

WAUN DDU ROMAN FORTLET

TOPOGRAPHICAL AND GEOPHYSICAL SURVEYS



Prepared by Cambria Archaeology

For Cadw



CAMBRIA ARCHAEOLOGY

REPORT NO. 2008/30
PROJECT RECORD NO. 63955

March 2008

Waun Ddu Roman Fortlet Topographical and Geophysical Surveys

By

Pete Crane BA Hons MIFA
and
Dave Hopewell

The report has been prepared for the specific use of the client. Cambria Archaeology can accept no responsibility for its use by any other person or persons who may read it or rely on the information it contains.



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

CAMBRIA ARCHAEOLOGY
Dyfed Archaeological Trust Limited
The Shire Hall, Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AF
Tel: General Enquiries 01558 823121
Heritage Management Section 01558 823131
Fax: 01558 823133
Email: cambria@cambria.org.uk
Website: www.cambria.org.uk

The Trust is both a Limited Company (No. 1198990) and a Registered Charity (No. 504616)
CHAIRMAN: C R MUSSON MBE B Arch FSA MIFA. CYFARWYDDWR DIRECTOR: K MURPHY BA MIFA

CONTENTS

Summary	1
Introduction	2
Methodology	3
Archaeological Background	4
Results	4
Discussion	6
Conclusion	6
Acknowledgements	7
References	8

Plate 1: Rhoswen possible fortlet

Figure1: Location of Waun Ddu

Figure 2: Waun Ddu Fortlet, adjacent camps and Roman Road

Figure 3: Waun Ddu, hachured plan

Figure 4: Waun Ddu, contour plan

Figure 5: Waun Ddu, geophysical plan

Figure 6: Waun Ddu, hachured and geophysical plan

Figure 7: Waun Ddu, interpretation

Cover plate: Mound at Waun Ddu during survey

**WAUN DDU ROMAN FORTLET
TOPOGRAPHICAL AND GEOPHYSICAL SURVEYS 2008**

SUMMARY

Geophysical and topographical surveys were undertaken on the Roman Fortlet at Waun Ddu (PRN 4161), located on the edge of the Brecon Beacons and 6km south east of Llandovery (NGR SN82063104). The topographical survey recorded the bank and entrance to the fort along with a mound in the corner of the fort, which has previously been suggested as a medieval motte (PRN 4152). The geophysical survey showed that this mound is unlikely to be a motte and is more probably a base for a lookout tower. This survey indicated at least one internal building along with a number of hearths, ovens or kilns.

1. INTRODUCTION

Dyfed Archaeological Trust was commissioned by Cadw to carry out fluxgate gradiometer and topographical surveys at Waun Ddu Roman Fortlet (PRN 4161) on the edge of the Brecon Beacons, Carmarthenshire (NGR SN82063104). The survey was undertaken with the assistance of Dave Hopewell from Gwynedd Archaeological Trust. This survey formed part of a Cadw funded pan-Wales study examining aspects of Roman fort environs and Roman roads. Geophysical surveys had previously been carried out at several sites across Wales and had produced good results.

2. METHODOLOGY

2.1 Topographical Survey Instrumentation

A total station EDM was used for the topographical survey recording readings along the tops and bottoms of features together with a number of spot heights, so that both contour and hachured plans could be produced. The temporary survey stations were also located with a basic Global Positioning System, probably giving results within $\pm 10\text{m}$ on the Ordnance Survey National Grid.

2.2 Geophysical Survey Instrumentation

A fluxgate gradiometer survey provides a relatively swift and completely non-invasive method of surveying large areas. Roman military sites are well suited to this technique as significant magnetic enhancement of the soil is an inevitable result of the day-to-day activities in a Roman fort. Recent surveys carried out in and around Roman forts in Gwynedd and Cumbria (Hopewell 2005 and Burnham Keppie and Fitzpatrick 2001) have demonstrated the suitability of this approach, with a wide range of features detected both within and outside the forts.

This survey was carried out using a Bartington Grad601-2 dual Fluxgate Gradiometer. This uses a pair of Grad-01-100 sensors. These are high stability fluxgate gradient sensors with a 1.0m separation between the sensing elements, giving a strong response to deeper anomalies.

The instrument detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides, which tend to be concentrated in the topsoil. Features cut into the subsoil and backfilled or silted with topsoil therefore contain greater amounts of iron and can therefore be detected with the gradiometer. This is a simplified description as there are other processes and materials that can produce detectable anomalies. The most obvious is the presence of pieces of iron in the soil or immediate environs which usually produce very high readings and can mask the relatively weak readings produced by variations in the soil. Archaeological features such as hearths or kilns also produce strong readings because fired clay acquires a permanent thermo-remnant magnetic field upon cooling. This material can also get spread into the soil leading to a more generalised magnetic enhancement around settlement sites.

Not all surveys produce good results as anomalies can be masked by large magnetic variations in the bedrock or soil or high levels of natural background "noise" (interference consisting of random signals produced by material within the soil). In some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features. It must therefore be stressed that a lack of detectable anomalies cannot be taken to mean that there are no below ground archaeological features.

The Bartington Grad601 is a hand held instrument and readings can be taken automatically as the operator walks at a constant speed along a series of fixed length traverses. The sensor consists of two vertically aligned fluxgates set 1.0m apart. Their Mumetal cores are driven in and out of magnetic saturation by an alternating current passing through two opposing driver coils. As the cores come out of saturation, the external magnetic field can enter them producing an electrical pulse proportional to the field strength in a sensor coil. The high frequency of the detection cycle produces what is in effect a continuous output (Clark 1990).

The gradiometer can detect anomalies down to a depth of approximately one metre. The magnetic variations are measured in nanoTeslas (nT). The earth's magnetic field strength is about 48,000 nT; typical archaeological features produce readings of below 15nT although burnt features and iron objects can result in changes of several hundred nT. The instrument is capable of detecting changes as low as 0.1nT.

2.2 Geophysical Survey Data Collection

The gradiometer includes an on-board data-logger. Readings in the surveys were taken along parallel traverses of one axis of a grid made up of 20m x 20m squares. The traverse interval was 0.5m. Readings were logged at intervals of 0.25m along each traverse giving 3200 readings per grid square.

2.3 Geophysical Survey Data presentation

The data was transferred from the data-logger to a computer where it was compiled and processed using ArchaeoSurveyor 2 software. The data is presented as a grey-scale plot where data values are represented by modulation of the intensity of a grey scale within a rectangular area corresponding to the data collection point within the grid. This has produced a plan view of the survey and allows subtle changes in the data to be displayed. This is supplemented by an interpretation diagram showing the main features of the survey with reference numbers linking the anomalies to descriptions in the written report. It should be noted that the interpretation is based on the examination of the shape, scale and intensity of the anomaly and comparison to features found in previous surveys and excavations etc. In some cases the shape of an anomaly is sufficient to allow a definite interpretation e.g. a Roman fort. In other cases all that can be provided is the most likely interpretation. The survey will often detect several overlying phases of archaeological remains and it is not usually possible to distinguish between them. Weak and poorly defined anomalies are most susceptible to misinterpretation due to the propensity for the human brain to define shapes and patterns in random background 'noise'. An assessment of the confidence of the interpretation is given in the text.

2.4 Geophysical Survey Data Processing

The data is presented with a minimum of processing although corrections are made to compensate for instrument drift and other data collection inconsistencies. High readings caused by stray pieces of iron, fences, etc are usually modified on the grey scale plot as they have a tendency to compress the rest of the data. The data is however carefully examined before this procedure is carried out as kilns and other burnt features can produce similar readings. The data on some noisy or very complex sites can benefit from 'smoothing'. Grey-scale plots are always somewhat pixellated due to the resolution of the survey. This at times makes it difficult to see less obvious anomalies. The readings in the

plots can therefore be interpolated thus producing more but smaller pixels and a small amount of low pass filtering can be applied. This reduces the perceived effects of background noise thus making anomalies easier to see. Any further processing is noted in relation to the individual plot.

2.5 The Roman Road over Mynydd Myddfai

The opportunity was taken after completion of the surveys to walk over the adjacent routes of the Roman Road and later trackways.

3. ARCHAEOLOGICAL BACKGROUND

The first mention of the Fortlet at Waun Ddu (NGR SN82063104) was in *Archeologia Cambrensis* in 1854 (page 129), when it was referred to as an outpost for the forts at Y Pigwn "a quarter of a mile distant". Later there was speculation that the mound in the corner could be a Norman Motte within a Roman Fortlet or even the whole site being a Motte and Bailey (Scheduled Ancient Monument file CM 194, 1961 onwards).

The Fortlet is in a strategic location with the Roman Road passing adjacent on the east side and with a far-reaching view of the road's descent towards Llandovery. The bank of the fort is quite slight being a maximum 1m above the exterior and about 0.3m higher than the interior. It is about 30m square with rounded corners to the east, south and west and, in the north corner, a rounded square mound 1m higher than the interior. There was no evidence of a ditch around the bank or the mound. To the north and east the bank has been cut by a number of former trackway routes. The area is now rough heath with varying amounts of gorse.

4. RESULTS (Figs 1 and 2)

The survey was carried out on 3-5 March 2008. An almost square area was geophysically surveyed with maximum dimensions of 100 x 100m. The survey was started on the west side of the fort working eastwards, before extending the survey to the south and west. These extensions proved negative therefore the survey was not extended any further. The weather was cold with some snow showers and lying snow for part of the second day. The amount of gorse bushes caused some problems, all were low enough to walk over but probably caused some disturbance to the geophysical survey readings. There were quite high levels of background noise across parts of the survey, presumably as a result of the bedrock being close to the surface or large stones in the topsoil.

4.1 Metal detecting evidence

While undertaking the surveys it was noted that a metal detectorist had been active recently as there were a few divots where this activity had taken place including one with a bullet cartridge. These were mostly on or around the mound.

4.2 Topographical survey and geophysical survey figures

Two versions of the topographical survey have been produced: a hachured plan (Fig. 3) and a contour plan (Fig. 4) with contours at 0.1m intervals. The geophysical survey grey-scale plot is also presented in two versions. The first (Fig. 5) shows the results, with a small amount of processing with the hachured

plan, while the second is with interpretation (Fig. 6) and has been processed using a high-pass filter which removes large scale variations in the data such as geological anomalies with the topographical hachured plan. The second figure is as above, but including an interpretation diagram (Fig. 7).

4.3 Topographical results

Figures 3 and 4

The topographical survey shows results much as previously described with the Fortlet defined by the exterior bank. The interior slope of the bank is very slight and not visible at all on the northeast side. No exterior ditch is visible except perhaps for a small portion of the south west side. There are two entrances through these banks, with the one to the southeast now being very slight.

The mound in the north corner is well defined. Approximately in the centre of the top of this mound there is an overgrown trench about 2m long by 1m wide and 0.3m deep, perhaps with slight traces of an overgrown spread spoil tip around it.

To the southwest of the corner mound, inside the fort bank, there is a much smaller mound about 0.3m high. Other than this there are no visible features, apart from an old track leading out of the northwest entrance (Fig. 3).

Outside the northwest entrance, down the hillslope, and adjacent to the northwest side of the old track, there are two linear mounds roughly 0.4m high. On the east side of the fort there are a number of old tracks. The most prominent of these are indicated on the plan. There is also the agger of the Roman road further to the east which itself had been cut by later quarries (Fig. 3).

4.4 Geophysical interpretation

Figure 7

The geophysical survey gave little indication of the bank (1). However the exterior ditch for the bank is clearly indicated (2) on all but the north corner. The northwest entrance (3) is marked only by the termination of the exterior ditch (2) and the old track (4), which can be seen extending further into the interior than was visible on the topographical survey. The southeast entrance (5) is only clearly visible by the break in the exterior ditch (2); however, there are two vague grey anomalies on either side of the entrance in the area of the bank, which may be gateposts.

The mound in the north corner (6) does not show as an anomaly and neither was there any indication of a ditch outside of the Fortlet in this area or around the mound. There was a considerable amount of heat-affected material (7) on the mound itself.

Around the small mound in the interior there was also a considerable amount of heat-affected material (8), suggesting the presence of an oven or kiln. There were also several other hearths or ovens, indicated as black areas, within the interior of the Fortlet. Other interior features are: a ditch (9) possibly with an entrance through it, a building (10) occupying part of the southwest side of the Fortlet along with parts of two more possible buildings (11).

The two linear mounds (12) outside the northwest entrance (3) show considerable amounts of heat-affected material. Outside the southeast entrance (5) there was a negative feature (13), possibly a ditch for a route from the Fortlet entrance to the adjacent Roman road. The old tracks to the west of the Fortlet

indicated on the topographical survey can also be seen as slight geophysical linear anomalies. There are a number of other small, very distinct anomalies outside the Fortlet, a few of which are likely to be iron objects, while others are probably large stones near the surface.

4.5 The Roman Road over Mynydd Myddfai

Ken Murphy

Figure 2

The section of road on Mynydd Myddfai/Mynydd Trecastle forms part of the Roman road route from Brecon Gaer to Llandovery (RR62b as defined by Margery 1973, 334-5). It passes close to Y Pigwn marching camps and Waun Ddu Fortlet. The route over Mynydd Myddfai/Mynydd Trecastle was the main coach road until superseded by the A40 in 1769. Earthworks alongside straight sections of the coach road on Mynydd Trecastle in Powys are considered to be the agger of the Roman Road. As the Roman road crosses over into Carmarthenshire its course was unclear. Fieldwork in 2008, however, has located the Roman road to the east of Waun Ddu Fortlet in Carmarthenshire. Here two straight sections of agger (240m long and 150m long) up to 1m high and 5m wide demonstrate that here the course of the coach road diverged from the Roman road. Close to the Fortlet, and on the steep slopes to the north, the line of the Roman road is lost in a series of braided tracks. One of these tracks is probably the course of the Roman road, but it is impossible to judge which one on the steep, gorse-covered slope.

5. DISCUSSION

The apparent lack of a ditch around the mound (6) in the northeast corner of the fortlet would appear to rule out its previous interpretation as a Norman Motte. It does, however, perhaps confirm an interpretation of this mound as a lookout or signal station. The heat-affected material (7) on the mound could be either from its use as a signal station or from cooking of other activities and it may have been spread when the trench was dug into the top of the mound, which is likely to have been some form of unofficial digging. The lack of a ditch around the north corner of the mound would indicate that either the mound is the earliest feature or it was designed as a part of the fortlet from its conception. Another similar fortlet with a small mound may have been discovered by aerial photography by Toby Driver of RCAHMW at Rhoswen in North Wales (Plate 1)(Hopewell pers. comm.)

The buildings (10 and 11) in the fortlet at Waun Ddu seem to have been wooden throughout and appear to exist only in the central area, possibly surrounded by an internal ditch or drain (9) that at least survives in the southeast corner. The two possible gateposts on either side of the southeast entrance also support the view of timber construction on earth or turf banks.

There are clearly a number of heat-affected areas within the fort, one of being considerable size and which also shows as a small surface mound (8). If dating evidence is required this may be an area to target for any limited archaeological investigation for radiocarbon samples. The two linear mounds (12) outside the northwest entrance are possibly dumps of ash from the ovens or kilns within the fortlet and may also be of considerable archaeological interest, both for dating, and also to analyse what was being discarded.

6. CONCLUSION

The combination of topographical survey and geophysical survey was particularly worthwhile as they complemented each other well, with both methods identifying

features that were not visible to the other. Not only has the existence of internal buildings now been confirmed, but it has also been demonstrated that the mound is most probably not a later feature but more likely to be either the earliest element of the fortlet or part of the original construction.

7. ACKNOWLEDGEMENTS

Dave Hopewell from Gwynedd Archaeological Trust for assistance with the geophysical survey and processing. Hubert Wilson of Dyfed Archaeological Trust for the topographical survey and illustrations. Ken Murphy of Dyfed Archaeological Trust for observation of the adjacent Roman Road.

REFERENCES

Burnham B C, Keppie L J F and Fitzpatrick A P, 2001 Roman Britain in 2000 1. Sites Explored. *Britannia* XXXII 312-22

Hopewell D, 2005 Roman Fort Environs in North West Wales *Britannia* XXXVI 225-269

Margary, I. D., 1973, *Roman Roads in Britain*, London: John Baker, 334-5



Plate 1: Rhoswen possible fortlet NPRN 407234 SH 69024117 RCAHMW 20 Dec 2007. Permission of RCAHMW

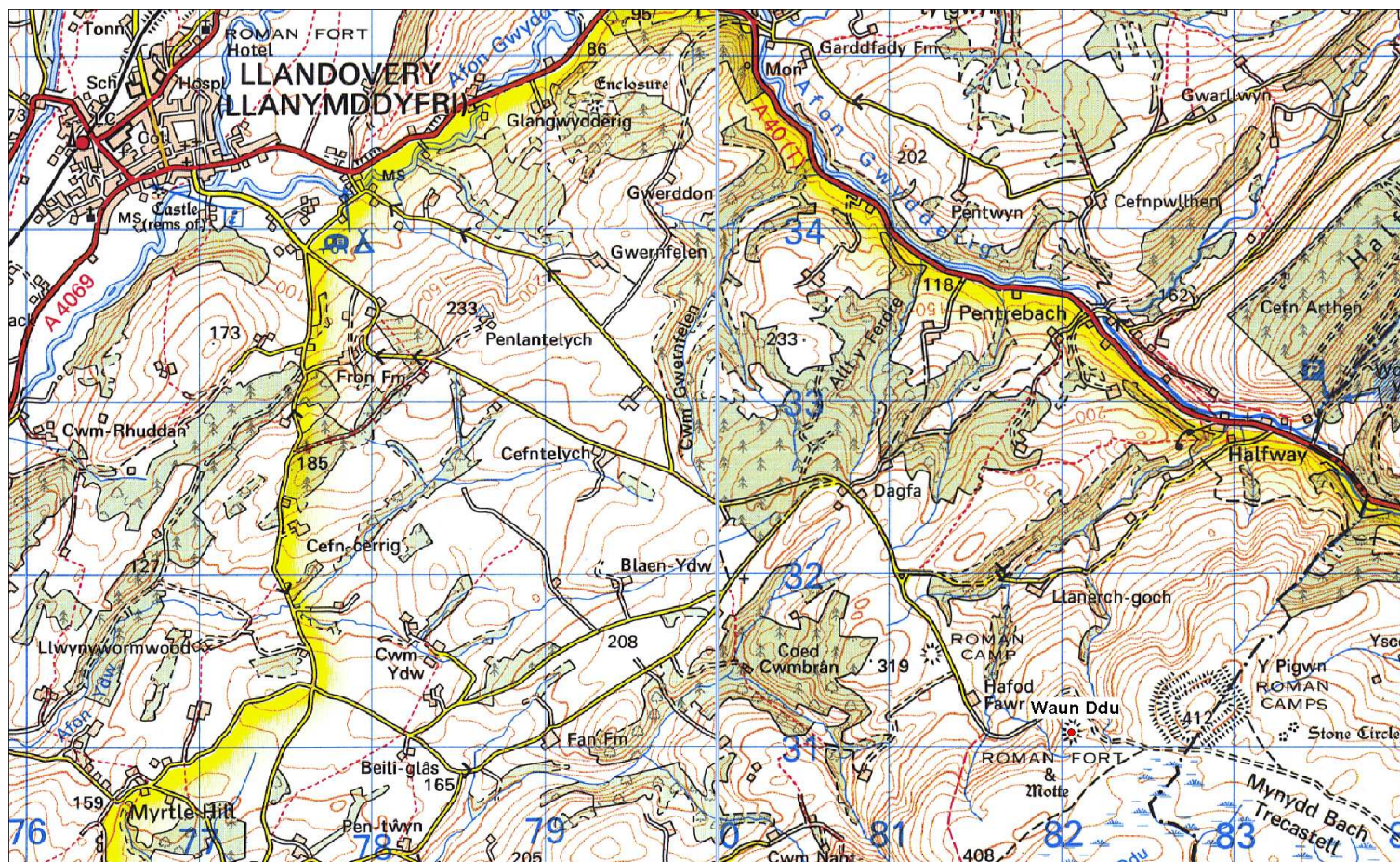


Figure 1: Location of Waun Ddu.

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Welsh Assembly Government: License Number: 100017916. 2005

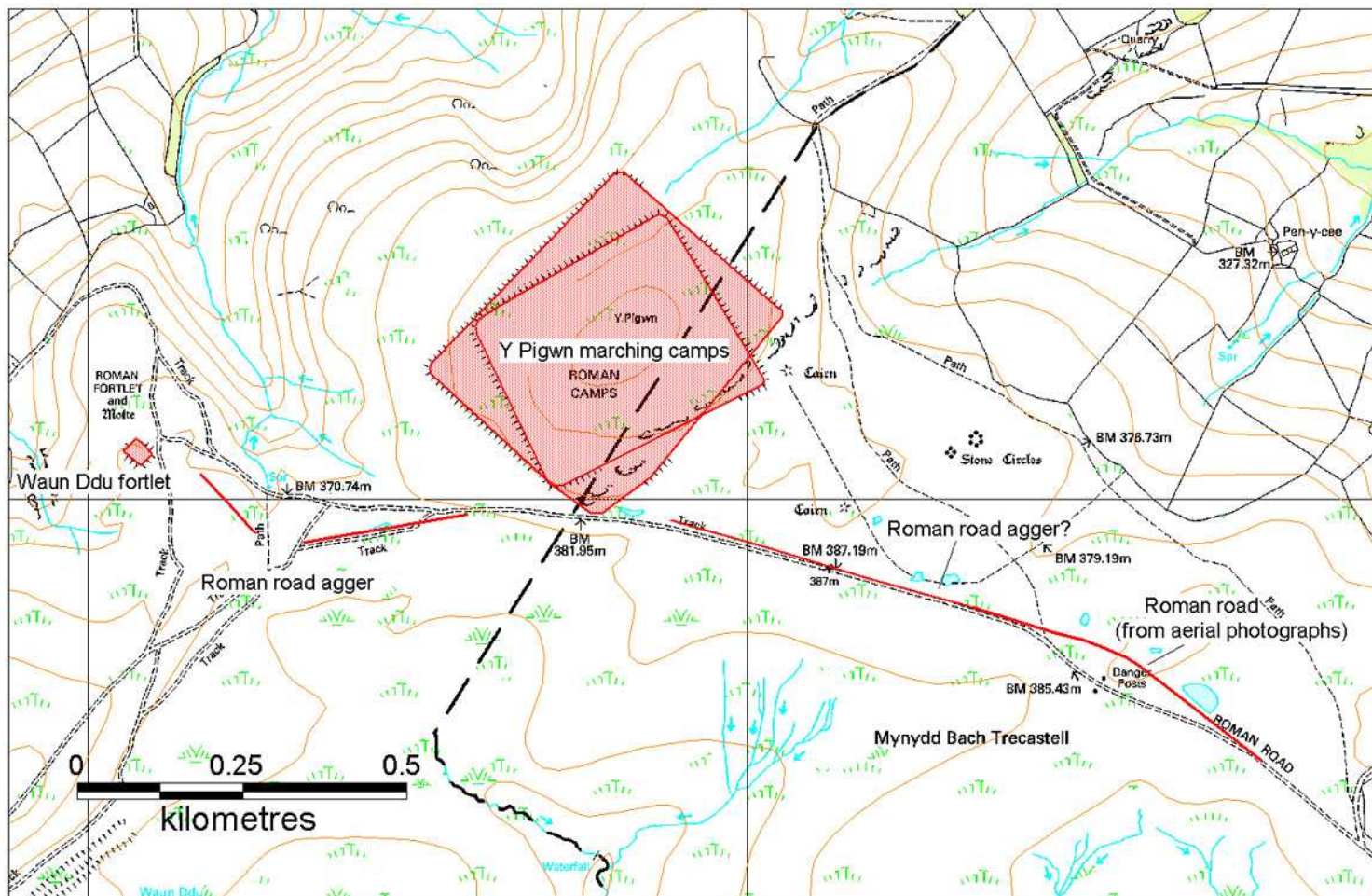


Figure 2 : Waun Ddu Fortlet, adjacent camps and Roman Road

This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Welsh Assembly Government: License Number: 100017916. 2005

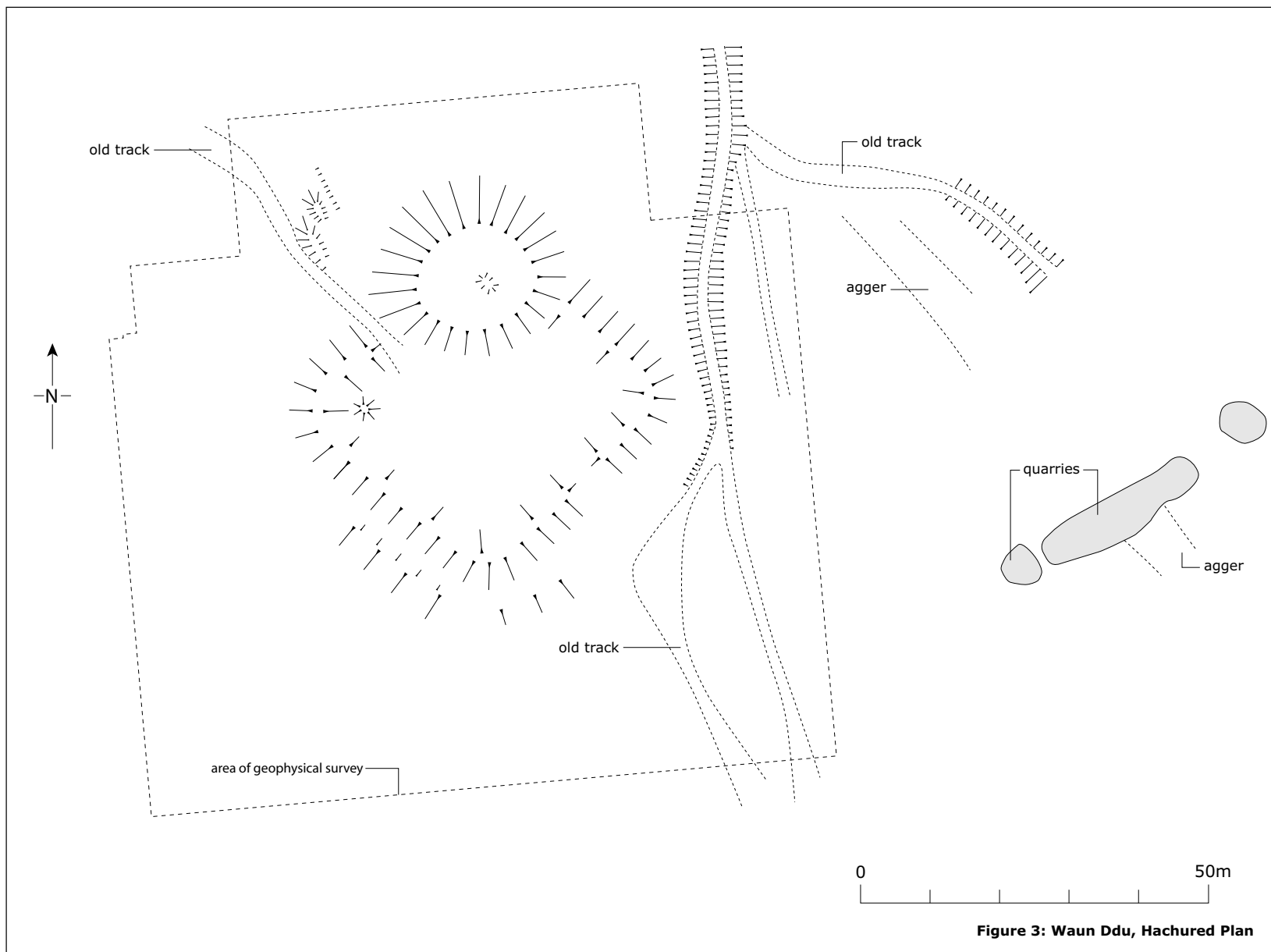


Figure 3: Waun Ddu, Hachured Plan

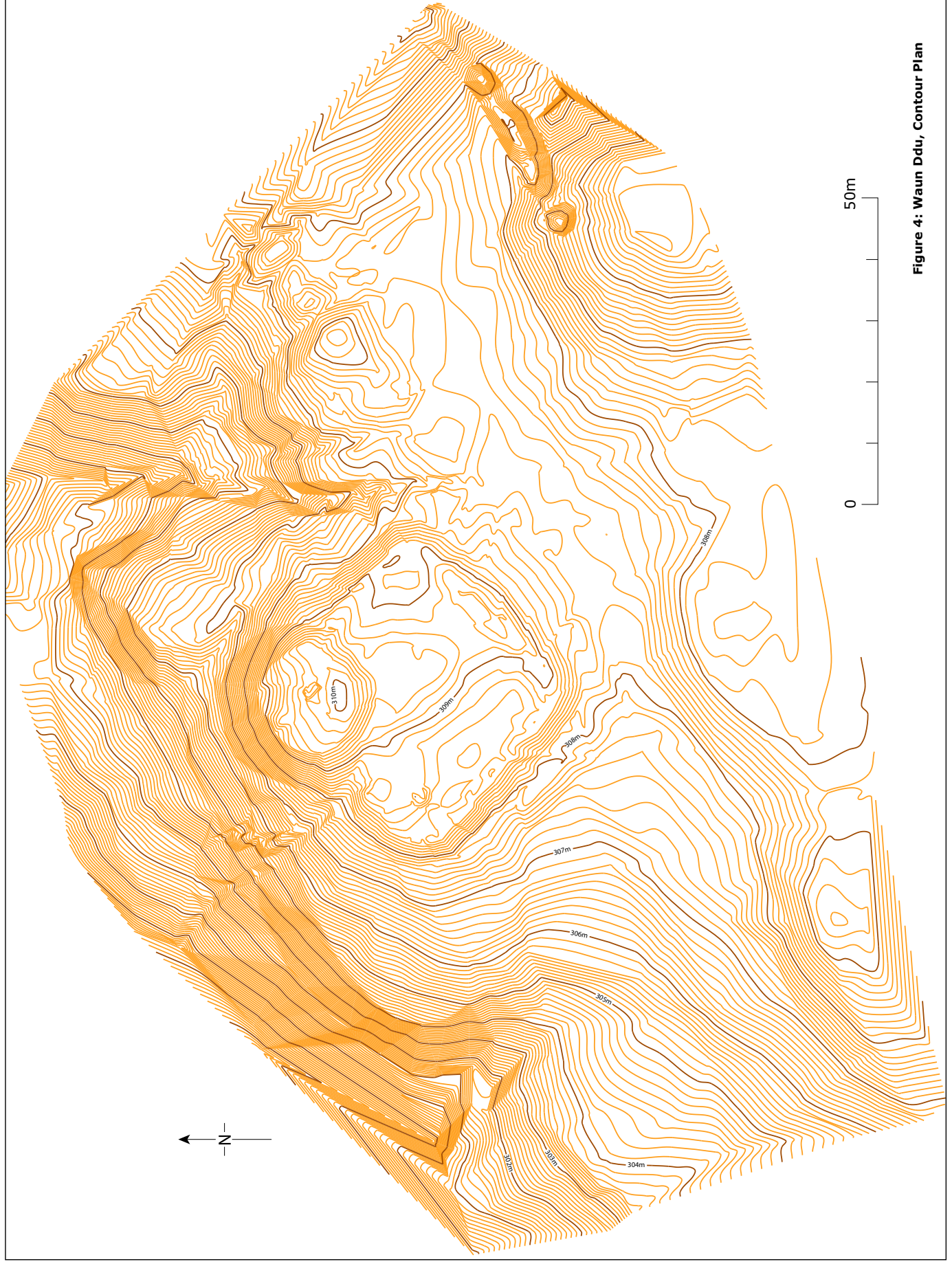
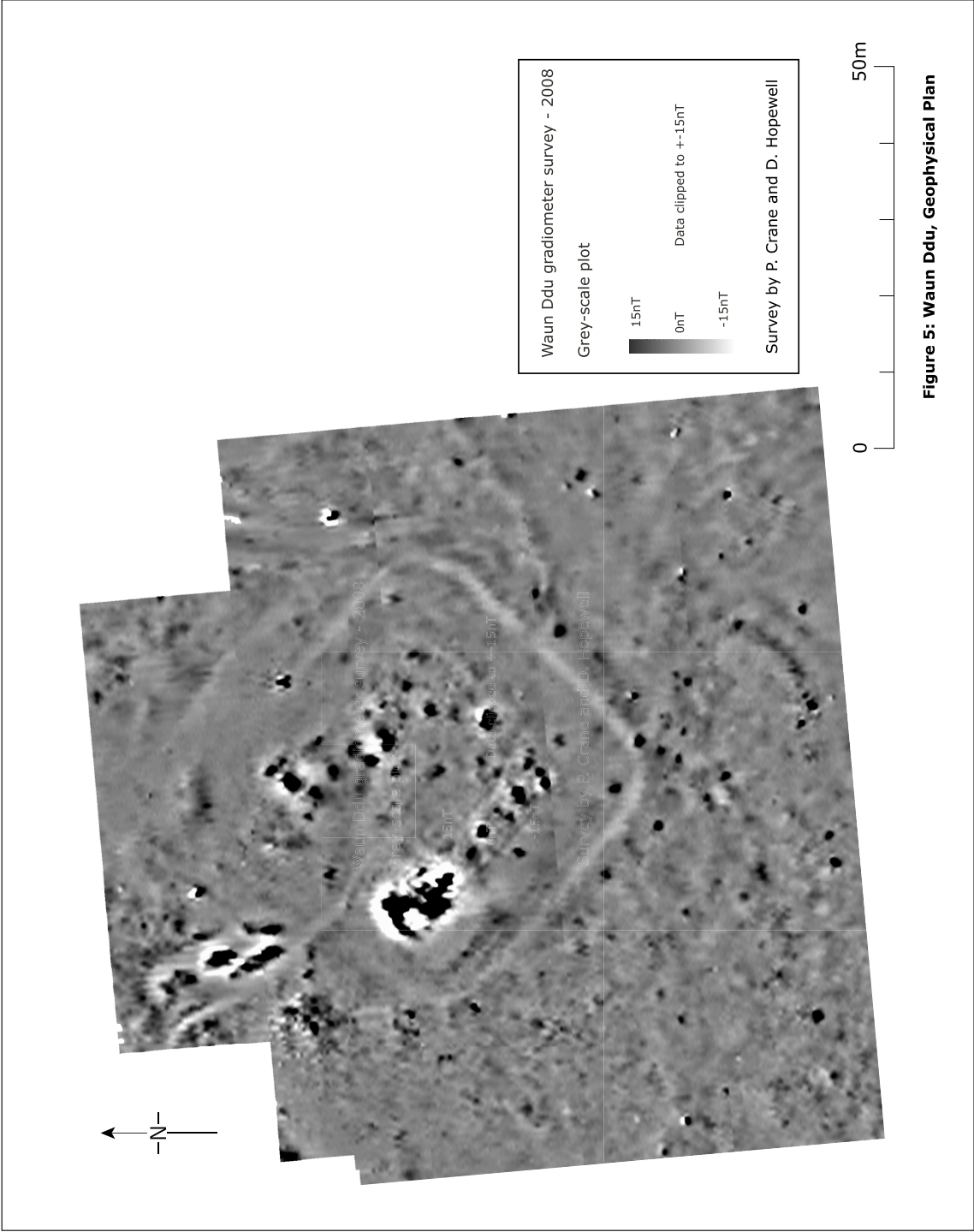


Figure 4: Waun Ddu, Contour Plan



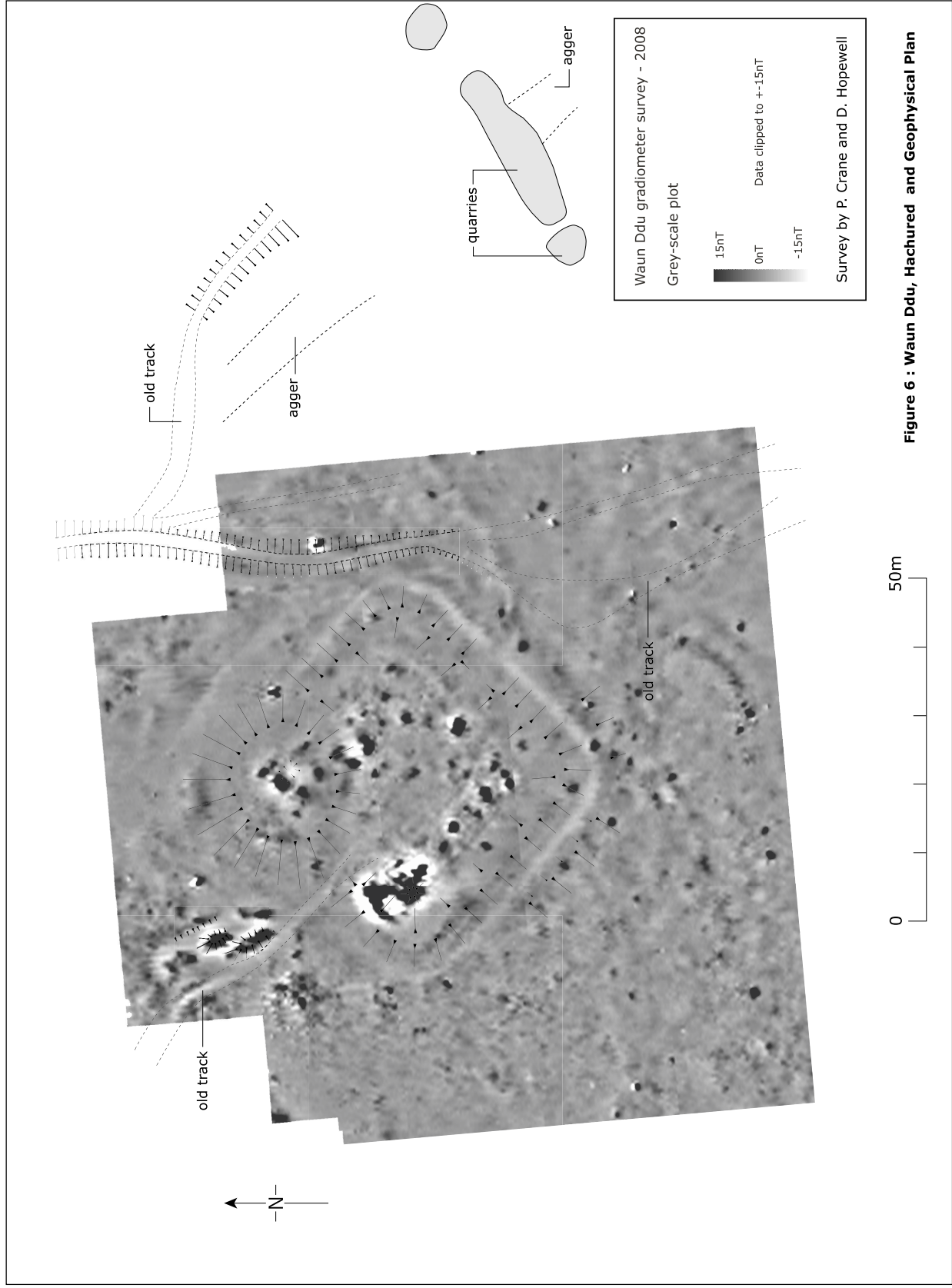
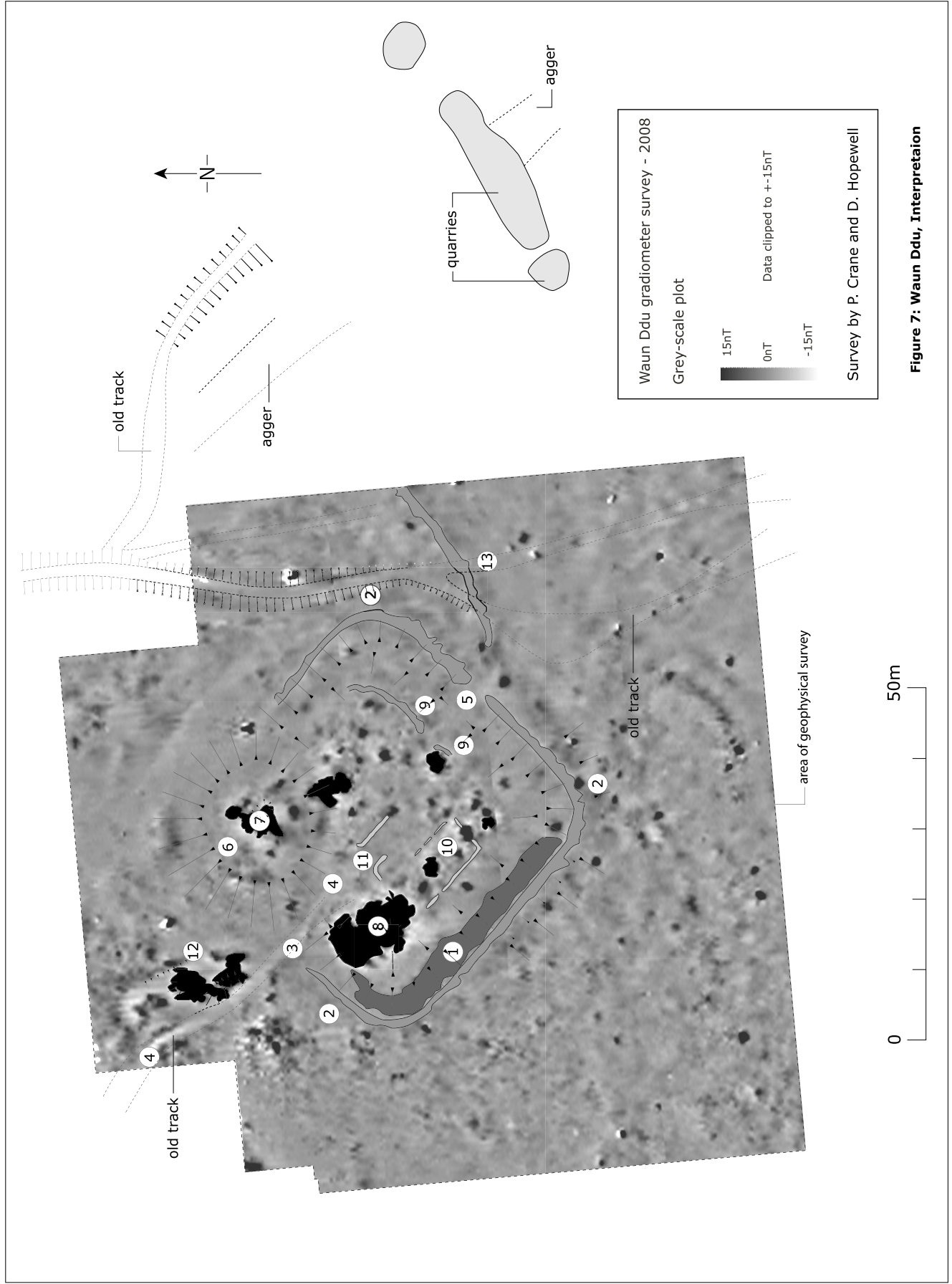


Figure 6 : Waun Ddu, Hachured and Geophysical Plan



**Waun Ddu Roman Fortlet
Topographical and Geophysical Surveys**

REPORT NUMBER 2008/30

March 2008

This report has been prepared by Pete Crane

Position: Senior Archaeologist

Signature Date 28 March 2008

This report has been checked and approved by Nigel Page

on behalf of Cambria Archaeology, Dyfed Archaeological Trust Ltd.

Position: Head of Field Services

Signature Date 28 March 2008

As part of our desire to provide a quality service we would welcome any comments you may
have on the content or presentation of this report