Substrata
Archaeological Geophysical Surveyors

An archaeological gradiometer survey

Land south of Le Neubourg Way Gillingham, Dorset

Centred on NGR 380466,126105

Report: 150530

30 May 2015

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Accompanying CD-ROM

Report ..... Adobe PDF format
Copies of report figures ..... Adobe PDF format
Raw and processed grid & composite files ..... DW Consulting TerraSurveyor 3 formats
Minimal processing data plots and metadata ..... DW Consulting TerraSurveyor 3 formats
Final data processing data plots and metadata ..... DW Consulting TerraSurveyor 3 formats
GIS project, shape files and classification schema
- GIS project ..... Manifold 8 '.map' file
- GIS shape files ..... ESRI standard
- GIS classification schema ..... Adobe PDF format

AutoCAD version of the survey interpretation ..... AutoCAD DXF

Website: substrata.co.uk

For an overview of Substrata, our archaeological geophysical surveying techniques and the results we obtain.

1 Survey description and summary

1.1 Survey

Type:	twin-sensor fluxgate gradiometer
Date:	between 8 and 15 May 2015
Area:	15 ha
Project Manager:	Ross Dean BSc MSc MA MCIfA
Lead surveyor:	Nick Crabb, AC Archaeology Ltd

1.2 Client

AC Archaeology Ltd, Manor Farm Stables, Chicklade, Hindon, Nr. Salisbury, Wiltshire SP3 5SU

1.3 Location

Site:	Land south of Le Neubourg Way
Village & Civil Parish:	Gillingham
District:	North Dorset
County:	Dorset
Nearest Postcode:	SP8 4XE
NGR:	ST 804 261
Ordnance Survey E/N:	380466,126105 (point)

1.4 Archive

OASIS number:	substrat1-212534
Archive:	At the time of writing, the archive of this survey will be held by Substrata and will be deposited with the ADS in due course.

1.5 Introduction

This report was commissioned by AC Archaeology Ltd on behalf of clients in order to help establish the cultural heritage and archaeological implications of a proposal for the construction of housing and associated infrastructure at the above site. The location of the proposed application area is shown in Figure 1.

1.6 Summary

The magnetic contrast, although affected by numerous high magnetic responses resulting from services passing across the area, was sufficient to be able to differentiate anomalies representing possible archaeological features. Four magnetic anomaly groups were identified as possibly representing archaeological deposits or features. Two of these are likely to represent two convergent ditches recorded by AC Archaeology during analysis of aerial photographs as part of this programme of work. One of these two coincides with a field boundary recorded on the 1841 Gillingham Tithe map but not on later maps. A further group represent Post-medieval or Modern field drains. The final group may represent a former routeway or modern vehicle tracks.

2 Survey aims and objectives

2.1 Aims

The main aim of the geophysical survey was to establish the presence or absence, extent and character of any archaeological features and deposits within the site. The results of the survey and any subsequent trial trenching will be reviewed and used to inform any subsequent mitigation.

The site specific aims are to:

- Establish the presence/absence of archaeological remains;
- Determine the extent, condition, nature, character, date and significance of any archaeological remains encountered;
- Establish the nature of activity on the site;
- Identify any deposits or structures that may relate to the occupation or use of the site;

- Provide further information on the archaeology of the site from any archaeological remains encountered.

2.2 Survey objectives

1. Complete a gradiometer survey across agreed parts of the application area.
2. Identify any magnetic anomalies that may be related to archaeological deposits, structures or artefacts.
3. Within the limits of the techniques and dataset, archaeologically characterise any such anomalies or patterns of anomalies.
4. Accurately record the location of the identified anomalies.
5. Produce a report based on the survey that is sufficiently detailed to inform any subsequent development on the site about the location and possible archaeological character of the recorded anomalies.

3 Standards

The standards used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and English Heritage (2010). The codes of approved practice that were followed are those of the Chartered Institute for Archaeologists (2014b) and Archaeology Data Service/Digital Antiquity Guides (undated). The document text was written using the house style of the Chartered Institute for Archaeologists (Chartered Institute for Archaeologists, undated).

4 Site description

The superficial geology of the area generally comprises Head deposits (clay, silt sand and gravel) overlying a solid geology of mudstone of the Kimmeridge Clay Formation (British Geological Survey, undated).

The application area lies at between 70 and 75m above Ordnance Datum (mOD). The proposed development area currently comprises four separate land parcels totalling approximately 15 hectares in area (Figure 1).

5 Archaeological background

The following is a short summary of information obtained an Historical Environmental Assessment completed by AC Archaeology Ltd in support of the application. The assessment of the baseline conditions included all designated and non-designated heritage assets within 1km of the application area (Cottam, 2014).

There are no designated historical environment assets within the application area and one non-designated asset. This comprises convergent linear earthworks, probably former field boundaries recorded by AC Archaeology during their assessment. It is likely that magnetic anomaly groups 1 and 2 in Figure 2 represent these ditches.

There are thirty-five designated assets within the broader study area of the Assessment, comprising two Conservation Areas and 33 Grade II Listed Buildings. A number of the hedgerows within, and forming boundaries to, the application area are considered to be historic hedgerows. A further 25 non-designated assets are recorded within the broader study area. These comprise a significant Romano-British settlement to the west, find spots, a Medieval settlement to the north and a number of extant or former Post-medieval structures.

The principal archaeological interest in the study area is the medieval suburb of Gillingham which, until recently, survived as an area of earthworks. Excavations undertaken in advance of development recorded a large medieval farm complex and a number of associated structures and boundaries. Two Early Medieval smelting ovens were also recorded close to the northern boundary of the application area. It is considered that there is some potential for deposits of this date to survive within the application area.

6 Results, discussion and conclusions

This survey was designed to record magnetic anomalies. The anomalies themselves cannot be regarded as actual archaeological features and the dimensions of the anomalies shown do not represent the dimensions of any associated archaeological features. The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to archaeological deposits and structures.

The terms 'archaeological features' and 'archaeological deposits' refer to any artefacts, material deposits or disturbance of natural deposits thought to be the result of human activity and not undertaken as recent land maintenance or farming.

The reader is referred to section 7.

6.1 Results

Figure 2 shows the interpretation of the survey data. It includes the anomaly groups identified as relating to archaeological deposits along with their numbers. Table 1 is an extract of the detailed analysis of the survey data which is provided in the attribute tables of the GIS project on the accompanying CD-ROM and in the project archive.

Figure 2 and Table 1 comprise the analysis of the survey data. Plots of the processed data are provided in Figures 3 and 4.

6.2 Discussion

6.2.1 General points

Not all anomalies or anomaly groups identified in Table 1 are necessarily discussed below. All identified anomaly groups are recorded in the GIS project on the accompanying CD-ROM.

The edges of the survey area and areas where recent services cross the site are highly disrupted magnetically and this has inevitably cause some false readings in the data set both before and after data processing.

Anomalies thought to relate to natural features were not mapped.

Recent man-made objects such as manholes, water management equipment, drains, cables and other services were mapped where they comprised significant magnetic responses across the dataset that needed clarification. If mapped, they are listed in Table 1 but are not discussed below.

There are numerous anomaly groups that could be interpreted as relating to large postholes or pits although most will have natural origins. Anomalies of this sort are only mapped as potential archaeology if they are clustered in groups or otherwise form recognisable patterns.

Data collection along the survey area edges was restricted as shown in Figures 3 and 4 due to the presence of magnetic materials in and adjacent to field and roadside boundaries. Strong magnetic responses mapped close to the field and roadside boundaries are likely to relate to these materials except where otherwise indicated in Figure 2.

6.2.2 Data relating to historical maps and other records

Magnetic anomaly groups **1 and 2** coincide with two convergent ditches recorded by AC Archaeology Ltd during an analysis of aerial photographs (Cottam, 2014). Group 2 follows the line of a stream and former field boundary recorded on the 1841 Gillingham Tithe map but not on later maps.

6.2.3 Data with no previous archaeological provenance
Group **3** exhibit a pattern typical of Post-medieval or Modern field drains.

Group 4 may represent a former track or routeway but may equally reflect recent vehicle tracks.

6.3 Conclusions
The magnetic contrast, although affected by numerous high magnetic responses resulting from services passing across the area, was sufficient to be able to differentiate anomalies representing possible archaeological features.

Four magnetic anomaly groups were identified as possibly representing archaeological deposits or features. Two of these are likely to represent two convergent ditches recorded by AC Archaeology during analysis of aerial photographs as part of this programme of work. One of these two coincides with a field boundary recorded on the 1841 Gillingham Tithe map but not on later maps. A further group represent Post-medieval or Modern field drains. The final group may represent a former routeway or modern vehicle tracks.

7 Disclaimer and copyright

The description and discussion of the results presented in this report are the authors, based on his interpretation of the survey data. Every effort has been made to provide accurate descriptions and interpretations of the geophysical data set. The nature of archaeological geophysical surveying is such that interpretations based on geophysical data, while informative, can only be provisional. Geophysical surveys are a cost-effective early step in the multi-phase process that is archaeology. The evaluation programme of which this survey is part may also be informed by other archaeological assessment work and analysis. It must be presumed that more archaeological features will be evaluated than those specified in this report.

8 Acknowledgements

Substrata would like to thank Peter Cox of AC Archaeology Ltd for commissioning us to complete this survey.

9 Bibliography

Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology [Online], Available: http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc [May 2015]

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Chartered Institute for Archaeologists (undated) *IfA house style*, [Online], Available: http://www.archaeologists.net/sites/default/files/node-files/ifa_house_style.pdf [May 2015]

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Cottam, S (2014) *PROPOSED DEVELOPMENT ON LAND SOUTH OF LE NEUBOURG WAY, GILLINGHAM, DORSET Centred on NGR 380466, 126105 Historic Environment Assessment*, AC Archaeology Ltd unpublished document ACW664/1/0

Dean, R. (2015) *A gradiometer survey method statement, Land south of Le Neubourg Way, Gillingham, Dorset* Substrata unpublished document

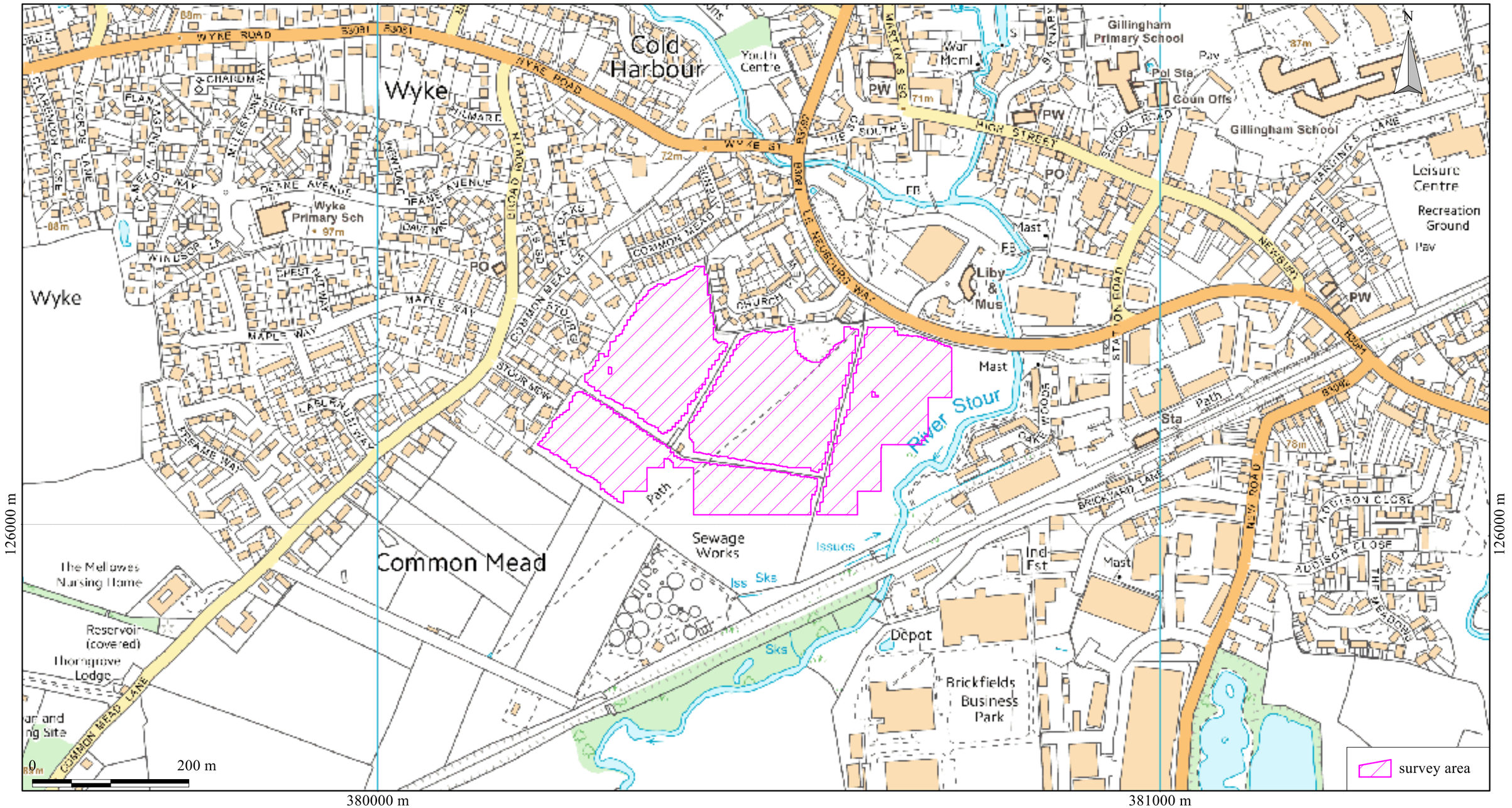
English Heritage (2010) *Geophysical Survey in Archaeological Field Evaluation,* [Online], Available: https://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf/

Appendix 1 Analysis table and supporting plots

General Guidance

The anomalies represented in the survey plots provided in this appendix are magnetic anomalies. The apparent size of such anomalies and anomaly patterns are unlikely to correspond exactly with the dimensions of any associated archaeological features.

A rough rule for interpreting magnetic anomalies is that the width of an anomaly at half its maximum reading is equal to the width of the buried feature, or its depth if this is greater (Clark, 2000: 83). Caution must be applied when using this rule as it depends on the anomalies being clearly identifiable and distinct from adjacent anomalies. In northern latitudes the position of the maximum of a magnetic anomaly will be displaced slightly to the south of any associated physical feature.



British Grid
centre X: 380483.24 m, centre Y: 126162.31 m

Scale: 1:5000 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 1: location map

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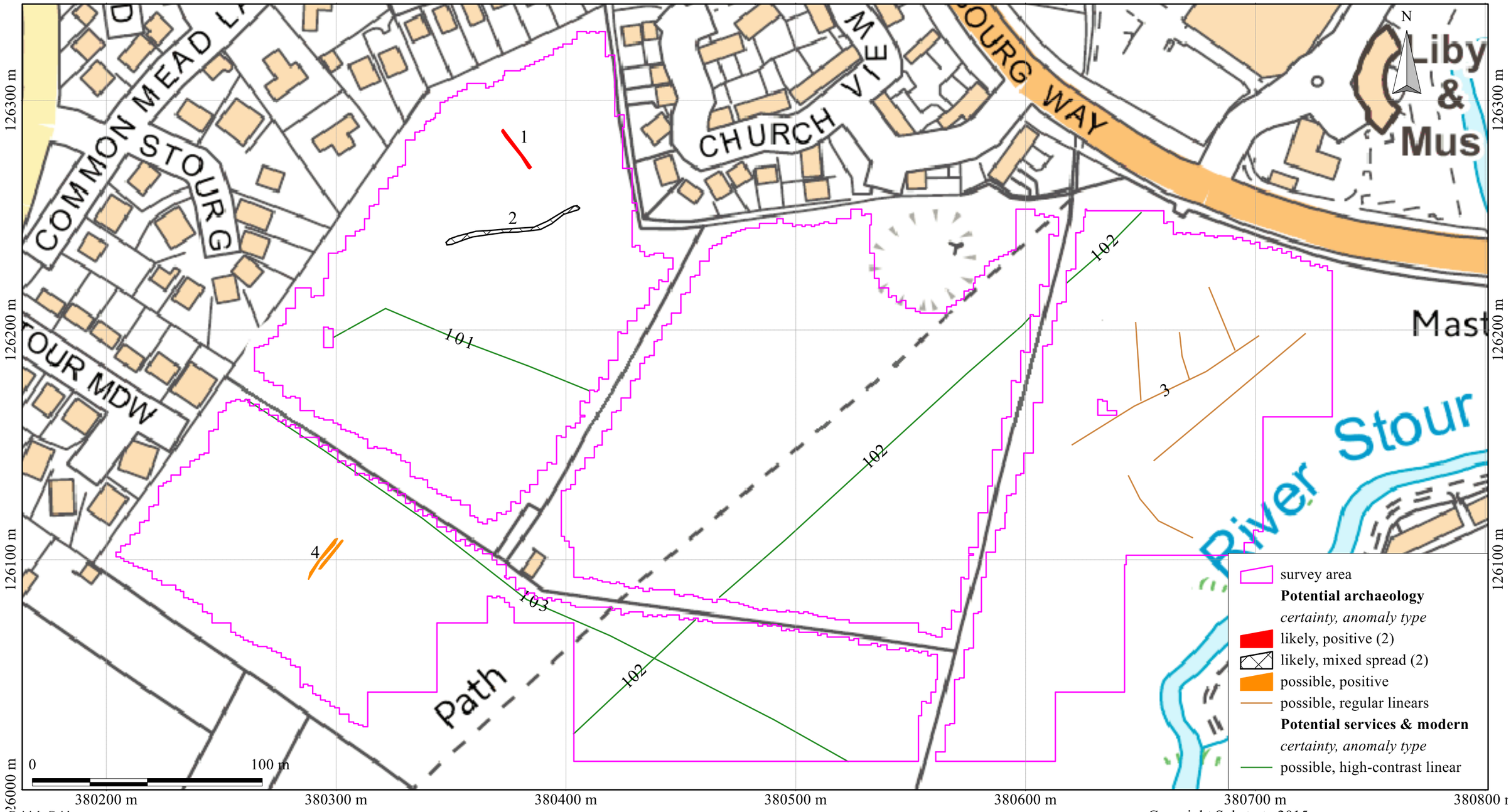

British Grid
centre X: 380482.34 m, centre Y: 126170.85 m

Scale: 1:1700 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:
1. All interpretations are provisional and represent potential archaeological deposits.
2. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
3. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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Figure 2: survey interpretation

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anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1		likely, positive	linear		the group coincides with one of two convergent ditches recorded by AC Archaeology	AC document ACW664/1/0
2		likely, mixed spread	curvilinear	field boundary	anomaly group represents a field boundary following the line of a stream mapped on the 1841 Tithe map but not on the Ordnance Survey 1st edition map of 1886; the group coincides with one of two convergent ditches recorded by AC Archaeology	1841 Gillingham Tithe map,1886 OS 1:10560 map, AC document ACW664/1/0
3		possible, mixed linear	multilinear	field drains		
4		possible, positive	parallel linear		anomaly group may represent a former trackway but is equally likely to reflect modern vehicle tracks	
101		possible, high contrast linear		ferrous cable, pipe or drain		
102		possible, high contrast linear		ferrous cable, pipe or drain		
103		possible, high contrast linear		ferrous cable, pipe or drain		

Table 1: data analysis

British Grid
centre X: 380482.34 m, centre Y: 126170.85 m

Scale: 1:1700 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 3: shade plot of processed data

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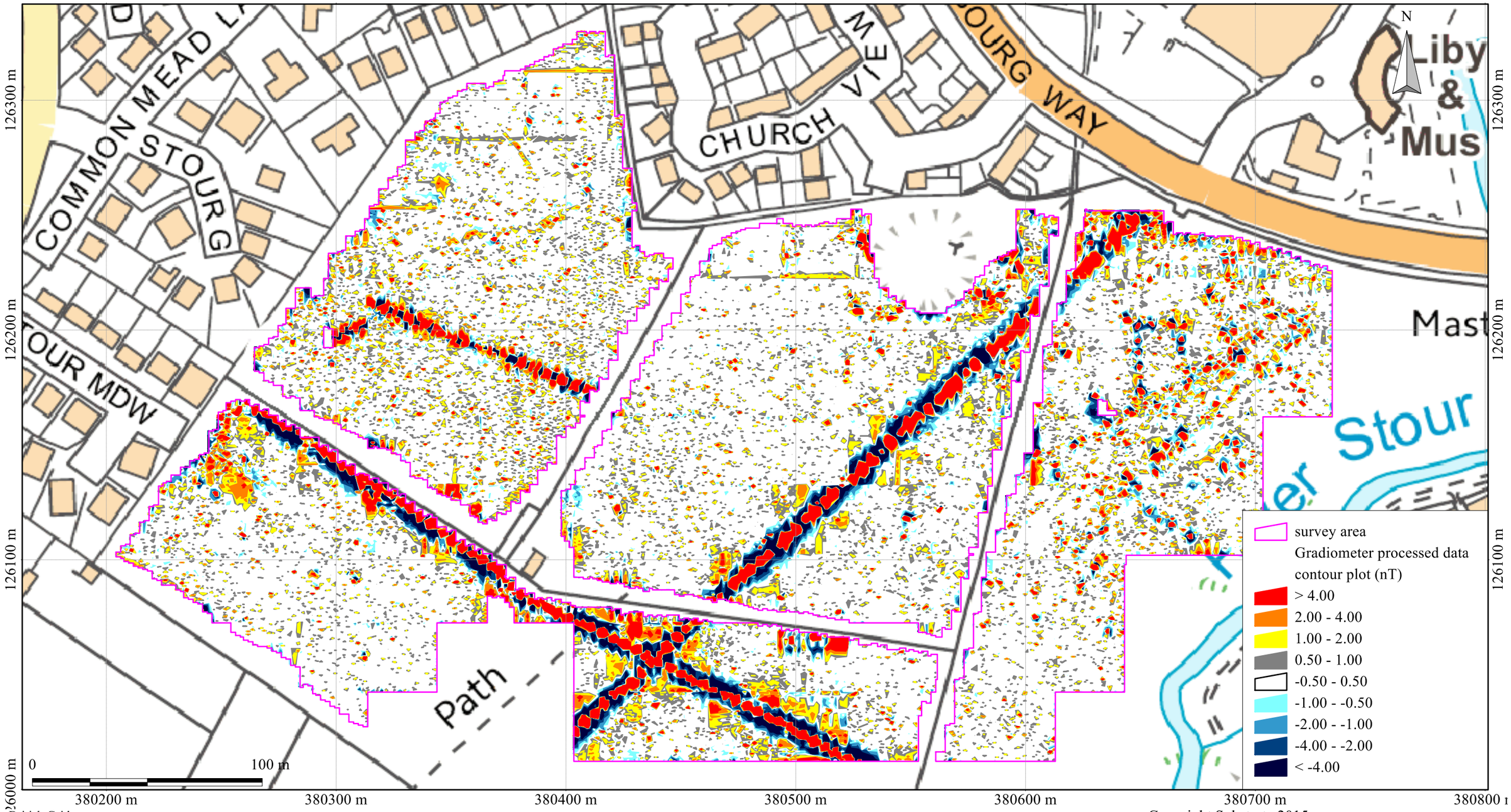

British Grid
centre X: 380482.34 m, centre Y: 126170.85 m

Scale: 1:1700 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 4: contour plot of processed data

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Appendix 2 Methodology Summary

<table>
<tr><th colspan="2">Table 2: methodology summary</th></tr>
<tr><td colspan="2">Documents
Survey methodology statement: Dean (2015)</td></tr>
<tr><td colspan="2">Methodology
1. The work was undertaken in accordance with the survey methodology statement. The geophysical (gradiometer) survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service/ Digital Antiquity Guides (undated).
2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system.
3. Data processing was undertaken using appropriate software, with all anomalies being digitised and geo-referenced. The final report included a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology.</td></tr>
<tr><td colspan="2">Grid
Method of Fixing: DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates.
Composition: 30m by 30m grids
Recording: Geo-referenced and recorded using digital map tiles.
DGPS used: Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra Explorer 7 as the survey control program.</td></tr>
<tr><td>Equipment
Instrument: Bartington Instruments grad601-2
Firmware: version 6.1</td><td>Data Capture
Sample Interval: 0.25-metres
Traverse Interval: 1 metre
Traverse Method: zigzag
Traverse Orientation: GN</td></tr>
<tr><td colspan="2">Data Processing, Analysis and Presentation Software
IntelliCAD Technology Consortium IntelliCAD 7.2
DW Consulting TerraSurveyor3
Manifold System 8 GIS
Microsoft Corp. Office Excel 2013
Microsoft Corp. Office Publisher 2013
Adobe Systems Inc Adobe Acrobat 9 Pro Extended</td></tr>
</table>

Appendix 3 Data processing

Table 3: gradiometer survey - processed data metadata
SITE Instrument Type: Bartington Grad 601 Units: nT Direction of 1st Traverse: 0 deg Collection Method: ZigZag Sensors: 2 @ 1.00 m spacing. Dummy Value: 32702 PROGRAM Name: TerraSurveyor Version: 3.0.25.0
Stats Max: 27.79 Min: -22.03 Std Dev: 2.60 Mean: 0.05 Median: 0.00 Processes: 18 1 Base Layer 2 Clip at 1.00 SD 3 De Stagger: Grids: All Mode: Both By: -2 intervals 4 DeStripe Median Traverse: Grids: All 5 DeStripe Median Traverse: Grids: All (vertical) 6 DeSlope (Area: Top 300, Left 0, Bottom 329, Right 119) using Horz Polynomial 7 DeSlope (Area: Top 240, Left 120, Bottom 269, Right 239) using Horz Polynomial 8 DeSlope (Area: Top 270, Left 840, Bottom 299, Right 959) using Horz Polynomial 9 DeSlope (Area: Top 300, Left 840, Bottom 329, Right 959) using Horz Polynomial 10 Range Match (Area: Top 270, Left 840, Bottom 299, Right 959) to Left edge 11 DeSlope (Area: Top 150, Left 1080, Bottom 179, Right 1199) using Horz Polynomial 12 DeSlope (Area: Top 120, Left 960, Bottom 149, Right 1079) using Horz Polynomial 13 DeSlope (Area: Top 180, Left 1200, Bottom 209, Right 1319) using Horz Polynomial 14 DeSlope (Area: Top 210, Left 1200, Bottom 239, Right 1319) using Horz Polynomial 15 DeSlope (Area: Top 180, Left 1080, Bottom 209, Right 1199) using Horz Polynomial 16 Range Match (Area: Top 150, Left 1080, Bottom 209, Right 1199) to Left edge 17 DeStripe Median Traverse: Grids: g (20)+g (51).xgd 18 Range Match (Area: Top 60, Left 120, Bottom 89, Right 239) to Bottom edge Note: converting the gradiometer data into ESRI GIS files imposed an x=y interpolation on the entire dataset