Land South of Kirby Lane, Melton Mowbray, Leicestershire: Geophysical Survey Report

Bloor Homes Ltd

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Executive Summary

Curra Terrae were commissioned by Stantec on behalf of Bloor Homes Ltd to conduct an archaeological geophysical survey on land south of Kirby Lane, Melton Mowbray, Leicestershire. The survey was commissioned with the aim of establishing the northern extent of archaeological anomalies previously identified to the south in 2022.

The geophysical survey produced good data throughout, and has confirmed the presence of additional archaeological anomalies likely to be associated with the same period of occupation as those previously identified to the south in the previous survey area. Further anomalies and trends indicative of historical and more land use have also been identified.

A significant and complex series of anomalies is noted, predominantly in the southern portion of Field 4. This is comprised of numerous interconnected ditch- and pit-like anomalies forming a series of probable enclosures, pits, and ditches on varying alignments. This is suggestive of the presence of a substantial and multiphase settlement complex which is likely to be Iron-Age to Romano-British in origin.

The dense anthropogenic activity within Field 4 seems to end prior to the early-medieval period, suggesting that the settlement was later abandoned. This is supported by medieval agricultural activity in the form of ridge and furrow cultivation not seemingly respecting the position of the settlement and extending across the area of archaeological activity.

Modern agricultural activity is also noted within the dataset as well as former field boundaries illustrated in historical OS maps from the 19th Century. Modern land drains are also clearly visible in the dataset.

1. Introduction

1.1 Project Background

1.1.1 Cura Terrae were commissioned by Stantec on behalf of Bloor Homes Ltd to conduct an archaeological geophysical survey ahead of a forthcoming planning application for development of land at south of Kirby Lane, Melton Mowbray, Leicestershire (hereafter 'the Site').

1.1.2 The Site is situated between National Grid Reference (NGR) 473330 317410 (SK 73330 17410) in the west and NGR 474540 317410 (SK 74540 17410) in the east (Figure 1).

1.2 Location, Topography and Geology

1.2.1 The Site is c. 25 ha in size, comprised of six arable fields, and is situated immediately south of Kirby Lane, southwest of the town of Melton Mowbray, and approximately 19 km northeast of Leicester in the county of Leicestershire.

1.2.2 The Site is bounded to the north by Kirby Lane. The south, east, and west are bounded by open agricultural fields. The Site is situated adjacent to the small settlement of Eye Kettleby. Fields 1 and 2 are divided by Eye Kettleby Drive / The Driveway. Each land parcel is defined by a hedgerow boundary. The southern portions of Fields 1, 2, 4, and 6 have been previously subject to geophysical survey (MOLA 2022), so were omitted from this phase of survey work.

1.2.3 The Site is undulating land, rising gradually towards the east and is recorded at approximately c. 75 m and 102 m above Ordnance Datum (aOD). The Site falls slightly again to the east to 93 m aOD.

1.2.4 The underlying bedrock of the Site is recorded as Blue Lias Formation – Mudstone. Superficial deposits vary extensively across the Site. Oadby Member - Diamicton, is the most common deposits across the survey area, with smaller deposits of Colluvium (Clay, Silt, Sand and Gravel), Head (Clay, Silt, Sand and Gravel), Bytham Sand and Gravel Formation (Sand and Gravel) and Glaciofluvial Deposits (Sand and Gravel) also recorded (British Geological Survey, 2025).

2. Archaeological and Historical Background

2.1 Introduction

2.1.1 Below is a summary of archaeological and heritage data compiled from publicly available Historic Environment Records (online) and by MOLA (2022) for previous geophysical survey investigations within an approximate 1 km search radius of the Site. While not exhaustive, this section aims to present a summary of findings considered relevant to the interpretation of the geophysical survey data collected.

2.2 Summary

2.2.1 The southern portions of Fields 1, 2, 4, and 6 were previously subject to geophysical survey (MOLA, 2022a). Extensive archaeological anomalies were identified by the survey in the Field numbered 4 for the currently proposed stage of geophysical survey works.

2.2.2 The area runs south of, and partially through, an area that has been subject to previous archaeological investigations. These comprised two stages of geophysical survey, in 2008 and 2015 (Walford 2016), followed by a trial trench evaluation and fieldwalking in 2017 (Simmonds and Morris 2017; Wolframm-Murray 2017).

2.2.3 The Leicestershire and Rutland Historical Environment Record (HER) records other archaeological sites and findspots located close to, but outside of, the survey area.

Prehistoric - Roman

2.2.4 The geophysical surveys detected two archaeological sites of Iron Age to Roman date. One was an enclosed settlement containing several roundhouses (Leicestershire and Rutland Historic Environment Record No. MLE8003) and the other a larger site laid out in a 'ladder settlement' pattern with evidence of multiple phases of development (MLE3928). Both of these lay in the main part of the survey area; no substantial archaeology was detected in the outlying western parcel (Walford 2016).

2.2.5 The trial trench evaluation confirmed the presence and dating of the two detected sites but found that the survey had understated the prevalence of archaeological features, many of which were obscured and heavily truncated by the remains of medieval ridge and furrow cultivation. Additional remains in the eastern portion of the area included two inhumations of Iron Age to Roman date (MLE23805), and two groups of ditches containing Iron Age to Roman pottery that are thought to represent field systems associated with the nearby settlement (MLE22564,

MLE23806). Further remains of Iron Age to Roman field systems were uncovered on land lying north of the central portion of the current road corridor (MLE23808) (Simmonds and Morris 2017).

2.2.6 The fieldwalking survey identified background scatters of prehistoric, worked flints and Roman and later potsherds across the walked areas but did not resolve any significant concentrations of finds (Wolframm-Murray 2017).

2.2.7 A Neolithic to Bronze Age flint scraper was recovered just west of Sandy Lane, north of the survey area, in 1993, and further flint flakes were recovered during later archaeological works in 2017 (HER No. MLE7588).

2.2.8 A geophysical survey was conducted in 2021, to the west of the proposed survey area, between Kirby Lane and the A607. An enclosure was detected with various curvilinear anomalies and two possible ring ditches, potentially representing an Iron Age barrow or roundhouse (MLE26193; Forshaw-Perring 2021).

2.2.9 A Roman site located north of Kirby Lane and west of Rydal Manor, north of the current survey area, was explored though a geophysical survey and trenching in 2016. Several rectilinear enclosures were detected and excavated, revealing boundaries, postholes, and possible beam slots. Recovered artefacts included upwards of 20 pottery sherds of 3rd- to 4th-century date, animal bones and roofing tile fragments (MLE22356).

Medieval

2.2.10 A field walking exercise was conducted in the 1980s and 1990s, to the east of Dalby Road, north of the centre of the current survey area. Numerous Anglo-Saxon artefacts were found including a shield boss, pottery, and a spearhead, cumulatively interpreted as grave-goods from a cemetery (MLE6211).

2.2.11 A putative second cemetery is recorded east of Sandy Lane due to several individual finds, including a copper-alloy Anglo-Saxon brooch, a decorated strap end, two buckles and a Viking disc brooch, being recovered during the 1980s and 1990s (MLE6212).

2.2.12 The earthworks and buried foundations of the deserted medieval village of Eye Kettleby are located north of the survey area, centred at White House Farm. The settlement reported a poll tax return for 41 residents in 1379, although this population had declined until only one resident was recorded in a hay subsidy in 1524.

2.2.13 Excavations in this area in 1996 uncovered evidence of an Anglo-Saxon settlement beneath the medieval remains (MLE3950).

2.2.14 Other medieval earthworks, relating to the former leper hospital at Burton Lazars, lie c. 300 m south of the eastern end of the survey area (MLE3475).

2.2.15 Adjacent pasture fields at either end of the previous survey area contain ridge and furrow earthworks, indicating medieval to post-medieval cultivation. Those at the western end also contain earthworks relating to small-scale gravel quarrying.

3. Geophysical Survey Methodology

3.1.1 All survey work was completed to appropriate standards, as outlined by existing guidance (CIfA 2020a; 2020b; 2020c, 2022; and Schmidt *et al*. 2015).

3.1.2 This geophysical survey was completed using a Bartington Grad601-2 system. Readings were recorded at a resolution of 0.01 nT and data collected with a traverse interval of 1 m and a sample interval of 0.25 m. Data was collected by traversing the survey area in 4 m increments using a hand-pushed non-magnetic cart system to achieve the best possible results.

3.1.3 Real Time Kinematic (RTK) differential GPS equipment (Carlson BRX7 GNSS Smart Antenna) was used to accurately determine the position of the survey equipment and survey monitor data.

3.1.4 The data processing was undertaken using TerraSurveyor64 software and consisted of a 'DeStripe' process. This process determines the average of the datapoints in each track and subtracts that value from all the datapoints along each survey track.

3.1.5 Illustrations were created using QGIS software. Interpretation of identified anomalies was achieved through analysis of anomaly patterning and increases in magnetic response and was aided by examining the available supporting information, including but not limited to Greyscale plots, Colourscale plots and XY Trace plots. The interpretations follow Cura Terrae colour coding and categorisations of anomalies and attempt, where possible, to suggest the nature of buried features.

3.1.6 Further details of geophysical survey methodology can be found in Appendix A.

4. Mitigating Factors

4.1.1 The results of geophysical survey may not reveal all potential archaeology within a survey area, and geological, agricultural, and modern features may limit the detection of weaker archaeological responses.

4.1.2 Survey works were undertaken in two phases of deployment. At the time of the first phase of survey works in November 2024, the Site conditions were firm underfoot throughout much of the Site. However, Field 3 was not suitable for survey at that time due to overgrown vegetation. This land parcel was surveyed during a second phase of works in May 2025 following the removal of the vegetation.

4.1.3 Some probable geological variation is noted in Field 1 and likely caused by localised variation in superficial deposits of Head. This is not thought to have had an impact on the detection of anomalies.

4.1.4 Field boundaries comprised hedgerows, trees, metal fences and roads. Where necessary, a 2 m buffer was observed along metal fences although some interference is still noted at the survey periphery. The buffer was observed to minimise the effects or magnetic interference on the survey and to help to reduce as far as is reasonably practicable any non-detection of potential buried features.

5. Results and Interpretation

5.1.1 Anomalies found within the survey data are listed in Table 1 and illustrated on Figures 3, 5, 7, and 9.

Table 1: Survey Anomalies

Anomaly Number	Anomaly Type	Description	Interpretation
E1. (Field 4, Figure 5)	Archaeology	Positive, linear anomaly 24m in length that forms a northeast to southwest oriented partial rectangular feature. Located in the centre of Field 3 and at the northern periphery of the proposed settlement.	This anomaly is characteristic of an infilled ditch and likely part of an enclosure. Its location at the periphery of the settlement complex suggests it served an agricultural or livestock purpose.
E2. (Field 4, Figure 5)	Archaeology	Positive, linear anomaly 53 m in length that forms a northeast to southwest oriented rectangular feature. Located in the centre of Field 3 and at the northern periphery of the survey area, adjoining (E1) on its eastern boundary.	This anomaly also indicates an infilled ditch and is likely part of an enclosure. Its location at the periphery of the settlement complex suggests it served an agricultural function.
E3. (Field 4, Figure 5)	Archaeology	Positive, linear anomaly 30 m in total length which forms a northeast to southwest oriented partial rectangular feature. Located in the centre of Field 3 and in the northern portion of the settlement complex, adjoining (E2) to the north, (E4) to the east and (E5) to the south.	This anomaly is characteristic of an infilled ditch and probably part of an enclosure.

Anomaly Number	Anomaly Type	Description	Interpretation
E4. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 14 m in length which forms a northeast to southwest oriented partial rectangular feature. Located in the centre of Field 3 and in the northern portion of the settlement area, adjoining (E1) to the north, and (E3) and (E5) to the west.	This anomaly is characteristic of an infilled ditch and probably part of an enclosure.
E5. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 28 m in length which forms a northeast to southwest oriented rectangular feature. Located in the centre of Field 3 and in the north of the settlement area, adjoining (E3) to the north, (E4) to the west and (E6) and (E7) to the south.	This anomaly is characteristic of an infilled ditch and probably part of an enclosure.
E6. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 40 m in length which forms a large, northeast to southwest oriented rectangular feature. Located in the south of Field 3 and in the northwest portion of the settlement area, adjoining (E5) to the north, (E7) and (E27) to the east and (E9) and (E10) to the south.	This anomaly is characteristic of an infilled ditch and probably part of an enclosure.
E7. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 40 m in length which forms a north to south oriented partial rectangular feature. located in the south of Field 3 and in the northwest portion of the settlement area, within the confines of the much larger (E6).	This anomaly is characteristic of an infilled ditch and probably part of an enclosure.

Anomaly Number	Anomaly Type	Description	Interpretation
E8. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 24 m in length which forms a northeast to southwest oriented partial rectangular feature. Located in the southwest of Field 3 and on the western periphery of the settlement area, adjoining (E9) to the east and (E12) to the south.	This anomaly is characteristic of an enclosure, although given its narrow width it could also represent an entrance or pathway.
E9. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 30 m in length which forms a northeast to southwest oriented rectangular feature. Located in the southwest of Field 3 and in the northwest portion of the settlement area, adjoining (E6) to the north, (E10) to the east, (E12) to the south and (E8) to the west.	This anomaly is characteristic of an enclosure. Its location towards the periphery of the settlement complex suggests it served an agricultural or livestock purpose.
E10. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 51 m in length which forms a northeast to southwest oriented rectangular feature. Located in the southwest of Field 3 and in the western portion of the settlement area, adjoining (E6) to the north and (E27) and (E11) to the east.	This anomaly is characteristic of an enclosure. Its location towards the periphery of the settlement complex suggests it served an agricultural or livestock purpose.
E11. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 14 m in length which forms a northeast to southwest oriented square feature. Located in the south of Field 3 and directly west of the centre of the settlement area, adjoining (E27) to the north and (E10) to the west.	This anomaly is characteristic of an enclosure. It may have had an agricultural function or served as a pen for livestock, although its small size and proximity to the centre of the settlement may suggest an alternative use as a gateway or entranceway.

Anomaly Number	Anomaly Type	Description	Interpretation
E13. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 36 m in length which forms a northeast to southwest oriented partial rectangular feature. Located in the southwest of Field 3, in the far western portion of the settlement area, adjoining (E12) to the north and (E14) to the south.	This anomaly is characteristic of an enclosure. Its location at the periphery of the settlements suggests it may have served an agricultural function or as a holding pen for livestock.
E14. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 15 m in length, located in the southwest of Field 3 and in the western periphery of the settlement area, directly south of (E13).	This anomaly forms part of the north-eastern tip of an enclosure.
E15. (Field 4, Figure 3)	Archaeology	Linear, positive anomaly 26 m in length which forms a northeast to southwest oriented partial rectangular feature. Located in the centre of Field 3, in the northeastern portion of the settlement area.	This anomaly is characteristic of an enclosure. Its location at the periphery of the settlement complex suggests it served an agricultural function.
E16. (Field 4, Figure 3)	Archaeology	Linear, L-shaped, northeast to southwest oriented positive anomaly 20 m in length. Located in the centre of Field 4, in the northeast portion of the settlement area, adjoining (E15) to the north and (E30) to the west.	This anomaly likely represents a partial enclosure. Its location at the periphery of the settlement complex suggests it served an agricultural function.

Anomaly Number	Anomaly Type	Description	Interpretation
E17. (Field 4, Figure 3)	Archaeology	Linear, positive anomaly 17 m in length which forms a northeast to southwest oriented, broadly rectangular feature. Located in the south of Field 4, just east of the centre of the settlement area, and adjoins (E30) to the north, (E18) to the east and (E21) to the south.	This anomaly is characteristic of a small enclosure feature.
E18. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 13 m in length forming a northeast to southwest oriented triangular shaped feature. Located in the south of Field 4, just east of the centre of the settlement area, and adjoins (E16) to the north, (E19) to the west, (E21) to the south and (E17) to the west.	This anomaly likely represents an enclosure feature, perhaps a later subdivision of E17.
E19. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 11 m in length, forming a northeast to southwest aligned rectangular feature. Located in the south of Field 4, towards the southeast of the settlement area, adjoining (E16) to the north, (E20) to the east, (E22) to the south and E18 to the west.	This anomaly likely represents an enclosure feature used for agricultural or livestock purposes.

Anomaly Number	Anomaly Type	Description	Interpretation
E20. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 12 m in length, forming a northeast to southeast aligned partial rectangular feature. Located in the south of Field 4 and just to the east of the centre of the settlement area, adjoining, (E16) to the north and (E23) to the east and (E19) to the west.	This anomaly likely represents a partial enclosure used for agricultural or livestock purposes.
E21. (Field 4, Figure 3)	Archaeology	Positive, linear anomaly 16 m in length, forming a north to south oriented rectangular feature. Located in the south of Field 4, directly to the east of the settlement's centre, adjoining (E18) to the north and (E22) to the east.	This feature likely served as an enclosure used for agricultural purposes or to hold livestock.
E22. (Field 4, Figure 3)	Archaeology	Positive, northeast to southwest oriented L-shaped anomaly 12 m in length. Located in the south of Field 4, in the southeast portion of the settlement area, directly to the south of (E19) and the east of (E21).	This anomaly forms part of the northwestern edge of an enclosure, the full extent of which is visible in the geophysical data gathered by the MOLA survey. The enclosure was likely used for agricultural or livestock holding purposes.
E23. (Field 4, Figure 3)	Archaeology	Positive L-shaped anomaly 24m in length. Located in the south of Field 4 and in the east of the settlement area, adjoining (E20) to the west.	This anomaly is thought to be part of a large enclosure feature, which was likely used for agricultural purposes based on its size.

Anomaly Number	Anomaly Type	Description	Interpretation
E24. (Field 4, Figure 3)	Archaeology	Positive L-shaped anomaly which forms a partial rectangle. Located in the southeast of Field 4 and towards the eastern portion of the settlement area, close to (E25) to the north and (E23) to the west.	This anomaly forms the northern half of an enclosure. It likely held an agricultural function or housed livestock.
E25. (Field 4, Figure 7)	Archaeology	Positive, L shaped linear anomaly, 83m in length. Located in the southeast of Field 4 and the far eastern portion of the settlement area, directly north for (E26).	This anomaly may represent a partial ditch boundary, or possibly be related to a larger enclosure.
E26. (Field 4, Figure 7)	Archaeology	Positive, linear anomaly that forms a partial L-shape 134m in length. Located in the southeast of Field 4 and the far eastern portion of the settlement area, directly to the south of (E25) and to the east of (E24).	This anomaly may form part of a large enclosure or boundary ditch, likely used for agricultural purposes. The anomaly is likely to continue into Field 5 to the east.
E27a. (Field 4, Figure 3)	Archaeology	Positive L-shaped anomaly located in southwest Field 4 and in the northern extent of the settlement area. Measures 42 m x 13 m directly north of (E28) and west of (P9).	This anomaly may form part of a larger agricultural enclosure. The overall morphology suggests that this part of a larger L-shaped feature which bounds (E10) and (E11). Furthermore, several other linear anomalies (E27b) are present within its northern portion, however, there varying orientation may indicate a different period of land use.

Anomaly Number	Anomaly Type	Description	Interpretation
E27b. (Field 4, Figure 3)	Archaeology	Two positive, L-shaped anomalies and a single linear - located in the southwest of Field 4 and in the northern extent of the settlement area. The L-shaped anomalies measure between 7m x 3m to 10 m x 4 m. The linear anomaly measures 9 m long.	The varying, disarticulated alignments of these anomalies makes it difficult to infer an association within the same l landscape. It is likely they represent different periods of land division within the settlement area.
E28. (Field 4, Figure 3)	Archaeology	Two disarticulated linear anomalies that likely formed part of a rectilinear anomaly - on a broadly northeast to southwest alignment. The northern most anomaly measures 24 m long, with a small northwest orientated extension 4 m in length. The southern most anomaly measures 17 m long with two curvilinear, south facing extensions measuring between 6 m to 9 m in length.	This anomaly represents a small agricultural enclosure. It bounds (E27a) located directly north and likely and maybe part of the same landscape. (R2a) is also situated within the bounds of the anomaly, however, its weaker response and different orientation suggests an earlier period of land division, so it is unlikely the anomalies are associated.
E29. (Field 4, Figure 3)	Archaeology	Four, positive, disarticulated linear anomalies that form part of a larger, rectilinear morphology. Located in the southwest of Field within the centre of the settlement area. The western most anomaly measures 12 m x 6 m. The remaining anomalies measure between 19 m to 23 m in long.	This anomaly continues a trend of northeast to southwest orientated enclosures within the centre of the settlement, which includes (E28). A positive, amorphous anomaly (P6) is also located within its bounds. Its morphology is suggestive of a possible area of mineral extraction, however, is it unclear as to whether they share the period within the landscape.

Anomaly Number	Anomaly Type	Description	Interpretation
P1. (Field 4, Figure 3)	Possible Archaeology	Several, positive amorphous anomalies located in the southwest of Field 4 in the northern portion of the settlement area. Measuring between 4m to 9 m in diameter.	The morphology of these anomalies is suggestive of cut and infilled areas associated mineral extraction. They are located within the bounds (E6) and (E7) although it is unclear as to whether they share the same landscape.
P2. (Field 4, Figure 3)	Archaeology	Several anomalies on a broadly northeast to southwest alignment, consisting of sublinear, amorphous and a single L-shaped anomaly. Located in the southwest of Field 4 within the centre of the settlement area.	These anomalies may represent a large, agricultural enclosure feature. It encompasses (E28) and (E29), however, it is difficult to infer as to whether they share the same period within the landscape. The L-shaped anomaly in the northern portion is on slight parallel alignment and of a similar morphology to (R2a). It is plausible that the two anomalies are associated as part of a larger enclosure system within the same landscape.
P3. (Field 4, Figure 3)	Archaeology	Three positive linear anomalies located in the southwest of Field 4, in the southern portion of the settlement area and immediately southwest of (E8) and c. 8 m south of (E9). Measuring between 12 m to 17 m long on a broadly northwest to southeast alignment.	This anomaly is likely the southern portion of a rectangular enclosure (E9) and the northeastern portion of enclosure (E12).

Anomaly Number	Anomaly Type	Description	Interpretation
P4. (Field 4, Figure 3)	Archaeology	Three positive anomalies consisting of a sub-circular, curvilinear and linear anomaly on a broadly northwest to southeast orientation. Located to the southwest of Field 4 in the southern extent of the settlement area. The linear measures 14 m long, the curvilinear 3 m long and the subcircular is 2 m in diameter.	This anomaly is suggestive of a southeastern extension of (P2) and is likely part of a larger, agricultural enclosure encompassing (E28) and (E29), though they may occupy different periods within the landscape.
P5. (Field 4, Figure 3)	Archaeology	Two positive, linear anomalies located in the southwest of Field 4 in the southern extent of the settlement area. Measuring between 19 m to 37 m long on a northeast to southwest orientation. Two further, linear protrude southeast with several subcircular anomalies within proximity. Measuring between 4 m to 9 m and between 1m to 3 m in diameter, respectively.	This anomaly is a probable extension of enclosure (R7) located immediately northwest. The smaller, southeastern extensions likely the remains of a smaller, enclosure but this cannot be inferred with certainty. The collection of subcircular anomalies is indicative of cut and infilled deposits usually associated with areas of mineral extraction. Though it is unclear as to whether they share the period within the landscape.
P6. (Field 4, Figure 3)	Archaeology	Positive, amorphous anomaly located in the southwest of Field 4 in the southern extent of the settlement area and within the bounds of (E9). Measures 17 m in diameter.	The morphology of this anomaly is indicative of cut and infilled deposits usually associated with areas of mineral extraction.

Anomaly Number	Anomaly Type	Description	Interpretation
P7. (Field 4, Figure 3)	Archaeology	Several linear anomalies located in southern area of Field 4 and in the southern extent of the settlement area, the morphology of which suggests a broadly rectangular shape with a minor subdivision in the northeast corner. (E17) is immediately east and (R7) immediately west.	This anomaly is indicative or agricultural enclosure which adjoins to (E17) to the east and (E30) to the north. Furthermore, a small linear extension in the northwest corner is a probable, sub enclosure within the bounds of the larger feature.
P8. (Field 4, Figure 3)	Archaeology	Positive anomalies consisting of three linear and two subcircular. Located in the southwest are of Field 4 and in the northern portion of the settlement area. The linear measure between 5 m to 20 m long on a northwest to southeast alignment. Whereas the remaining two anomalies measure between 2m to 4 m in diameter.	These anomalies are a probable continuation of the northern extent of several enclosure feature consisting of (R1), (P9) (E27a) to the northwest, although they are weaker in their response within the dataset.
P9. (Field 4, Figure 3)	Archaeology	Two positive anomalies consisting of a single linear and a single subcircular anomaly. Located in the southwest are of Field 4 and in the northern portion of the settlement area. The linear anomaly measures 7 m long on a northwest to southeast alignment. The subcircular measures 2 m in diameter. They are located immediately southeast of (E27a) and immediately northwest of (R1).	The linear anomaly is a probable continuation of the northern extent of several enclosure features consisting of (E27a) to the northwest and (R1) to the southeast. The subcircular anomaly is indicative of cut and infilled deposits associated with an area of mineral extraction.

Anomaly Number	Anomaly Type	Description	Interpretation
P10. (Field 1, Figure 3)	Possible Archaeology	Series of small, positive, circular anomalies distributed across Field 1.	These anomalies may represent a loose alignment of pits on a northeast to southwest alignment. Such features can indicate mineral extraction or waste disposal. However, these anomalies may equally be caused by minor geological variation.
P11. (Field 2, Figure 3 and 5)	Possible Archaeology	Two, positive anomalies, one ovular and one circular, located on the far western edge of Field 2. The northernmost, ovular anomaly has a diameter of 9m, whilst its smaller, circular counterpart has a diameter of 3m.	These anomalies may represent a pair of pits, perhaps associated with mineral extraction or waste disposal. However, they may equally be the product of geological variation.
R1. (Field 4, Figure 3)	Archaeology	Two positive anomalies consisting of a single rectilinear and a single linear anomaly. Located in the southwest are of Field 4 and in the northern portion of the settlement area. Rectilinear anomaly measures 14 m x 7 m. The linear measures 8 m long a northeast to southwest alignment.	The rectilinear anomaly is a probable continuation of the northern extent of several enclosure features consisting of (E27a) and the northern extent of (P9). The slightly weaker response and different orientation of the linear anomaly makes it difficult to infer an association.
R2a. (Field 4, Figure 3)	Archaeology	Positive L-shaped anomaly located in the southwest are of Field 4 and in the northern portion of the settlement area. Measures 12 m x 8 m and is located immediately northwest of (R2b) and within the bounds of (E28).	This anomaly represents the remains of an agricultural enclosure and is likely associated with (R2b). Furthermore, it is also plausible that the northern extent of (P2) is a northwestern extent of this anomaly given the similar morphology and near parallel alignment.

Anomaly Number	Anomaly Type	Description	Interpretation
R2b. (Field 4, Figure 3)	Archaeology	Positive L-shaped anomaly located in the southwest are of Field 4 and in the northern portion of the settlement area. Measurers 8 m x 3 m and is located immediately northwest of (R3) and southeast of (R2a).	This anomaly represents the remains of an agricultural enclosure and is likely associated with (R2a) and the northwest portion of (R3) to form a smaller, rectangular enclosure.
R3. (Field 4, Figure 3)	Archaeology	Positive linear anomaly located in the southwest are of Field 4 and in the northern portion of the settlement area. Measuring 20 m long on a broadly northwest to southeast alignment. Two further, linear anomalies extend southwest, both of which measure 10 m long.	The anomaly represents the southeastern extent of three, small agricultural enclosures consisting of (R2a) and (R2b) to the northwest.
R4. (Field 4, Figure 3)	Archaeology	A positive, broadly subcircular anomaly located in the southwest are of Field 4 and in the northern portion of the settlement area. Measures 14 m in diameter and located directly north of (E29) and east of (R5).	It is plausible that this anomaly is a smaller sub-enclosure of (E29) given its location within the bounds of the larger enclosure. However, it is unclear as to whether there is association with (R5) given is different orientation and morphology. It is probable they represent different periods within the landscape.
R5. (Field 4, Figure 3)	Archaeology	Three, positive linear anomalies located in the southwest area of Field 4 and in the centre of the settlement area that form a broadly rectangular feature. Measuring 10 m x 9 m x 7 m.	This anomaly represents the southern extent of several, small agricultural enclosures consisting of (R2a – R3) which adjoin to the north.

Anomaly Number	Anomaly Type	Description	Interpretation
R6. (Field 4, Figure 3)	Archaeology	Two, positive linear anomalies on perpendicular alignments and a single ovular anomaly located in the southwest area of Field 4 and in the centre of the settlement.	This anomaly represents a further southeastern extension of several, small agricultural enclosures consisting of (R2b), (R3) and (R5) which adjoin to the north and northwest respectively. The ovular anomaly within the centre could represent the remains of a smaller, enclosure feature but this cannot be inferred with confidence.
R7. (Field 4, Figure 3)	Archaeology	Two, positive curvilinear located in the southwest of Field 4 and in the centre of settlement area. They adjoin (R6) to the northwest. The two form a larger, rectilinear anomaly and a smaller, sub-circular anomaly.	This anomaly represents the southeastern extent of several, small agricultural enclosures consisting of (R2b), (R3), (R5) and (R6) which adjoin to the northwest.
B1 and B2. (Field 5 Figure 9)	Former Boundary	Two fragmented, positive linear anomalies on a north to south alignment located throughout Field 6. The anomalies are broadly parallel spaced 37m apart.	These anomalies correspond to the location of former boundaries visible on 19th century OS maps (1888 – 1915) of the Site.
B3. (Field 3, Figure 5)	Former Boundary	Weakly dipolar linear anomaly on a broadly north to south alignment.	This anomaly also corresponds to the position of a former boundary noted on 19th Century OS maps adjacent to the former railway line between Field 3 and Field 4.

Anomaly Number	Anomaly Type	Description	Interpretation
D1. (Field 4, Figure 5)	Possible Archaeology	Weak positive, linear anomaly located in the eastern portion of Field 4. Measures 54 m total length on a broadly northwest to southeast alignment, with a 10 m break in the centre.	This anomaly represents a possible cut and infilled ditch feature. However, its weak response within the dataset makes it difficult to a infer a more accurate interpretation.
D2. (Field 4, Figure 5)	Possible Archaeology	Two positive, linear anomalies located in the eastern portion of Field 4. Measuring between 8 m to 20 m long on a broadly east to west alignment.	This anomaly represents a possible cut and infilled ditch feature. However, their weak response with the dataset makes it difficult to a infer a more accurate interpretation.
D3. (Field 4, Figure 5)	Possible Archaeology	Weak positive, curvilinear anomaly located in the eastern portion of Field 4. Measures 20 m long on a broadly north to south and east to west alignments, respectively	This anomaly represents a possible cut and infilled ditch feature and may denote a former boundary feature. However, its weak response with the dataset makes it difficult to a infer a more accurate interpretation.
D4. (Field 4, Figure 5)	Possible Archaeology	Several positive, disarticulated linear and sub-circular anomalies located in the eastern portion of Field 4.	These anomalies represent possible cut and infilled ditch features and may denote the remains of former boundary features. However, their weak response with the dataset makes it difficult to a infer a more accurate interpretation.
D5. (Field 6, Figure 7, and 9)	Possible Archaeology	Weak positive, curvilinear anomaly located in the northwest corner of Field 6. Measures 17 m long on a broadly northeast to southwest alignment.	This anomaly represents a possible cut and infilled ditch feature. However, its weak response within the dataset makes it difficult to a infer a more confident interpretation. The anomaly may be natural in origin.

Anomaly Number	Anomaly Type	Description	Interpretation
U1. (Field 1, Figure 3)	Uncertain Trend	Two weak positive, subcircular anomalies located in Field 1, one towards the north of the field and one in the south-east.	These weak, diffuse anomalies may represent archaeological features, but their weak, diffuse nature precludes a definitive interpretation, and a geological or agricultural origin is equally likely.
U2. (Field 2, Figure 3)	Uncertain Trend	Weak positive, curvilinear anomaly, 9m in length, located in the south of Field 2.	This weak anomaly may represent an archaeological feature such as a ditch, but its weak response and isolated position precludes a definitive interpretation, and a recent agricultural origin is equally likely.
U3. (Field 4, Figure 5)	Uncertain Trend	Three, weak positive, linear anomalies located in the west of Field 3.	These weak linear trends may represent ditch features, but their weak response makes a confident interpretation difficult. The anomalies may also indicate land drains.
U4. (Field 5, Figure 9)	Uncertain Trend	Weak positive, northeast to southwest oriented, broadly linear anomaly 50m in length located in the centre of Field 5.	This weak, diffuse anomaly may represent an infilled ditch feature. However, due to its weak response it is difficult to interpret confidently, and a more recent agricultural origin is equally likely.
NA (All Fields)	Ridge and furrow	Positive, broadly spaced linear anomalies, predominately east to west oriented and found across the Site.	These anomalies represent a regime of ridge and furrow agriculture.

Anomaly Number	Anomaly Type	Description	Interpretation
NA (Field 1, Figure 3)	Geology	Large, amorphous positive anomalies located across Field 1.	These anomalies are likely the product of geological variation, loosely converging on a known, mapped superficial deposit of Head.
NA (Field 5, Figure 7)	Increased Magnetic Response	Three, amorphous, dipolar anomalies located across Field 5.	These anomalies indicate an area of increased magnetic response, potentially caused by modern agricultural activity or material.
NA (All Fields)	Land Drains	Linear, positive anomalies of varying orientations located across the Site.	These anomalies represent modern land drains.
NA (All Fields)	Ferrous disturbance	Amorphous, dipolar anomalies found across the Site, concentrated around its borders.	These anomalies represent large quantities of modern ferrous material.
NA (All Fields)	Ferrous Spikes	Small, circular, dipole anomalies scattered across the Site.	These anomalies indicate the presence of isolated modern ferrous material.

6. Discussion

6.1.1 The geophysical survey produced good data throughout, and revealed anomalies believed to be of an archaeological origin. Most prominently, a complex series of interconnected linear and rectilinear anomalies was noted in the south of Field 4. This shows the northern extent of the anomalies previously identified by the survey undertaken 2022.

6.1.2 Numerous probable enclosures, pits and ditches on varying alignments have been identified, suggesting the presence of a substantial, multiphase settlement complex, seemingly consisting of numerous agricultural enclosures arranged around a central, further enclosed area likely dedicated to dwellings and other settlement activity.

6.1.3 The periphery of the settlement is dominated by linear and rectilinear anomalies believed to represent boundary ditch features creating land divisions of varying sizes. They are concentrated to the east (E1-E14) and west (E15-E26) of the more central settlement complex (R1 – R6) and are known to extend beyond the survey area to the south. This is supported by geophysical survey data collected by The Museum of London Archaeology in 2022 (MOLA 2022). These features likely served an agricultural function, demarcating cultivation areas or serving as holding pens for livestock.

6.1.4 Further smaller, rectangular features (E27-E30) are located towards the nexus of the complex, where they enclose several broadly circular or sub-circular anomalies (R1-R7). Based on their morphology and size these features have been tentatively interpreted as structures typical of Iron Age to early Romano-British settlement sites.

6.1.5 Several more isolated, linear, and curvilinear anomalies (D1-D5) located in the eastern part of the complex have been interpreted as further ditches and gullies possibly associated with drainage.

6.1.6 Numerous small, circular anomalies (P1-P9) are present within the complex and have been interpreted as pits and some possible areas of burning, possibly associated with waste disposal, though is it also plausible these anomalies could represent modern activity within the landscape. Further pit-like anomalies (P10-P11) are also located in the west of the Site in Field 1 and 2, respectively though it is unlikely they are associated. These isolated pit-like anomalies could equally be natural in origin.

6.1.7 Iron-Age to Romano-British anthropogenic activity would appear to be most likely origin of the proposed settlement, based on the morphologies of the various anomalies within the dataset. Weakly positive, broadly spaced, and parallel linear anomalies across the Site are indicative of ridge and furrow cultivation based on their shape. This practice has its origins in the medieval or post-medieval period. These do not respect the postulated settlement area, suggesting that by sometime before the medieval period, the area was no longer occupied.

6.1.8 The remaining anomalies noted within the Site are limited to areas of geological variation within the centre of Field 1 likely associated with localised variation in the superficial deposits of Head. Modern agricultural activity is also noted, with several land drains and areas of increased magnetic responses and ferrous disturbance are also visible within the dataset. Increased responses to the north of Field 3 may be associated with disturbed ground and or redeposited materials due to modern agricultural activity. This is broadly adjacent to the route of the former railway line heading south from Melton Mowbray so tentatively could be associated with this period of activity, although it is more likely the result of surface metalling in the modern gateway.

6.1.9 Further ferrous disturbances along survey extents have likely been caused by proximity to metal fencing and external objects outside the survey area. Ferrous 'spike' anomalies are also present throughout the survey areas, caused by probable agricultural waste and debris present within the topsoil.

7. Curation and Storage

7.1.1 The archive will be prepared in accordance with national guidelines (CIfA 2020b). The integrity of the primary field record will be preserved. Security copies will be maintained where appropriate. Digital records of the geophysical survey and its collected data will be held by Cura Terrae

7.1.2 An OASIS form has been created on the results of the works under the following reference number (**curaterr1-534155**). Following approval of the report, a pdf version of the final version will be submitted within three months to the Archaeology Data Service via the OASIS form.

8. References

Allen, M., Blick, N., Brindle T., Evans, T., Fulford, M., Holbrook, N., Richards, J., & Smith, A. (2016). *The Rural Settlement of Roman Britain: an online resource*. Available at: http://archaeologydataservice.ac.uk/archives/view/romangl/map.cfm

Aspinal, A., Gaffney, C. and Schmidt, A. (2008). *Magnetometry for Archaeologists*. *Plymouth: Altamira Press*

Bartington Instruments Ltd. (n.d.). Grad601 Single Axis Magnetic Field Gradiometer system. Oxford: Bartington Instruments Ltd

British Geological Survey. (2024). *Geology of Britain Viewer*. Available at http://mapapps.bgs.ac.uk/geologyofbritain/home.html

Chartered Institute for Archaeology (CIfA) (2020a). *Standard and guidance for archaeological geophysical survey. Reading: Chartered Institute for Archaeologists*. Available at https://www.archaeologists.net/codes/cifa

Chartered Institute for Archaeologists (CIfA) (2020b). *Standard and guidance for the creation, compilation, transfer, and deposition of archaeological archives*. Available at https://www.archaeologists.net/codes/cifa

Chartered Institute for Archaeologists (CIfA). (2020c). *Standard and Guidance for the collection, documentation, conservation, and research of archaeological materials*. Available at https://www.archaeologists.net/codes/cifa

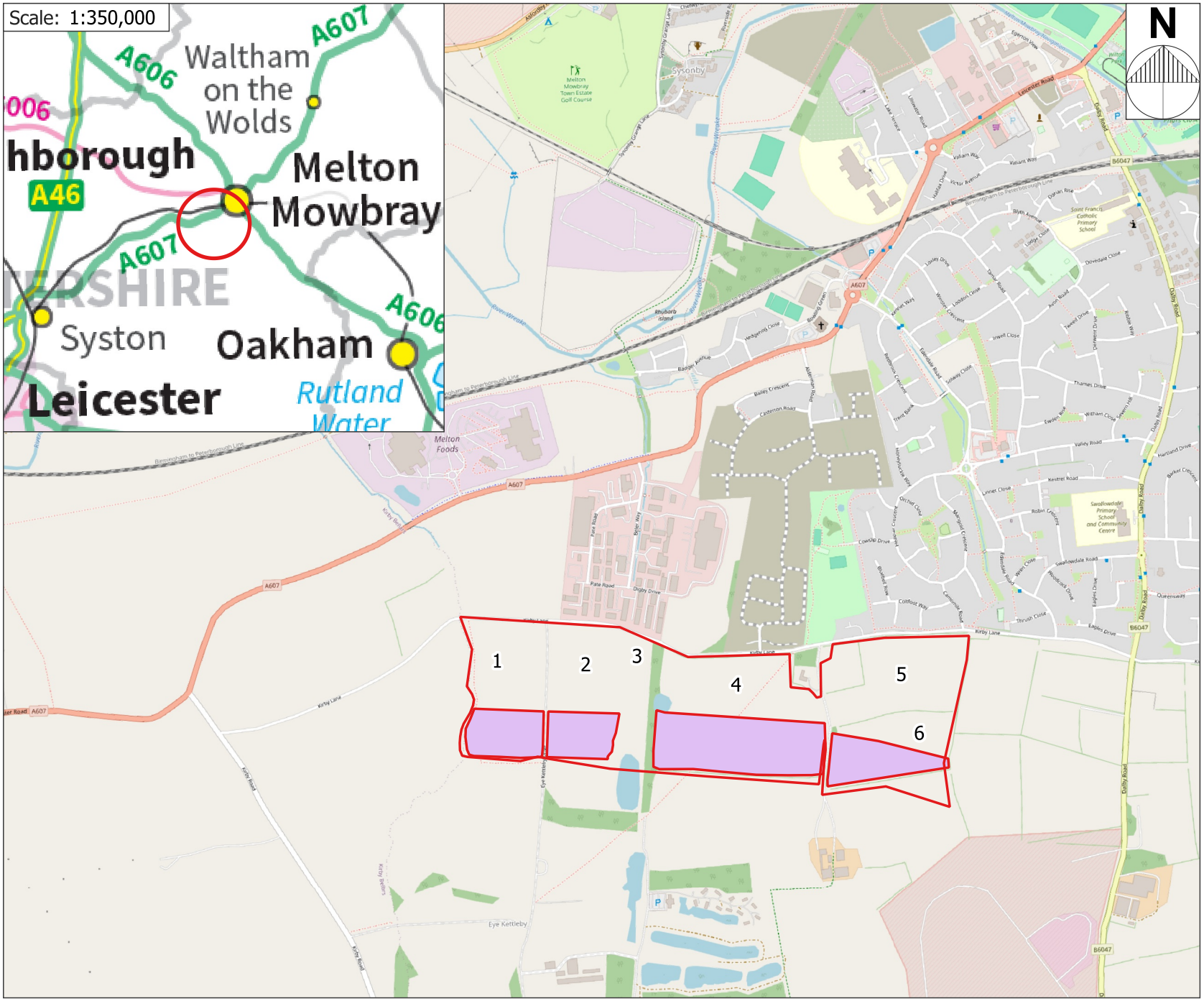
Chartered Institute for Archaeologists (CIfA) (2022). *Code of Conduct: professional ethics in archaeology*. Available at https://www.archaeologists.net/codes/cifa

Ecus Ltd (2024). *Kirby Lane, Melton Mowbray, Leicestershire Written Scheme of Investigation for Geophysical Survey*. Unpublished client report.

Gaffney, C. and Gater, J. (2003). *Revealing the Buried Past*. Stroud: Tempus Publishing

MOLA. (2022), *Archaeological geophysical survey of the route of the Melton Mowbray Distributor Road South Melton Mowbray, Leicestershire August - October 2022*. Unpublished report.

Schmidt, A., Linford, P., Linford, N., David, A., Gaffney, C., Sarris, A. and Fassbinder, J. (2015). EAC Guidelines for the use of Geophysics in Archaeology. Namur: Europae Archaeologia Consilium (EAC)



CuraTerrae

Key

- Site Boundary
- Approximate Previous Geophysical Survey

0 100 200 300 400 500 m

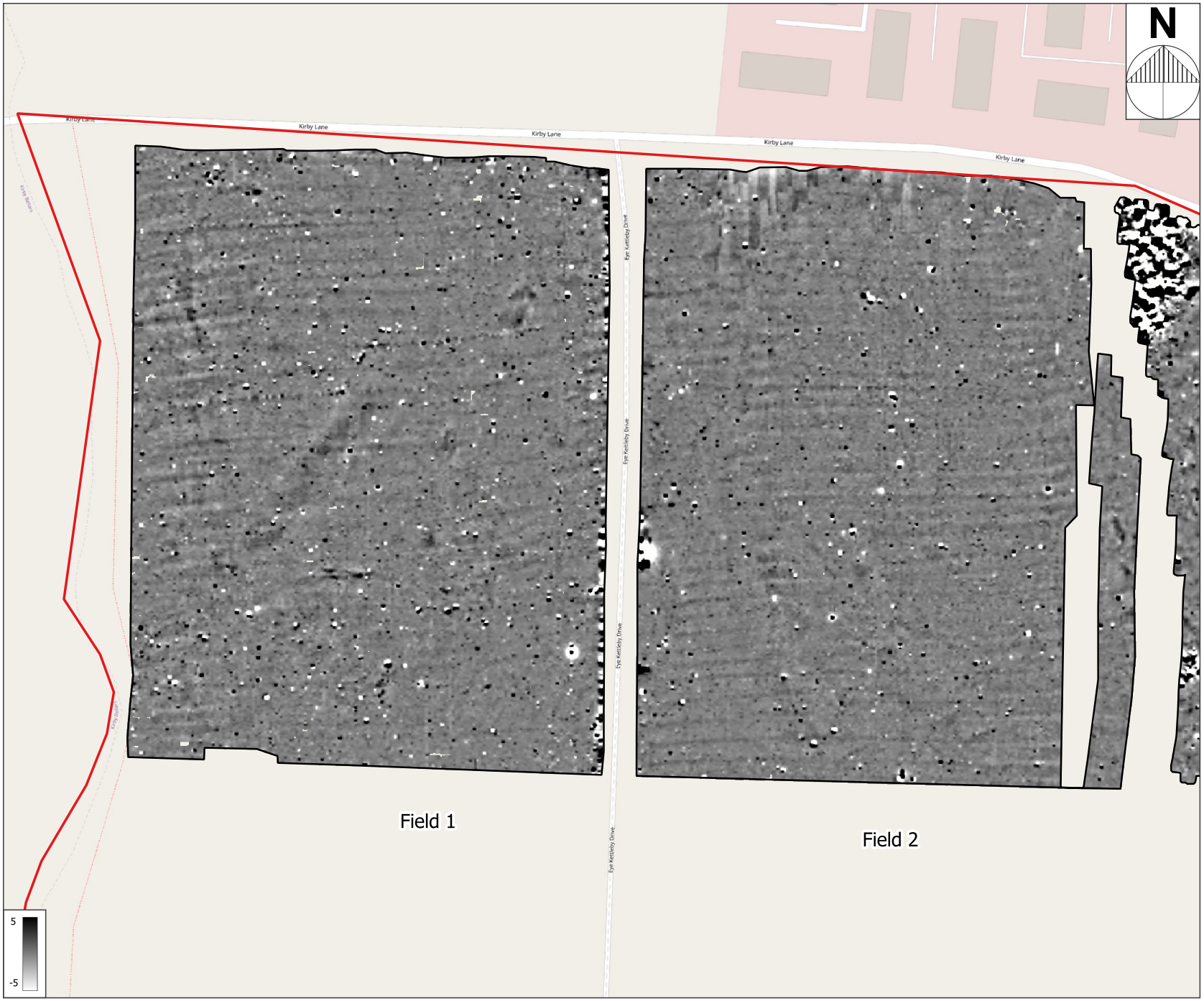
Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 1
Site Location

A	04.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:14,000 @A4 | Drg.Ref: 24406 - GEO - 1 - A

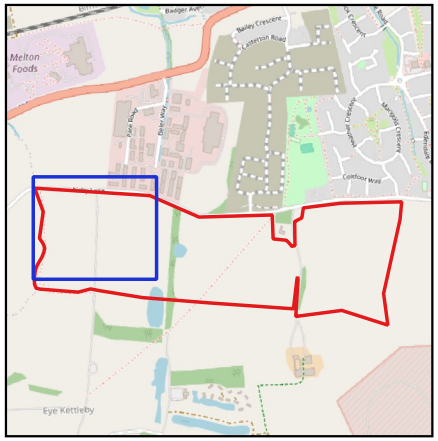


CuraTerrae

Key

Site Boundary

Survey Extent



0 20 40 60 80 100 m

Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 2
Greyscale Plot - Fields 1 & 2

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 2 - A

CuraTerrae

Key

- Site Boundary
- Survey Extent
- Possible Archaeology
- Uncertain Trend
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response
- Geology

0 20 40 60 80 100 m

Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 3
Interpretation Plot - Fields 1 & 2

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

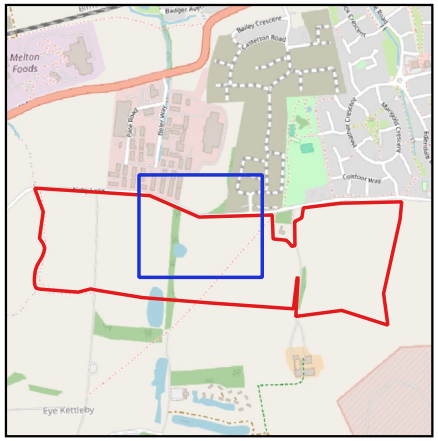
May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 3 - A

CuraTerrae

Key

Site Boundary

Survey Extent



0 20 40 60 80 100 m

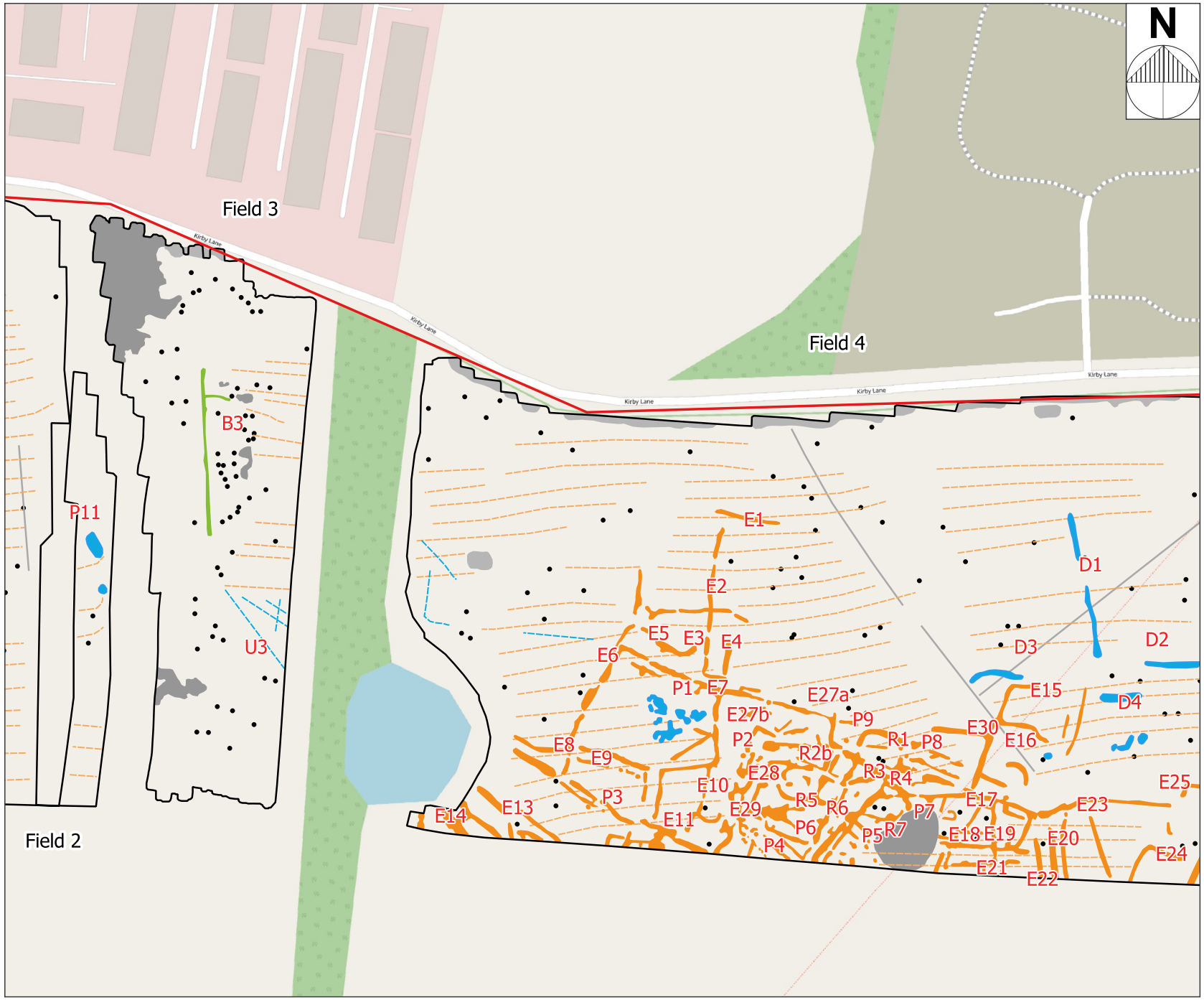
Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 4
Greyscale Plot - Field 2 (East), Field 3, and Field 4 (West)

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 4 - A



CuraTerrae

Key

- Site Boundary
- Survey Extent
- Archaeology
- Possible Archaeology
- Former Boundary
- Uncertain Trend
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response

0 20 40 60 80 100 m

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Land South of Kirby Lane, Melton Mowbray, Leicestershire
Figure 5
Interpretation Plot - Field 2 (East), Field 3, and Field 4 (West)

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

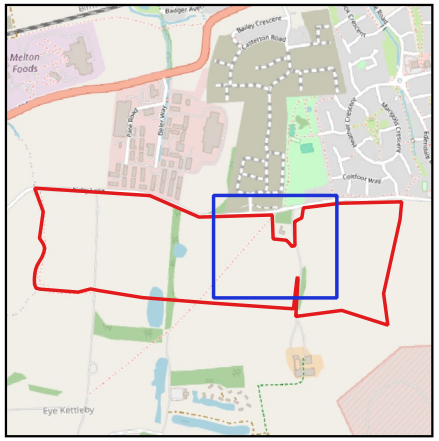
Site centred on:	SK 73965 17297

May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 5 - A

CuraTerrae

Key

- Site Boundary
- Survey Extent



0 20 40 60 80 100 m

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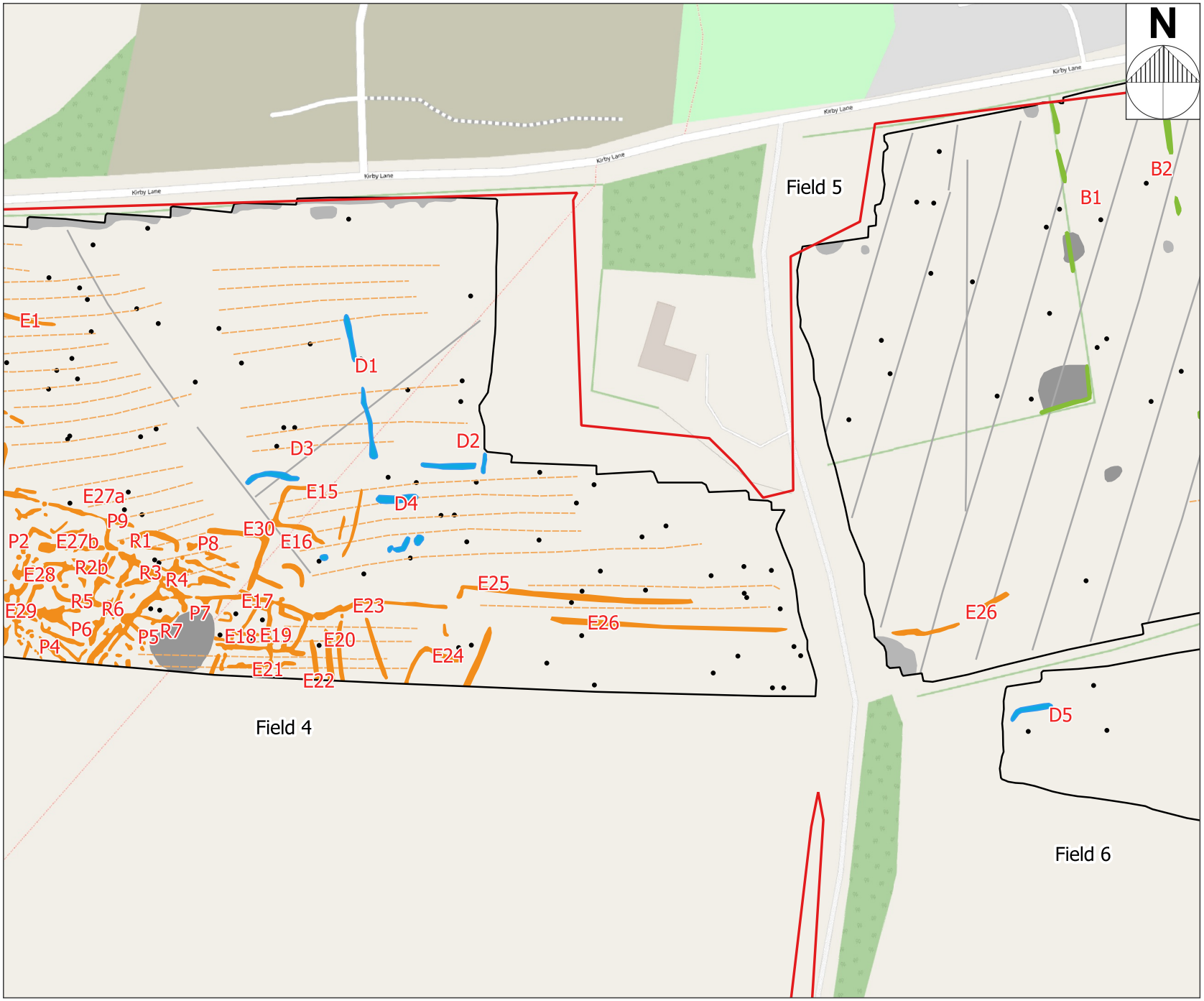
Land South of Kirby Lane, Melton Mowbray, Leicestershire
Figure 6
Greyscale Plot - Field 4 (East), and Fields 5 & 6 (West)

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297



Key

- Site Boundary
- Survey Extent
- Archaeology
- Possible Archaeology
- Former Boundary
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response

0 20 40 60 80 100 m

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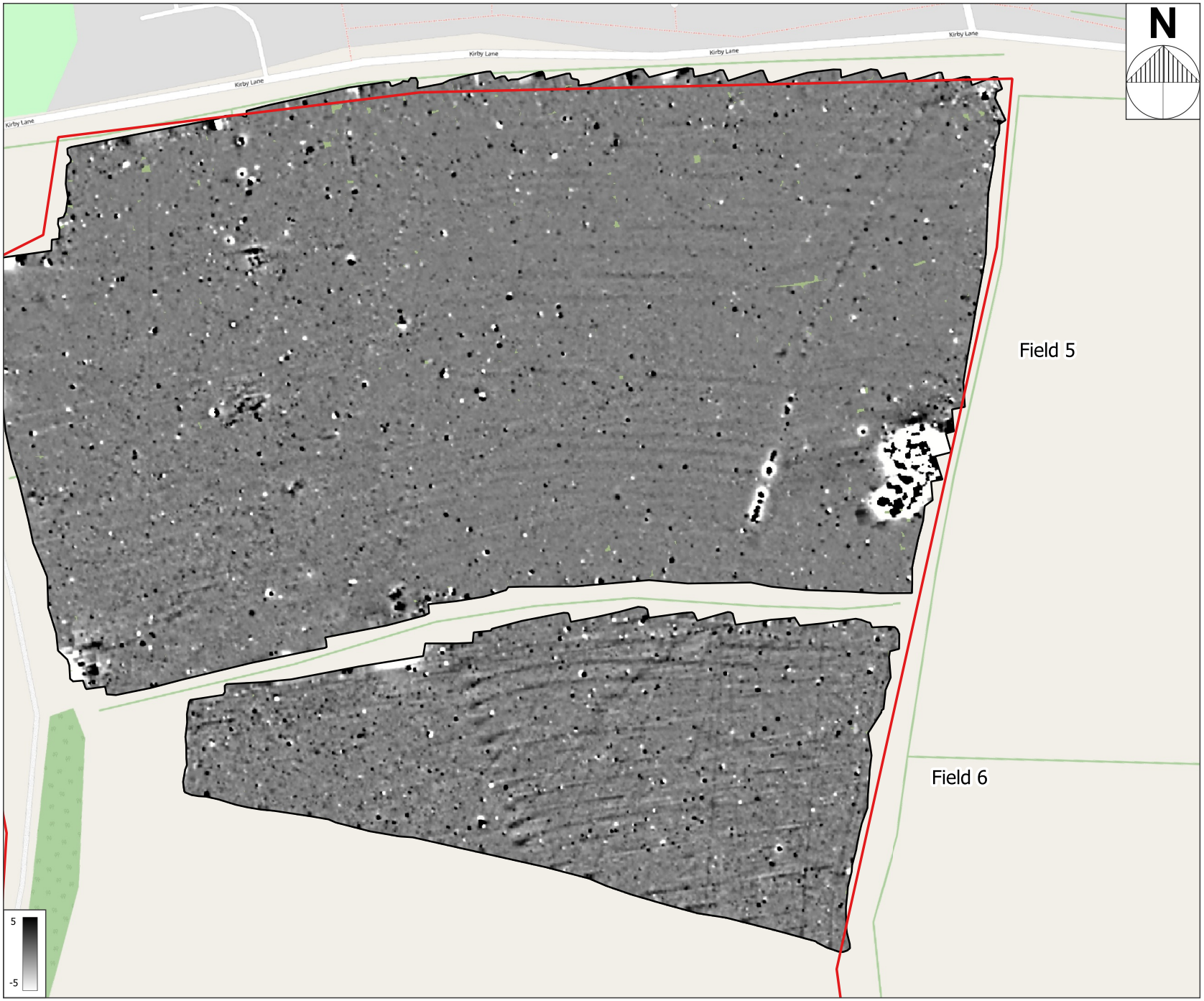
Land South of Kirby Lane, Melton Mowbray, Leicestershire
Figure 7
Interpretation Plot - Field 4 (East), and Fields 5 & 6 (West)

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 7 - A

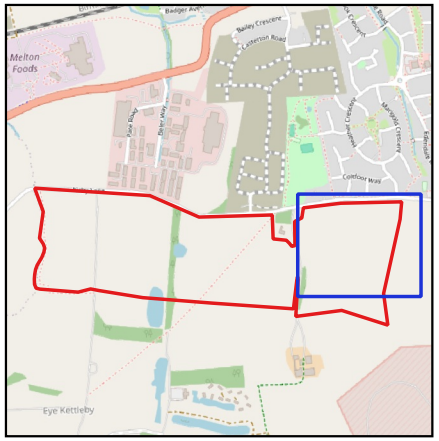


CuraTerrae

Key

Site Boundary

Survey Extent



0 20 40 60 80 100 m

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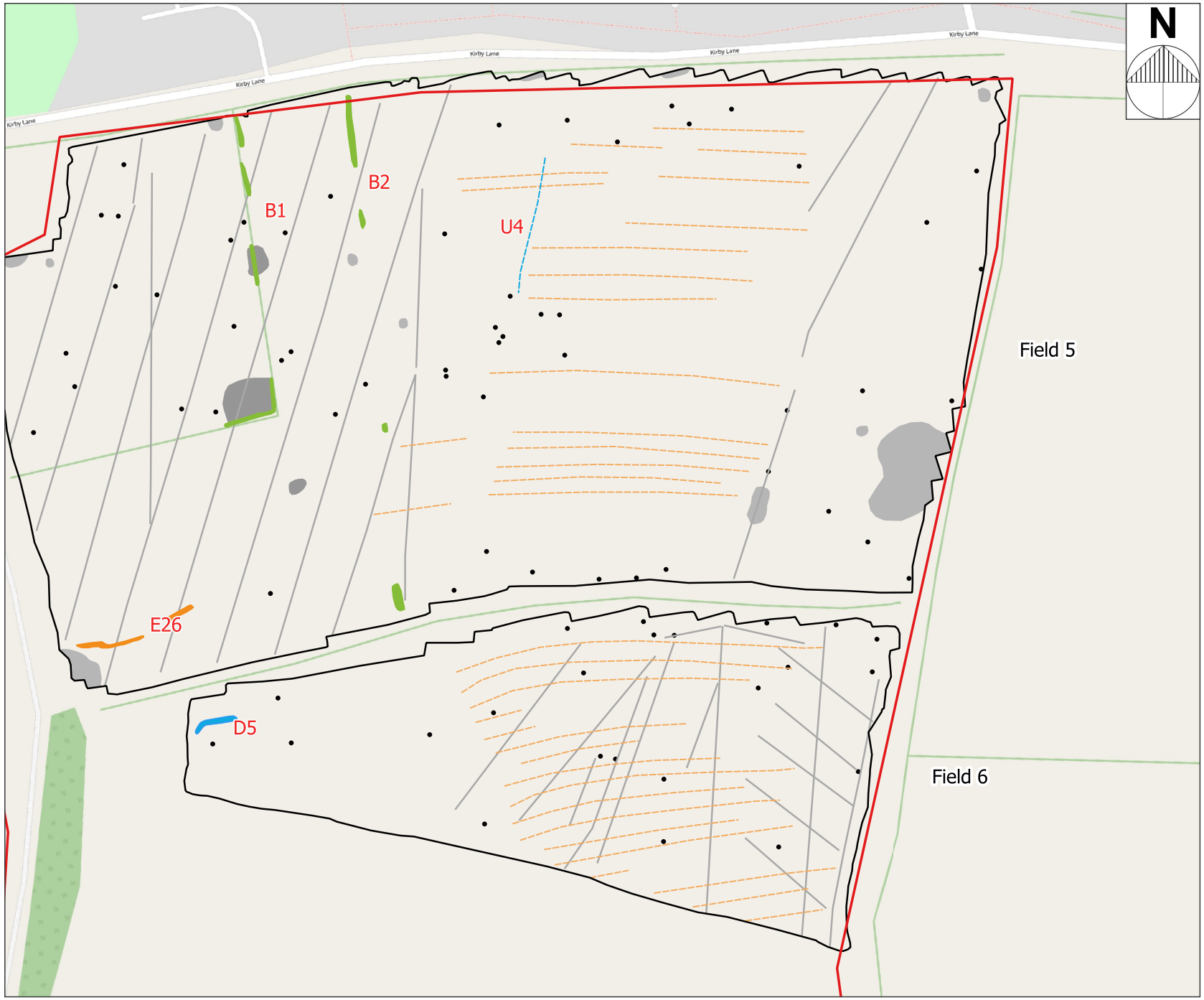
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 8
Greyscale Plot - Fields 5 & 6

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 8 - A



CuraTerrae

Key

- Site Boundary
- Survey Extent
- Archaeology
- Possible Archaeology
- Former Boundary
- Uncertain Trend
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response

0 20 40 60 80 100 m

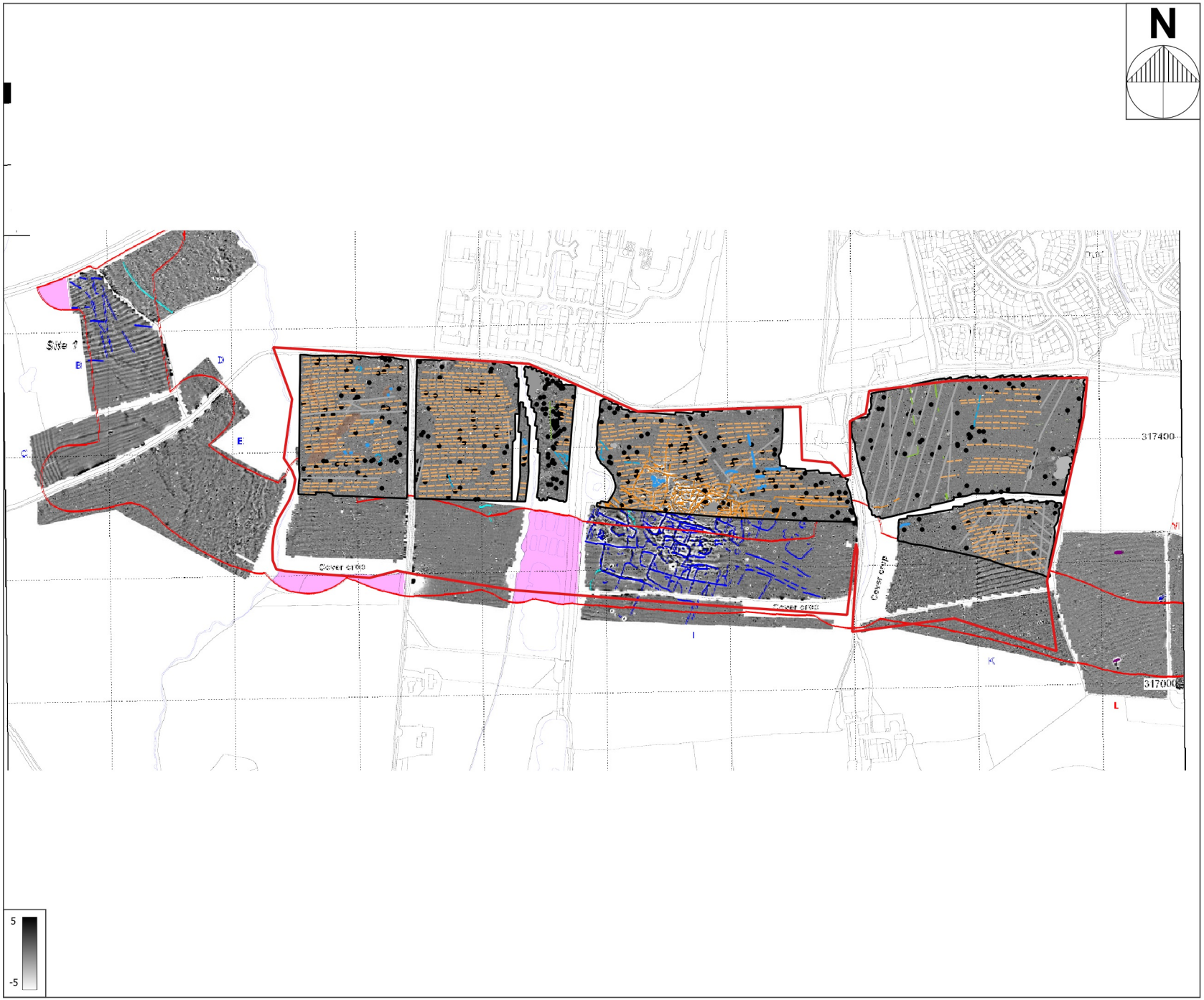
Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 9
Interpretation Plot - Fields 5 & 6

A	18.11.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:2,000 @A4 | Drg.Ref: 24406 - GEO - 9 - A



CuraTerrae

Key

- Site Boundary
- Survey Extent

Identified by Ecus Ltd. 2024:

- Archaeology
- Possible Archaeology
- Former Boundary
- Uncertain Trend
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response

Identified by MOLA 2022:

- Archaeology
- Possible Archaeology

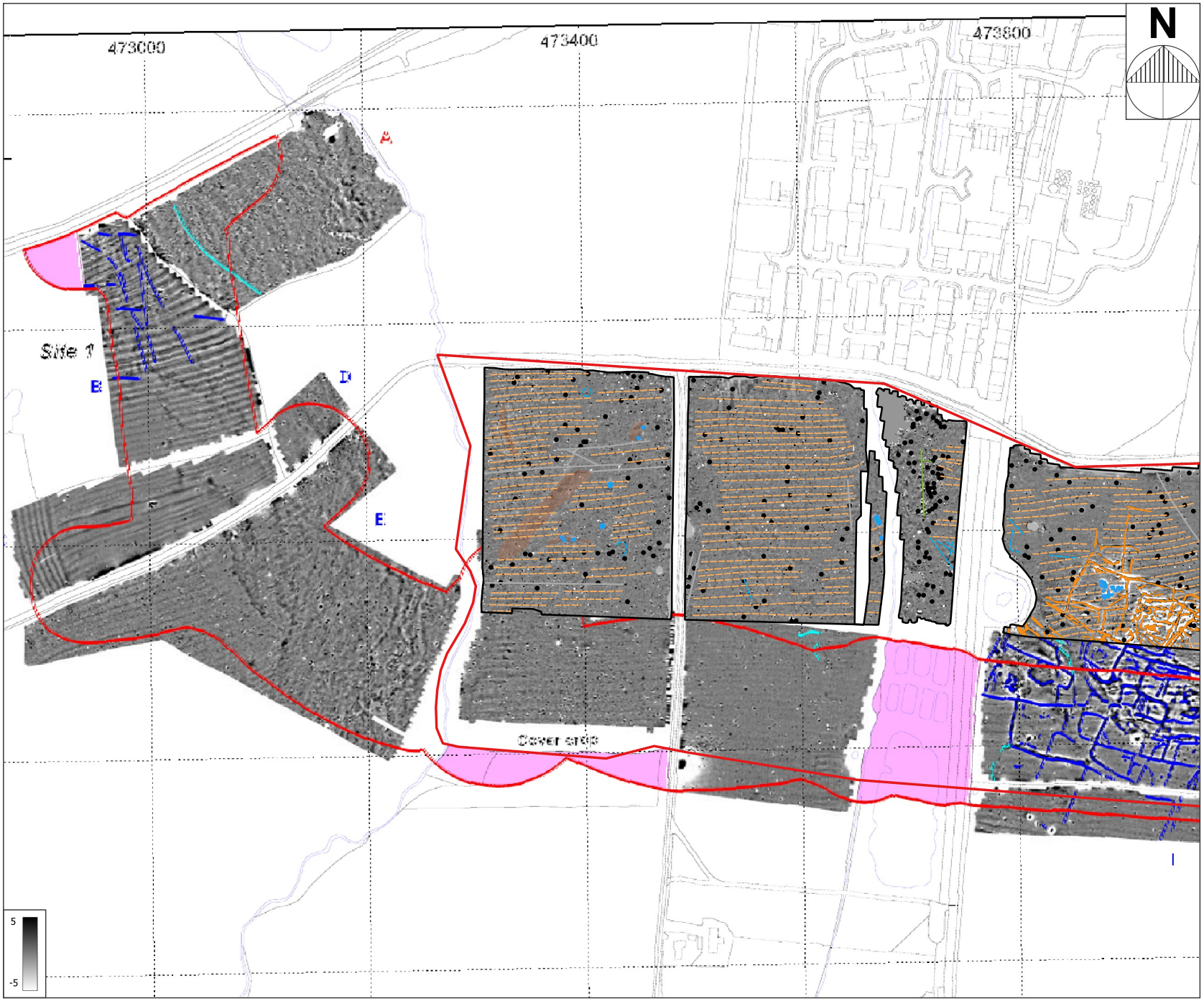
0 80 160 240 320 400 m

Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 10
Overview of Greyscale and Interpretation Data with Additional Data from MOLA (2022)

A	06.12.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297



CuraTerrae

Key

- Site Boundary
- Survey Extent

Identified by Ecus Ltd. 2024:

- Archaeology
- Possible Archaeology
- Former Boundary
- Uncertain Trend
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response

Identified by MOLA 2022:

- Archaeology
- Possible Archaeology

0 50 100 150 200 250 m

Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 11
Overview of Greyscale and Interpretation Data with Additional Data from MOLA (2022)

A	06.12.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

Cura Terrae

Key

- Site Boundary
- Survey Extent

Identified by Ecus Ltd. 2024:

- Archaeology
- Possible Archaeology
- Former Boundary
- Uncertain Trend
- Ridge & Furrow
- Land Drain
- Ferrous spike
- Ferrous Disturbance
- Increased Magnetic Response

Identified by MOLA 2022:

- Archaeology
- Possible Archaeology

0 50 100 150 200 250 m

Bloor Homes Ltd
Land South of Kirby Lane, Melton Mowbray, Leicestershire

Figure 12
Overview of Greyscale and Interpretation Data with Additional Data from MOLA (2022)

A	06.12.24	PFP	-
Rev	Date	Drawn by	Checked by

Site centred on:	SK 73965 17297

May 2025 | Scale: 1:5,000 @A4 | Drg.Ref: 24406 - GEO - 12 - A

Appendix A: Technical Information

Gradiometer Survey

Magnetic surveys measure distortions of variable strength in the earth's magnetic field caused by magnetic fields associated with buried features (Gaffney and Gater 2003, 36) that have either remnant or induced magnetic properties (Aspinal *et al*. 2008, 21–26). Human activity and inhabitation often alter the magnetic properties of materials (Aspinal *et al*. 2008, 21) resulting in the ability for numerous archaeological features to be detected through magnetic surveys.

Intensive burning or heating can also result in materials attaining a thermoremanent magnetisation; examples of which include kilns, ovens, heaths, and brick structures (Aspinal *et al*. 2008, 27; Gaffney and Gater, 2003, 37). However, there is also no way to always confidently assert from the results of Gradiometer surveys alone, whether burned material is in situ or has been redeposited within, for example, a refuse pit.

When topsoil-rich with iron oxides, fills a man-made depression in the subsoil, it creates an infilled feature, such as a pit or ditch, with a higher magnetic susceptibility compared to the surrounding soil (Aspinal *et al*. 2008, 37–41; Gaffney and Gater 2003, 22– 26). Magnetic surveys can also detect features with a lower magnetically susceptibility than the surrounding soil, an example of which is a stone wall.

Limitations

Poor results can be due to several factors including, but not limited to, short lived archaeological occupation and land use, or sites with minimal cut or built features. Results can also be limited in areas where the natural geology is of a similar composition to the fills of cut archaeological features such as ditches, or where soils are naturally deficient in iron compounds. Poor results can also be caused by areas with soils overlying naturally magnetically enhanced geological deposits, which can produce strong or variable responses limiting the detection of earlier archaeological features.

Overlying layers, such as demolition rubble or layers of made ground such as during landscaping works, can also limit the detection of earlier archaeological features. The presence of above ground structures within, or in the near vicinity of, the survey area as well as underground services containing ferrous material such as pipelines or electricity cables can distort survey results, further limiting the detection of earlier archaeological features.

Particularly uneven or locally variable elevation in topography can increase the data processing required, and/or distort results beyond the capabilities of processing. It is also possible in areas containing dramatic topographical changes that natural weathering, such as hill wash, often in combination with intensive modern ploughing or other natural geological deposits, will reduce the topsoil on slopes and towards the peaks of hills and possibly destroy or truncate potential archaeological features as a result.

Conversely features at the bottom of slopes may be covered by a greater layer of topsoil or other deposits, and so if buried features are present, they appear faint or are entirely limited in their detection.

Over-processing of data can also obscure, remove or artificially enhance or create anomalies, especially if there are on the same orientation as the direction of data collection. Consequently, where possible, attempts are made to ensure data is not collected on the same orientation as known potential features and that data quality is sufficient to minimise the required data processing.

Instrumentation

Bartington Grad601-2

The Bartington 601-2 is a single axis, vertical component fluxgate gradiometer comprising a data logger battery cassette and two sensors. The sensors are mounted on a rigid carrying frame; each sensor contains two fluxgate magnetometers with 1 m vertical separation.

The difference in the magnetic field between the two fluxgates in each sensor is measured in nano Tesla (nT). The gradiometer data is recorded with a range of ±100 nT. It should be noted that the actual resolution is limited because of potential internal instrumental noise. The gradiometers are calibrated at the start of every day and recalibrated whenever necessary.

This system records four lines of data on each traverse, with traverses walked in a zig-zag pattern until all the survey area is covered.

Appendix B: Data Visualisation and Further Information

Visualisation

The survey data collected was used to produce a series of images to demonstrate the results of surveys. These are outlined below:

- Greyscale plot – This method visualises the survey data as a shaded drawing, with highest readings showing as black, running through different shades to lowest showing as white. Plotting parameters can be adjusted to aid interpretation of geophysical survey data.
- XY Trace plot – This is an alternative method of data visualisation, plotting the magnitude of responses on a scaled XY trace. The stronger the response, the sharper the rise in the trace. This type of plot can be used to differentiate the origin of an anomaly and is best used in conjunction with an alternative method of interpretation.
- Interpretation plot – Through detailed analysis, anomalies have been interpreted and possible features identified. Interpretation drawings are used to show potential features and to reinforce and clarify the written interpretation of the data. Anomalies have been characterised using the terminology detailed in the following section and have been assigned colour coding, which is outlined in keys on figures associated with this report.

Magnetic Anomalies

Different anomalies can represent different features created by human occupation, agricultural or modern activity, or natural pedological and/or geological changes in the substrata.

Anomalies interpreted as 'stronger' are considered more likely to be of the interpreted characterisation; whereas a 'weaker' categorisation represents a more tentative interpretation applied to those anomalies with lesser increases in magnetic response or if the anomaly has incomplete patterning or irregular form. The strength and size of anomalies can vary depending on the magnetic properties of the feature, the magnetic susceptibility of the soil, the depth at which the feature is buried, and the state of preservation.

Terminology

- Anomaly - Any outstanding high or low magnetic response forming a particular shape or covering a specific area within the survey results.
- Feature - A man-made or naturally created object, material or deposit that has been detected through the site investigation works and has sufficient characteristics or supporting evidence for positive identification.

- Magnetic Susceptibility - The ability of a buried feature to be magnetically induced when a magnetic field is applied.
- Magnetic Response - The strength of the changes in magnetic values caused by a buried feature with either a greater or lesser ability to be magnetised compared with the soil around it. Anomalies are considered to either have strong/weak or positive/negative response. The strength of magnetic response (along with patterning) can be essential in determining the nature of a buried feature, but it should be noted that the size or strength of the magnetic response does not always correlate with the size of the buried feature.
- Morphology - The shape or form of an individual anomaly.
- Thermoremanence - The affect caused when a material has been magnetically altered through a process of heating. Thermoremanent magnetisation occurs when an object or material is heated passed the Curie Point and acquires a permanent magnetisation that is associated with the magnetic field that they cooled within (Gaffney and Gater 2003, 37).

Characterisation of Anomalies & Interpretation Categories

Archaeological or Historical Anomalies

- Archaeology – Linear, rectilinear, or curvilinear anomalies with a positive and/or negative magnetic response, composed of a patterning or shape that is suggestive of a buried archaeological feature. These are often indicative of structural remains or infilled cut features such as ditches. The strength of the anomaly signal can be suggestive of the properties of the feature. Negative linear anomalies represent upstanding or infilled features that are less magnetically susceptible than background readings, for example structures such as a ditch-bank, or a cut ditch containing a fill composed of a non-igneous stone material. Bipolar linear anomalies considered to be of an archaeological nature are indicative of material with a high magnetic susceptibility, such as a brick wall. Isolated anomalies or anomalies with a more amorphous form possibly represent infilled features or thermomagnetic features such as areas of heating/burning of an archaeological origin. Unless associated with conclusively identified archaeological remains, such as linear anomalies, absolute identification of positive responses can be problematic as it is often not possible to decipher if they are of an archaeological, modern, or agricultural origin. Consequently, isolated positive responses such as those indicating pit-features, are not always shown within the Interpretation plot(s) unless composed of a broad form or belonging to a series of isolated positive responses. Bipolar responses considered likely to be of an archaeological origin are also interpreted as isolated anomaly (archaeology). These are considered to relate to material with a very strong magnetic susceptibility or thermoremanent magnetisation.
- Possible archaeology – This categorisation is applied where anomalies are weaker or more diffuse in response, resulting in a less certain origin. It is possible that these belong to archaeological features but given their weaker responses or incomplete patterning it is equally plausible that they relate to other sources, such as agricultural features or natural soil formations or geological variations.
- Former Boundary - Linear anomalies, sub/irregular-rectilinear anomalies either with positive or negative magnetic responses, that correspond with the location of former field boundaries, ponds or buildings recorded on historic maps, Aerial photos and/or LiDAR coverage of the site.

- Ridge and Furrow - Broadly spaced linear anomalies or trends that are likely to be indicative of earlier forms of agricultural practice, such as ridge and furrow. These often correspond with the location of earthworks visible on the ground during the survey, or can be identified on aerial or LiDAR survey imagery.

Strongly Magnetic / Bipolar / Dipolar

- Modern Service – Highly magnetic, typically dipolar linear anomalies with a stronger area of variably decreasing ferrous response depending on the vicinity of the survey instrumentation to the buried or extant feature.
- Increased magnetic response – Isolated bipolar responses of a typically modern nature that are likely to relate to buried ferrous material, building debris, or objects, such as magnetically enhanced agricultural debris. If a trend is noted in the alignment or spacing of isolated bipolar responses, it is possible that they are indicative of ferrous fittings or connectors used on buried non-magnetic buried utilities, although occasionally an archaeological origin cannot be ruled out. Also, areas of increased magnetic response denote areas of disturbance containing a high concentration of dipolar or bipolar responses. These are generally considered to be caused by modern debris in the topsoil, including agricultural 'green waste'. It is also possible that the disturbance is in part also caused by isolated archaeological material or geological or pedological changes in the substrata.
- Ferrous disturbance - Areas of magnetic disturbance, often along the edges of survey areas, or surrounding Modern Services caused by highly ferrous material such as standing metal structures like fencing and buildings. Modern Agricultural Anomalies.

Modern Agricultural

- Agricultural Trend - Ploughing trend tends to be regularly spaced linear anomalies, often with a narrower spacing, that conform with ploughing regime at the time of survey, or a recent regime recorded on aerial photos of the site. The response and distribution of land drains varies depending on the composition of the land drain and associated ditch or channel. Consequently, land drains can be composed of weak / strong positive / negative magnetic responses and are identified as a product of either their variance in magnetic values or positioning compared with regularly spaced linear anomalies considered to relate to modern ploughing. Land drains can be located within former agricultural regimes, such as ridge and furrow.
- Land drain – Weakly positive, and/or dipolar, regularly broadly spaced linear trends in a typically parallel or 'herringbone' formation. These are generally modern in origin, although earlier post-medieval ceramic drains are often plausible but cannot be determined.
- Uncertain Trend – Generally positive, although sometimes negative, isolated, and weak linear or curvilinear trends. This category is applied where multiple origins can be asserted to a barely detected anomaly.