ARCHAEOLOGICAL EVALUATION REPORT:

GEOPHYSICAL SURVEY BY MAGNETOMETRY ON LAND OFF TABLEY LANE, PRESTON, LANCASHIRE

Planning Reference: 06/2020/1421
NGR: SD 5003 3344
AAL Site Code: PRTL 22
OASIS Reference Number: allenarc1-511265

Report prepared for RPS Group

By
Allen Archaeology Limited
Report Number AAL2022139

November 2022

Allenarchaeology

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Document Control

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Version no:	1.0	24/11/2022

Cover image: View across Field 6, looking south

Executive Summary

- RPS Group commissioned Allen Archaeology Limited to undertake a geophysical survey using magnetometry on land off Tabley Lane, Preston, Lancashire, as a condition of planning permission for a residential development.

- The site lies within the south-eastern margins of the central and eastern areas of the Fylde. Within the Fylde there is little evidence of Mesolithic and early Neolithic activity, but substantial evidence for late Neolithic/Bronze Age activity. In the medieval period the site was either located in the agricultural hinterland of Woodplumpton, Cottam or possible the deserted medieval village of Bartle. A 1770 map indicated a structure within the central-eastern area of the site, which may represent a smithy. This structure was no longer present on the 1847-49 OS map.

- The survey revealed very little of archaeological interest, with a few former field boundaries corresponding well with historic mapping shown in various parts of the site. Most prominently modern land drainage and filled in former ponds were identified.

- The electricity cables crossing the northernmost field were picked up by the survey, which potentially could mask more ephemeral features within those areas, however the rest of the field was revealed only land drainage and a former field boundary.

- A large part of one of the fields was left unsurveyed due to waterlogging and it having been churned up by cattle. This area also coincided with ridge and furrow features seen both on site and on Lidar data for the field.

1.0 Introduction

1.1 RPS Group commissioned Allen Archaeology Limited (AAL) to undertake a geophysical survey using magnetometry on land off Tabley Lane, Preston, Lancashire, as a condition of planning permission for a residential development.

1.2 The site works and reporting conform to current national guidelines as set out in '*EAC Guidelines for the Use of Geophysics in Archaeology*' (EAC 2016), '*The Use of Geophysical Techniques in Archaeological Evaluations*' (Gaffney et al. 2002), the Chartered Institute for Archaeologists '*Standard and guidance for archaeological geophysical survey*' (CIfA 2020), and a specification by this company (AAL 2022).

2.0 Site Location and Description

2.1 Preston is the administrative centre for Lancashire, approximately 14km west of central Blackburn and 24km east-southeast of central Blackpool. The proposed development area comprises nine fields totalling approximately 20.24ha at Sandy Lane and Tabley Lane. The site centres on NGR SD 5003 3344.

2.2 The bedrock geology comprises limestone of the Sherwood Sandstone Group, overlain by superficial geological deposits of Devensian Till (http://mapapps.bgs.ac.uk/geologyofbritain/home.html). Both the bedrock of Triassic and Permian sandstone, and the overlying till, are considered to give an average to poor response to magnetometry (English Heritage 2008).

3.0 Planning Background

3.1 Outline planning permission (Planning Reference 06/2020/1421) has been granted for a residential development on land at Sandy Lane and Tabley Lane, Preston. An Archaeological Desk Based Assessment (ADBA) (RPS 2020) was produced and submitted to the LPA as part of the outline planning application. Following on from the submission of the ADBA, the Planning Officer (Archaeology) at Lancashire County Council advised that a geophysical survey and subsequent evaluation trenching would be required as a condition of planning permission.

3.2 The approach adopted is consistent with the recommendations of the National Planning Policy Framework (NPPF), with the particular chapter of relevance being '*Section 16. Conserving and enhancing the historic environment'* (Department for Levelling Up, Housing and Communities 2021).

4.0 Archaeological and Historical Background

4.1 An archaeological desk-based assessment has been compiled for this site (RPS 2020), and the results are summarised below.

4.2 The site lies within the south-eastern margins of the coastal plain of western Lancashire, known as the Fylde. Whilst historically there has been a lack of Mesolithic and early Neolithic activity within this area, recent fieldwork has provided some evidence for a Mesolithic/Neolithic transition settlement east of Poulton. Evidence for late Neolithic and Bronze Age activity is more substantial, with several find spots and sites recorded within the region.

4.3 Iron Age and Roman sites are also rare, but once again recent excavations have revealed more evidence for settlement from these periods south of Poulton and at Kirkham. Close to the site the only evidence for Roman activity was the recovery of a bronze coin located approximately 730m to the north.

4.4 The estate map of 1770 and the 1838 tithe map both show a structure within the central eastern area of the site, which may represent a smithy, since the tithe award records the area around the building as 'Smithy Field'. The structure is not present in the earliest OS map (1847-1849), suggesting its demolition prior to then. The estate map has the site divided into 19 fields with 1 pond, which has increased to 22 plots of land and 2 ponds by the time of the tithe map. Later OS mapping has 13 fields and 5 ponds by 1895 and 9 fields and 4 ponds by 1965.

5.0 Geophysical Survey Methodology

5.1 The geophysical survey consisted of a detailed gradiometer survey of as much of the development area as was suitable, coming to approximately 17 hectares. The survey was undertaken in a series of 30m grids across the site.

Summary of Survey Parameters

5.2 Fluxgate Magnetometer

Instrument:	Bartington Grad601-2 Dual Fluxgate Gradiometer
Sample Interval:	0.25m
Traverse Interval:	1.00m
Traverse Separation:	1.00m
Traverse Method:	Zigzag
Resolution:	0.01nT
Processing Software:	Terrasurveyor 3.0.37.30
Surface Conditions:	Pasture
Area Surveyed:	16.89 hectares
Date Surveyed:	Monday 14th to Tuesday 22nd November 2022
Surveyors:	Robert Evershed BSc (Hons) Ben Jenkins BSc (Hons)
Data Interpretation:	Robert Evershed BSc (Hons)

Data Collection and Processing

5.3 The grids were marked using pre-programmed grids on the Leica GS08 Netrover. Magnetic data was collected on a north-northwest to south-southeast alignment due to the layout of the site boundaries. A traverse pattern close to north – south is preferable as the fluxgate gradiometer is set up and balanced with respect to the cardinal points. Since the data is plotted as north – south traverses there is considerable merit sampling the north – south response of a magnetic anomaly with as many data points as is possible, this is accomplished as the density collected along the traverse line is greater than that between traverses (Aspinall *et al*. 2008).

5.4 The data collected from the survey has been analysed using Terrasurveyor 3.0.37.30. The resulting data set plots are presented with positive nT/m values and high resistance as black and negative nT/m values and low resistance as white.

The data sets have been subjected to processing using the following filters:

- De-striping
- Clipping
- De-staggering

5.5 The de-stripe process is used to equalise underlying differences between grids or traverses. Differences are most often caused by directional effects inherent to magnetic surveying instruments, instrument drift, instrument orientation (for example off-axis surveying or heading errors) and delays between surveying adjacent grids. The de-stripe process is used with care as it can sometimes have an adverse effect on linear features that run parallel to the orientation of the process.

5.6 The Bartington Grad 601-2 is set to record date with range between -100 and 100 nT/m. The clipping process is used to remove extreme data point values which can mask fine detail in the data set. Excluding these values allows the details to show through.

5.7 The de-staggering process compensates for data correction errors caused by the operator commencing the recording of each traverse too soon or too late. It shifts each traverse either forward or backwards by a specified number of intervals.

5.8 Plots of the data are presented in processed linear greyscale (smoothed) with any corrections to the measured values or filtering processes noted, and as separate simplified graphical interpretations of the main anomalies detected.

6.0 Geophysical Survey Results (Figures 2 – 8)

6.1 For the purposes of interpreting the anomalies, the survey data has been processed to the values of -3 to 3 nT/m (Figure 3). This enhances faint anomalies that may otherwise not be noted in the data, with a number of anomalies identified across the data set. These are discussed in turn and noted as single- or double-digit numbers in square brackets. Positive anomalies represent material that is more magnetically susceptible than the surrounding material, with negative anomalies representing material that is less magnetically susceptible.

6.2 There were a few areas within the site where it was not possible to survey [1] to [8]. These represented a small structure relating to an adjacent pylon, small ponds, or waterlogged areas churned up by cattle. The entirety of Field 4 was waterlogged, and became progressively more churned up moving northwards.

Plate 1: Pylon and small structures in Field 1, corresponding with unsurveyed area [1], looking south

Plate 2: Northern part of Field 4, looking roughly west. Corresponds with area [2]. Ridge and furrow earthworks visible across field

Plate 3: Ground conditions within the northern part of Field 4 [2]

Plate 4: Small pond in Field 6 [3], looking north-northwest

Plate 5: Small pond in Field 4 [4], looking north-northwest

Plate 6: Waterlogged and rutted area within Field 4 [5], looking north-northwest

Plate 7: Waterlogged and churned up area between Fields 4 and 6 [6], looking south-southeast

Plate 8: Waterlogged and churned up entrance into Field 5 [7], also public footpath, looking east-northeast. Triangular metal lid for concrete inspection chamber visible

6.3 Scattered throughout the entire site are a large number of weak and strong dipolar responses, examples of which are highlighted as [16], [28], [33], [38], [45], [62], [64] and [67]. The characteristic dipolar response of pairs of positive and negative 'spikes' suggest near-surface ferrous metal or other highly fired material in the topsoil, which could represent small pieces of metal such as nails, horseshoes or parts of a tractor.

Field 1

6.4 Along some of the edges of the field are areas of magnetic noise [9], producing readings of -20 to 20 nT/m, which likely represents a combination of a build-up of modern waste along the edge of the field and the metal and wood fence around the field.

6.5 The large amount of magnetic noise [10] corresponds with the location of an electricity pylon and associated structures (Plate 1), producing readings of up to -100 to 100 nT/m.

6.6 Aligned roughly northeast to southwest across the field are linear areas of magnetic noise [11]. These areas have produced readings of -2 to 2 nT/m, and represent the effect of the electricity cables running above the site.

6.7 The area of magnetic noise [12] within the field, -8 to 13 nT/m, likely relates to modern waste within the topsoil. This material was visible in parts of the field while surveying and did include some modern material, but two pieces of older pottery, one medieval and one Roman were also identified. No features within the field appear to relate to either of these pieces of pottery.

6.8 Two short linear dipolar features were identified in the southwest corner of the field [13], readings up to -50 to 60 nT/m. These may represent drainage features or buried modern services. The magnetic noise from the electricity cables appears to partially mask these results.

6.9 Within the field are a few short potential positive linear features, including the series of parallel features [14], 2 to 4 nT/m, likely to represent field drainage.

6.10 The potential positive linear feature [15], aligned roughly northwest to southeast, 1 to 3 nT/m, may relate to a former field boundary seen on the 1838 Tithe Map of Woodplumpton (RPS 2022).

Field 2

6.11 There are a few areas of magnetic noise along the edges of the field [17], [18], [19] and [20], producing readings of -10 to 5 nT/m, -60 to 10 nT/m, -100 to 100 nT/m and -40 to 30 nT/m. These likely represent a combination of a build-up of modern waste along the field edge combined with the fence along the edge of the field, but also the effects of a telegraph pole [18], material associated with the construction of the new houses immediately adjacent to the site [19] and a metal gate [20].

6.12 The small area of magnetic noise [21], -10 to 10 nT/m, likely represents an area of buried modern waste within the field.

6.13 Running across the field roughly northeast to southwest is a positive linear/curvilinear feature [22], 10 to 20 nT/m, likely to represent a modern drain. It corresponds with the lowest part of the field seen on Lidar data (Figure 8), but may also correspond with a former field boundary seen on the 1770 Estate Map of Woodplumpton and the 1838 Tithe Map of Woodplumpton (RPS 2022).

6.14 The potential positive linear feature [23], 5 to 10 nT/m, may relate to land drainage, but also appears to correspond with a former field boundary seen on the Estate and Tithe Maps (RPS 2022) and also the 1st Edition OS map (Figure 7).

6.15 The positive linear feature [24], running parallel to [23], may also represent land drainage, but could in part correspond with a former field boundary seen on the 1st Edition OS map (Figure 7). The same is true for the potential positive linear feature [25], aligned roughly east to west, 3 to 5 nT/m.

6.16 The positive linear feature [26], aligned roughly northeast to southwest, 3 to 5 nT/m, is most likely a land drain.

6.17 The parallel potential positive linear features [27], aligned east to west, 1 to 2 nT/m, likely represent a former cultivation trend.

Field 3

6.18 The area of magnetic noise [29], at the eastern end of the field, -100 to 100 nT/m, is due to a metal gate making up part of the field boundary.

6.19 The small area of magnetic noise [30], -2 to 6 nT/m, likely represents an area of buried modern waste.

6.20 The parallel potential positive linear features [31], 1 to 2 nT/m, likely represent a former cultivation trend. The small potential positive curvilinear feature [32], could represent a short ditch or drainage feature.

Field 4

6.21 The area of magnetic noise along the eastern edge of the field [34], producing readings down to -100 nT/m, likely represents interference from a buried modern service outside of the survey area or material related to the construction of new homes immediately adjacent to that edge of the field.

6.22 The magnetic noise [35] along the southern edge of the field, -10 to 10 nT/m, is most likely a combination of a build-up of modern waste along the field edge and metal within the field boundary.

6.23 The linear dipolar feature [36], -50 to 80 nT/m, is probably a buried modern service, most likely a water pipe leading into the small pond (Plate 5).

6.24 Within the southwest corner of the field there is a very short linear dipolar feature [37], -25 to 60 nT/m, which likely represents a buried modern service, also potentially a drainage/ defunct water pipe feature relating to the hollow in this part of the field (Plate 6), seen clearly on the Lidar data for the site (Figure 8).

Field 5

6.25 The area of magnetic noise in the northeast corner of the field [39], -20 to 20 nT/m with some higher spikes up to -100 to 100 nT/m, could represent a build-up of modern waste within this area, or demolition material from a small building seen in this location on the Enclosure and Tithe Maps (RPS 2022), but gone by the time of the 1st Edition OS map (Figure 7).

6.26 The large area of magnetic noise [40], -100 to 100 nT/m, appears to correspond with a former pond seen on the Tithe Map (RPS 2022) and the 1st Edition OS map (Figure 7), and likely corresponds with material used to infill this. A slight hollow in this location is still seen in the Lidar data for this area (Figure 8).

6.27 The positive linear/curvilinear feature [41], aligned roughly north to south, 1 to 2 nT/m, corresponds with a former field boundary seen on the Enclosure and Tithe Maps (RPS 2022), and also corresponds with a slight hollow in the Lidar data (Figure 8)

6.28 The positive linear feature [42], aligned roughly east-northeast to west-southwest, 1 nT/m, corresponds with a slight hollow on the Lidar data (Figure 8), and potentially a former field boundary seen on the Enclosure and Tithe Maps (RPS 2022).

6.29 Within the northern part of the field there are a few parallel potential positive linear features [43], aligned roughly east-northeast to west-southwest, 0.5 to 1 nT/m, which may correspond to a former cultivation trend. These are also slightly visible on the Lidar data for the field (Figure 8).

6.30 The positive linear feature [44], and adjacent short positive linear features, 3 to 8 nT/m, represent land drainage, and a continuation of drainage seen in Field 6 immediately to the west.

Field 6

6.31 The small area of magnetic noise [46], -80 to 50 nT/m, corresponds with an area indicating a marsh on the 1st Edition OS map (Figure 7), and a hollow on the Lidar data (Figure 8), and likely represents material used to fill this area in.

6.32 The linear area of magnetic noise [47], with readings up to -100 to 100 nT/m, likely represents modern drainage, but also a former field boundary on the Enclosure, Tithe (RPS 2022 and 1st Edition OS maps (Figure 7)), as well as a linear hollow on the Lidar data (Figure 8).

6.33 The large area of magnetic noise [48], -100 to 100 nT/m, likely represents material used to fill a large pond seen on the 1st Edition OS map (Figure 8).

6.34 The area of magnetic noise along the southern and eastern edge of the field [49], -10 to 10 nT/m with some higher spikes, is likely a combination of a build-up of modern waste along the edges of the field and metal within the fence around the field.

6.35 The positive linear and curvilinear features at the northern end of Field 6 [50], 5 to 6 nT/m, represent modern drainage features.

6.36 The positive linear features [51], 3 to 10 nT/m, are also modern drainage features.

6.37 The positive linear feature [52], aligned roughly northeast to southwest, 6 to 10 nT/m, represents a modern drainage feature, and corresponds to a former field boundary in this location on the Enclosure and Tithe maps (RPS 2022).

6.38 The positive linear features [53], 10 to 20 nT/m, represent modern drainage features.

6.39 The potential positive linear/curvilinear feature [54], 4 nT/m likely corresponds to a former field boundary seen on the Enclosure and Tithe maps (RPS 2022).

6.40 The positive linear feature [55], 80 nT/m, represents modern drainage along with [47].

6.41 The linear dipolar feature [56], -100 to 100 nT/m, represents a buried modern service, likely associated with the former pond at its northern end.

6.42 The positive linear features [57], 5 to 20 nT/m, represent modern drainage features.

6.43 The parallel potential positive linear features [58], aligned roughly north to south, 2 nT/m, likely represent a former cultivation trend.

6.44 The large dipolar spikes [59], [60] and [61], -100 to 100 nT/m, relate to triangular metal covers for concrete inspection chambers.

Plate 9: Triangular metal lid of a concrete inspection chamber within Field 6

Field 7

6.45 The area of magnetic noise [63], -100 to 100 nT/m, likely represents buried modern material, possibly hardcore infilling a former feature. Potentially this material may be masking some former field boundaries seen on the 1st Edition OS map (Figure 7) in this location.

Field 8

6.46 The area of magnetic noise at the northeast part of the field [65], -100 to 100 nT/m, likely represents buried modern material, and the effect of modern farm buildings immediately adjacent to this part of the site.

6.47 There are a few short linear and curvilinear positive features within the field [66], 4 to 5 nT/m, which may represent modern drainage features.

7.0 Discussion and Conclusions

7.1 The survey has revealed a large amount of modern features across the site, with the most prominent being land drainage and filled in ponds. Some of the positioning of the land drainage corresponds with former field boundaries seen on some or all of the 1770 estate map of Woodplumpton, 1838 Tithe map of Woodplumpton or the early OS maps, and there are also a few positive linear and curvilinear features also representing former field boundaries.

7.2 The large areas of magnetic noise in the southern half of the site likely represent filled in former ponds, seen on historic mapping. These features may relate originally to former marl pits or small quarrying.

7.3 The linear features in the very northern field are a response from the overhead power cables, which did appear quite low within that field. The large area of noise in the northern field is a current electricity pylon and associated structures.

7.4 The largest area not surveyed was the northern part of Field 4. This was due to the entire field being completely waterlogged and the northern part in particular being churned up by the movement of cattle. Other unsurveyed areas were current small ponds and areas too churned up by cattle movement.

7.5 Archaeologically, apart from the former field boundaries, there are faint signs of linear features within a few of the fields which likely correspond to former cultivation, possibly ridge and furrow. However, the most noticeable ridge and furrow seen on site was situated in the field that was only partially surveyable; however, the alignment of the ridge and furrow pretty much perfectly corresponded with the traverses that were walked, so it is possible that processing the results may have removed these features within the part of the field that were surveyed. These features are clearly visible on Lidar data for the field (Figure 8).

8.0 Effectiveness of Methodology

8.1 The non-intrusive evaluation methodology employed is appropriate to the scale and nature of the site. Magnetometry was the prospection technique best suited to the identification of archaeological remains on the site. Other techniques would have required further justification and may have proved too time consuming or cost-prohibitive.

9.0 Acknowledgements

9.1 Allen Archaeology Limited would like to thank RPS Group for this commission.

10.0 References

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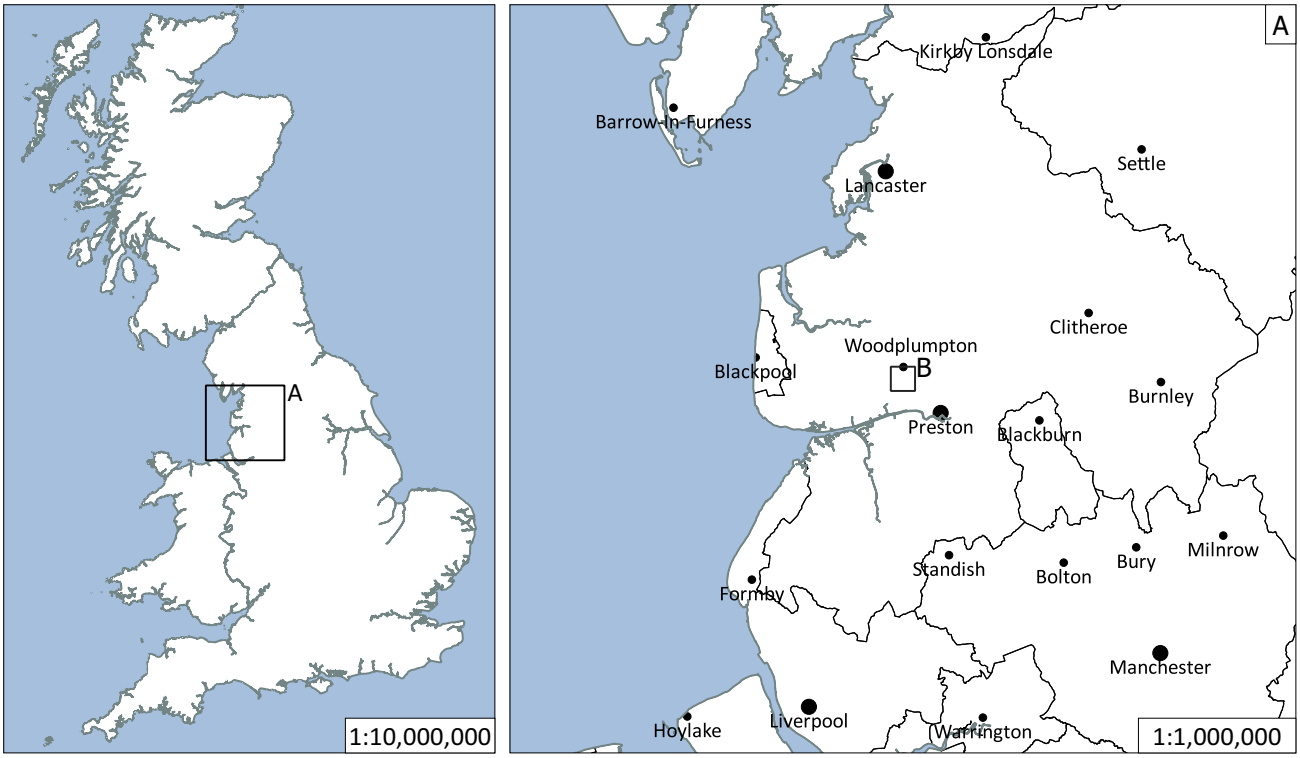

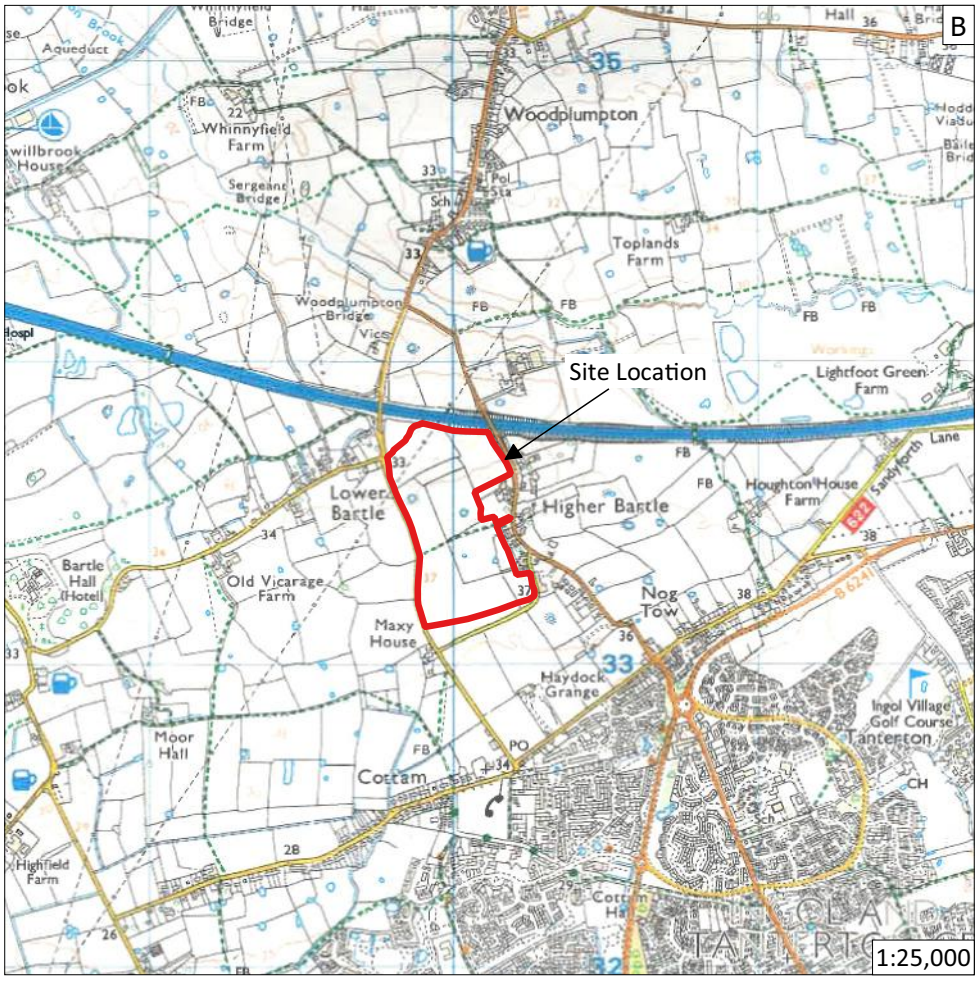

Figure 1: Site location outlined in red

Site Code	PRTL 22
Scale	1:10,000,000 1:1,000,000 1:25,000 @ A4
Drawn by	R Evershed
Date	03/11/2022

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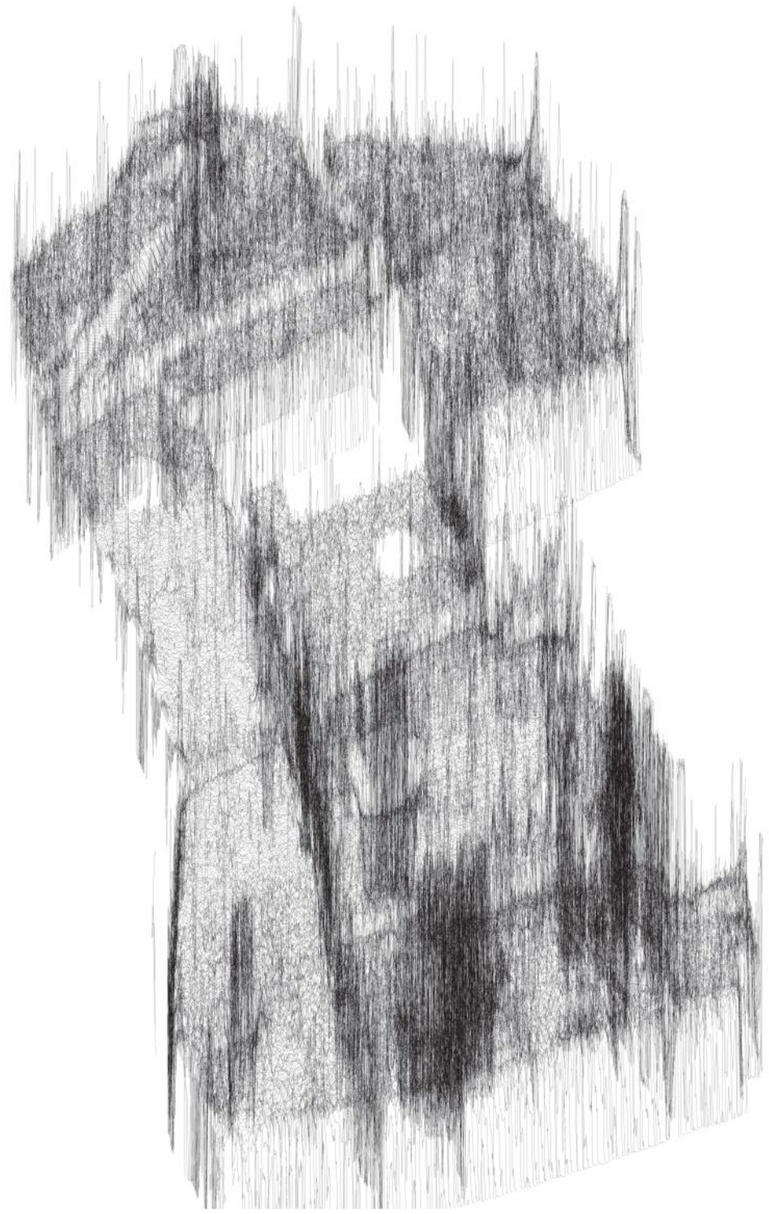
Raw data (clipped to +/- 40 nT)

40
nT
-40

Trace Plot (ZMT and clipped to +/- 25nT)



25nT

N

0 400m

Scale 1:4,000

Site Code	PRTL 22
Scale	1:4,000 @ A3
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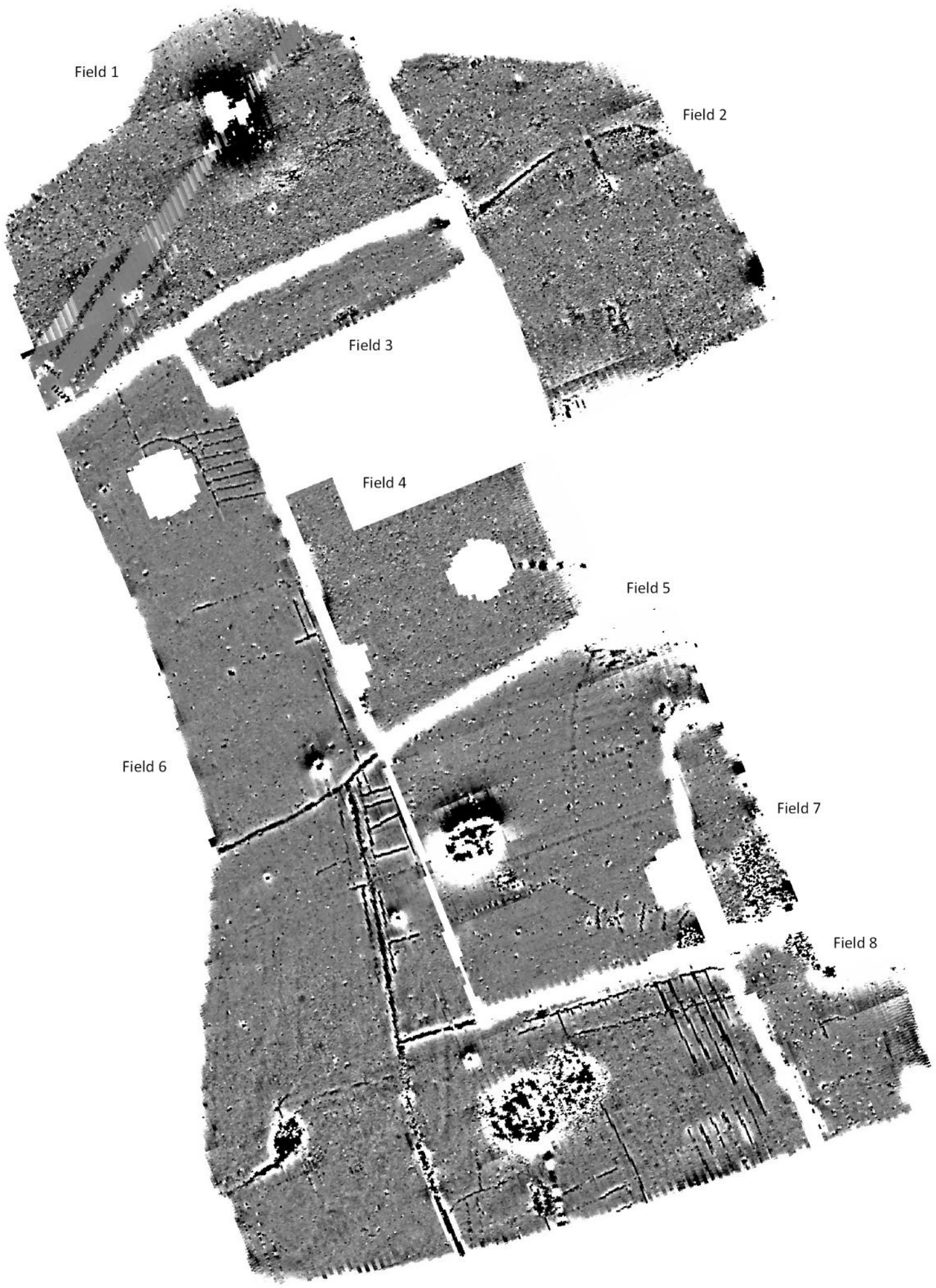
Figure 2**:** Greyscale raw data and processed trace plot



N

Key

3
nT
-3

Site Code	PRTL 22
Scale	1:2,500 @ A3
Drawn By	R Evershed
Date	24/11/2022

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Figure 3: Processed greyscale plots

0 40 80 120 160 200 m

Figure 4: Geophysical interpretation

Figure 5: Processed greyscale location

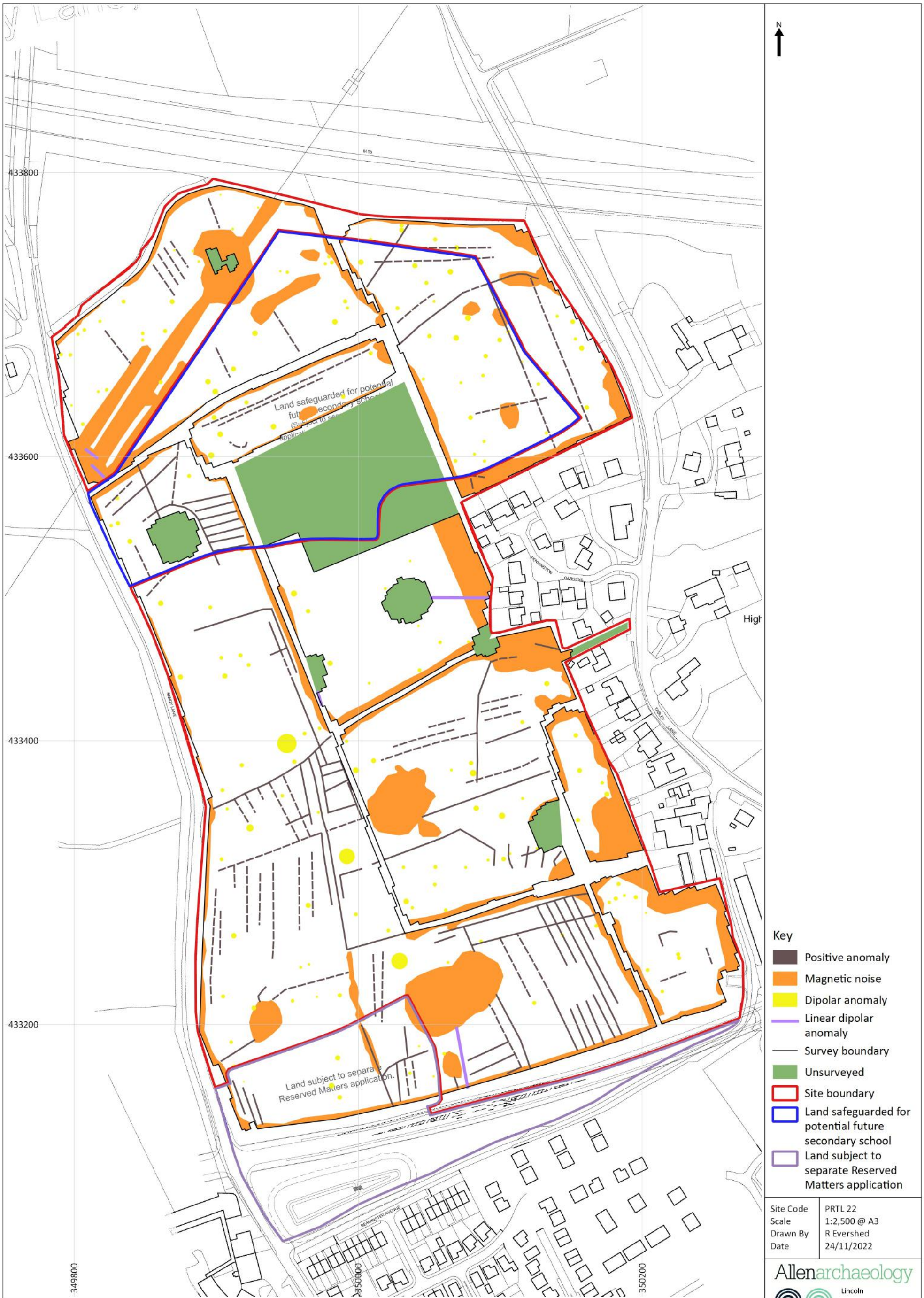

Figure 6: Geophysical interpretation location

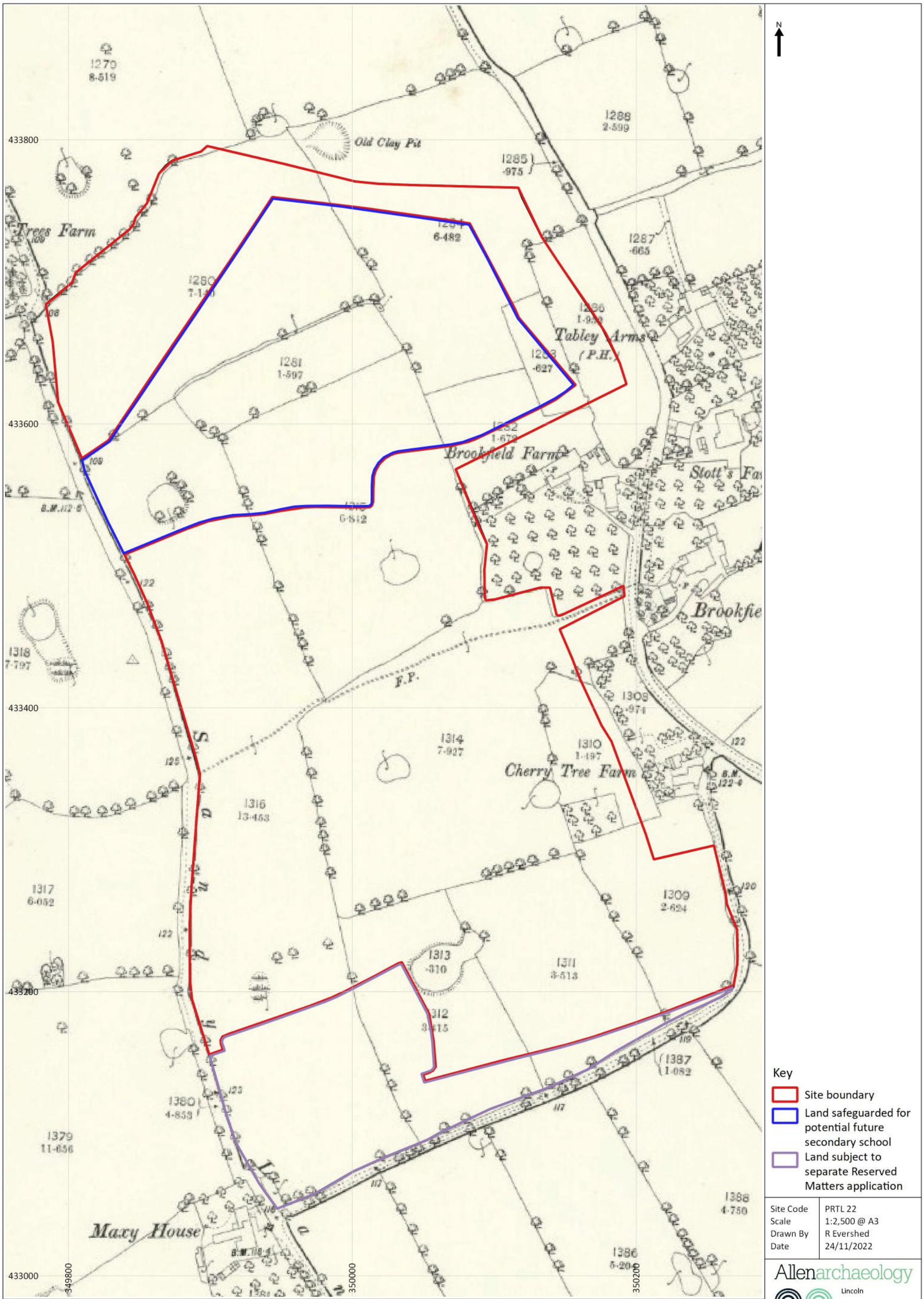

Figure 7: Site boundary superimposed over 1st Edition OS map

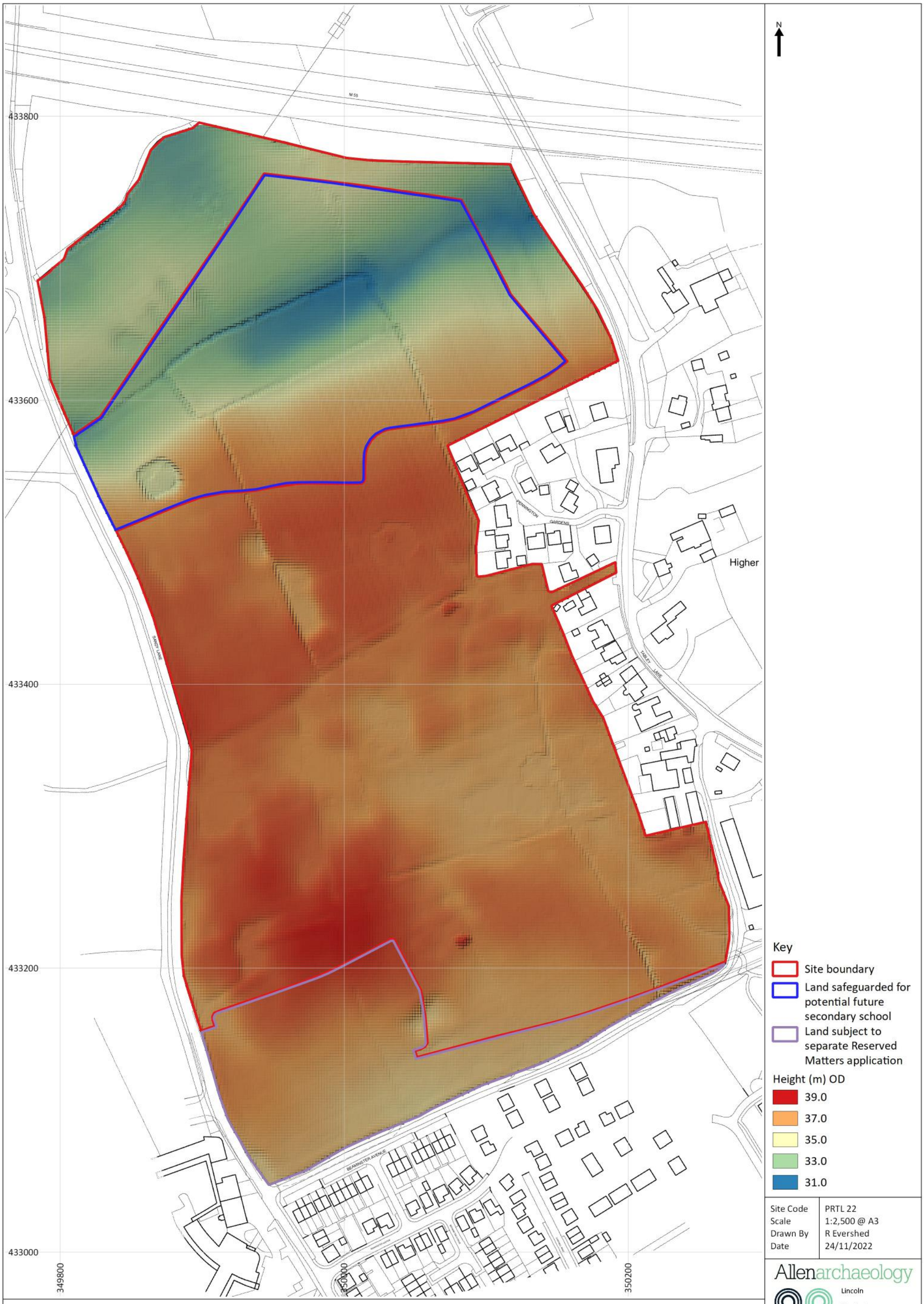

Figure 8: Site boundary superimposed over Lidar data

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