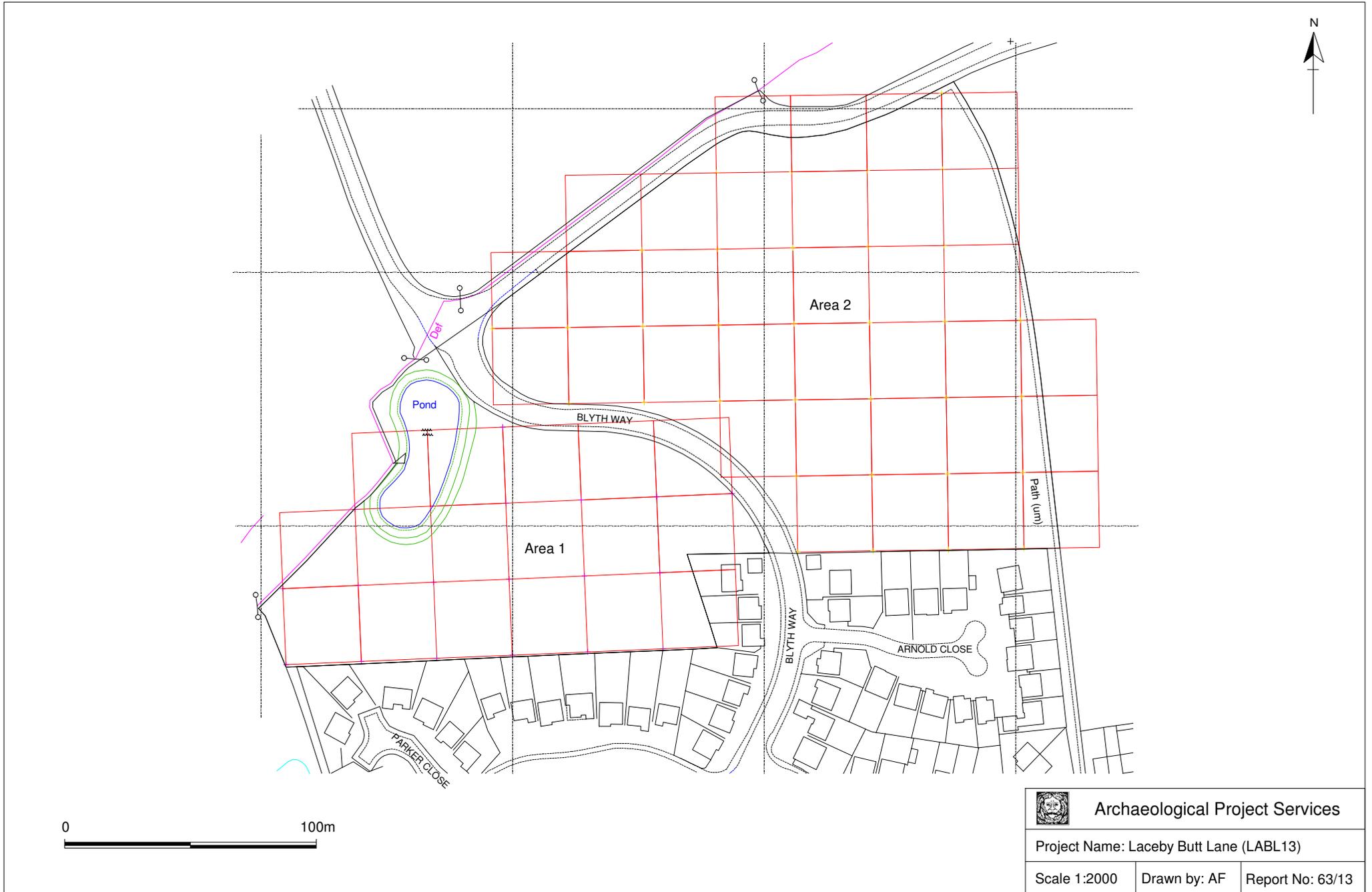


Figure 3 - Location and layout of survey areas

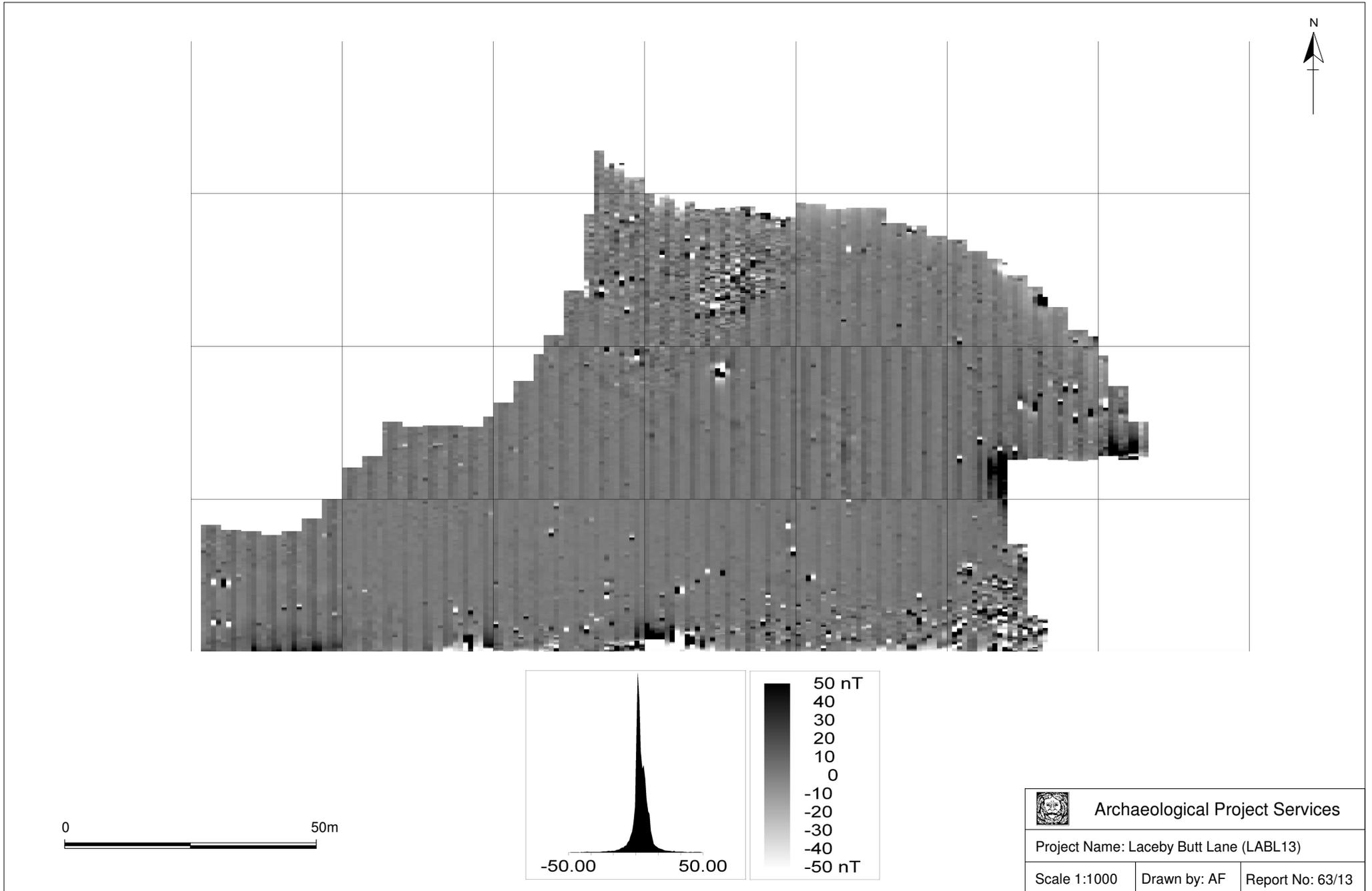
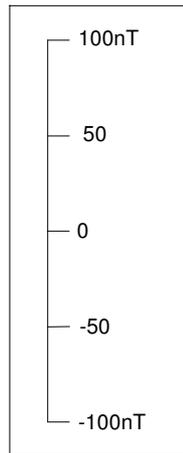
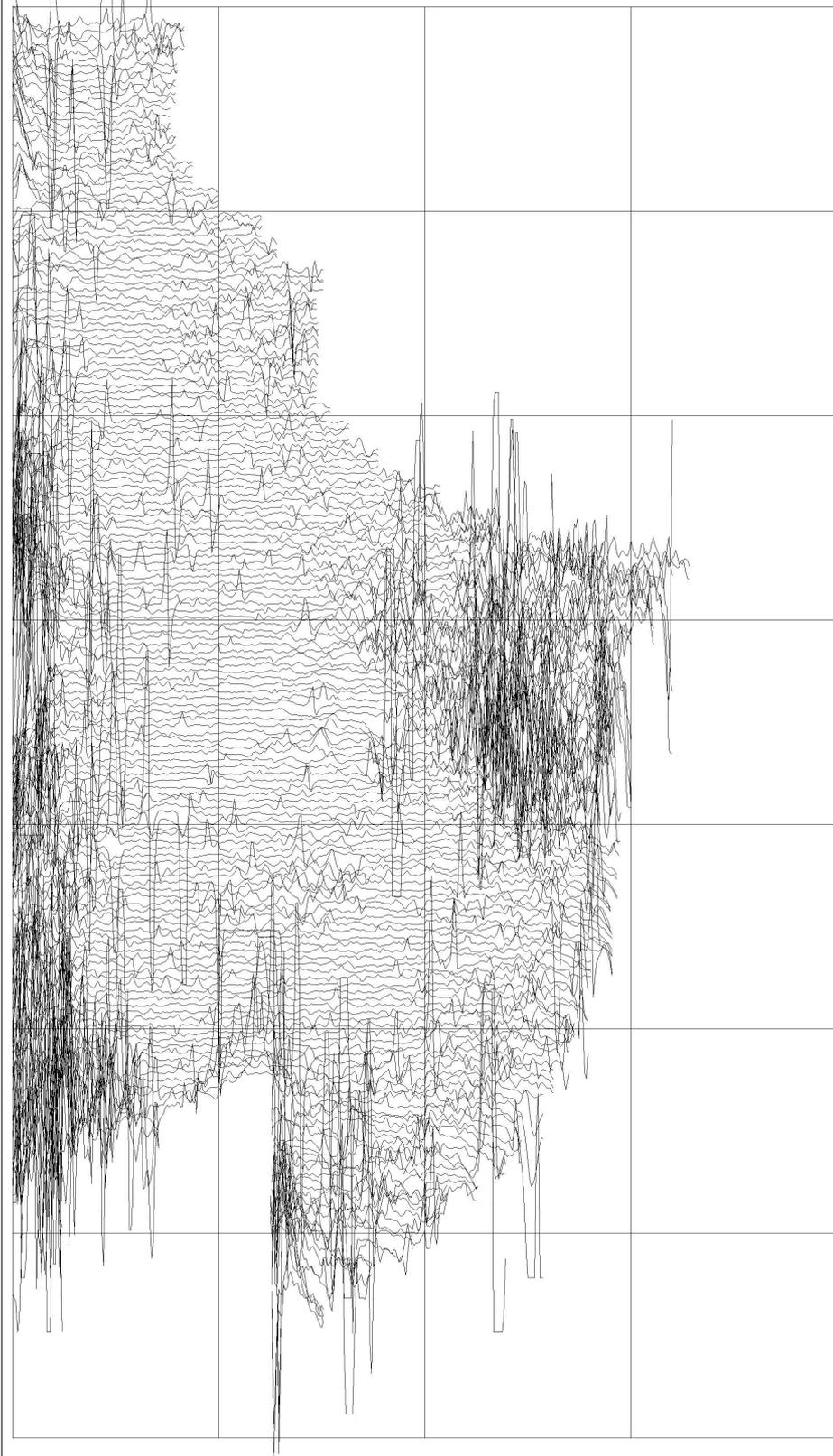


Figure 4 - Minimally processed data greyscale plot: Area 1



| | | | |
|--|---------------------------------|------------------|--|
|  | Archaeological Project Services | | |
| Project Name: Laceby Butt Lane (LABL13) | | | |
| Scale 1:1000 | Drawn by: AF | Report No: 63/13 | |

Figure 5 - Minimally processed data trace plot: Area 1

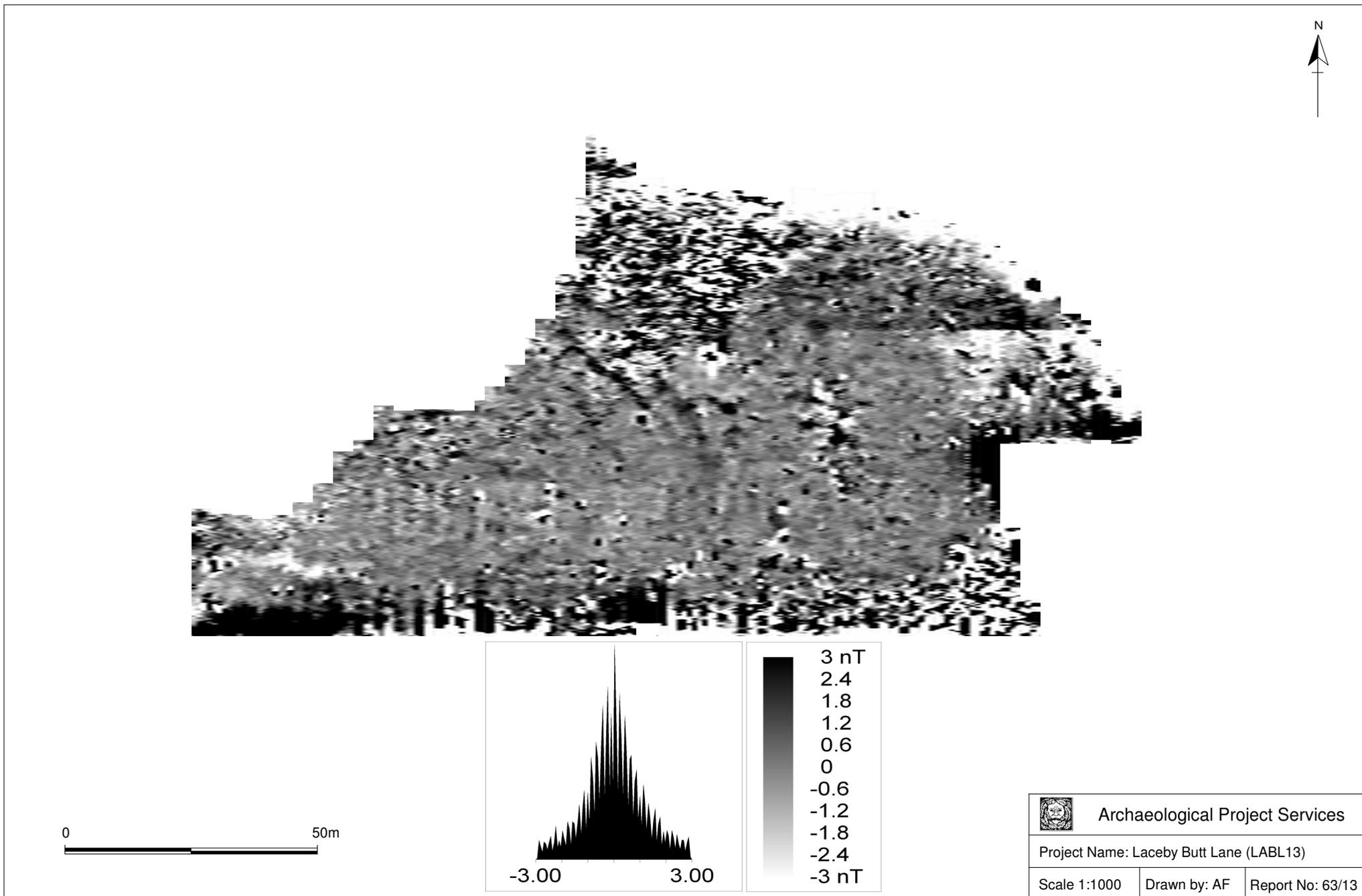


Figure 6 - Processed data greyscale plot: Area 1

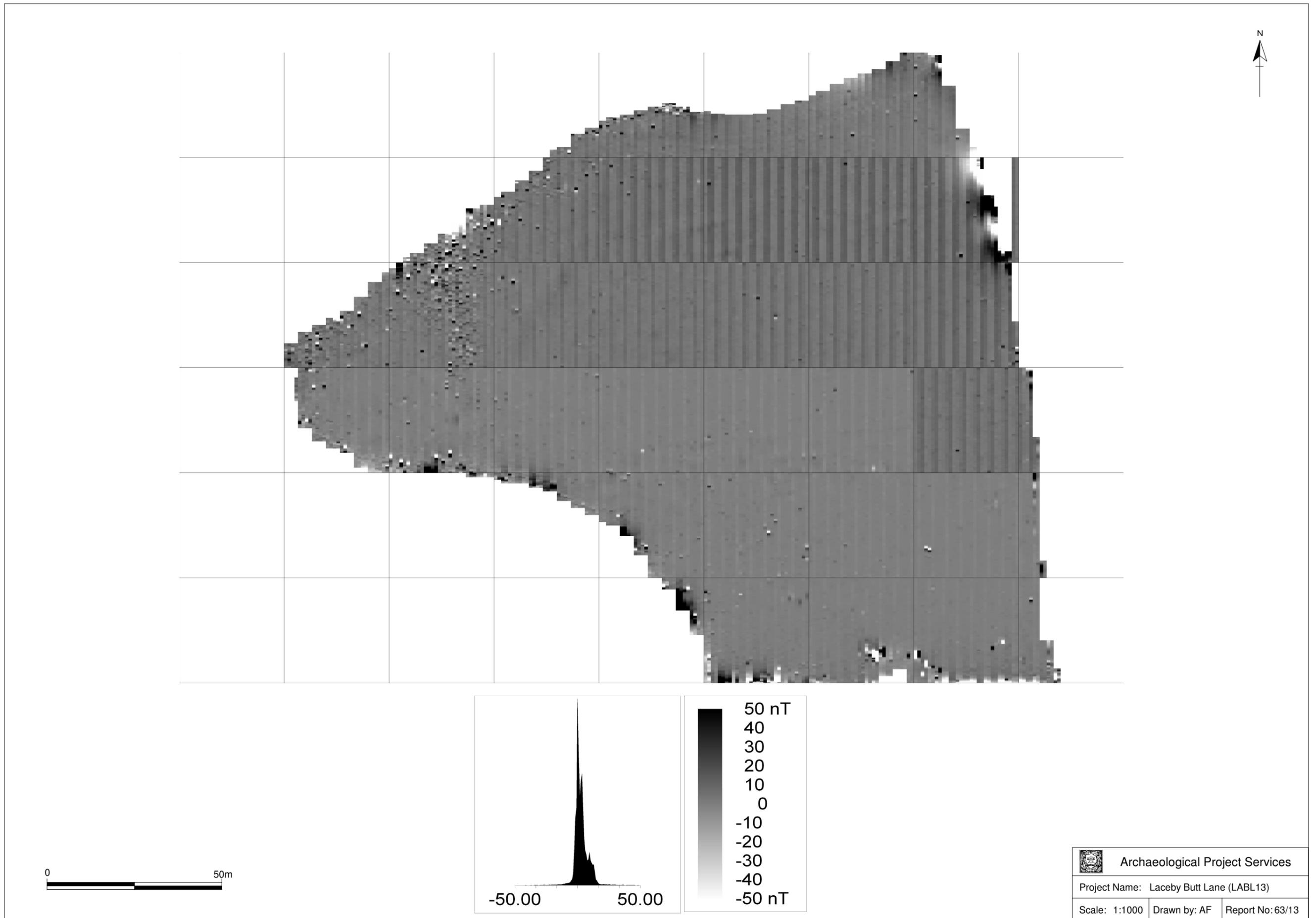
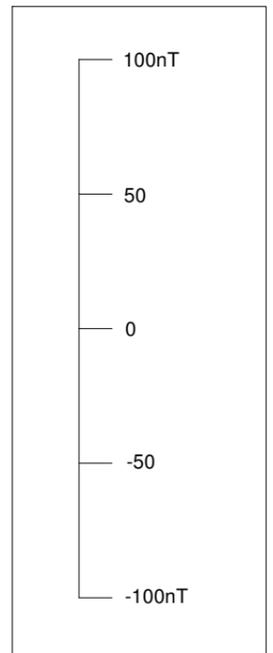
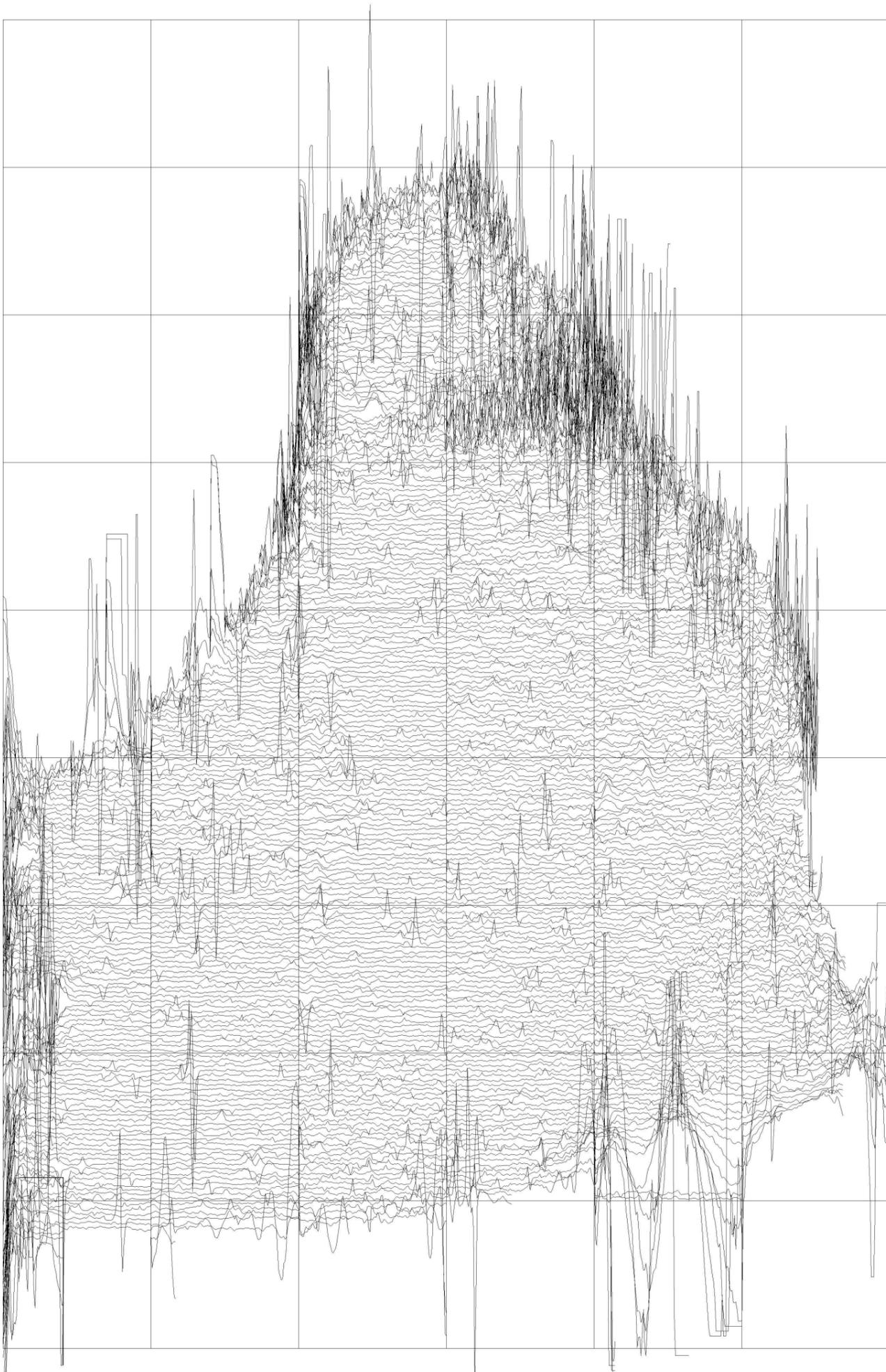


Figure 7 - Minimally processed data greyscale plot: Area 2



| | | |
|---|---------------------------------|------------------|
|  | Archaeological Project Services | |
| Project Name: Laceby Butt Lane (LABL13) | | |
| Scale 1:1000 | Drawn by: AF | Report No: 63/13 |

Figure 8 - Minimally processed data trace plot: Area 2

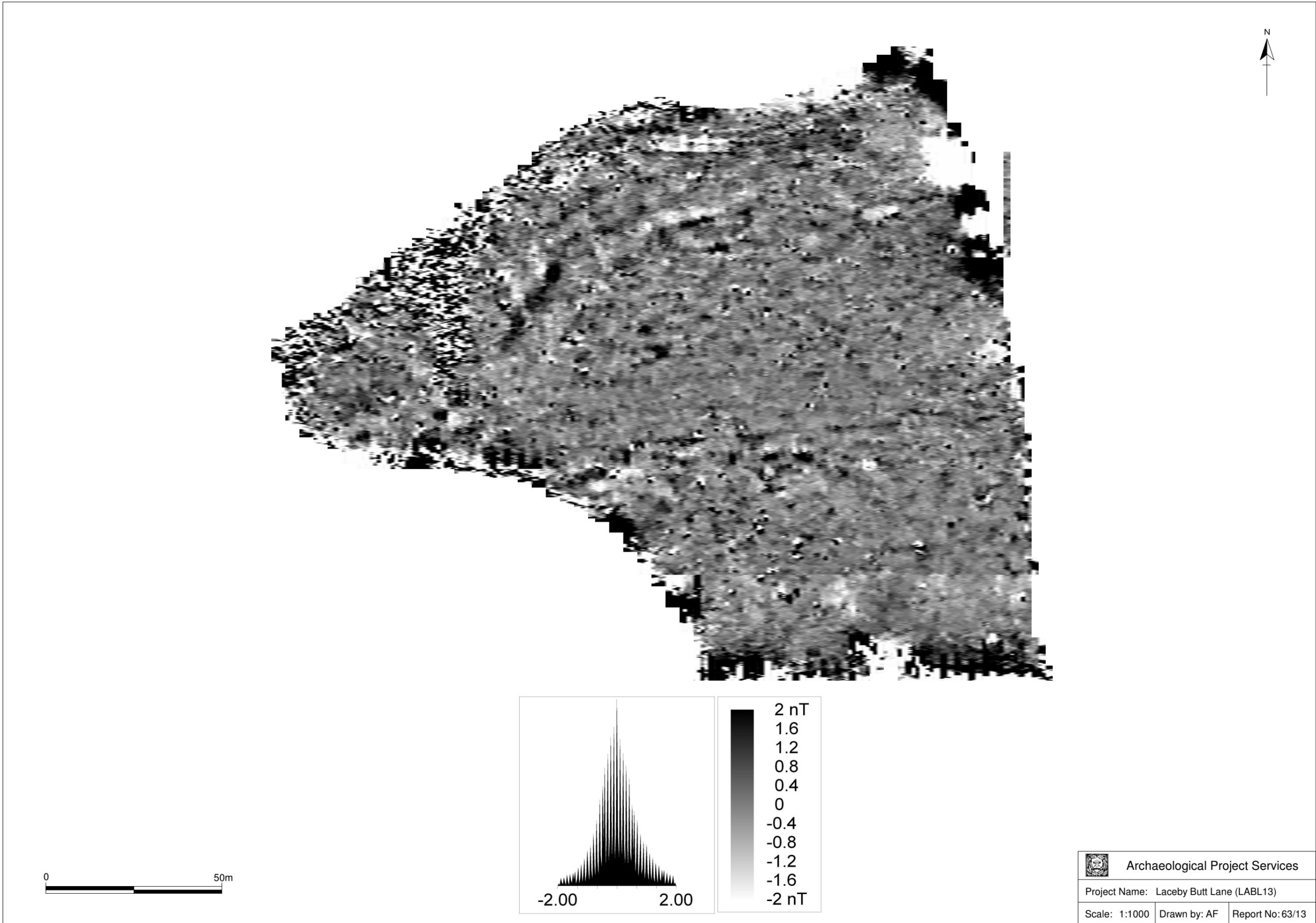


Figure 9 - Processed data greyscale plot: Area 2

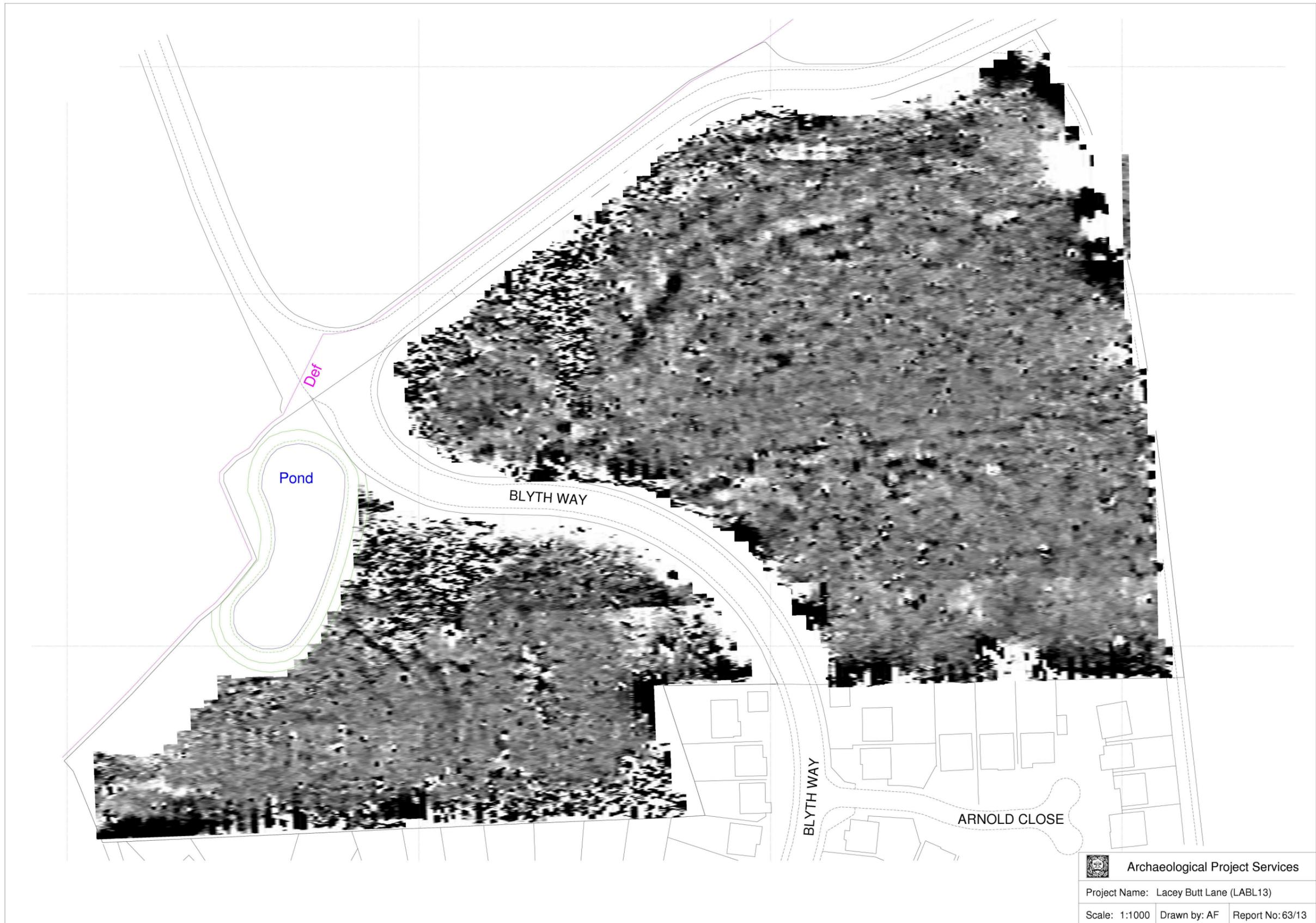


Figure 10 - Processed data greyscale plot overlain on base map: Areas 1 & 2

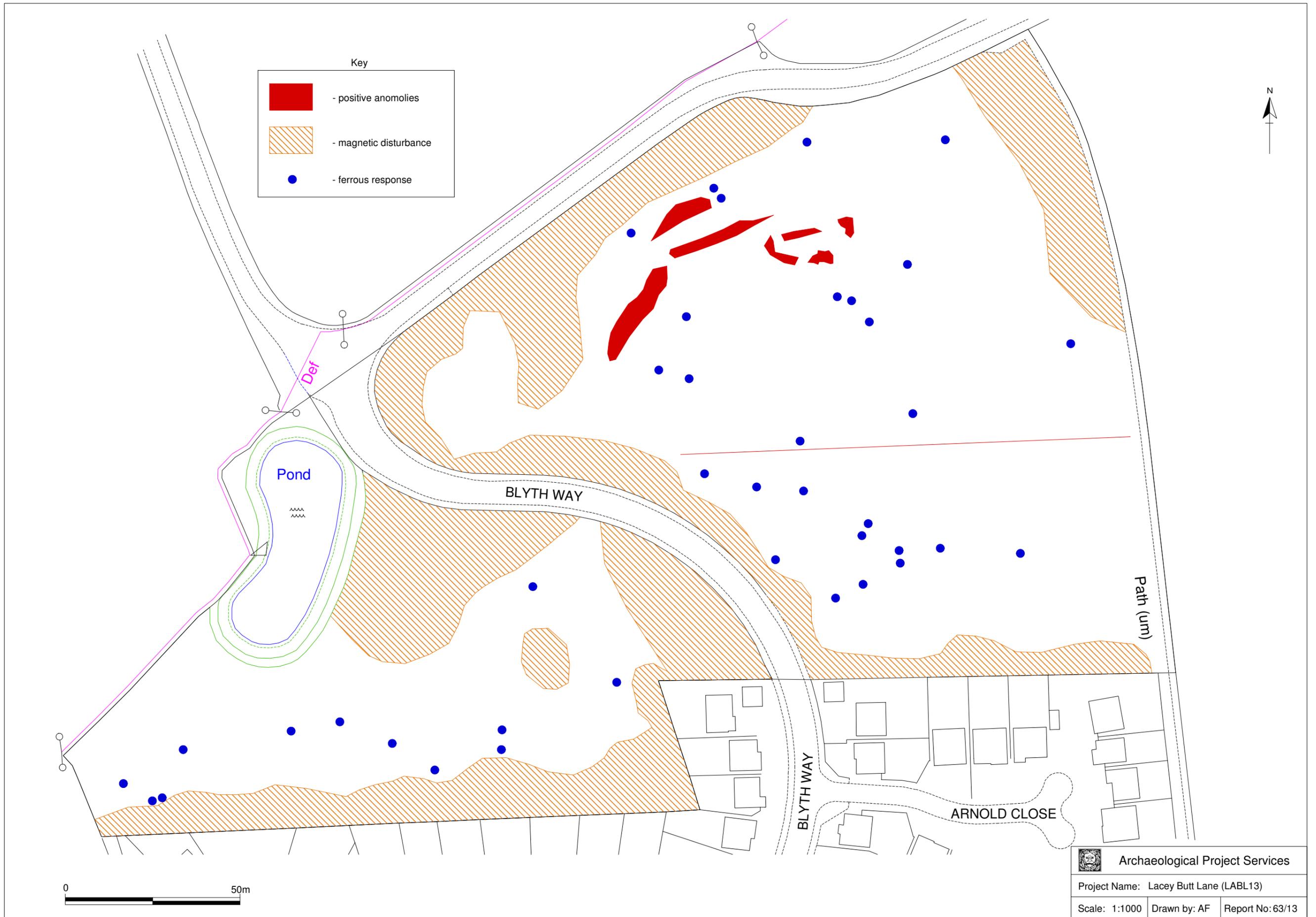


Figure 11 - Interpretative plot: Areas 1 & 2

Appendix 1

THE ARCHIVE

The archive consists of:

- 2 Daily record sheets
- 1 Report text and illustrations
- Digital data

| | | | |
|--|--|--|---|
| File names | L1-01.xgd L1-02.xgd L1-03.xgd L1-04.xgd L1-05.xgd L1-06.xgd L1-07.xgd L1-08.xgd L1-09.xgd L1-10.xgd L1-11.xgd L1-12.xgd L1-13.xgd L1-14.xgd L1-15.xgd L1-16.xgd L1-17.xgd L1-18.xgd L1-19.xgd L1-20.xgd | L2-01.xgd L2-02.xgd L2-03.xgd L2-04.xgd L2-05.xgd L2-06.xgd L2-07.xgd L2-08.xgd L2-09.xgd L2-10.xgd L2-11.xgd L2-12.xgd L2-13.xgd L2-14.xgd L2-15.xgd L2-16.xgd L2-17.xgd L2-18.xgd | Labl13-01.xgd Labl13-02.xgd Labl13-03.xgd Labl13-04.xgd Labl13-05.xgd Labl13-06.xgd Labl13-07.xgd Labl13-08.xgd Labl13-09.xgd Labl13-10.xgd Labl13-11.xgd Labl13-12.xgd Labl13-13.xgd Labl13-14.xgd Labl13-15.xgd Labl13-16.xgd Labl13-17.xgd Labl13c1.xcp Labl13c2.xcp |
| Explanation of codes used in file names | xgd files are magnetometer grids, named with site code and number in the order surveyed. xcp files are composites containing record of all the data and processes used to produce the end product | | |
| Description of file formats | All files are in plain text xml format with header data defining survey and processing parameters | | |
| List of codes used in files | D indicates a "dummy" value within the composite data | | |
| Hardware, software and operating systems | ArcheoSurveyor 2.5.15 running under Windows 7 | | |
| Date of last modification | 16/05/13 | | |
| Indications of known areas of weakness in data | | | |

All primary records are currently kept at:

Archaeological Project Services, The Old School, Cameron Street, Heckington, Sleaford, Lincolnshire NG34 9RW

The ultimate destination of the project archive is:

North East Lincolnshire Museum Service

Archive Number: 2013.021

Site Code: LABL13

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OASIS ID: archaeol1-154809

Project details

| | |
|--|--|
| Project name | LAND AT BUTT LANE, LACEBY, NORTH EAST LINCOLNSHIRE |
| Short description of the project | Detailed magnetic gradiometer survey was undertaken for Larkfleet Homes on land at Butt Lane, Laceby, North East Lincolnshire. Magnetometer survey identified few anomalies of potential archaeological origin. A small cluster of vaguely linear and discrete positive anomalies occurred towards the northern boundary of survey area 2. These may represent cut features but no clear pattern is evident and little more can be said on the basis of form alone. It is suggested that these probably represent changes in the natural geology rather than archaeological features |
| Project dates | Start: 14-05-2013 End: 15-05-2013 |
| Previous/future work | Not known / Not known |
| Any associated project reference codes | LABL13 - Sitecode |
| Type of project | Field evaluation |
| Site status | None |
| Current Land use | Grassland Heathland 3 - Disturbed |
| Monument type | NONE None |
| Significant Finds | NONE None |
| Methods & techniques | "Geophysical Survey" |
| Development type | Rural residential |
| Prompt | National Planning Policy Framework - NPPF |
| Position in the planning process | Pre-application |
| Solid geology (other) | Flamborough chalk |
| Drift geology | GLACIAL SAND AND GRAVEL |
| Techniques | Magnetometry |

Project location

Country England
 Site location NORTH EAST LINCOLNSHIRE NORTH EAST LINCOLNSHIRE LACEBY LAND AT BUTT LANE
 Study area 4.00 Hectares
 Site coordinates TA 2100 0710 53 0 53 32 46 N 000 10 24 W Point

Project creators

Name of Organisation Archaeological Project Services
 Project brief originator Local Authority Archaeologist and/or Planning Authority/advisory body
 Project design originator Gary Taylor
 Project director/manager Gary Taylor
 Project supervisor Andrew Failes
 Type of sponsor/funding body Developer

Project archives

Physical Archive Exists? No
 Digital Archive recipient NE Lincs Museums Service
 Digital Archive ID 2013.021
 Digital Contents "Survey"
 Digital Media available "Geophysics","Survey"
 Paper Archive recipient NE Lincs Museums Service
 Paper Archive ID 2013.021
 Paper Contents "Survey"
 Paper Media available "Correspondence","Map","Report","Survey "

Project bibliography 1

Publication type Grey literature (unpublished document/manuscript)
 Title LAND AT BUTT LANE, LACEBY, NORTH EAST LINCOLNSHIRE (LABL13) GEOPHYSICAL SURVEY
 Author(s)/Editor(s) FAILES, A.

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