Document Reference	Appendix No.	Title
4.01.9b	9.2	
		Archaeological Evaluation (Geophysical Survey) Part 2

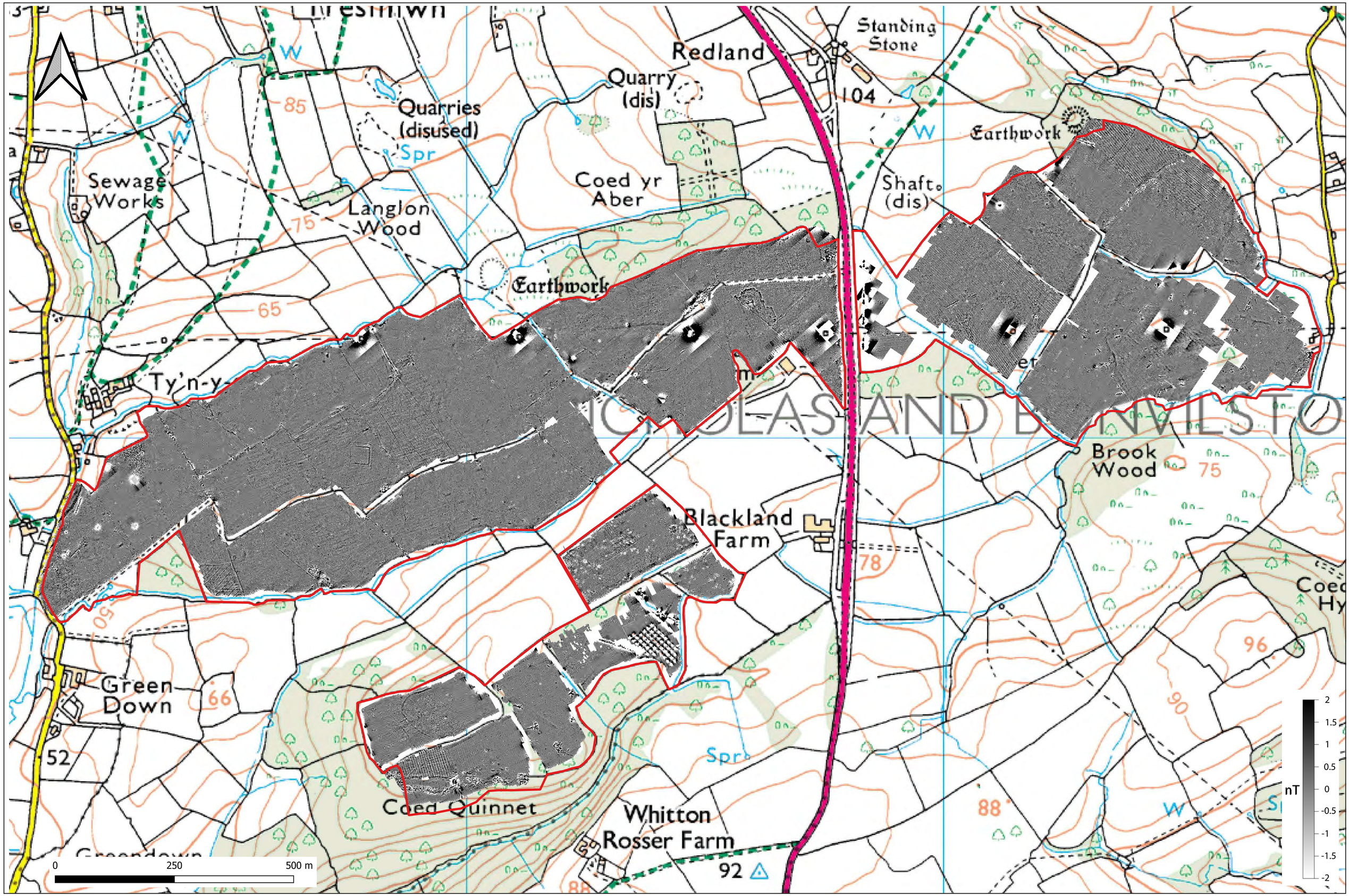

Figure 5. Magnetic survey results +/-2nT

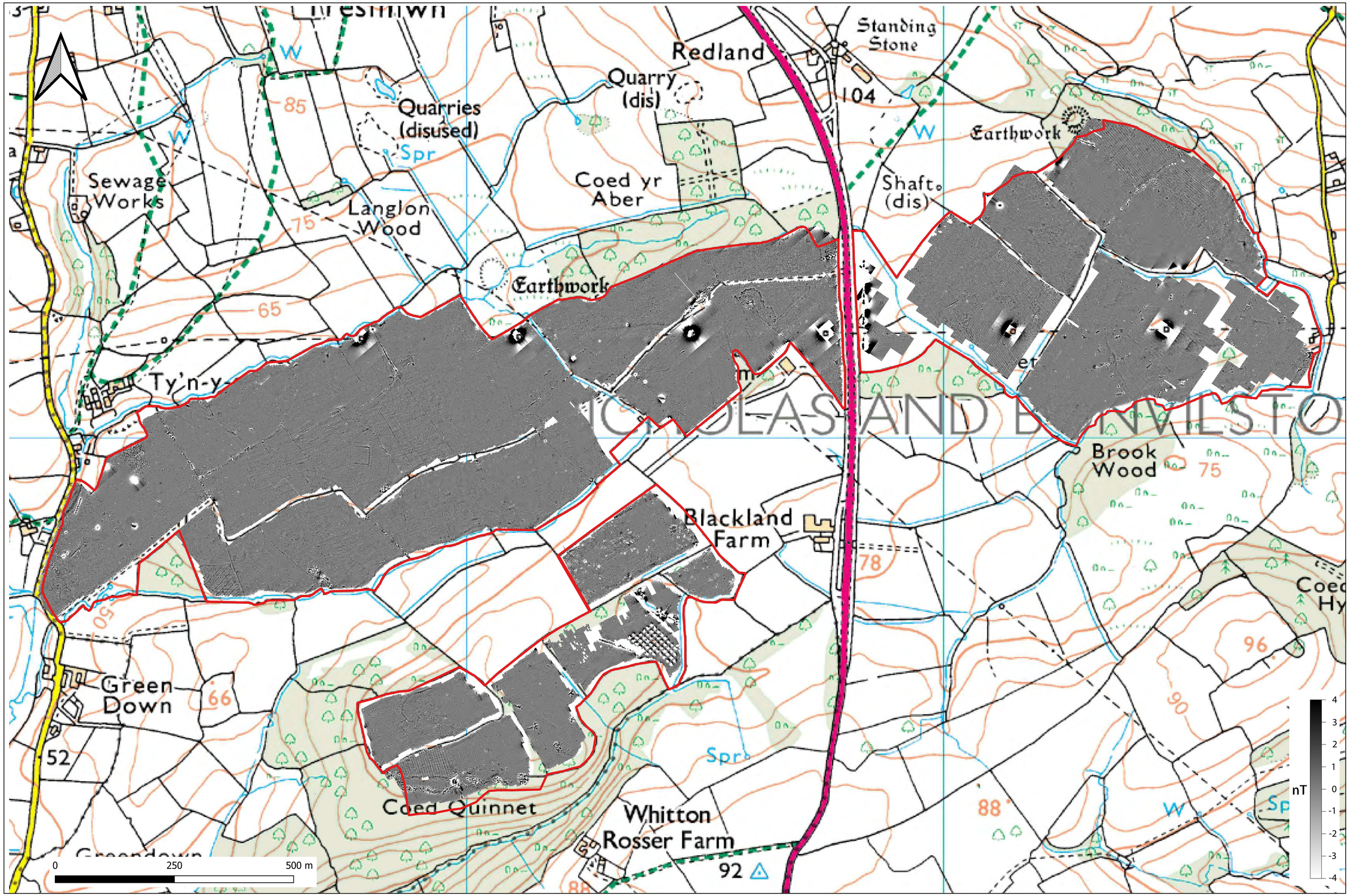

Figure 6. Magnetic survey results +/-4nT

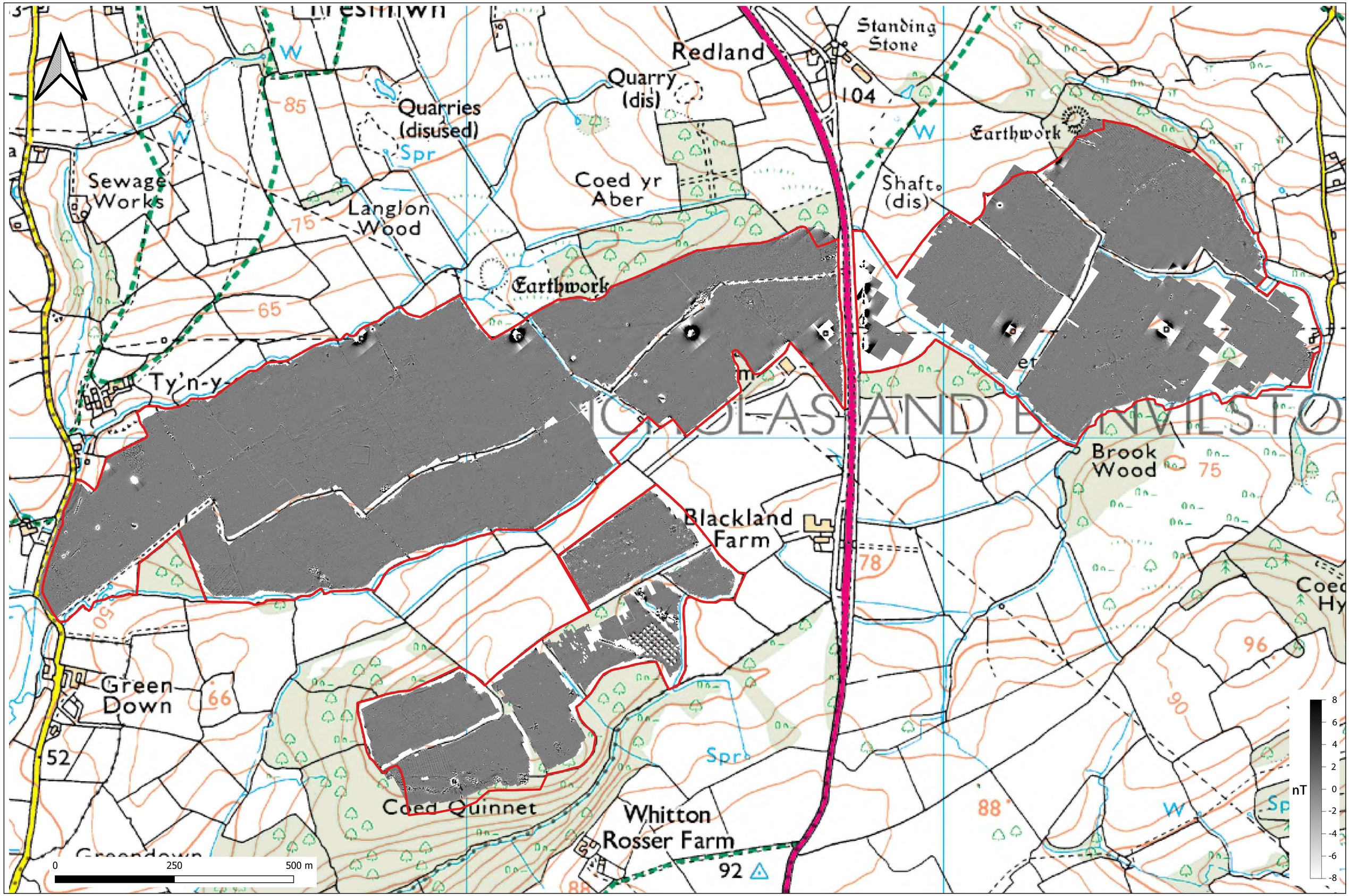

Figure 8. Magnetic survey results +/-8nT

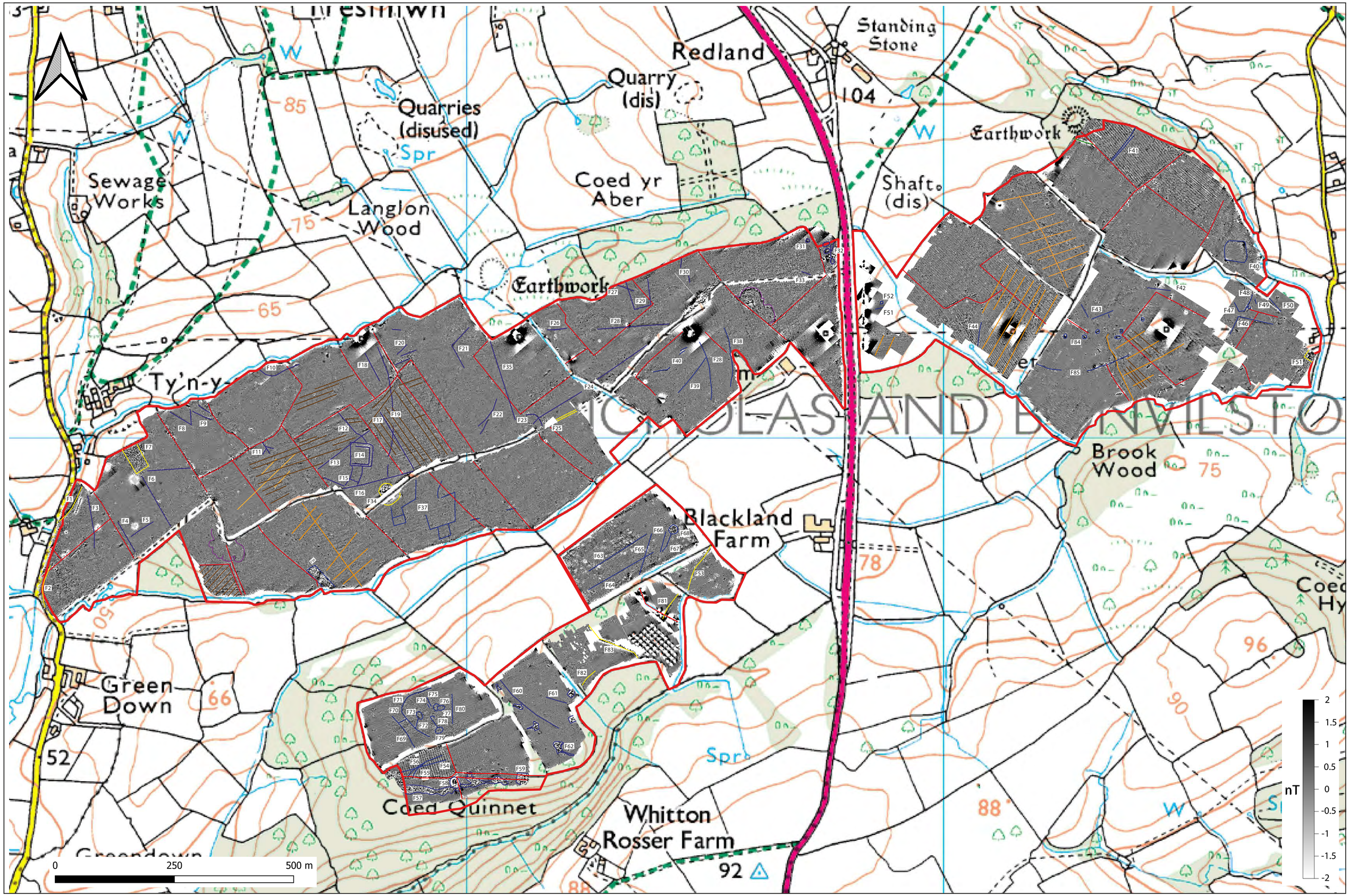

Figure 8. Magnetic survey results +/-2nT with marked interpretations

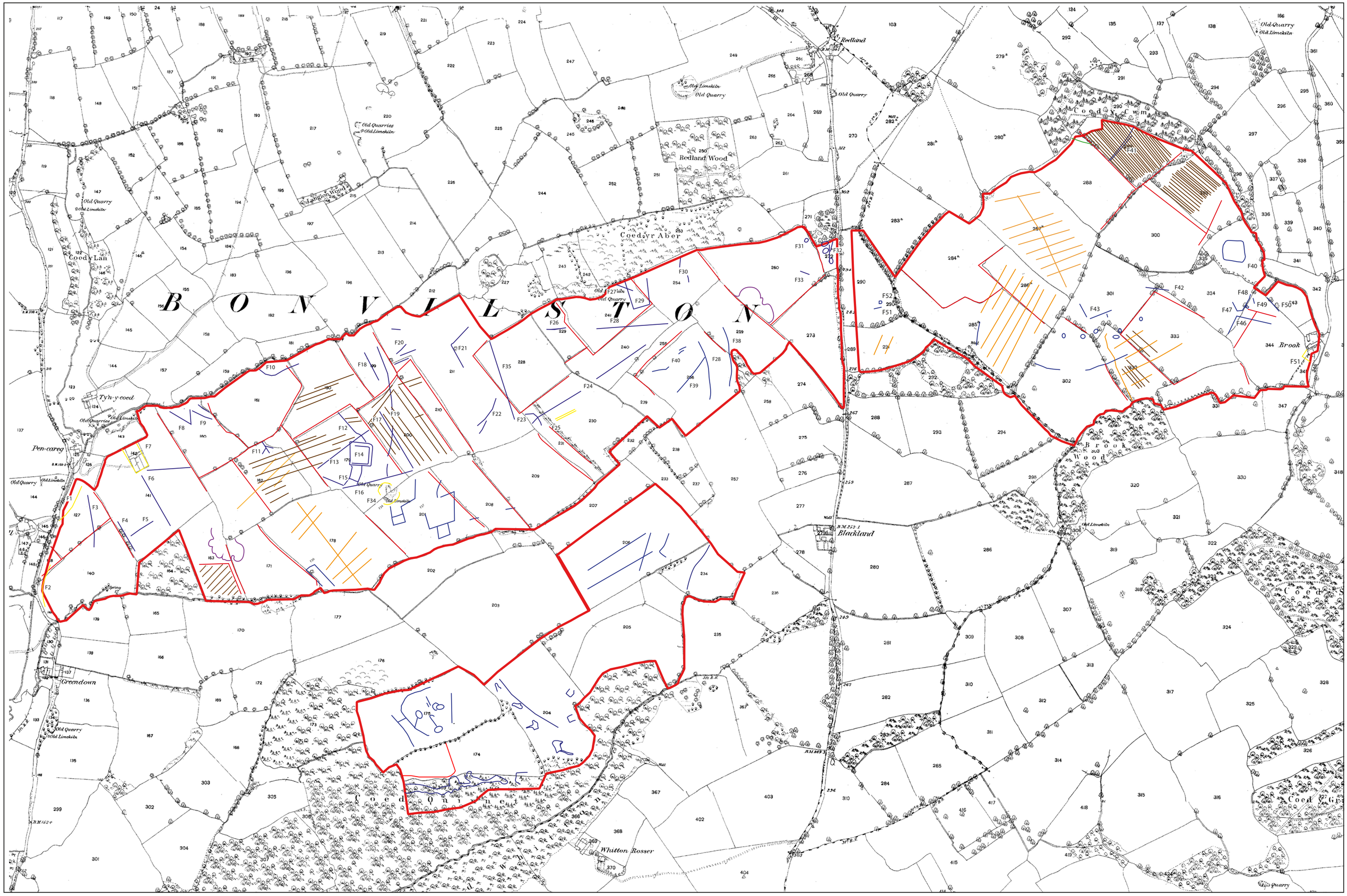

Figure 9. Interpretations overlaying the First Edition Ordnance Survey Map

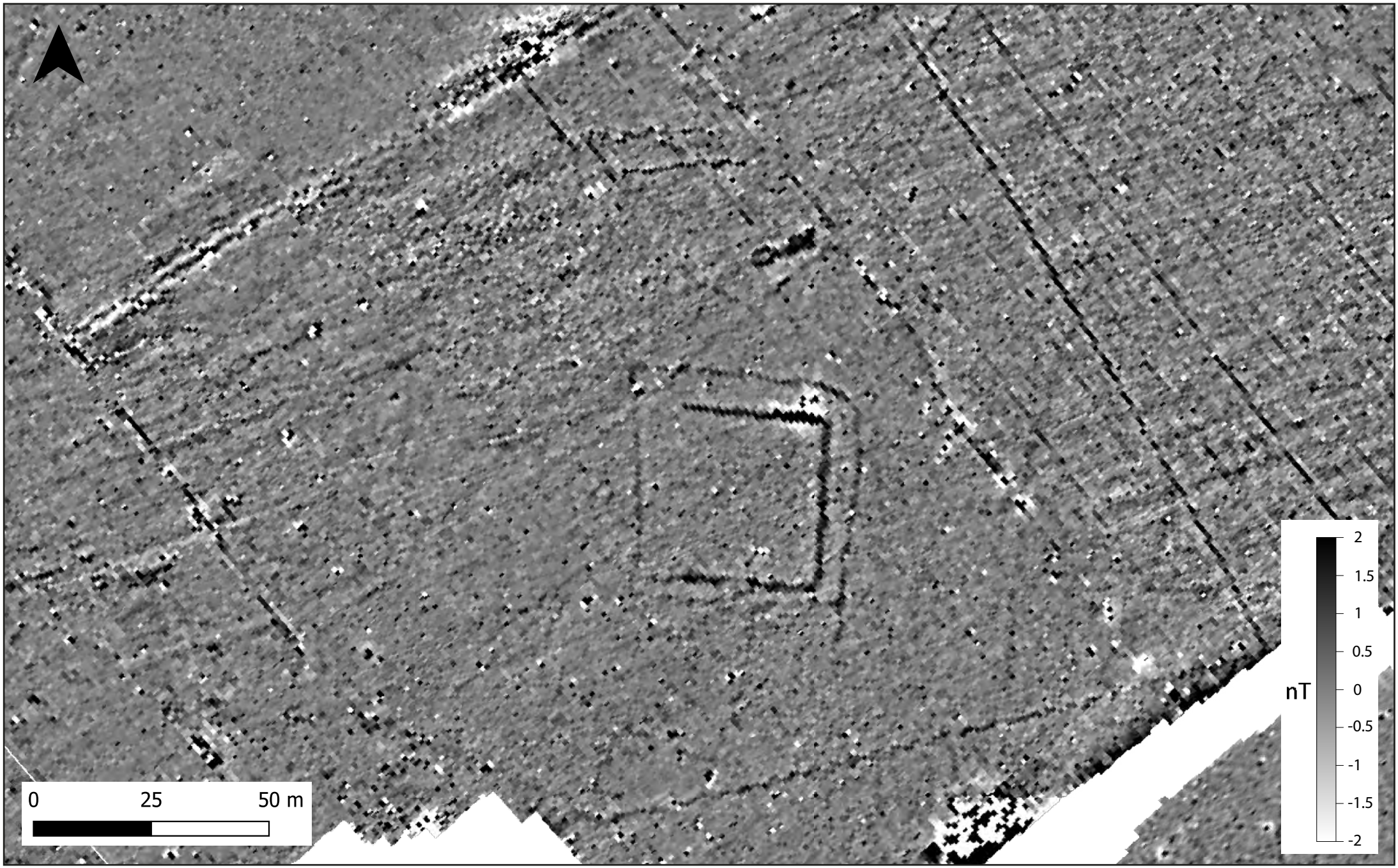

Figure 10. Feature 14 +/-2nT within Area 1

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Revealing the past, informing the future

Figure 11. Feature 28 +/-2nT within Area 1

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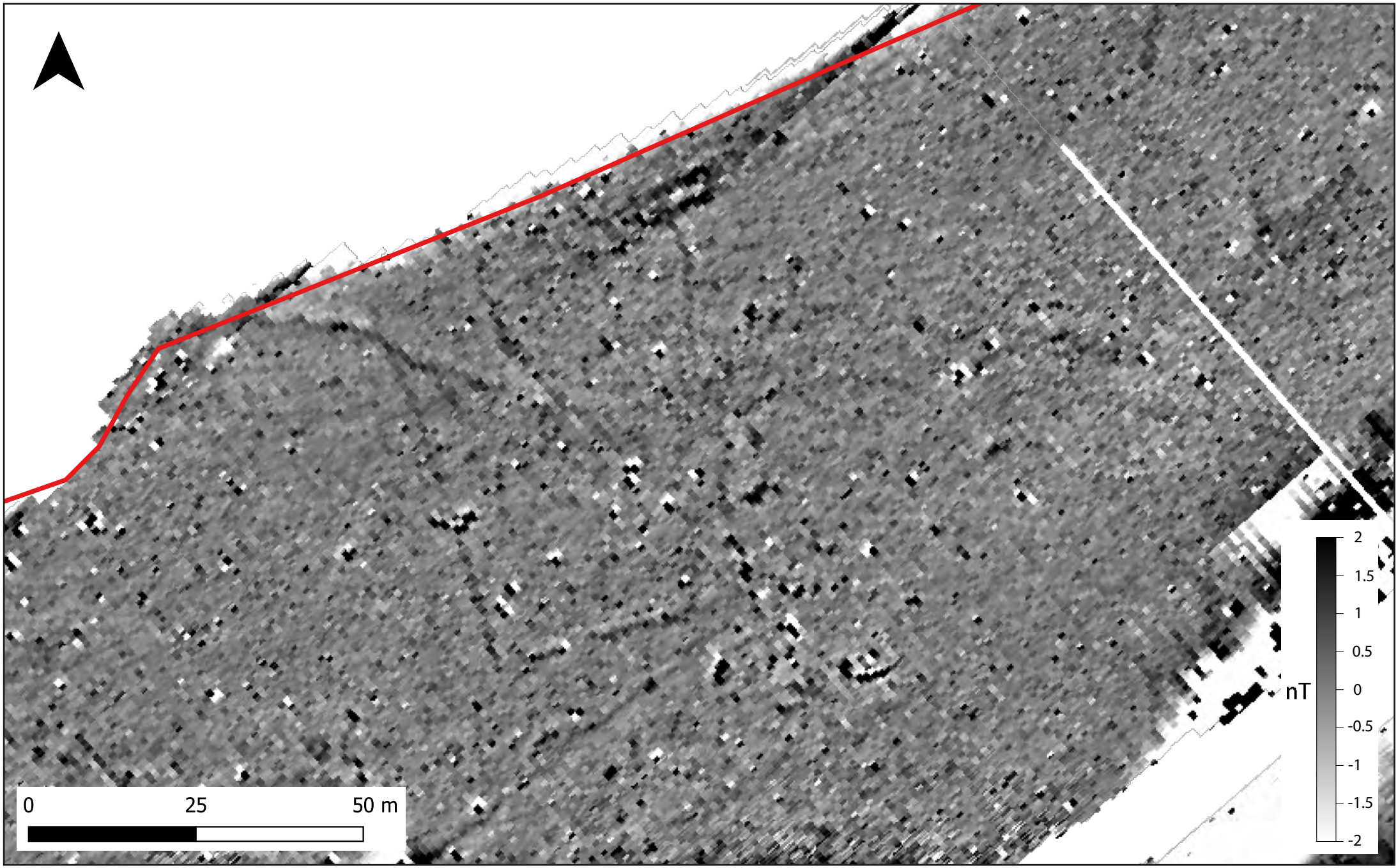

Figure 12. Feature 29 +/-2nT within Area 1

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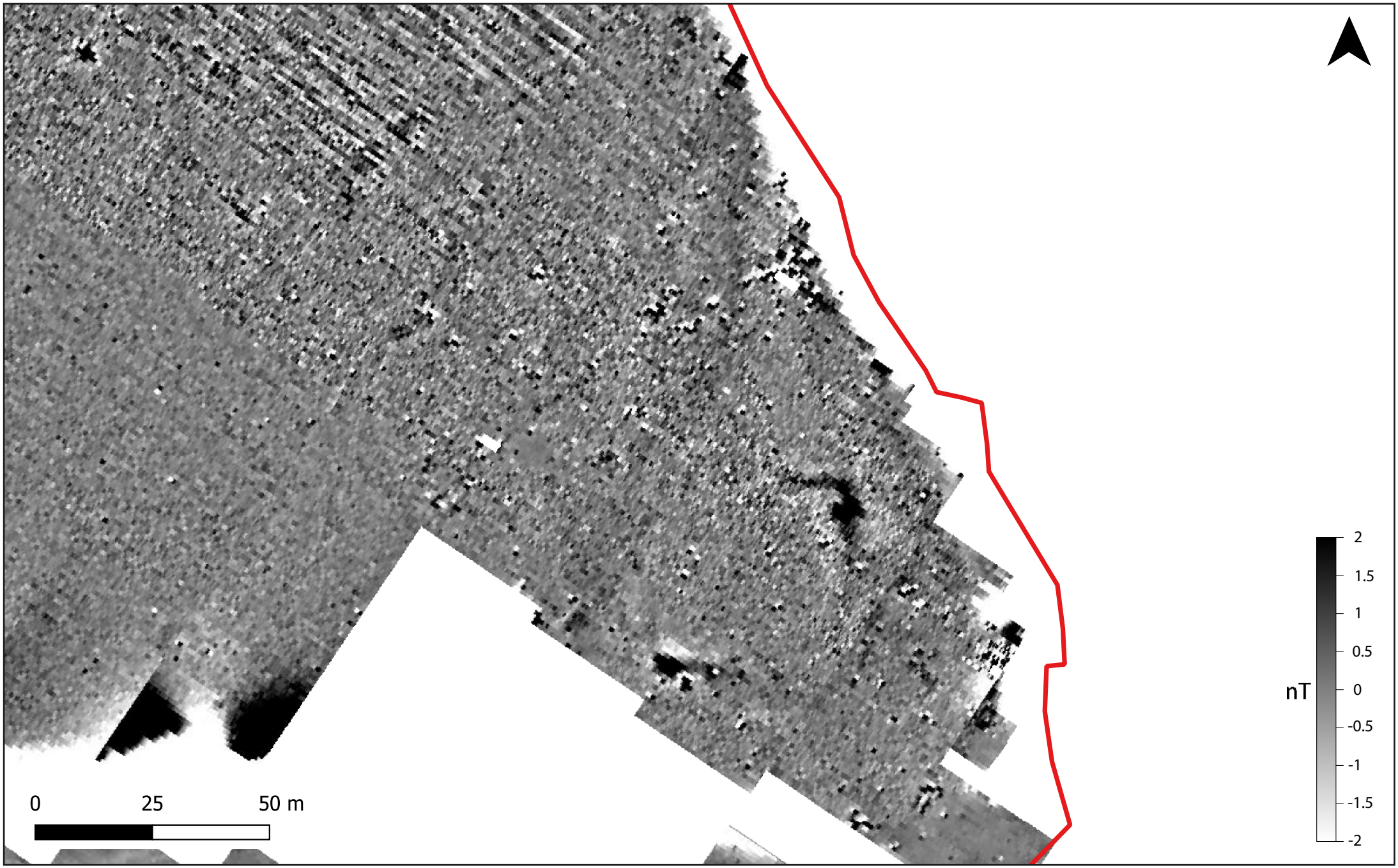

Figure 13. Feature 40 +/-2nT within Area 2

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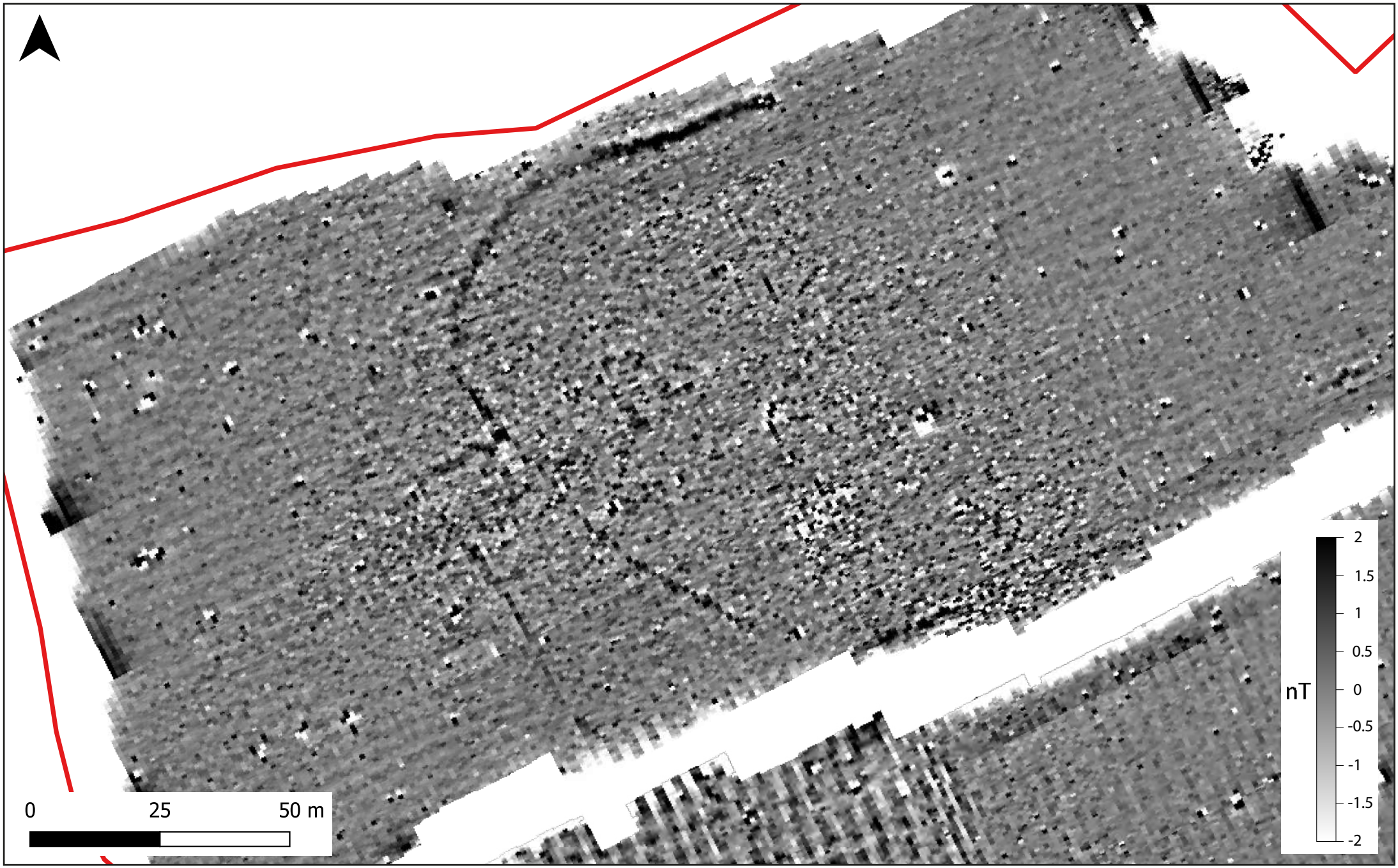

Figure 14. Field 3E +/-2nT

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Appendix I – Written Scheme of Investigation

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Revealing the past, informing the future

Archaeology Wales

Written Scheme of Investigation

Geophysical Survey:

Land at Pancross, Redland and Oaklands Farm, near Bonvilston, Vale of Glamorgan

Prepared for:

Sirius Planning

Project No: 2798

September 2021

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REGISTERED ORGANISATION CIfA

Contents

Figures

1 Introduction

1.1.1 This Written Scheme of Investigation (WSI) details the methodology for a programme of archaeological mitigation (geophysical survey) to be undertaken at the site. The proposed development comprises plans for the construction a Solar farm and power storage units (batteries) with ancillary infrastructure will occupy this area on land at Pancross, Redland and Oaklands Farm, near Bonvilston, Vale of Glamorgan (henceforth – the site), centred on NGR ST 07000 72770 (Figures 1). The local planning authority is the Vale of Glamorgan Council (henceforth – VoGC).

1.1.2 The recommendations for a geophysical survey on the site were outlined in an initial desk-based assessment (Evans 2021) carried out for the proposed development. After consultation with the Glamorgan-Gwent Archaeological Trust – Archaeological Planning Management (GGAT-APM), as advisors to the local planning authority, the area initially recommended for geophysical survey was extended to cover the entirety of the proposed development area.

1.1.3 This WSI has been prepared by Steven Cole (Assistant Supervisor) of Archaeology Wales Ltd (Henceforth - AW) at the request of Sirius Planning. It provides information on the methodology that will be employed by AW during a geophysical survey of the site.

1.1.4 This WSI is to be approved by GGAT-APM, on behalf of VoGC, prior to the survey being undertaken. The purpose of the archaeological mitigation (geophysical survey) is to provide VoGC with sufficient information regarding the nature of archaeological remains on the site of the development, the requirements for which are set out in Planning Policy Wales (Ed.11, February 2021), Section 6, and Technical Advice Note 24. All work will conform to the Standard and Guidance for Geophysical Survey (CIfA December 2020) and be undertaken by suitably qualified staff to the highest professional standards.

2 Site Description & Archaeological Background

2.1 Site Description

2.1.1 The proposed development site is located approximately 1.2km to the south of Bonvilston and 5km to the north of Cardiff Airport, Vale of Glamorgan, centred on NGR ST 07000 72770 (henceforth – the site). The site is currently made up of 126 hectares of enclosed agricultural fields. The site comprises of three areas. Area One is bounded to the north and south by enclosed fields, the east by the A4226, and to the west by a single tracked road. Area Two is situated to the east of Area One and it is bounded to the north-west by enclosed fields, to the north-east, east and the south by woodland, and to the west by the A4226. Area Three is situated to the south of Area One and it is bounded to the north by enclosed fields, and to the east, south, and west by woodland (Figure 1).

2.1.2 The geology beneath the site varies between Mary's Well Bay Member (interbedded limestone and mudstone) formed approximately 199 to 210 million years ago in the Jurassic and Triassic Periods, Penarth Group (interbedded mudstone and limestone) formed approximately 201 to 210 million years ago in the Triassic Period, and Lavernock Shales Member (mudstone) formed approximately 199 to 201 million years ago in the Jurassic Period. No superficial deposits are recorded throughout the site (BGS 2021).

2.2 Archaeological Background

2.2.1 An in-depth archaeological background of the surrounding area can be found in the initial desk-based assessment (DBA) (Evans 2021). The assessment concluded that fourteen sites of archaeological interest were located within the proposed development area. Two of these sites comprise of cropmarks of an enclosure and field system within Area One (GGAT03998s; NPRN 309275 & NPRN 309284). The assessment identified two new sites of archaeological interest within Area One: a structure (OFV01) and an old quarry/limekiln (OFV02). The remaining previously recorded sites are located within Area Two, and these are made up of industrial and agricultural post-medieval sites. The DBA also recorded a medium potential for further unrecorded activity spanning from the prehistoric to the post-medieval period.

2.2.2 Following the desk-based assessment, consultation with GGAT—APM highlighted an unpublished excavation to the south of the proposed development which would increase the likelihood of encountering archaeological activity in the area.

2.2.3 As a part of improvement works to the A4226 (Five Mile Lane), to the south of the proposed development area, a range of archaeological features were picked up during a geophysical survey (GSB Prospection, 2015). Subsequently, excavations revealed extensive archaeological evidence dating from the prehistoric onwards. This included a villa site, prehistoric circular enclosures, field systems and the excavations of over 450 inhumations/cremations (Red River Archaeology, forthcoming).

3 Objectives

3.1.1 This WSI sets out the methodology to ensure that the geophysical survey will meet the standard required by The Chartered Institute for Archaeologist's Standard and Guidance for archaeological geophysical survey (2020).

3.1.2 The primary objective of the work will be to locate and describe, by means of geophysical survey, archaeological features that may be present within the development area. The proposed archaeological work will attempt to elucidate the presence of absence of archaeological material that might be affected by the scheme, in particular its character, distribution, extent and relative significance.

3.1.3 A report will be produced that will provide information which is sufficiently detailed to allow informed planning decisions to be made that can safeguard the

archaeological resource. The information could then be used to determine further archaeological investigation or appropriate mitigation strategies for any archaeological remains within the area to be implemented prior to or during the proposed development.

4 Methodology for geophysical survey

4.1.1 The area to be surveyed will include all of the accessible development area. On-site adjustments may be required to avoid areas of magnetic interference or inaccessibility, for example wire fencing, areas of dense undergrowth and steeper slopes which may prove unsuitable for survey.

4.1.2 The site and all survey points will be located by GPS and plotted onto an O.S. base map. The survey will be carried out using a Bartington Grad601 Magnetometer. This is chosen as an efficient and effective method of locating archaeological anomalies on this type of site. The machine consists of two high stability fluxgates gradiometers suspended on a single frame, accurately aligned, that can detect localised magnetic anomalies compared with the general magnetic background. When mapped in a systematic manner this allows changes in the magnetic field resulting from differing features in the soil to be plotted. Strong magnetic anomalies will be generated by iron-based objects or areas of heat-activity, such as hearths and kilns. More subtle anomalies may be generated by changes, typically in the iron-oxide content, of underlying soils, compared to the natural subsoil. This helps to detect infilling material of features such as ditches and pits, as well as overlying material such as wall lines.

4.1.3 Relatively level fields of low pasture provide good locations for this type of survey. Areas of significant slopes would preclude safe surveying, as would areas of dense vegetation, but previous site visits suggest the vast majority of the area should be open to survey.

4.1.4 Each survey area will be divided into 20m or 30m square grids along a common alignment. Within each grid, parallel traverses 1m apart will be walked at rapid pace along the same orientation. Instrument readings will be logged at 0.25m intervals, with an average cycle of 4 using an ST1 internal sample trigger. Incomplete survey lines resulting from irregular area boundaries or obstacles will be completed using the “dummy log” key.

4.1.5 Further survey information will be completed on the relevant pro-forma sheet. All data will be downloaded in the field into a laptop computer.

4.2 Data processing and presentation

4.2.1 Following completion of the detailed survey, a composite of the survey area will be created and processed using the software package Terrasurveyor v.3. After downloading, the results will be plotted in 2D.

4.2.2 The most typical method of visualizing the date is as a greyscale image. In a greyscale, each data point is represented as a shade of grey, from black to white at either extreme of the data range. A variety of processing tools (including destriping and possibly despiking) will be used to enhance any potential archaeology. The mean level of each traverse of data will be reduced to zero and all grids matched so that there will be no differences between background levels. The data will be analysed using a variety of parameters and styles and the most useful of these will be saved a JPEG/TIFF images and displayed using Adobe Illustrator software.

4.2.3 The final results will be presented at an appropriate scale tied to the Ordnance Survey National Grid. A level of interpretation of these results will also be displayed.

5 Monitoring

5.1.1 GGAT-APM will be contacted approximately one week prior to the commencement of site works, and subsequently once the work is underway.

5.1.2 Any changes to this WSI that AW may wish to make after approval will be communicated to GGAT-APM for approval on behalf of the Planning Authority.

5.1.3 GGAT-APM will be given access to the site so that they can monitor the progress of the work, they will be kept regularly informed about developments, both during the site works and subsequently during the post-fieldwork programme.

6 Post-fieldwork programme

6.1 Final reporting

6.1.1 The client report will contain, as a minimum, the following elements:

- Concise non-technical bilingual summary of the results
- Description of, and reasoning behind, geophysical survey technique
- Detailed plans of the site and survey results
- Site illustrations, related to Ordnance Datum
- Written description
- Written interpretation of results along with illustrated interpreted site plan
- Statement of local and regional context
- Conclusions as appropriate
- Bibliography
- A copy of the AW Specification

6.1.2 Copies of the report will be sent to the Client, and a copy of the report will be sent to GGAT-APM for approval. Following approval, a copy will also be sent to VoGC and the regional Historic Environment Record. Digital copies will be provided in pdf format if required.

6.1.3 The report and all relevant information will be submitted to the Historic Environment

Record following the guidelines and procedures laid out in the Guidance for the Submission of Data to the Welsh Historic Environment Records (WAT 2018).

6.1.4 A summary report of the work will be submitted for publication to a national journal no later than one year after the completion of the work.

6.2 Site archive

6.2.1 An ordered and integrated project archive will be prepared in accordance with The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017 (National Panel for Archaeological Archives in Wales) and the guidelines of the Chartered Institute for Archaeologists upon completion of the project.

6.3 Archive deposition

6.3.1 The final archive will, whenever appropriate, be deposited with a suitable receiving institution. Although there may be a period during which client confidentiality will need to be maintained, copies of all reports and the final archive will be deposited no later than six months after completion of the work.

6.3.2 Copies of all reports, the digital archive and an archive index will be deposited with the National Monuments Record, RCAHMW, Aberystwyth.

6.3.3 Wherever the archive is deposited, this information will be relayed to the HER. A summary of the contents of the archive will be supplied to GGAT-APM.

7 Resources and timetable

7.1 Standards

7.1.1 AW works to the standards and guidance provided by the Chartered Institute for Archaeologists. AW fully recognise and endorse the Chartered Institute for Archaeologists' Code of Conduct, Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology and the Standard and Guidance for archaeological geophysical survey currently in force. All employees of AW, whether corporate members of the Chartered Institute for Archaeologists or not, are expected to adhere to these Codes and Standards during their employment.

7.2 Staff

7.2.1 The project will be undertaken by suitably qualified AW staff. Overall management of the project will be undertaken by Charley James-Martin MCIfA, AW Project Manager.

7.3 Equipment

7.3.1 The project will use a Bartington Grad601 set to standard specifications.

7.4 Timetable of archaeological works

7.4.1 The work will be undertaken at the convenience of the client. No start date has yet

been agreed, GGAT-APM will be informed once this has been arranged.

7.5 Insurance

7.5.1 AW is fully insured for this type of work, and holds Insurance with Aviva Insurance Ltd and Hiscox Insurance Company Limited through Towergate Insurance. Full details of these and other relevant policies can be supplied on request.

7.6 Arbitration

7.6.1 Disputes or differences arising in relation to this work shall be referred for a decision in accordance with the Rules of the Chartered Institute of Arbitrators' Arbitration Scheme for the Institute for Archaeologists applying at the date of the agreement.

7.7 Health and safety

7.7.1 Prior to the commencement of work AW will carry out and produce a formal Health and Safety Risk Assessment in accordance with The Management of Health and Safety Regulations 1992. A copy of the risk assessment is attached, and a copy will be kept on site and be available for inspection on request. A copy will be sent to the client (or their agent as necessary) for their information. All members of AW staff will adhere to the content of this document.

7.7.2 AW will adhere to best practice with regard to Health and Safety in Archaeology as set out in the FAME (Federation of Archaeological Managers and Employers) health and safety manual Health and Safety in Field Archaeology (2002).

8 References

Chartered Institute for Archaeologists, 2014. Standards and guidance for the collection, compilation, transfer and deposition of archaeological archives.

Chartered Institute for Archaeologists, 2014. Standards and guidance for the collection, documentation, conservation and research of archaeological materials.

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Evans, J. 2021. Land at Pancross and Oakland Farm Bonvilston, Vale of Glamorgan: Archaeological Desk-based Assessment. AW Report 1900

GSB Prospection. 2015. Culverhouse Cross to Cardiff International Airport/St Athan Enterprise Zone Link: Geophysical Survey. Report G1506.

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Welsh Archaeological Trusts, 2018. Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs).

British Geological Survey: Geology of Britain viewer: www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html (accessed 14/1/21)

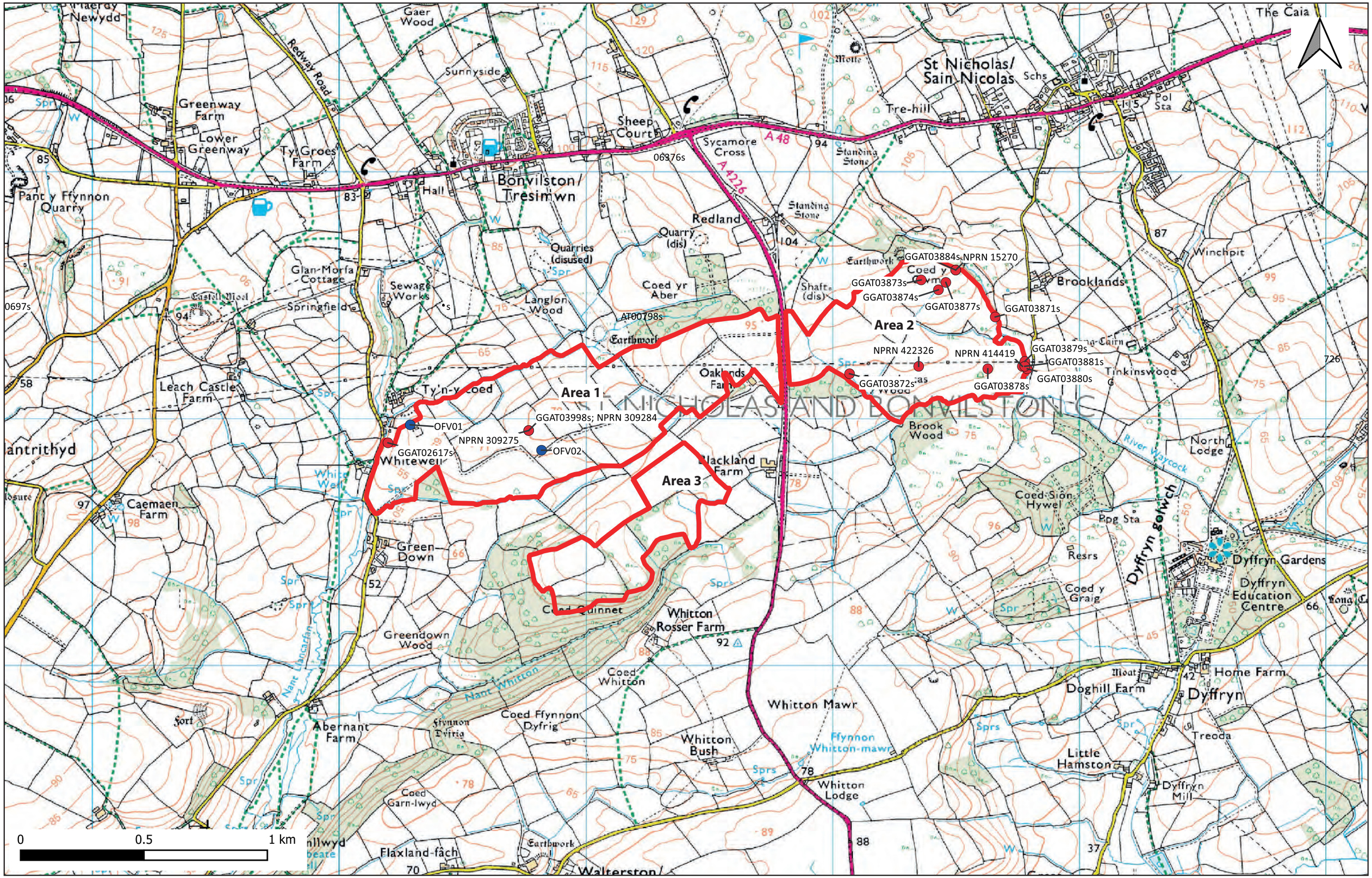

Figure 1. Map showing the location of the proposed development including sites of archaeological interest: Existing (red), and new sites identified by Evans 2021 DBA (blue).