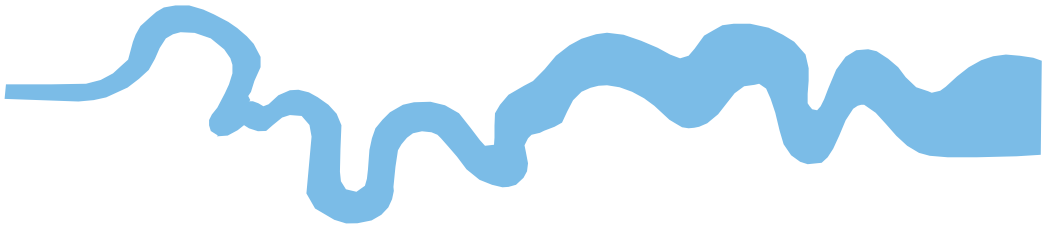
T V A S



SOUTH

Land east of Harrisons Lane, Ringmer, East Sussex

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: HLR 21/202

(TQ 4551 1223)

Land east of Harrisons Lane, Ringmer, East Sussex

Geophysical Survey (Magnetic) Report

For Gleeson Land

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code HLR 21/202

April 2022

Summary

Site name: Land east of Harrisons Lane, Ringmer, East Sussex

Grid reference: TQ 4551 1223

Site activity: Magnetometer survey

Date and duration of project: 25th - 27th of April 2022

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: HLR21/202

Area of site: *c.* 13ha

Summary of results: A number of potential features were detected by the archaeological survey such as a large number of potential pits and a pit alignment and a rectangular enclosure with associated land division.

Location of archive: The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Report edited/checked by:	Steve Ford✓ 3.5.22
	Tim Dawson✓ 3.5.22

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Land east of Harrisons Lane, Ringmer, East Sussex
A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 21/202b

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Harrisons Lane, Ringmer, East Sussex (TQ 4551 1223) (Fig. 1). The work was commissioned by Nick Keeley, on behalf of Gleeson Land, Sentinel House, Harvest Crescent, Fleet, Hampshire, GU51 2UZ.

Planning permission is to be sought from Lewes District Council for a residential development. In preparation a geophysical survey has been requested to inform the application. This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2019), and the District's policies on archaeology. The fieldwork was undertaken by Kyle Beaverstock and Luciano Cicu between the 25th and 27th of April 2022 and the site code is HLR 21/202.

The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Location, topography and geology

The site is located to the south-east of Ringmer (Fig. 1), approximately 4.3km north-east of Lewes and 6.4m south-west of Halland. The site is bounded by Harrison Lane to the west, Potato Lane to the south and farmland to the north and east. The site is comprised mostly of pastoral fields and one arable field, it is a relatively flat parcel of land sitting at a height of 17m above Ordinance Datum and the underlying geology is stated as mostly Gault Clay (BGS 2006) with potential for some Head in the south-east of the site.

Site history and archaeological background

The archaeological background has been highlighted in a desk-based assessment (Wallis 2021). In summary, Ringmer and the South Downs region in general is considered to be an archaeologically rich area (Rudling 2003). Although few sites have been identified in Ringmer itself a number of prehistoric sites have been recorded on the chalk downs to the south such as the Neolithic long barrow (Drewett 2003) and the early Iron Age settlement at Caburn hillfort (Hamilton 1998; 2003; Curwen and Curwen 1927). Also, to the north-west a Roman settlement situated at a crossroads has been identified.

Methodology

Sample interval

Data collection required a temporary grid to be established across the survey area using wooden pegs at 20m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 1600 sampling points across a full 20m × 20m grid (EAC 2015), providing an appropriate methodology balancing cost and time with resolution. The geophysical survey encountered a number of obstacles including fencing, hedgerows, trees and farm equipment. Conditions were dry and bright.

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to 10^{-9} Tesla, the SI unit of magnetic flux density.

Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both European Archaeological Council (EAC 2015) and the Chartered Institute *for* Archaeologists (2002, 2014).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for the fast yet detailed surveying of an area.

The detailed magnetometry survey was carried out using a dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometer. The instrument consists of two fluxgates mounted 1m vertically apart with a second set positioned at 1m horizontal distance. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high

response as will buried ferrous objects. More subtle anomalies such as pits and ditches, can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

A Trimble Geo7x handheld GPS system with sub-decimetre real-time accuracy was used to tie the site grid into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

Process	**Effect**
Clip from -1.75 to 1.56 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
Interpolate: *y* doubled	Increases the resolution of the readings in the *y* axis, enhancing the shape of anomalies.
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
De-spike: threshold 1, window size 3×3	Compresses outlying magnetic points caused by interference of metal objects within the survey area.
Search & Replace: from: ±30 nT to: ±1000 nT with: dummy	Removes extreme values resulting from magnetic interference caused by near-by ferromagnetic objects.
Range match (area: top 90, left 0, bottom 149, right 359) to top edge	Equalises the range of values between areas surveyed by different operatives, correcting for differences in setup.
De-stagger: all grids, both by -1 intervals	Cancels out effects of site's topography on irregularities in the traverse speed.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 3) with the processed data then presented as a second figure (Fig. 4), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 5). Anomalies are shown as colour-coded lines, points and polygons. The grid layout and georeferencing information (Fig. 2) is prepared in EasyCAD v.7.58.00, producing a .FC7 file format, and printed as a .PDF for inclusion in the final report.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 2.16.2 and exported again in .PNG format in order to present them in figure templates in

Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised, they are exported in .PDF format for inclusion within the finished report.

Results

A number of anomalies were detected by the geophysical survey (Figs. 3 and 4). In field A, along the northern boundary, are areas of magnetic disturbance represented by positive and negative magnetic responses with a high amplitude. Some of these take a linear form **[Fig. 5: 1]**, these are aligned north-east to south-west with a small section branching off to the north-west in the south and another aligned north-east to the south-west along the northern strip of field A and running into field C. These most likely represent buried services and the electric fencing along the northern and north-western boundary. In the centre of the field is a negative linear anomaly **[2]** orientated north-west to the south-east and running for *c.*96m, this anomaly was identified by the Lidar survey (Wallis 2021) and is likely to have been part of a previous field system, although it has not been marked on any maps. In the north of field A is a weak positive linear anomaly **[3]**, this anomaly is orientated north-east to south-west and runs for *c.*102m, this anomaly was also identified by the Lidar survey and is likely to be the remnants of a field boundary of a previous field system.

In the north-west of field B is an area of magnetic debris **[4]** represented by irregular positive and negative responses with a relatively high amplitude and are likely caused by subterranean disturbance, potentially containing ferrous objects. On the eastern boundary of field B is a group of positive anomalies and associated area of magnetic debris **[9]**. The primary anomaly appears to form a rectangle measuring 8m wide by 20m long with a weaker positive linear anomaly almost linking its north-eastern corner to the field boundary to the east and squared patch of magnetic debris filling the gap between its southern half and the field boundary. The size and layout of this group of anomalies suggests the presence of a buried rectangular structure aligned north-south and with a possible deposit of structural or occupation debris to its east. Across the north of field B and in the west and north of field D are a series of positive and weak positive circular and sub-circular anomalies **[5]**. These are mostly irregularly positioned and may represent a series of pits, however in field D some of these appear to form a line and may be a pit alignment **[6]**.

In the east of field E, are a series of positive and weak positive linear anomalies **[7]** and **[8]**. Positive anomaly **[7]** is a series of linear shapes that form a rectangle measuring *c.*48m long and *c.*28m wide, this is orientated north-west to the south-east with a further linear anomaly running to the north-west for *c.*41m. This feature most likely represents a small enclosure. Running through this is an L-shaped positive linear anomaly **[8]**

running south-west to north-east for *c.*46m before turning to the north-west and running for *c.*46m. The orientation of positive linear anomalies **[7]** and **[8]** suggests a relationship, however their physical relationship suggests that these may be different phases.

Conclusion

The geophysical survey successfully identified a number of potential buried archaeological features. In fields A and C, the north and west of the survey area is dominated by magnetic disturbance caused by buried services and linear magnetic anomalies that are likely related to a previous field system. In fields B and D are a series of circular and sub-circular features some of which appear to form a linear pattern, possibly representing pit alignment, along with a potential rectangular structure on the eastern edge of field B. In field E are a series of linear anomalies some of which form a rectangular feature and may represent an enclosure with associated land division. Another series of linear anomalies running through the potential enclosure may indicate different phases. These features show a strong potential for archaeological remains to be present.

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Appendix 1. Survey and data information

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

Raw data
Filename: Ringmer A RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 545536.62784878, 112243.437778717 m
Southeast corner: 545745.66784878, 112072.227778717 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 209 m x 171 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 65351, Recorded: 65351

Stats
Max: 106.50
Min: -105.20
Std Dev: 3.47
Mean: 0.40
Median: 0.55
Composite Area: 3.579 ha
Surveyed Area: 2.2738 ha

Filename: Ringmer B RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 545620.190087176, 112406.395396425 m
Southeast corner: 545725.490087176, 112365.575396425 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 105 m x 40.8 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 8087, Recorded: 8087

Stats
Max: 107.23
Min: -109.74
Std Dev: 13.91
Mean: 0.03
Median: 0.65
Composite Area: 0.42983 ha
Surveyed Area: 0.26725 ha

Filename: Ringmer C RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 545623.105796561, 112382.711574746 m
Southeast corner: 545734.905796561, 112243.481574746 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 112 m x 139 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 38679, Recorded: 38679

Stats
Max: 101.75
Min: -101.12
Std Dev: 2.83
Mean: 0.23
Median: 0.09
Composite Area: 1.5566 ha
Surveyed Area: 1.2134 ha

Filename: Ringmer D RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 545428.27873894, 112353.596337258 m
Southeast corner: 545641.99873894, 112099.316337258 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 214 m x 254 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 114623, Recorded: 114623

Stats
Max: 104.65
Min: -108.36
Std Dev: 2.50
Mean: 0.19
Median: 0.00
Composite Area: 5.4345 ha
Surveyed Area: 3.5028 ha

Filename: Ringmer E RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 545425.234529904, 112396.750411444 m
Southeast corner: 545609.964529904, 112319.530411444 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 185 m x 77.2 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 20071, Recorded: 20071

Stats
Max: 106.92
Min: -109.72
Std Dev: 8.23
Mean: 0.07
Median: 0.12
Composite Area: 1.4265 ha
Surveyed Area: 0.68443 ha

Filename: Ringmer F RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 545241.88250659, 112346.33047782 m
Southeast corner: 545445.85250659, 112137.81047782 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 204 m x 209 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 75279, Recorded: 75279

Stats
Max: 107.55
Min: -109.76
Std Dev: 10.50
Mean: -0.54
Median: -0.06
Composite Area: 4.2532 ha
Surveyed Area: 2.5115 ha

Processed data
Filename: Ringmer A.xcp
Stats
Max: 1.56
Min: -1.75
Std Dev: 0.51
Mean: -0.01
Median: 0.01
Composite Area: 3.579 ha
Surveyed Area: 2.2738 ha

GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -1.60 to 1.40

Filename: Ringmer B.xcp
Stats
Max: 1.56
Min: -1.75
Std Dev: 0.88
Mean: 0.01
Median: 0.01
Composite Area: 0.42983 ha
Surveyed Area: 0.26382 ha

GPS based Proce6
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -1.60 to 1.40
5 DeStagger by: 50.00cm, Shift Positions
6 DeStagger by: 50.00cm, Shift Positions

Filename: Ringmer C.xcp
Stats
Max: 1.56
Min: -1.75
Std Dev: 0.55
Mean: 0.01
Median: 0.01
Composite Area: 1.5566 ha
Surveyed Area: 1.2068 ha

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -1.60 to 1.40
5 DeStagger by: 50.00cm, Shift Positions

Filename: Ringmer D.xcp
Stats
Max: 1.56
Min: -1.75
Std Dev: 0.48
Mean: 0.01
Median: 0.01
Composite Area: 5.4345 ha
Surveyed Area: 3.4865 ha

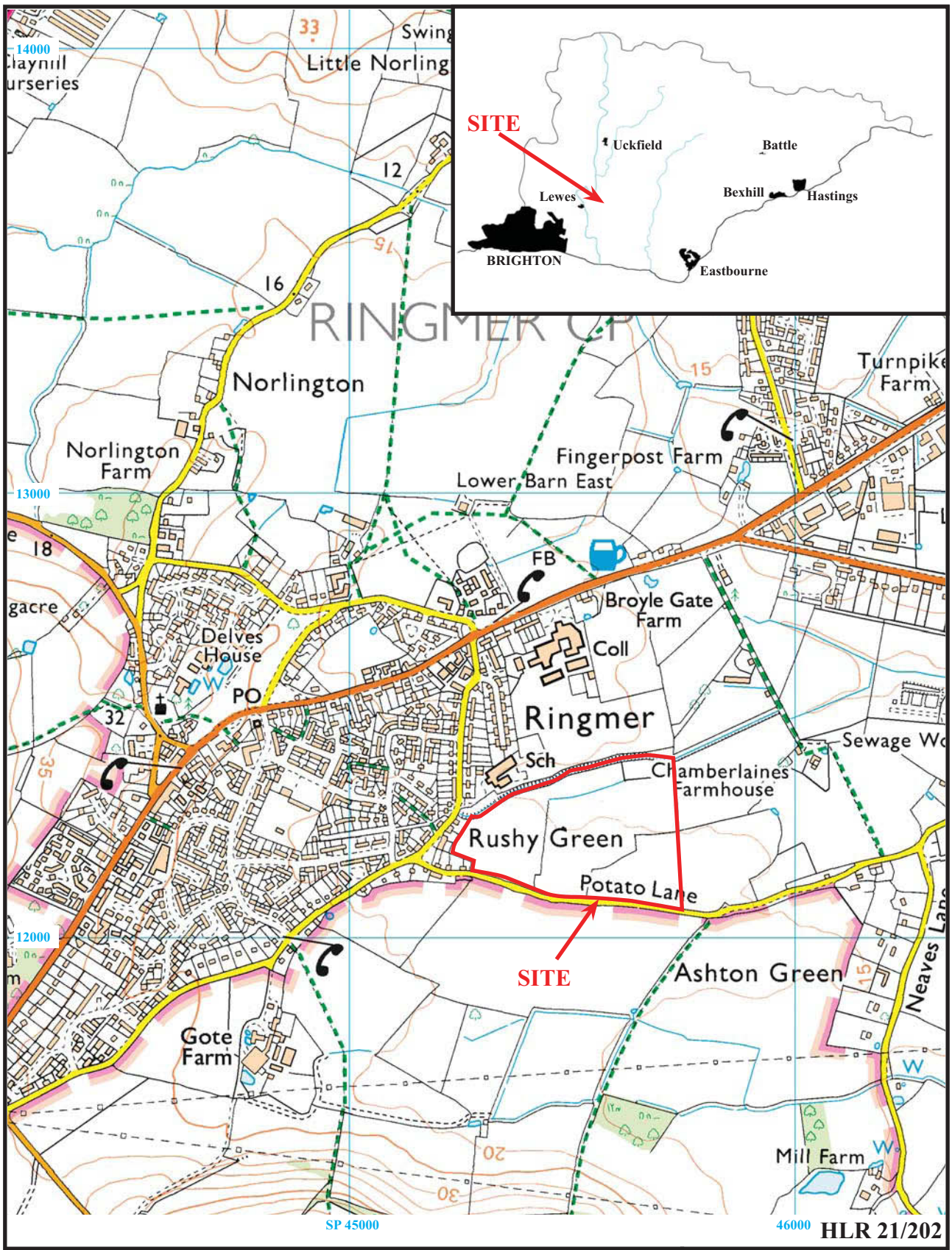
GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -1.60 to 1.40
5 DeStagger by: 50.00cm, Shift Positions

Filename: Ringmer E.xcp
Stats
Max: 1.56
Min: -1.75
Std Dev: 0.69
Mean: -0.07
Median: 0.00
Composite Area: 1.4265 ha
Surveyed Area: 0.67909 ha

GPS based Proce6
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -1.60 to 1.40
5 DeStagger by: 50.00cm, Shift Positions
6 DeStagger by: 50.00cm, Shift Positions

Filename: Ringmer F.xcp
Stats
Max: 1.56
Min: -1.75
Std Dev: 0.71
Mean: -0.05
Median: 0.00
Composite Area: 4.2532 ha
Surveyed Area: 2.4993 ha

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -1.60 to 1.40
5 DeStagger by: 50.00cm, Shift Positions



Land East of Harrison Lane,
Ringmer, East Sussex, 2022
Geophysical Survey (Magnetic)

Figure 1. Location of site within Ringmer and East Sussex.

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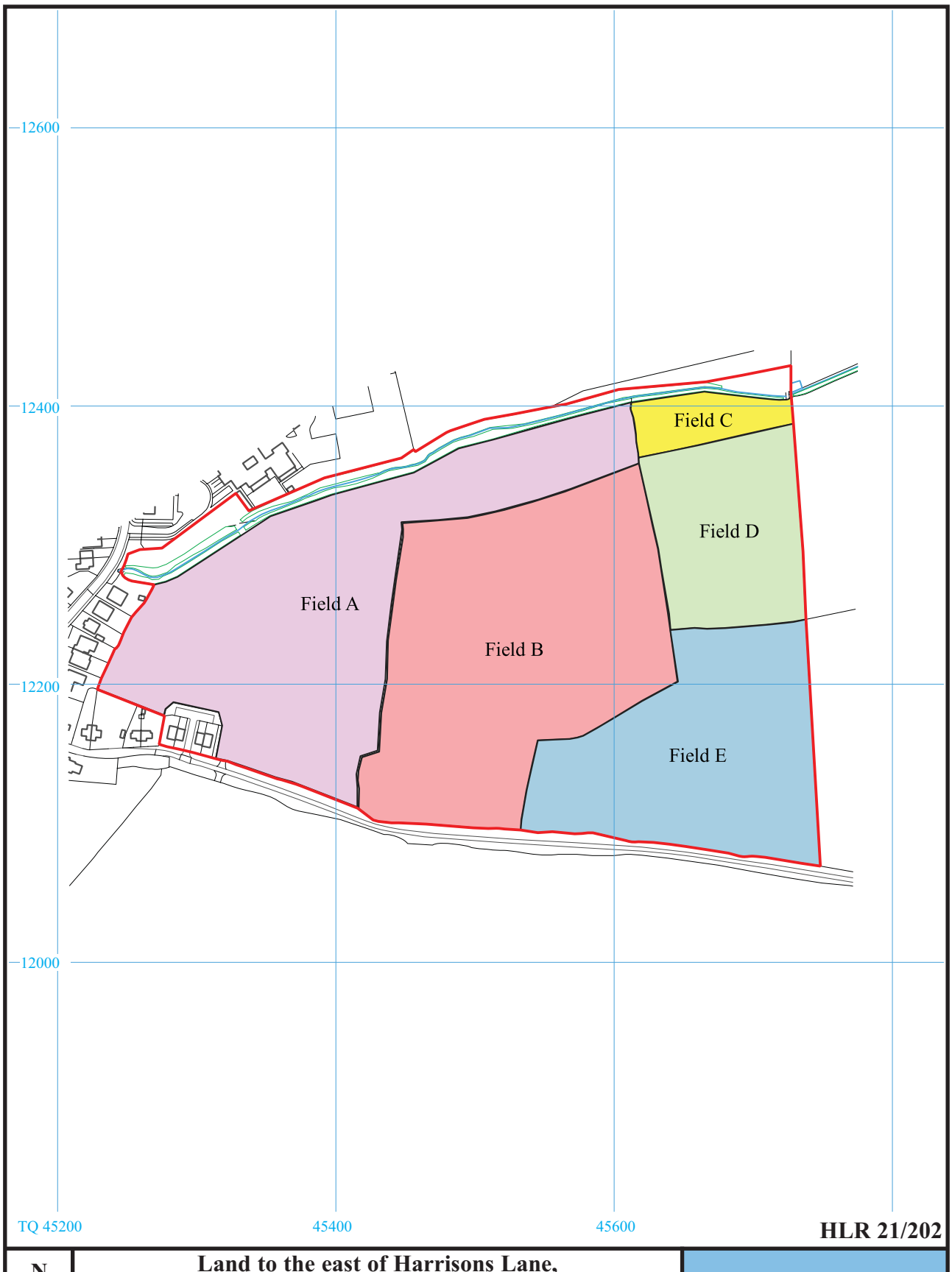

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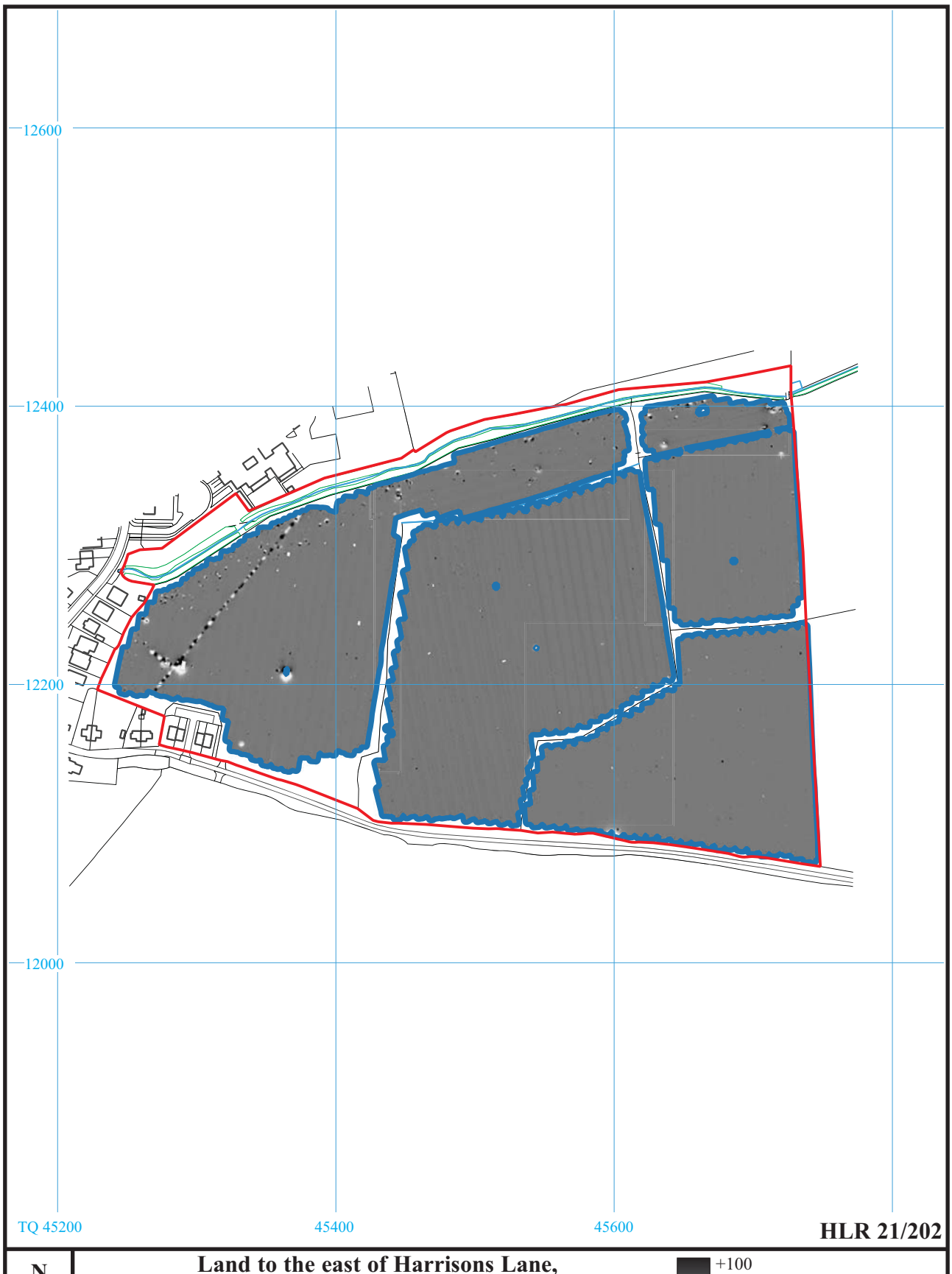
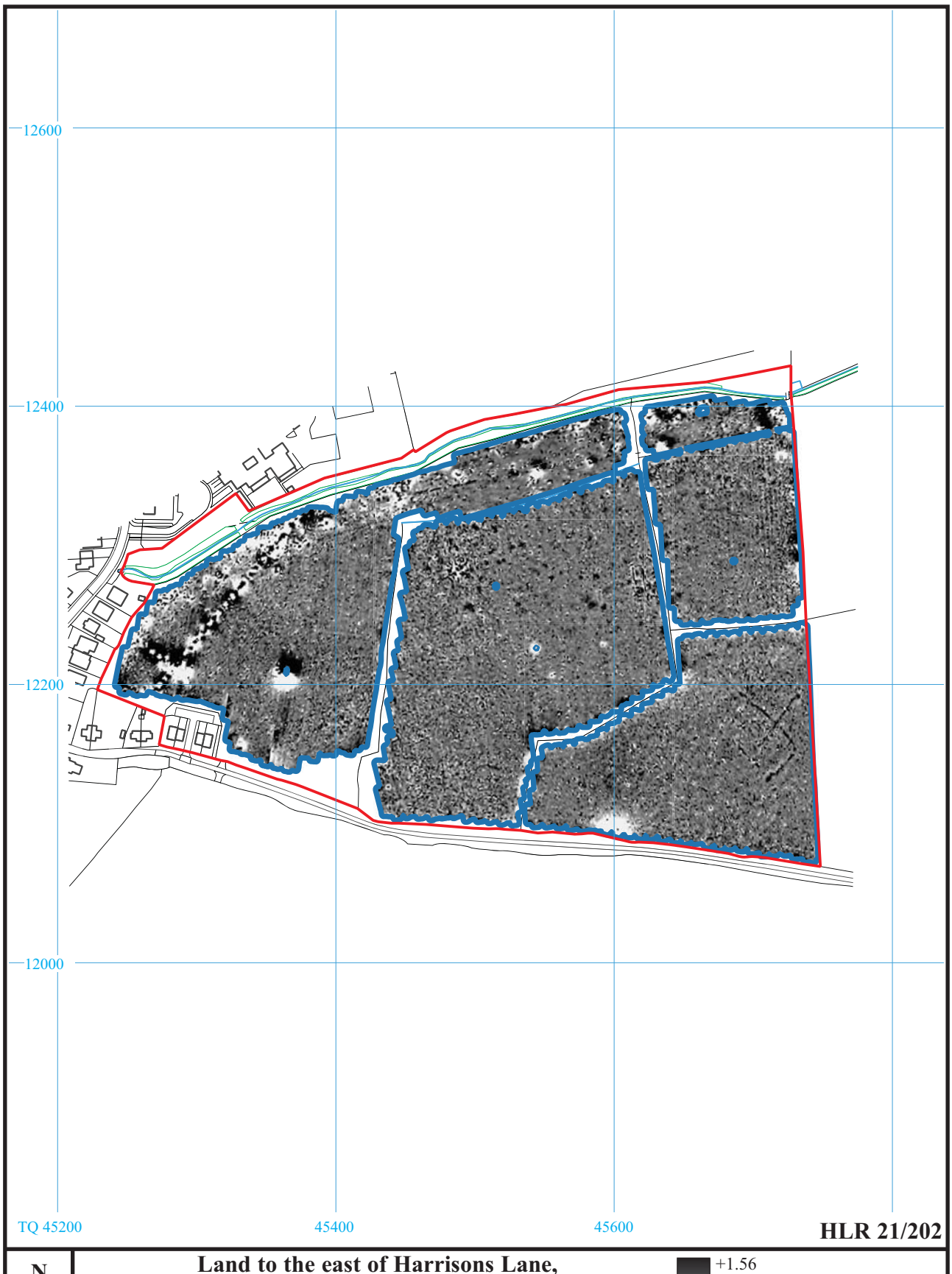
Land to the east of Harrisons Lane, Ringmer, East Sussex, 2022
Geophysical Survey (Magnetic)
Figure 2. Field plot.

0m 200m

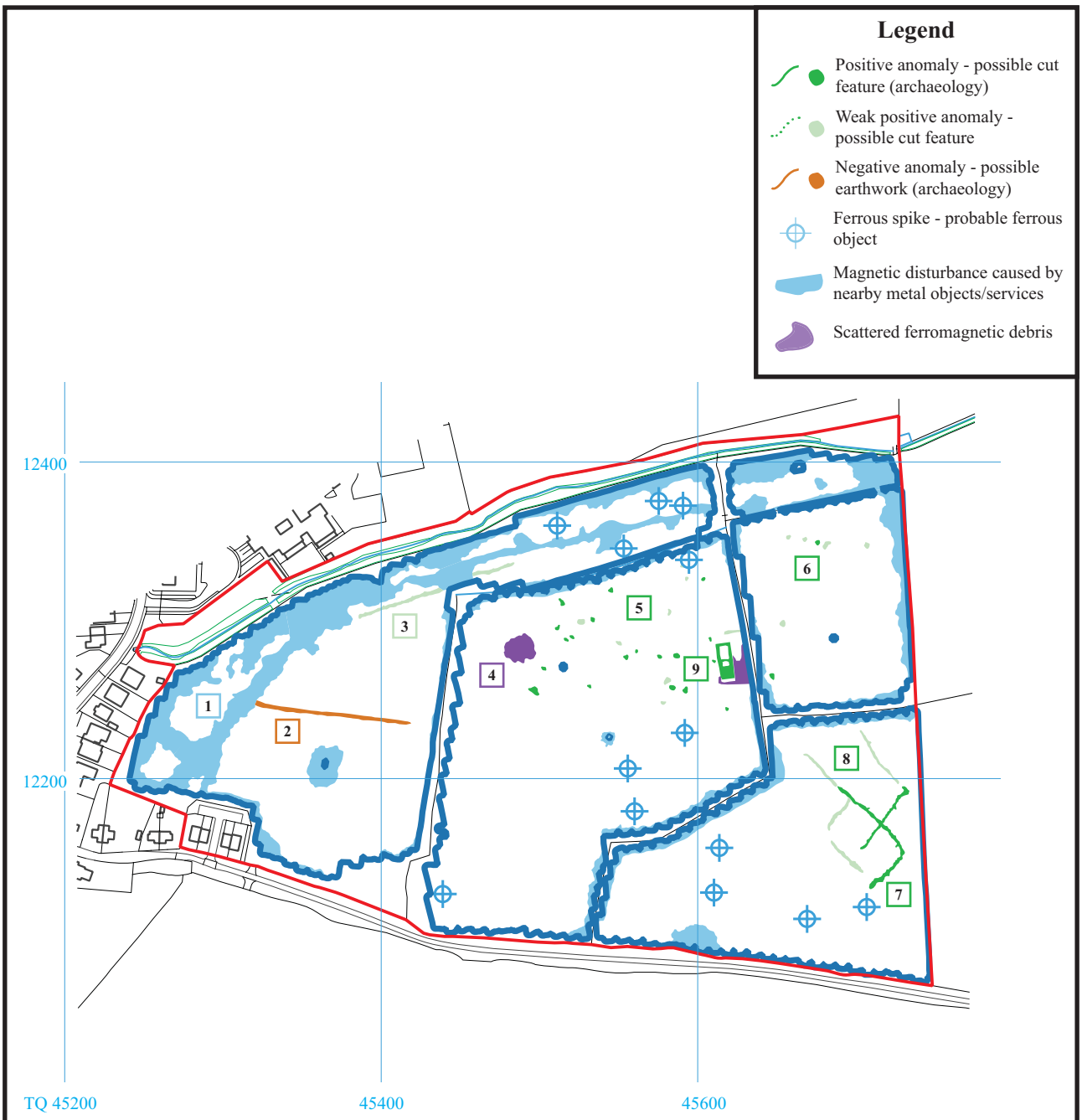
TVAS SOUTH



Land to the east of Harrisons Lane, Ringmer, East Sussex, 2022
Geophysical Survey (Magnetic)
Figure 3. Plot of raw gradiometer data.



Land to the east of Harrisons Lane,
Ringmer, East Sussex, 2022
Geophysical Survey (Magnetic)
Figure 4. Plot of processed gradiometer data.



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Land to the east of Harrisons Lane, Ringmer, East Sussex, 2022
Geophysical Survey (Magnetic)
Figure 5. Interpretation plot.

0m 200m

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Plate 1. Field A looking north-east

Plate 2. Northern strip of Filed A looking west

Plate 3. Field B looking south

Plate 4. Field C looking east

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Land to the east of Harrisons Lane,
Ringmer, East Sussex, 2022
Geophysical Survey (magnetic)
Plates 1 to 4.

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Plate 5. Field D looking south-east

Plate 6. Filed E looking south-west

Plate 7. Western area of Field E looking north-west

Land to the east of Harrisons Lane,
Ringmer, East Sussex, 2022
Geophysical Survey (magnetic)
Plates 5 to 7.

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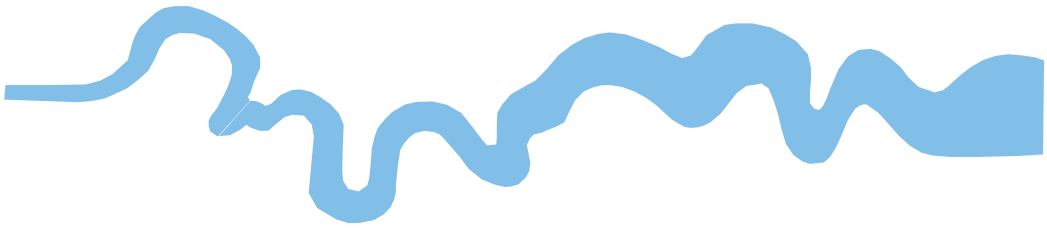
TIME CHART

	Calendar Years
Modern	AD 1901
Victorian	AD 1837
Post Medieval	AD 1500
Medieval	AD 1066
Saxon	AD 410
Roman	AD 43
	AD 0 BC
Iron Age	750 BC
Bronze Age: Late	1300 BC
Bronze Age: Middle	1700 BC
Bronze Age: Early	2100 BC
Neolithic: Late	3300 BC
Neolithic: Early	4300 BC
Mesolithic: Late	6000 BC
Mesolithic: Early	10000 BC
Palaeolithic: Upper	30000 BC
Palaeolithic: Middle	70000 BC
Palaeolithic: Lower	2,000,000 BC



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