



DISCOVERING DUMFRIES AND GALLOWAY'S PAST

GEOPHYSICAL SURVEY AT KELTON MAINS, THREAVE ESTATE, CASTLE DOUGLAS: INTERIM REPORT



COVER IMAGE: VOLUNTEERS UNDERTAKING MAGNETIC AND TOPOGRAPHIC SURVEY AT KELTON MAINS. © SALLY BIJL



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Contents

Summary	2
Acknowledgements	2
Introduction	3
Project Background	3
Site Location	3
Aims and objectives	3
Archaeological and historical background	3
Survey	4
Geophysical survey	4
Topographic survey	5
Results	5
Resistance survey	5
Magnetic survey	5
Conclusions	6
Open Day	6
Appendix 1: Technical data	7
Appendix 2: Volunteers	8
Bibliography	9

List of figures

Cover image: volunteers undertaking magnetic and topographic survey at kelton mains. © Sally Bijl	1
Figure 1: General location of geophysical survey	10
Figure 2: Processed resistance survey data	11
Figure 3: Resistance survey - interpretation	12
Figure 4: Processed magnetic survey data	13
Figure 5: Magnetic survey - interpretation	14
Figure 6: Survey grid superimposed on Aerial Photograph	15
Figure 7: Composite survey data (magnetic and resistance) superimposed on aerial photograph	16
Figure 8: Topographic model of Meikle Wood Hill looking NNW	17

Summary

Volunteers undertook a week long programme of resistance and magnetic survey on top of Meikle Wood Hill, on the *National Trust for Scotland* estate at Threave, near Castle Douglas.

A wide range of volunteers drawn from the local community participated in the survey, receiving training in both types of survey.

Acknowledgements

The survey would not have been possible without the enthusiasm of all volunteers who turned up across all five days; our thanks to all those listed in Appendix 2. Background research was greatly assisted by Andy Nicholson at D&G HER. Permission to carry out survey was granted by landowners, National Trust for Scotland. Karl Munday and Derek Alexander (NTS) are particularly thanked for all their assistance on site.

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Introduction

This report presents the results of a week of both magnetic (gradiometer) and resistance survey carried out on Meikle Wood Hill, Kelton Mains, part of the NTS Threave Estate at Castle Douglas. The survey was focused on the site of a double-ditched enclosure noted from aerial photographs taken in 1984 by RCAHMS (NMRS NX76SW 22; RCAHMSAP 69080).

A total of 0.68ha of magnetic survey and 0.44ha of resistance survey were carried out over the course of 4 days.

This fieldwork was carried out by volunteers drawn from the local community and an NTS Thistle Camp work party, under the supervision of staff from the University of Glasgow and NTS. The survey was part of Discovering Dumfries and Galloway's Past, a project engaging local communities across the region in non-intrusive archaeological fieldwork.

Project Background

Site Location

The survey area was under pasture at the time of survey, although it has recently been cultivated.

Ground conditions were generally good during the survey, and the weather was largely dry and bright, apart from heavy showers on 11/10/12. The survey area spread across the summit of Meikle Wood Hill, overlooking the floodplain of the River Dee, approximately 450m to the North of Kelton Mains Steading.

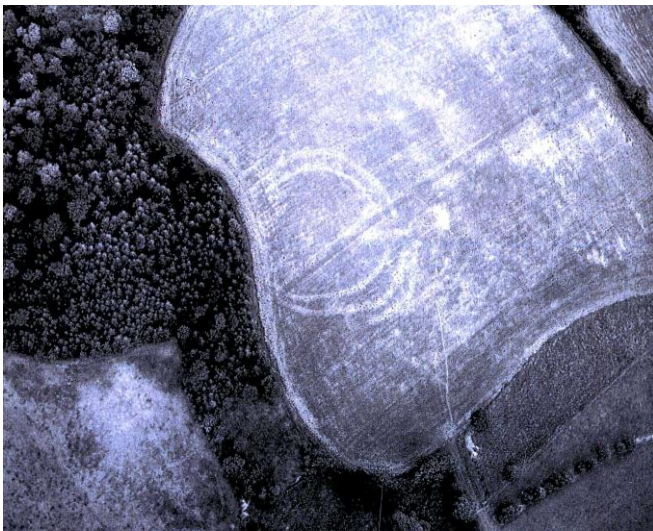
Aims and objectives

The purpose of any geophysical survey is to “as far as reasonably possible, determine the nature of the detectable archaeological resource within a specified area using appropriate methods and practices” (English Heritage, 2008: 3).

As a training exercise, and community archaeology project, a key purpose was to provide hands-on experience for local volunteers in planning, setting up and conducting a geophysical survey.

Archaeological and historical background

The ‘target’ of the survey was a number of features first noted by RCAHMS on an aerial photograph taken in 1984 (NMRS NX76SW 22; RCAHMSAP 69080). The main feature visible on this aerial photograph is a double circuit of ditches, about 85m from N-S by 120m from E-W. These ditches form almost complete arcs on the aerial photograph, with an entranceway to the SE, except at the western extent where their line is obscured by tree planting. It is also possible to note from the aerial photograph an additional run of ditch to the south of the double-ditched enclosure, as well as internal features, including the ring ditch of a possible round-house.

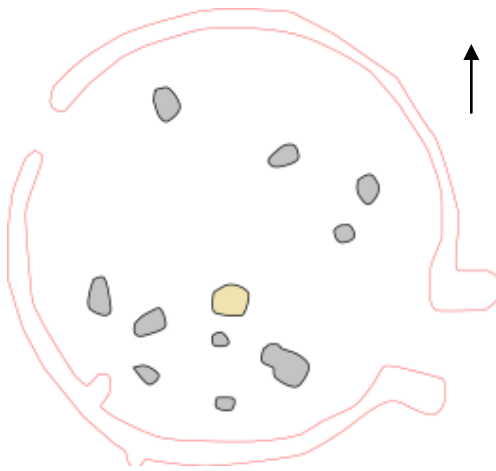


Extract from aerial photograph, showing clearly defined double-ditched enclosure. © RCAHMS

The site has been Scheduled as a fort (SM 8367) of probable later prehistoric date. The scheduling entry recognises that “although the site has been ploughed over the years, important structures and deposits are likely to survive below the level of the plough soil”. Section 42 consent was obtained prior to survey

fieldwork.

Similar settlement enclosures of likely later prehistoric date are known in the local area, such as univallate enclosures at Little Wood Hill (NMRS NX76SW 10), 250m to the NW of Meikle Wood Hill, and at Lodge Island (NMRS NX76SW 14), 1.5km to the SW of the site; significant detail has been revealed at the latter through geophysical survey undertaken by Glasgow University Archaeology Department (Finlay and Sharpe, 2003).



The enclosure at Hayknowes Farm, Annan. Redrawn after Gregory, 2001

In morphology, the enclosure on Meikle Wood Hill is similar to one excavated at Hayknowes Farm, Annan (Gregory, 2001). Crop-marks here again showed a clearly defined double-ditched enclosure, with a clear break in the inner and outer ditch circuits postulated as an entrance. Excavation in 1995 and 1996 confirmed a Mid/Late Pre-Roman Iron Age date and recorded detail of a ring-groove roundhouse at its centre (ibid.: 43).

Previous archaeological work across the survey area has been limited to a watching brief conducted in 2009 during the erection of the fence bordering the western extent of the survey area; no archaeological finds or features were recorded (Alexander, 2009).

Survey

Geophysical survey

Standards

The surveys and subsequent reporting were carried out in accordance with English Heritage's guide to *Geophysical Survey in Archaeological Field Evaluation* (2008), the IfA's *Standard and Guidance for Archaeological Geophysical Survey (Draft)* (IfA, 2010) and the ADS' *Geophysical Data in Archaeology: A Guide to Good Practice* (Schmidt, 2001).

Field methods

An overall survey grid was established using tapes, with reference to known points on Ordnance Survey mapping. This grid was tied in using an EDM.

Data collection was carried out using a standard methodology, with data collected in 20m grid units, with all grids walked in the same direction (E-W).

A Geoscan RM15 resistance meter was used to conduct the resistance survey; the sample interval used was 1.0m with a traverse interval of 1.0m. A Bartington Grad 601-2 dual fluxgate gradiometer was used to collect magnetic survey data; the sample interval used was 0.25m with a traverse interval of 0.5m – with all data being logged in continuous mode.

All grids were walked in a zig-zag traverse scheme.

Data processing

Geoplot software (version 3) was used to download and process the resistance data. Greyscale plots of both raw and processed data were produced in Geoplot. Raw data is held in the project archive, processed data and interpretations are presented in this report as figures 2-7.

The 'raw' data has been subject to minimum editing to remove operator error, with data subsequently processed to remove geological and background biases and interpolated to aid interpretation (see appendix 1).

Topographic survey

A topographic survey, covering the wider environs of the survey area was undertaken with the NTS' Stonex EDM. Data was collected by project volunteers and downloaded on site using Penmap. It was subsequently exported as a DXF file, before being imported into Sufer, for processing and presentation (see figure 8).

Additionally, the EDM was used to tie in the survey grid.

Results

A set of interpretative diagrams are presented in figures 3 and 5, with certain anomalies annotated for ease of reference in the discussion below.

Resistance survey

Resistance survey was very effective in locating a number of features that are directly observable on the aerial photograph of the area.

The double-ditched enclosure (**A**) is particularly well-defined, especially at its southern extent, visible as two discrete areas of lower resistance, representing moist ditch deposits, with a dry area, evident as a high resistance anomaly, between them. The interior of the enclosure is largely 'quiet' save for several amorphous features (**B**), which may be associated with the ring-grooved round house previously noted from the air within the enclosure. The effects of cultivation are visible across the survey area, especially to the East, where a higher level of disturbed stonework was noted (**C**). Additionally, several linear anomalies to the south of the double-ditched enclosure (**D**) may be attributable to agricultural practice; however, the possibility that they are associated with the enclosure must not be ruled out. They appear to match well the line of a possible enclosure arc previously noted on the aerial photograph.

Magnetic survey

The background to the magnetic survey is remarkably 'quiet' with features of possible archaeological interest identifiable as only weak positive magnetic responses.

The double-ditched enclosure is much more poorly defined than in resistance survey. A discrete area of weak positive magnetic enhancement (**E**) is only visible in the extreme SW of the survey area, apparently cut by cultivation traces to the east (**K**).

A number of very discrete sub-circular magnetic anomalies are evident across the western extent of the survey area. These are spread over areas of up to 2m, so cannot be interpreted as isolated ferrous magnetic spikes, although some of them appear to have a dipolar signature.

(**F**) appears to represent a pit outside the enclosure, and a series of pits (**H**) appear to 'line' the interior of the enclosure extrapolated from resistance and air photograph survey (see figure 7). None of these features are apparent on aerial photographs.

Additionally, a cluster of small positive magnetic anomalies are visible within the well-defined arc of the enclosure ditch (**I**), apparently representing a discrete set of pits just inside the enclosure. Two larger amorphous areas of magnetic enhancement to the north of these possible pits (**G**) appear to also

represent archaeological features on the interior of the enclosure. They remain hard to interpret, but appear to be in a similar position to the ring-ditch suggested by aerial photographs.

As in the resistance survey, the area to the west of the survey area is disturbed (**J**), which may be masking anomalies of possible archaeological origin in this area.

Conclusions

The results of both surveys have largely confirmed the morphology of the bi-vallate enclosure seen on aerial photographs. The ditches were particularly clear in the resistance survey as areas of low resistance, indicating that their fill is very damp, as such features do not usually show up well in resistance survey (Gaffney and Gater, 2003: 139).

The 'quiet' background of the magnetic survey resulted in the enclosure being difficult to detect. However, there are a number of pit-like anomalies both inside and without the enclosure. Additionally, a number of features were noted in both surveys towards the centre of the enclosure which appear to correlate with the ring-ditch noted in aerial photographs.

By pulling together the results of both surveys, with the features noted from the air and the detailed topographic data collected on site, it is possible to suggest that the current interpretation of the morphology, and suggested later prehistoric date, of the enclosure is reasonable. Additionally, the surveys have suggested that a number of slight features not visible on aerial photographs, of probable prehistoric origin survive in situ, although cultivation has likely truncated some previous evidence of activity across this area.

Open Day

An Open Morning was held on Saturday 13th October at Kelton Mains. 42 local interested individuals visited a small display which showcased the results of the survey.

Appendix 1: Technical data

Resistance Data

1. 'Raw' Data

Clip (limits maximum and minimum values for display and subsequent processing): $-2/+2 \sigma$

Despike (removes large anomalies above a certain threshold): x-radius 1; y-radius 1; threshold 2

Zero Mean Grid (normalizes dataset to remove discrepancies between balancing of remote probes)

2. Processed data

Interpolation (smoothes greyscale appearance by adding extra data points into the dataset, calculated with reference to surrounding collected data) on both the Y and X-axis.

Gradiometer Data

1. 'Raw' Data

Clip (limits maximum and minimum values for display and subsequent processing): $-2/+2 \sigma$

2. Processed data

Low pass filter (smoothes data and enhances larger weak anomalies)

Interpolation (smoothes greyscale appearance by adding extra data points into the dataset, calculated with reference to surrounding collected data) on both the Y and X-axis.

For more technical information on data processing, see (Geoscan Research, 2005: Chapter 6).

Appendix 2: Volunteers

Thanks to all the following for their help over the course of survey:

Christine McPherson
Alistair Fraser
Richard Gibb
Alistair Charleston
Sally Bijl
W Wright
M Paris
Emma Flaconer
Mia Misso
Cameron Parkin
Jim Shearer
Jenny Anderson

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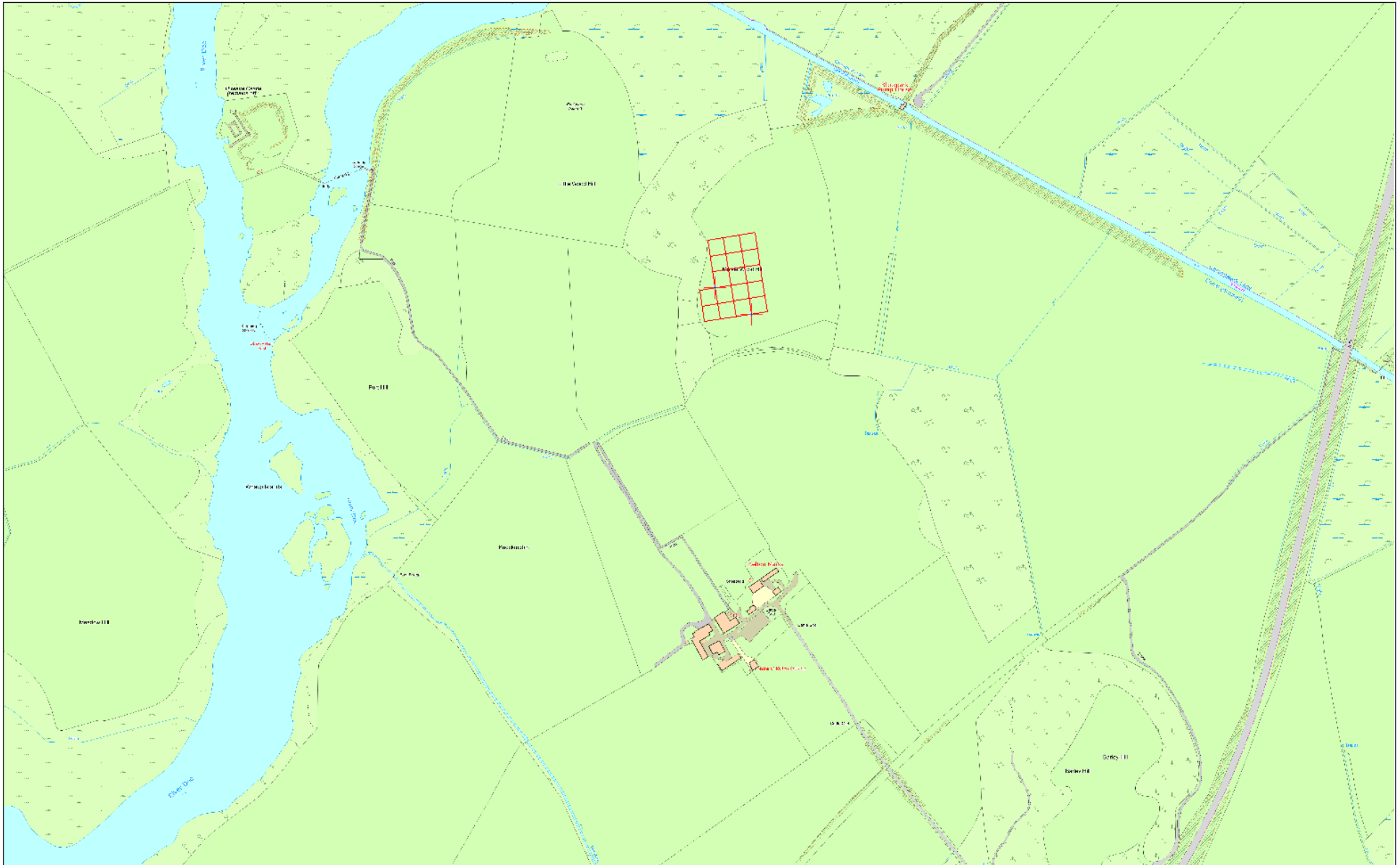
Other sources

National Monument Record of Scotland (NMRS) – consulted at <http://canmore.rcahms.gov.uk>

National Collection of Aerial Photography – consulted at <http://aerial.rcahms.gov.uk>

National Library of Scotland – consulted at <http://maps.nls.uk>

Historic Scotland Scheduled Monument List – consulted at <http://data.historic-scotland.gov.uk>



Discovering Dumfries and Galloway's Past: Survey at Kelton Mains



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Aerial photograph © RCAHMS 2012

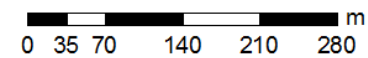
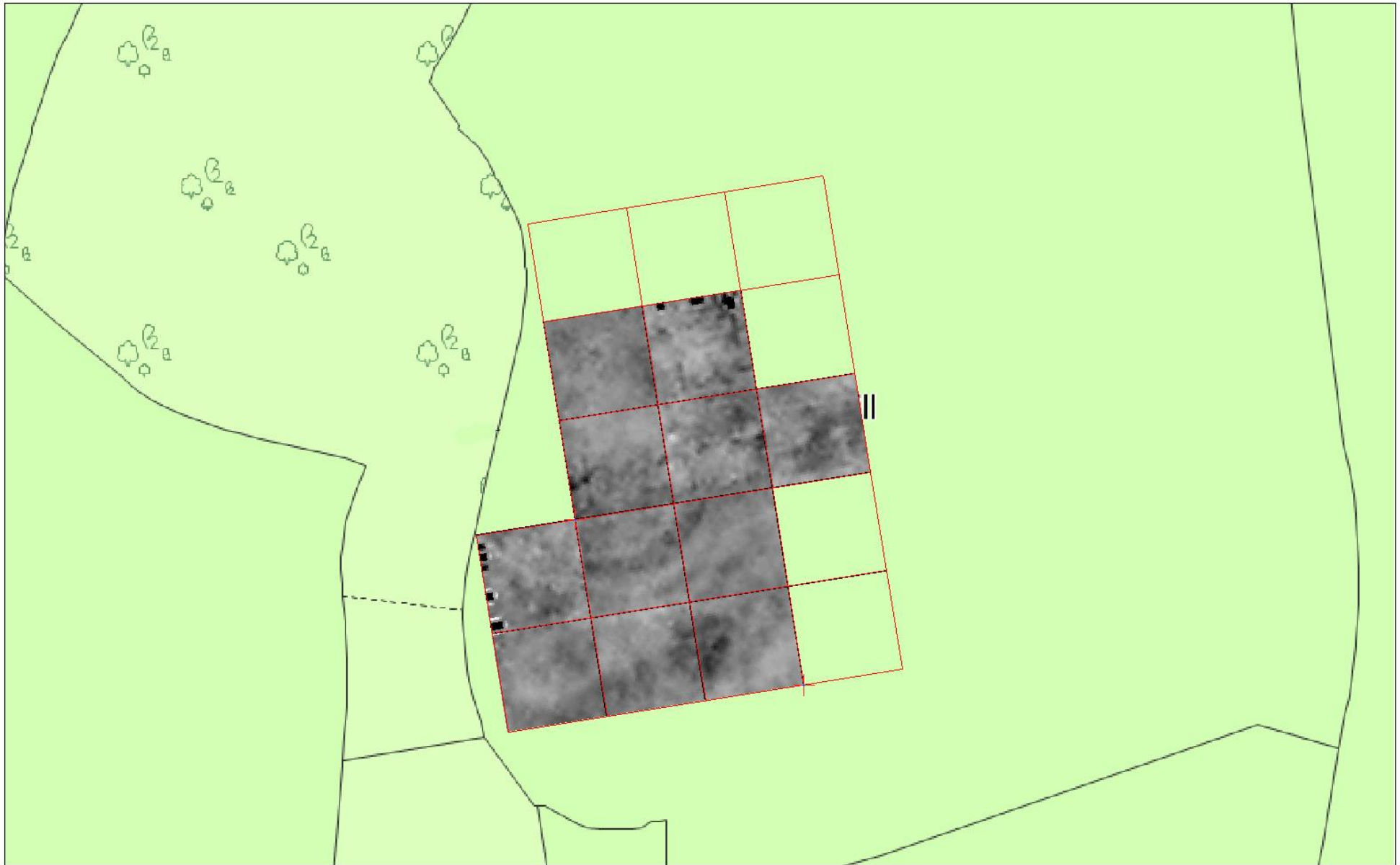


FIGURE 1: GENERAL LOCATION OF GEOPHYSICAL SURVEY



Discovering Dumfries and Galloway's Past: Survey at Kelton Mains



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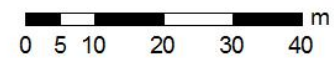
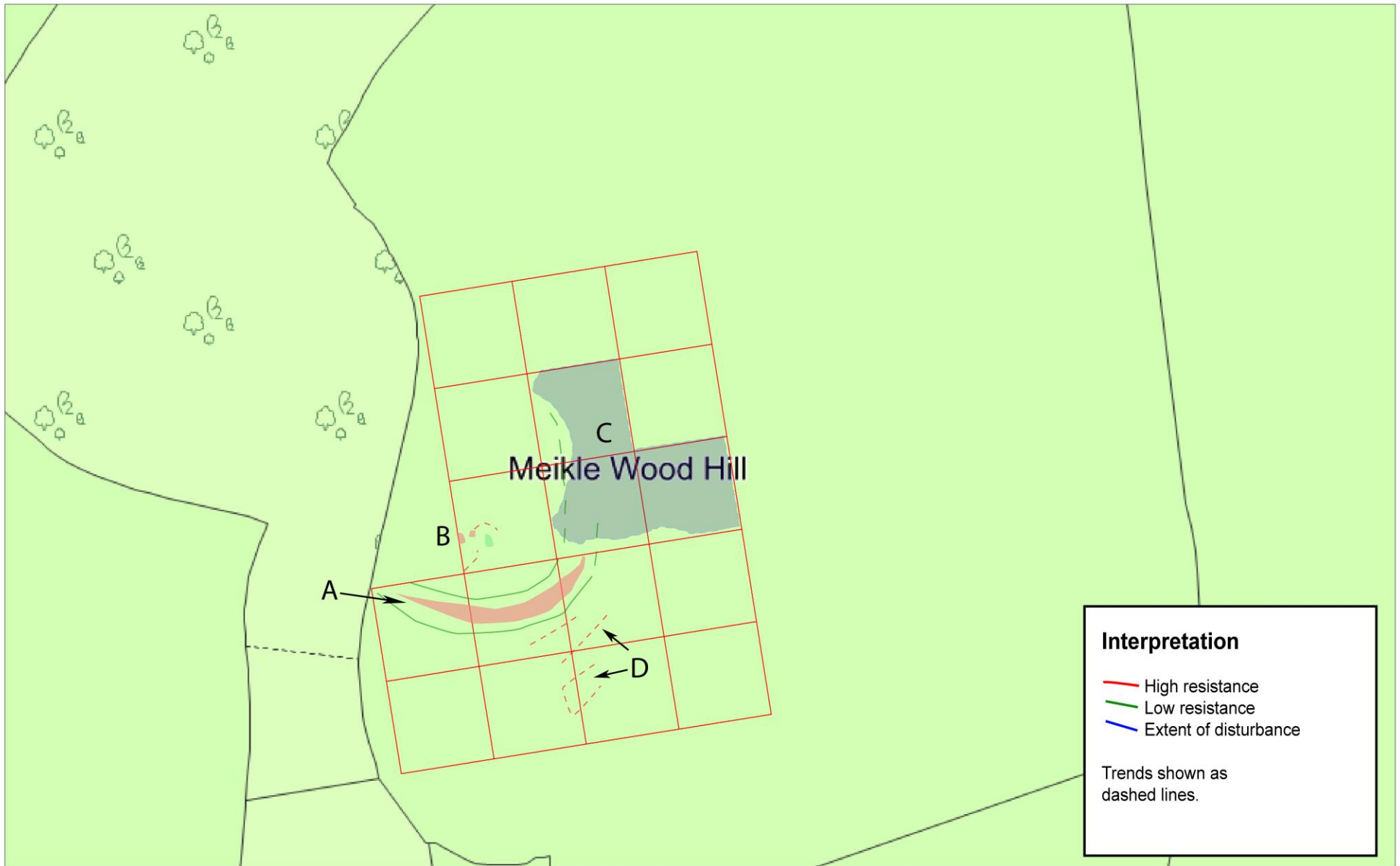


FIGURE 2: PROCESSED RESISTANCE SURVEY DATA



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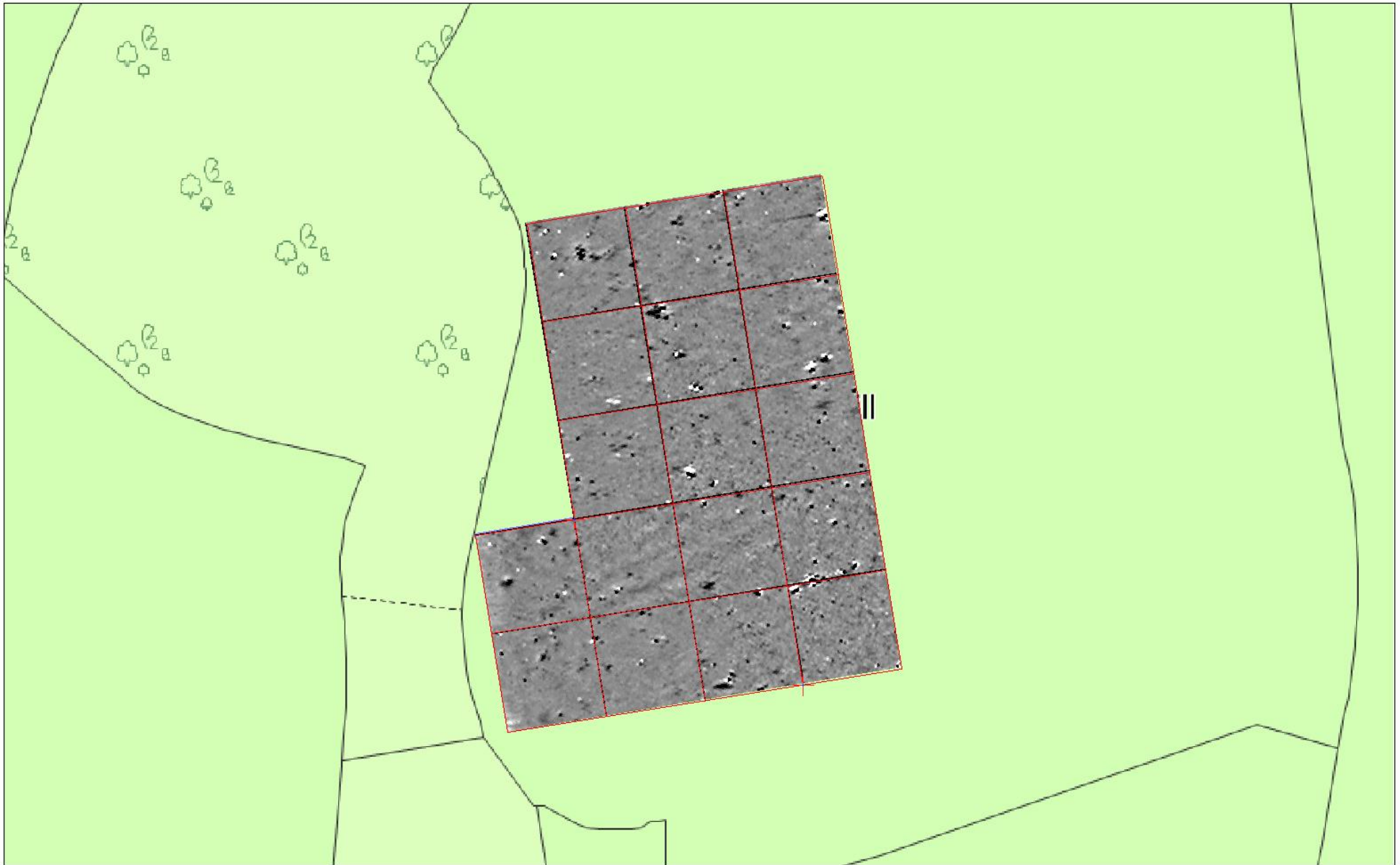


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FIGURE 3: RESISTANCE SURVEY - INTERPRETATION



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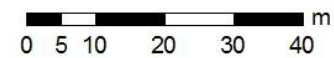
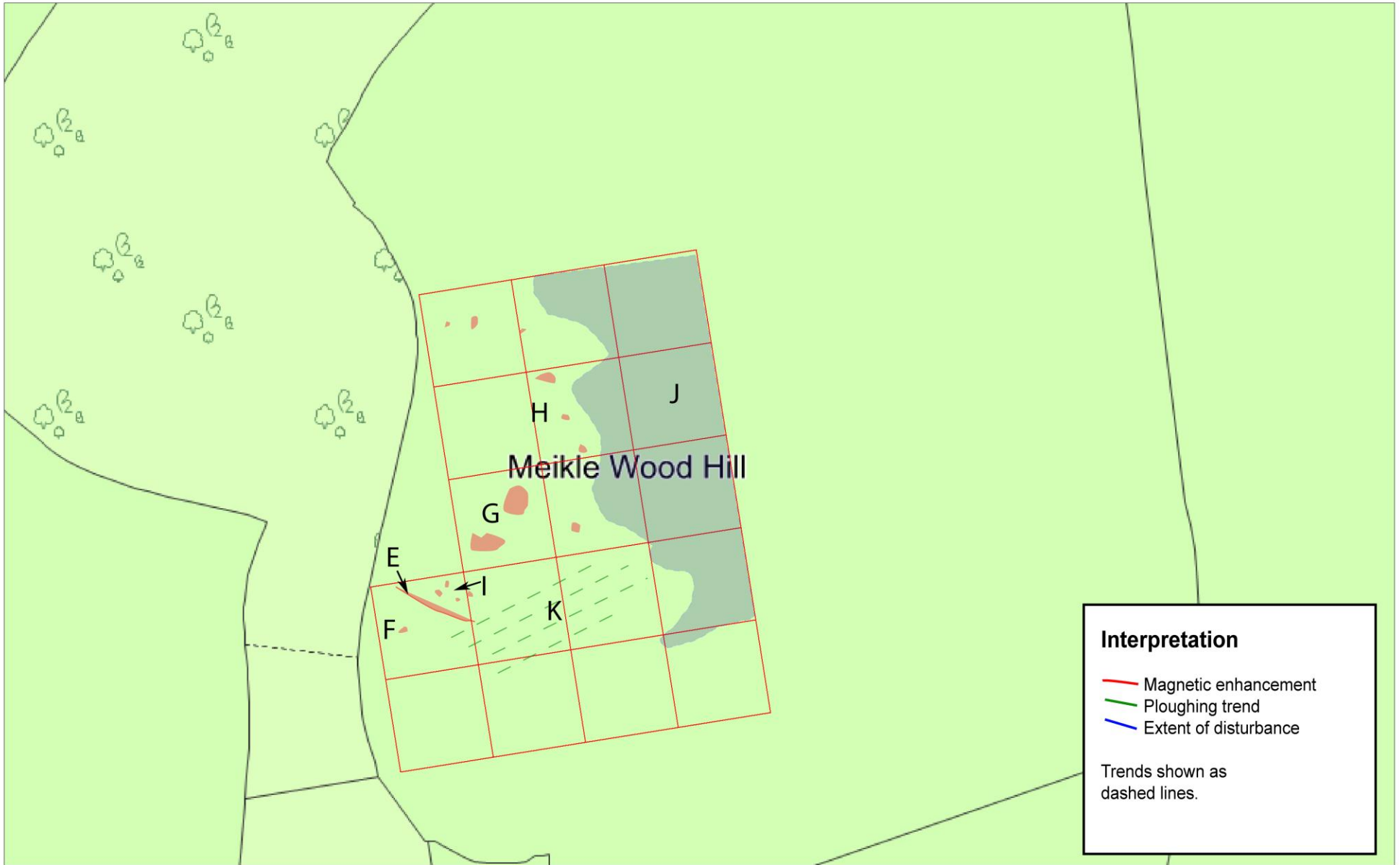


FIGURE 4: PROCESSED MAGNETIC SURVEY DATA



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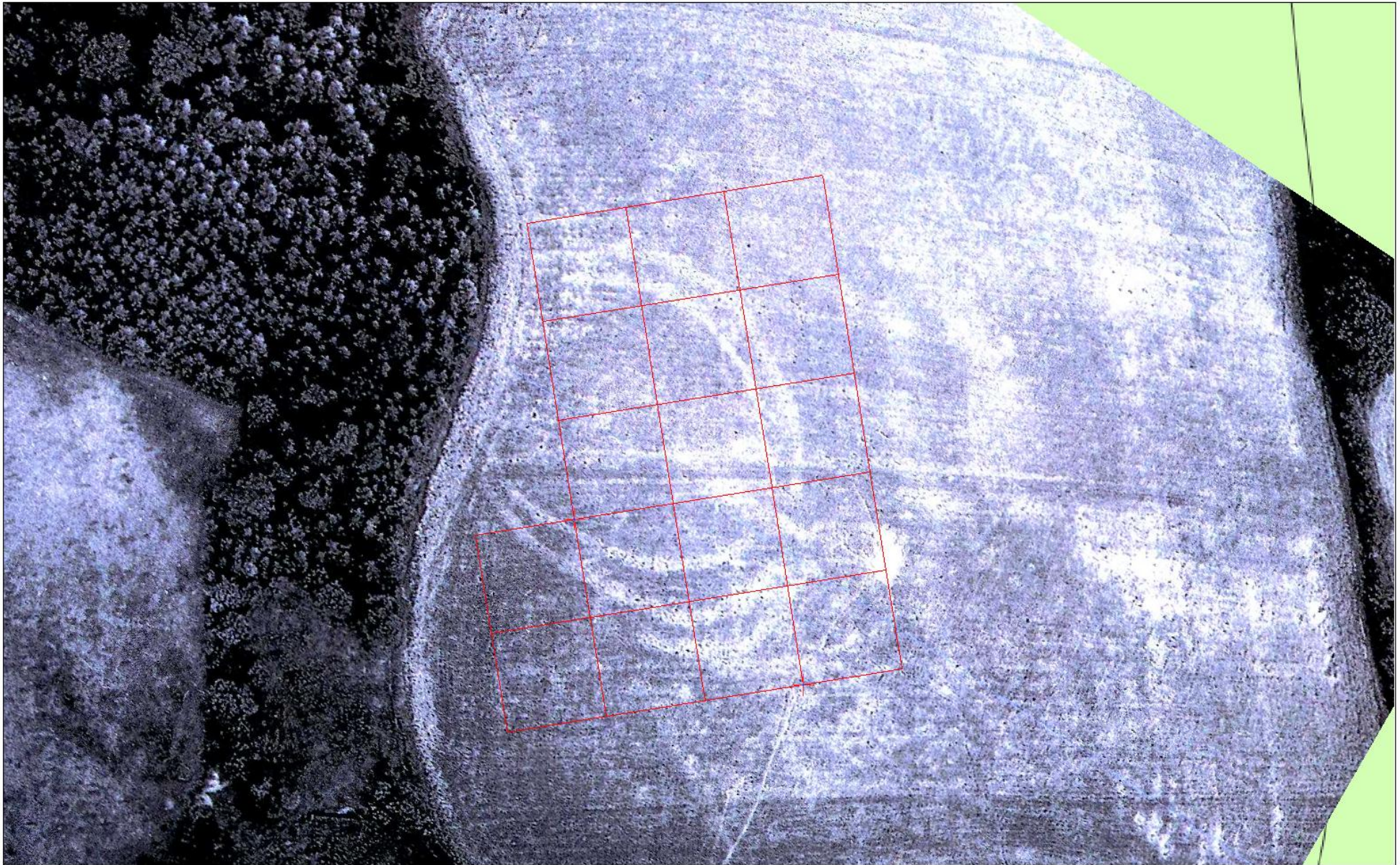


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FIGURE 5: MAGNETIC SURVEY - INTERPRETATION



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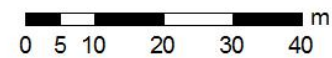
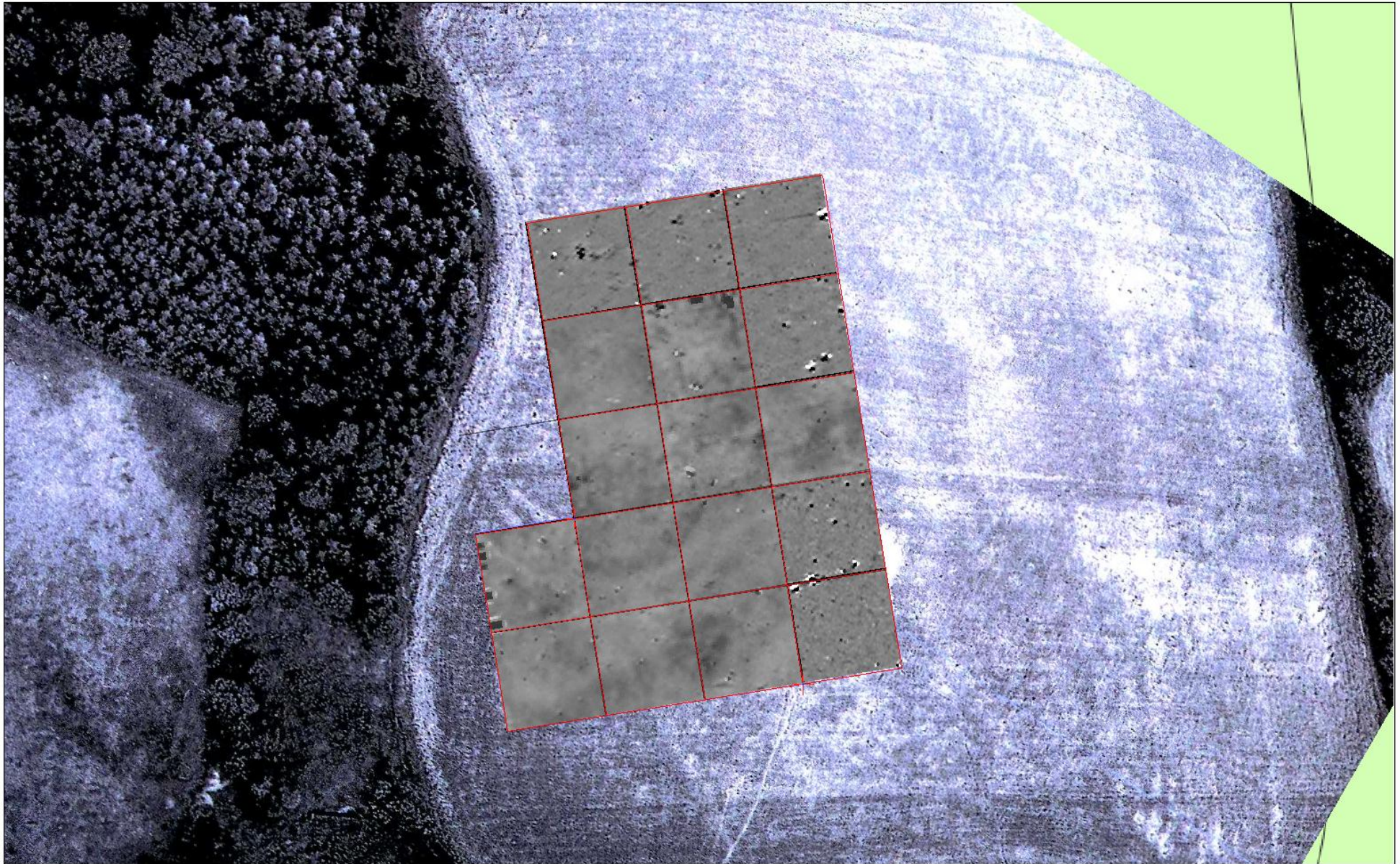


FIGURE 6: SURVEY GRID SUPERIMPOSED ON AERIAL PHOTOGRAPH



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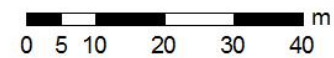


FIGURE 7: COMPOSITE SURVEY DATA (MAGNETIC AND RESISTANCE) SUPERIMPOSED ON AERIAL PHOTOGRAPH

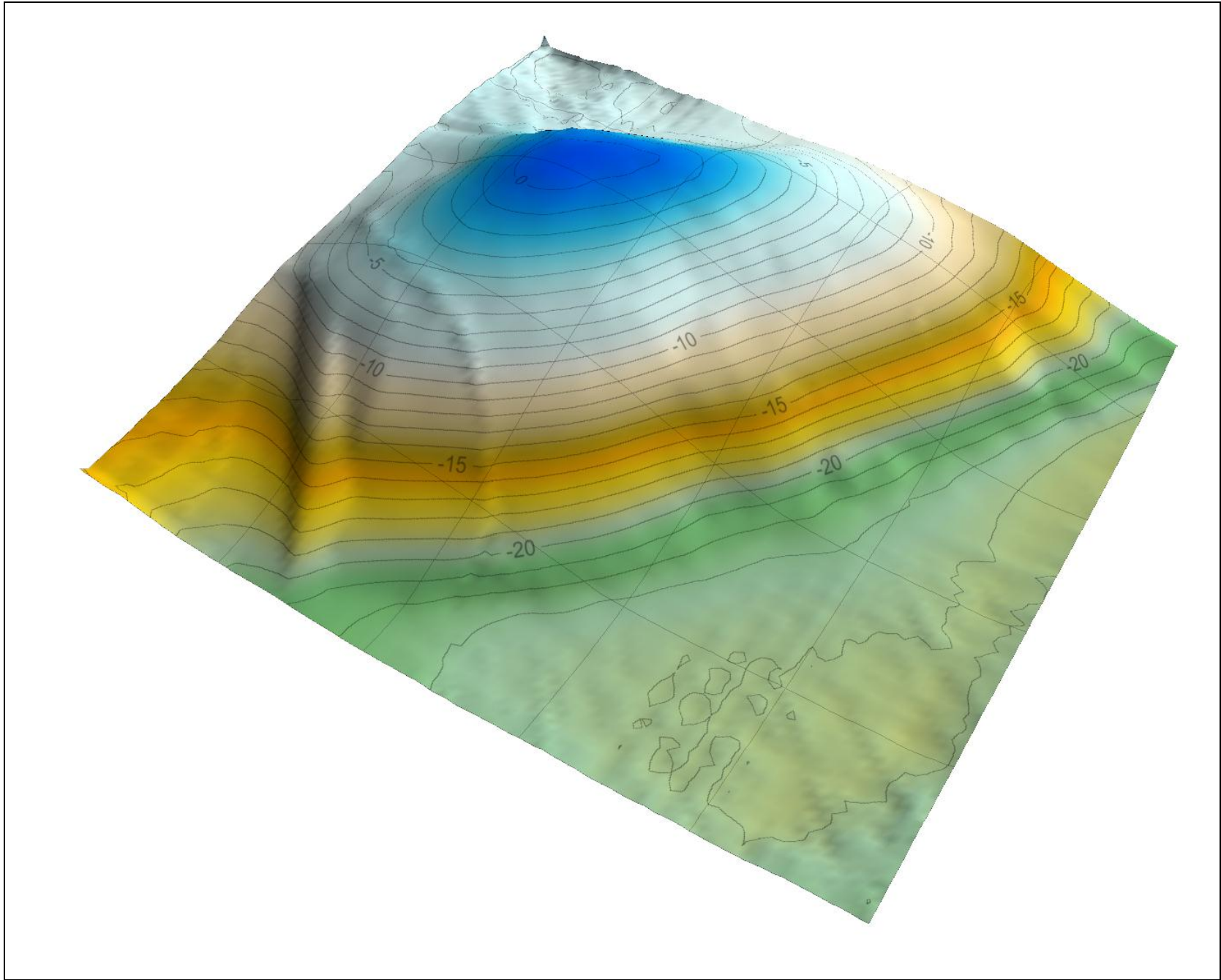


FIGURE 8: TOPOGRAPHIC MODEL OF MEIKLE WOOD HILL LOOKING NNW