

Thorns Geophysical Survey April 2016

Bartington 601-2 Magnetic Gradiometer Data



Introduction

The Swaledale and Arkengarthdale Archaeology Group (SWAAG) has carried out a geophysical survey of Thorns deserted settlement, near Ribbleshead, as part of the 'Stories in Stone', a four-year programme of community and heritage projects that has been developed by the Ingleborough Dales Landscape Partnership with funding from the Heritage Lottery Fund. In addition a GNSS survey of a number of ruined buildings and walls in one of the areas was carried out using a ProMark PM120 GPS/GLONASS receiver.

The surveys were carried out on April 19th 2016. This report includes the survey results that may be used with accreditation; within the 'Stories in Stone' project reports and presentations.

Copyright and Archive

1. All reports produced by SWAAG (swaag.org) are ©swaag.org but can be freely used with accreditation.
All reports will be made available on swaag.org and through the OASIS project on the Archaeology Data Service.
2. The Yorkshire Dales National Park Authority must be credited when their OS 1:10,000 map has been used; using the text: ©Crown copyright and database rights 2011 Ordnance Survey 1000237401, kindly supplied by the North Yorkshire Dales National Park Authority.
3. The Google Earth image can be used but the 'Google earth and the secondary text' must remain as part of the image.
4. The LIDAR image is Published by Environment Agency and licensed under [Open Government Licence] Open Government Licence.

Location

Thorns is located to the south of the Ingleton to Hawes B6255 road, close to Ribbleshead and is on the Ribble Way footpath. The map, Figure 1, shows the location of survey grids in red, and the Google earth image, Figure 2, below is an aerial view of the survey area.

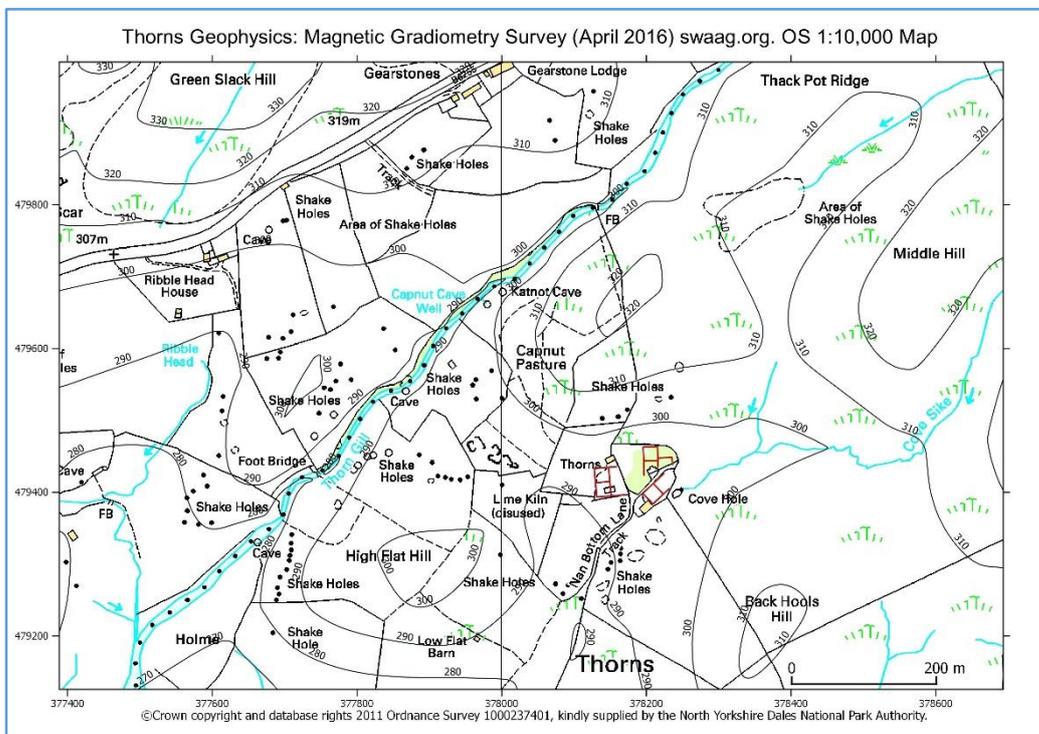


Figure 1



Figure 2

The Thorns settlement is located on limestone, the shallow soil is not ideal for a magnetic survey.

The Environmental Agency has included the Thorns area in their LIDAR aerial surveys. The Survey grids are outlined in red on the LIDAR image, Figure 3, below. The incident illumination is from 300° and 40° azimuth.

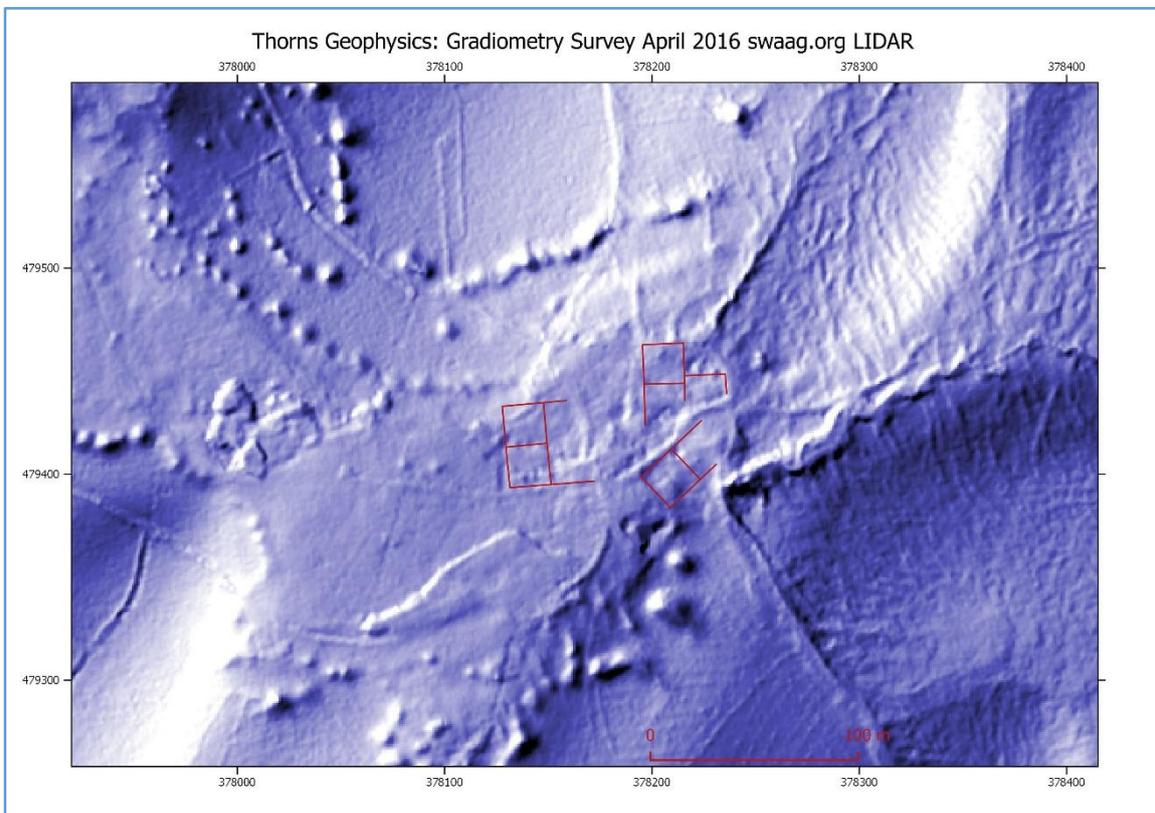


Figure 3

Geophysical Survey Method

The shallow soils ruled out using the RM85 Resistivity Meter, so only a magnetic survey using the Bartington 601-2 Gradiometer was carried out. The survey settings and post survey processing is listed in the accompanying metadata table.

Data processing was performed using TerraSurveyor Version: 3.0.29.1 and mapping using QGIS Version 2.12.3.

Coordinate System

Graphical Information Systems such as QGIS (qgis.org) use six-digit British National Grid coordinates. For example, Thorns is SD 78270 79394 which is equivalent to 378270 479394.

Magnetic Gradiometry Results

Three sites were surveyed at Thorns in small fields bounded by dry-stone walls. For each site the results are reported in three formats:

a) Figure 4, Greyscale image.

Metadata	
Filename:	Thorns-SPE-Processed2Composite.xcp
Instrument Type:	Grad 601 (Magnetometer)
Units:	nT
Direction of 1st Traverse:	90 deg
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	2047.5
Dimensions	
Grid Size:	20 m x 20 m
X Interval:	0.25 m
Y Interval:	1 m
Stats	
Max:	40.00
Min:	-30.00
Std Dev:	10.84
Mean:	4.67
Median:	3.41
Composite Area:	0.96 ha
Surveyed Area:	0.29835 ha
Processes: 2	
1	Base Layer
2	Clip from -30.00 to 40.00 nT

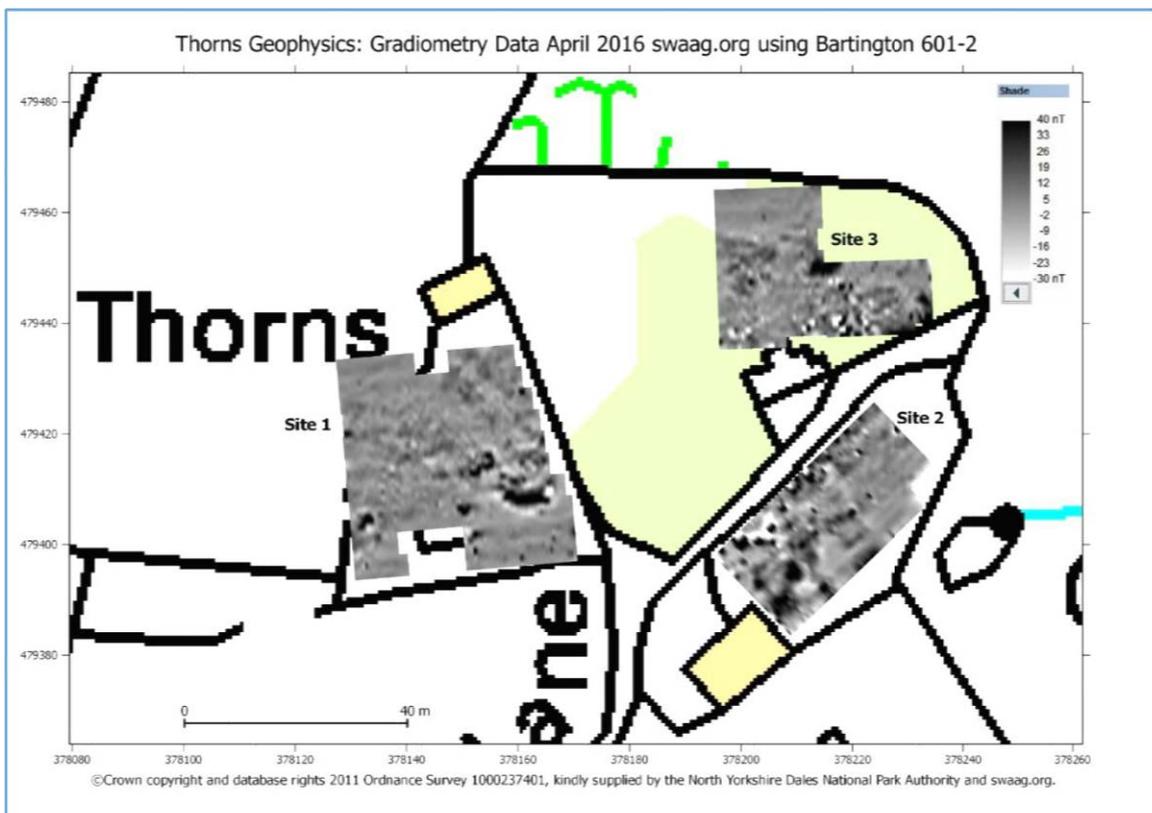


Figure 4

b) Figure 5, Greyscale image with very high results shown in red and very low results shown in blue.

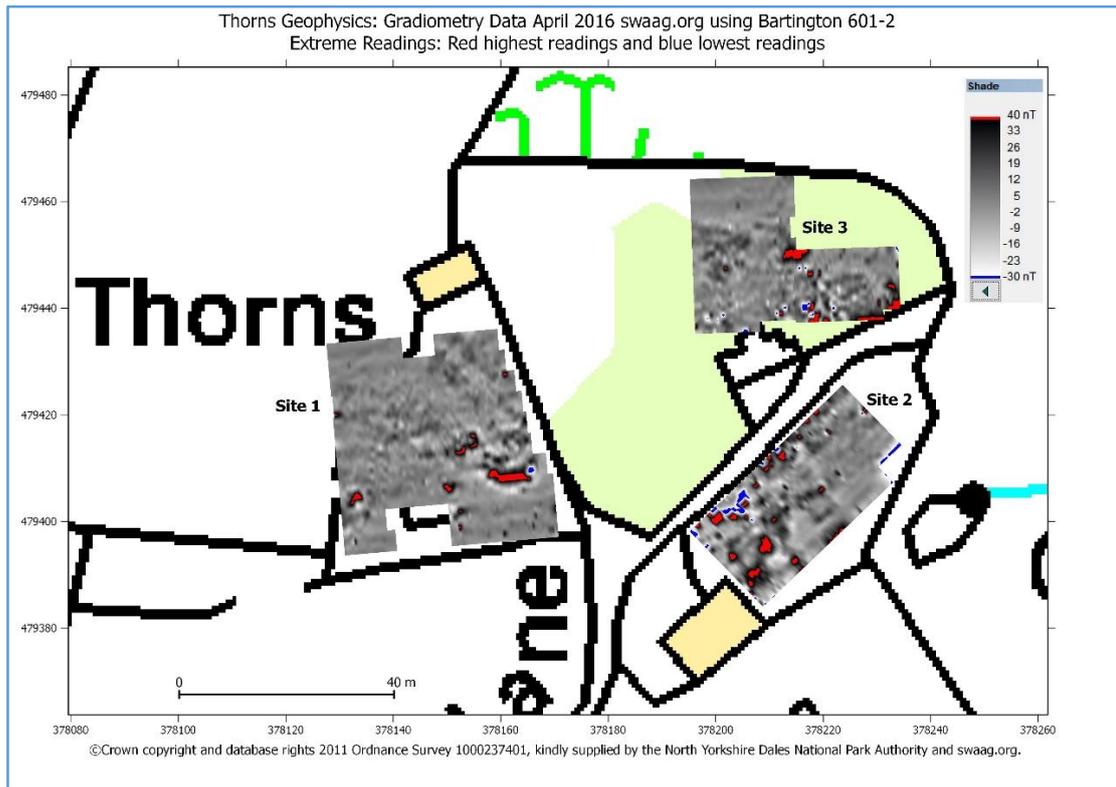


Figure 5

c) Figure 6, as for Figure 5 but with banded contours.

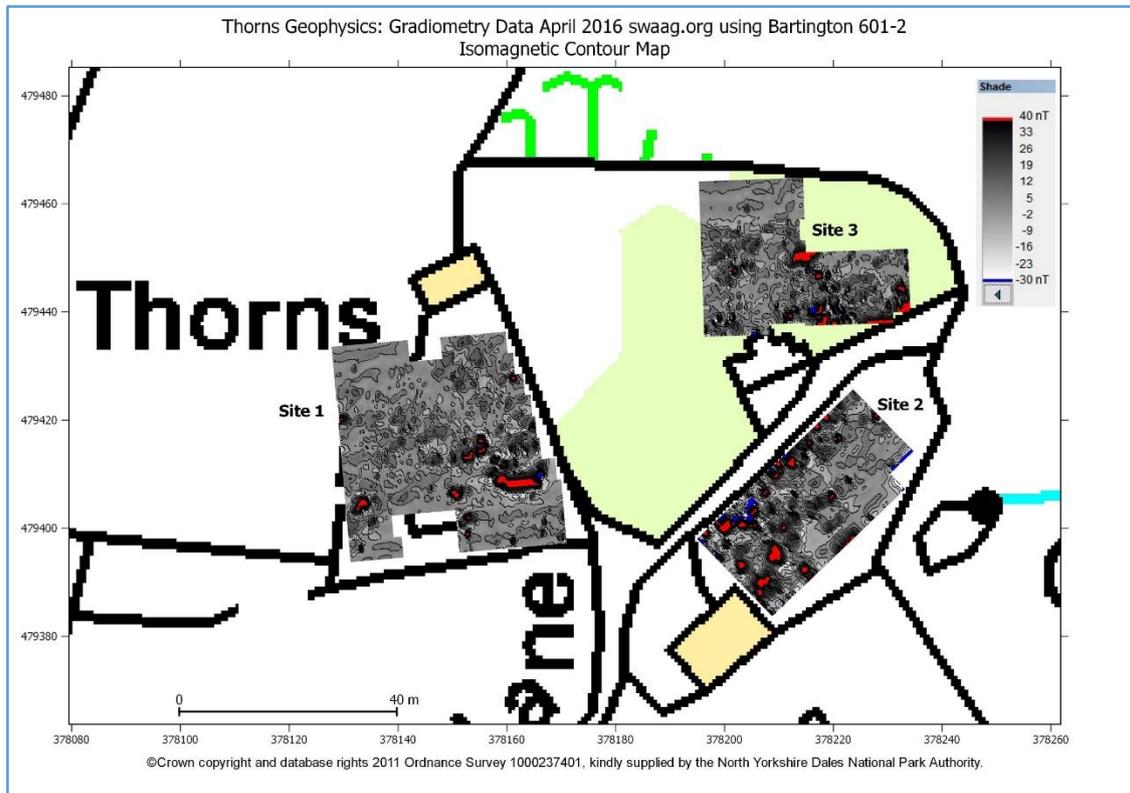


Figure 6

Stray ferrous or iron objects are commonly found scattered over modern fields. These show up as strong bipolar signals where you get a very high and a very low reading close together. In Figure 7, below, the ferrous bipolar signals are circled in red.

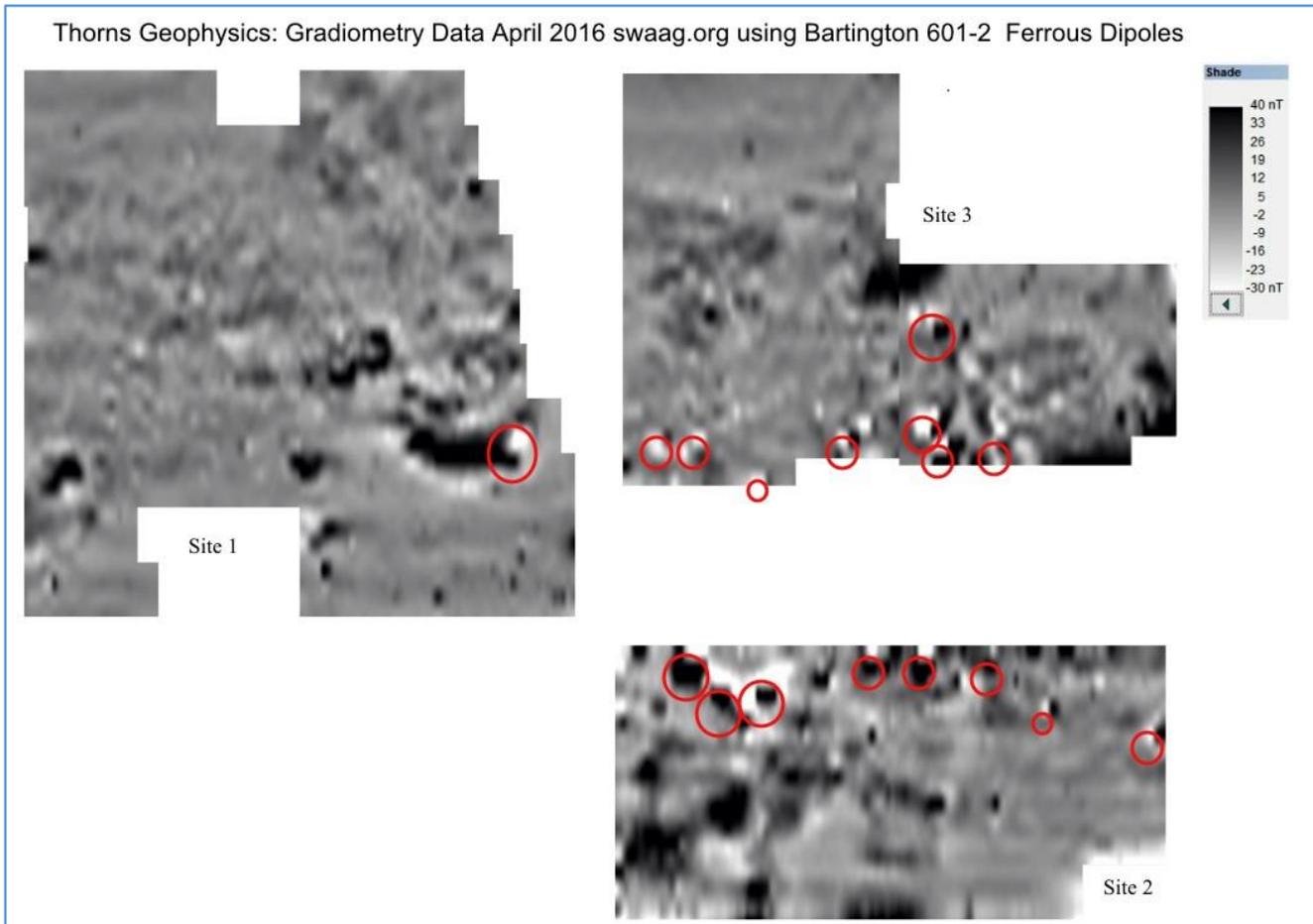


Figure 7

Most of the bipolar signals are close to dry-stone walls which may be due to wire placed to stop sheep jumping them; see Figure 8, below:



Figure 8

The general appearance of the magnetic data suggests that most of the features are geological. The thin soils reduce the chance of ditches or foundations being found. The most likely archaeological features to be identified would be areas where burning has taken place, such as: ovens, fires, kilns and metal working. In Figure 9, a series of likely areas of strong positive results have been identified with a **C**. The area **A** and perhaps **B** shows some short linear features which may be worth investigating to determine if they are geological or archaeological.

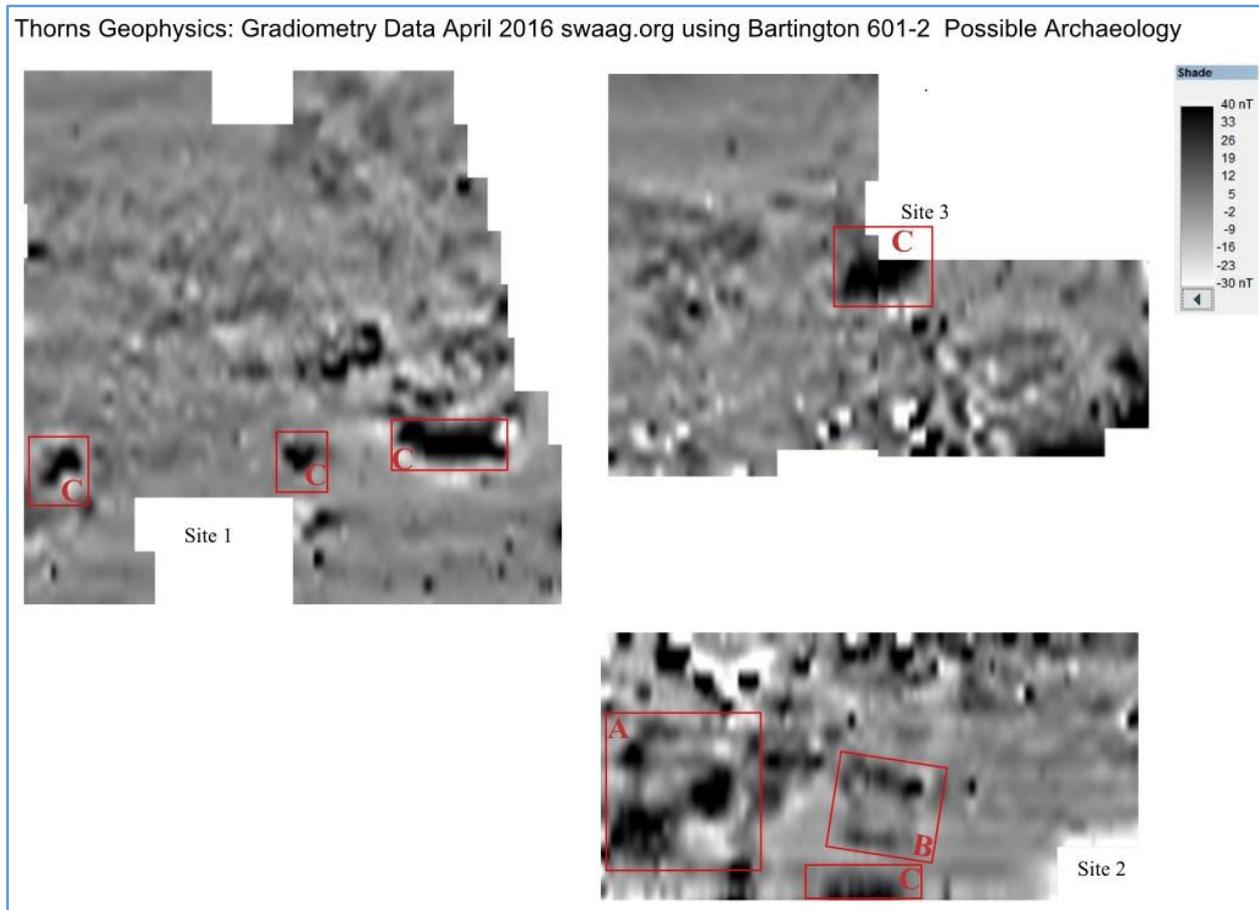


Figure 9

The results of the GNSS survey are shown overlaid. Figure 10 shows the outline of the boundary walls for areas 1 and 3 plus the selected topographic features. Figure 11 shows the same data as Figure 10 plus the outlines of the geophysical survey grids to allow a comparison between the geophysical data and the topographic features. Figures 12 and 13 show the data with a superimposed OS grid to help in the location of features. . Figure 14 shows the GNSS data plotted over the LIDAR image of the area.

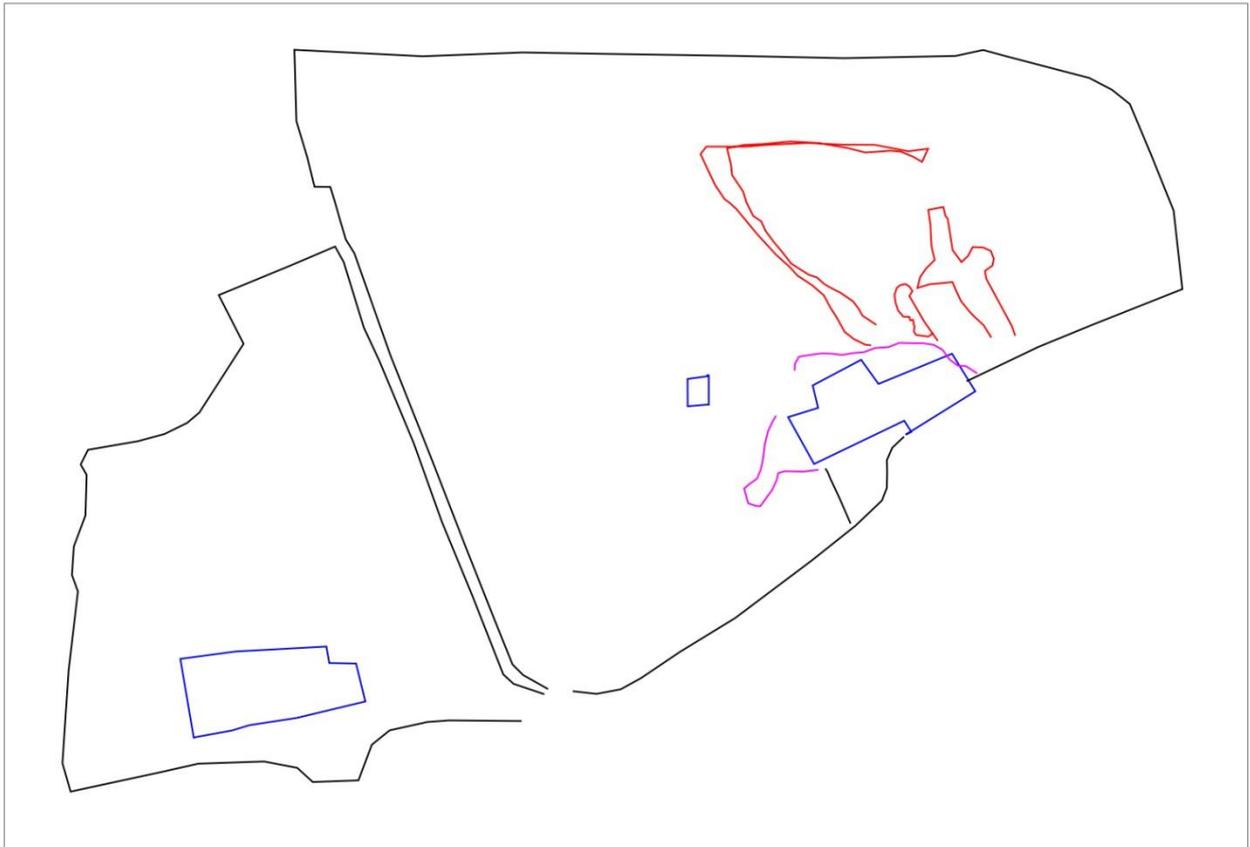


Figure 10, GNSS survey data

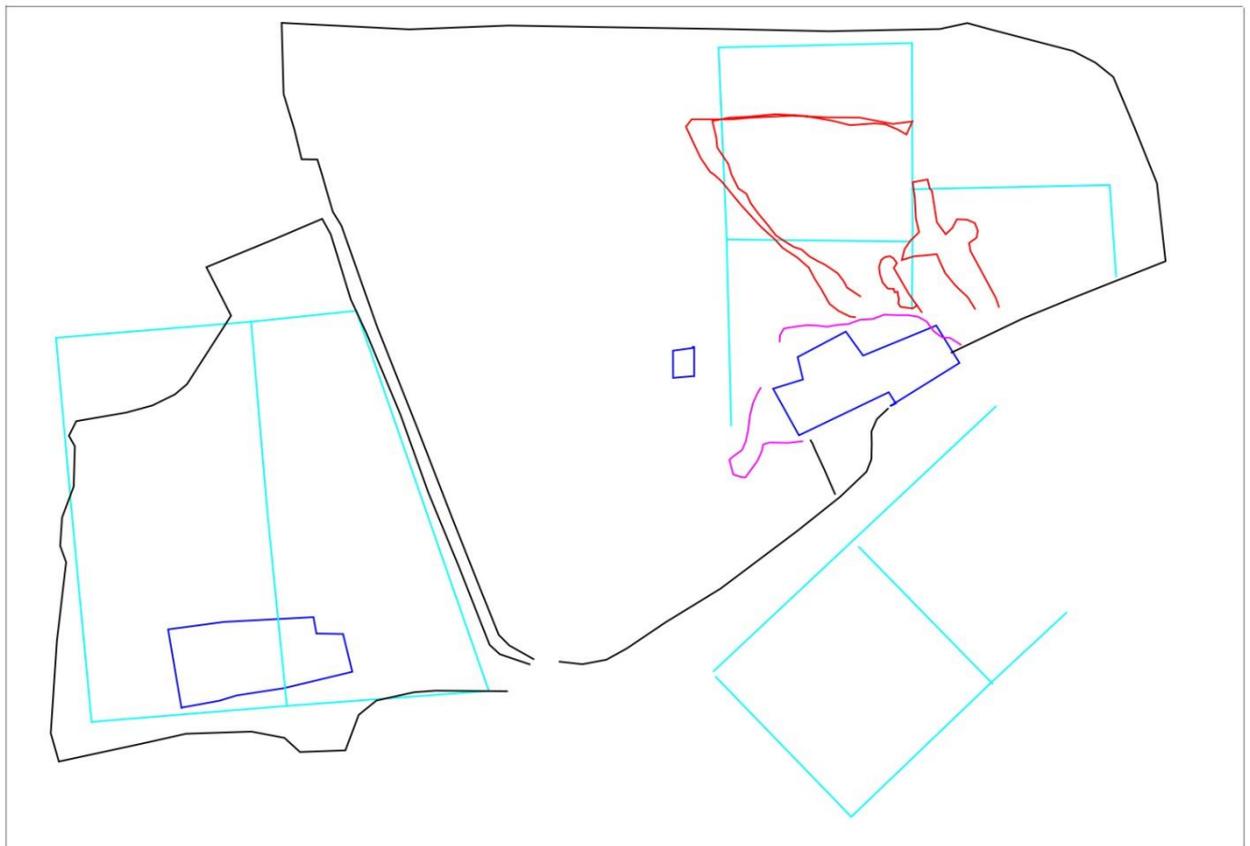


Figure 11, GNSS data including geophysical survey grids

Thorns: Topographic features

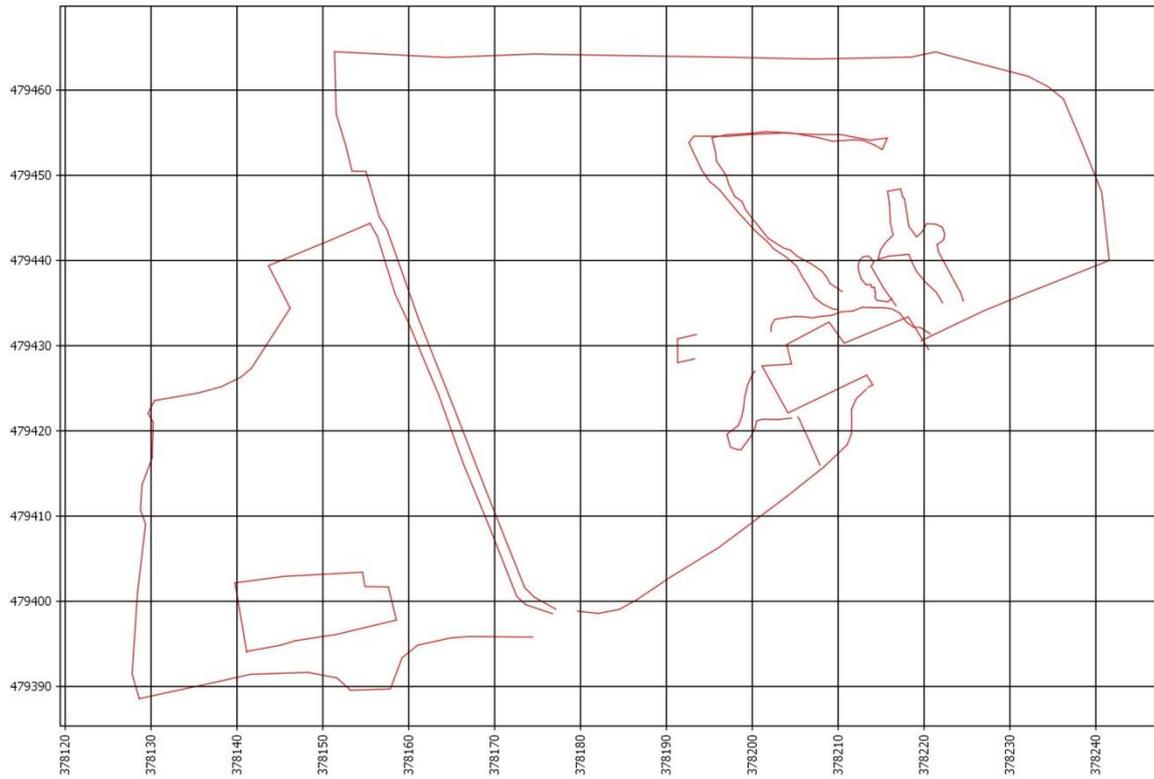


Figure 12, GNSS data with superimposed OS grid

Thorns: Survey grids and topographic features.

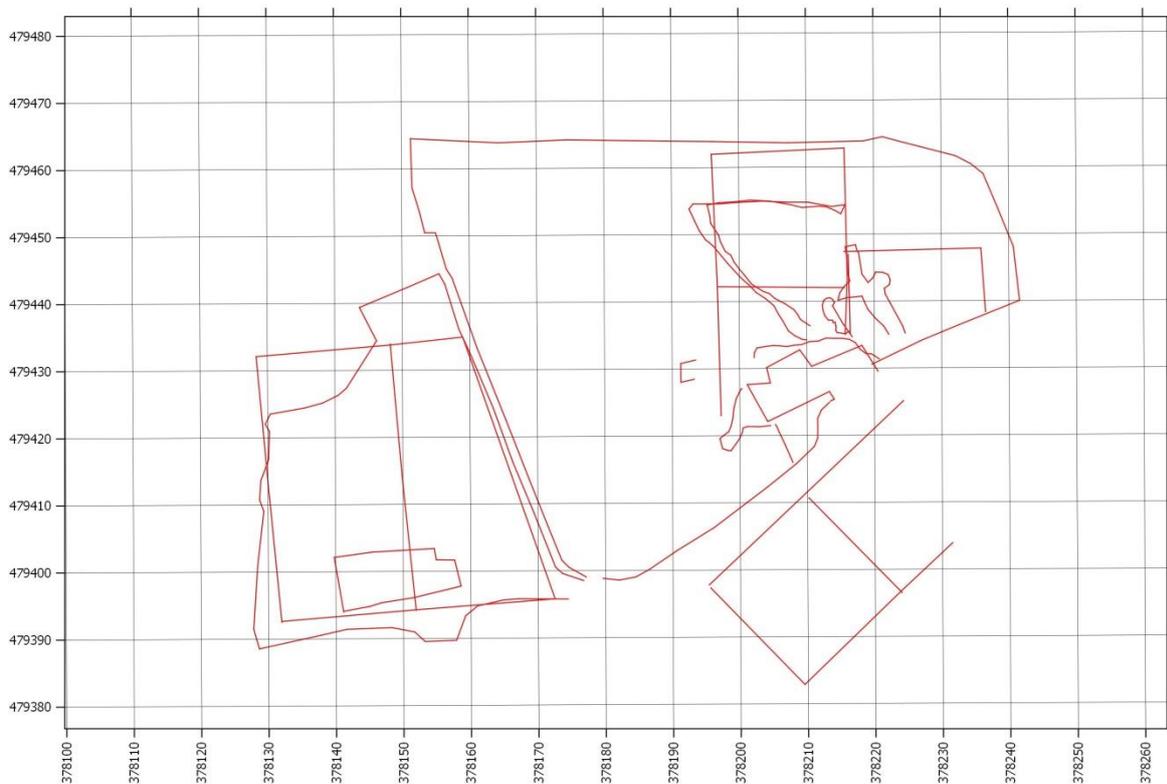


Figure 13, GNSS data with survey grids and superimposed OS grid

Thorns: Survey grids and topographic features over LIDAR.

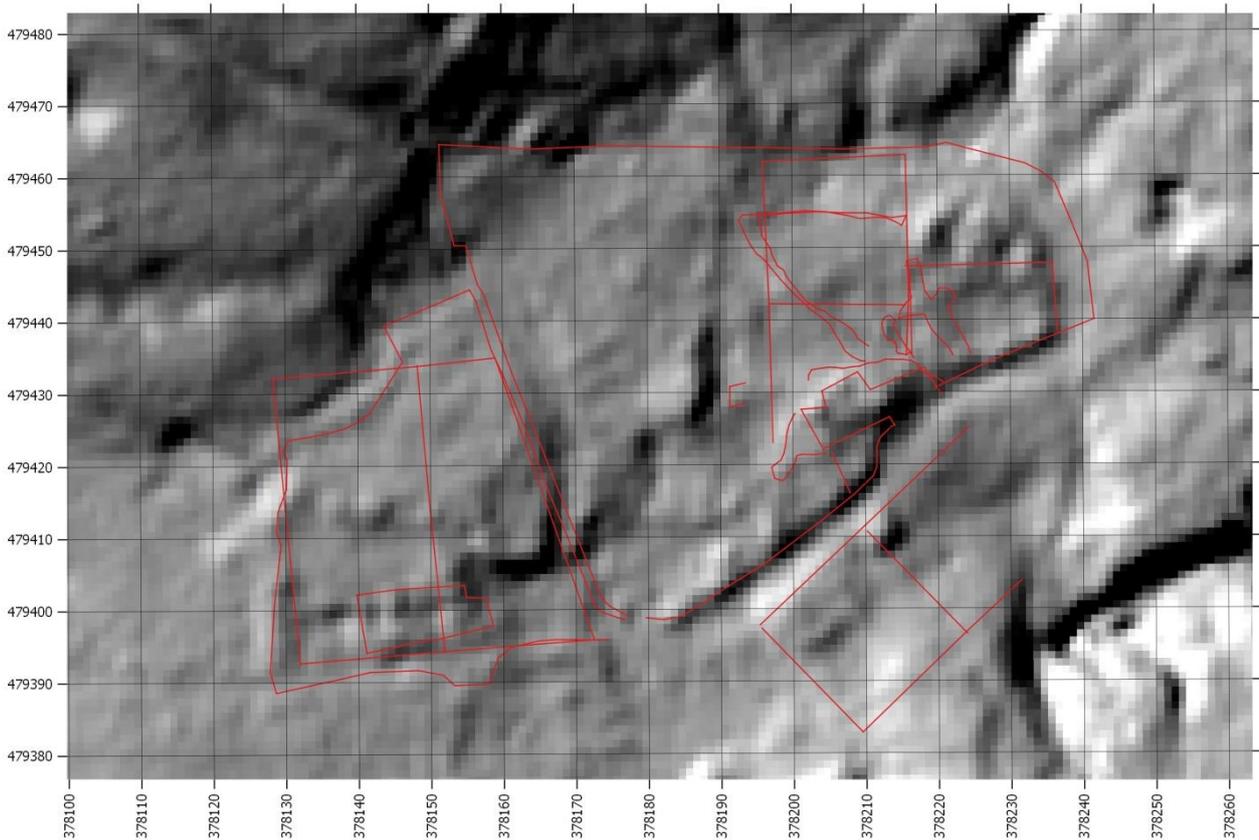


Figure 14, GNSS data superimposed over LIDAR image

Personnel

The following SWAAG members conducted the survey:

David Brooks, Andrea Dixon, Mike Keenan, Alan Mills, Robert Nicholson and Mike Walton.

The data processing was carried out by Stephen Eastmead who also wrote this report.

SWAAG would like to acknowledge the support of the Heritage Lottery Fund, which as part of the SWAAG Big Dig project (2013 through 2015), funded the purchase of the Bartington Grad601-2 Gradiometer used for this survey.

