



**A report on geophysical surveys undertaken
to investigate
'The Roman History of Tysoe'**

David Sabin & Kerry Donaldson

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A report on geophysical surveys undertaken to investigate 'The Roman History of Tysoe'

Fieldwork by David Sabin BSc (Hons) MCIfA
Report by David Sabin

Report checked by Kerry Donaldson BSc (Hons)
Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

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Archaeological Surveys Ltd
1 West Nolands, Nolands Road, Yatesbury, Calne, Wiltshire, SN11 8YD
Tel: 01249 814231 Fax: 0871 661 8804
Email: info@archaeological-surveys.co.uk
Web: www.archaeological-surveys.co.uk

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ACKNOWLEDGMENTS

Investigations by Kevin Wyles of Tysoe over several decades has produced a robust body of evidence of widespread Roman activity and settlement around Tysoe. Archaeological Surveys Ltd have been fortunate to have been commissioned by Kevin to carry out magnetometry that builds on previous surveys and provides further information on the 'Roman History of Tysoe'. The Council for British Archaeology's Mick Aston Archaeology Fund has provided the financial resources to carry out the work which has produced a considerable amount of new information. Without the funding the investigations would not have been possible. The cooperation of local land owners has been vital and thanks must go to the following landowners and tenant farmers in allowing access for surveying: The Marquess of Northampton, owner of the Compton Estate, and tenant farmer Mr G Ridgway of Downs Farm; Feoffee Farm, owner Tysoe Utility Estate, and tenant farmer Mr P Paxton; Mill Farm, owner and farmer Mr M Gibbs; Hopkins Farm, owned by Warwickshire County Council with tenant farmer Mr R Leach. Thanks also go to the owners of land surveyed previously but included with this report: Mr N Butcher, owner of Barn Ground Farm, for access to land near Sunrising Hill and the Upton Estate for access to four Roman settlement sites (previously reported – Archaeological Surveys J311, 2010).

SUMMARY

Archaeological Surveys Ltd carried out magnetometry over ten areas representing five separate sites within the parish of Tysoe, Warwickshire. Each site was considered to have potential for Romano-British remains based on fieldwalking evidence, cropmarks or topography. The surveys aimed to improve understanding of the Roman History of Tysoe and the work was funded by the Council for British Archaeology's Mick Aston Archaeology Fund.

Survey at Downs Farm, to the south of the village, located a complex area of enclosures and archaeological features covering at least 3.5ha. The site is likely to have seen development over a long period with evidence for changes in the morphology of enclosures and their periodic renewal resulting in a mass of anomalies. Other features include ring ditches, pits and trackways. It is likely that the anomalies represent a farming settlement with its origin sometime in the prehistoric and continuing through the Roman period.

Magnetometry carried out over 7.8ha to the north east of Hopkins Farm located extensive anomalies relating to ditches and enclosures associated with Roman and possible prehistoric settlement and agriculture. Several small ring ditches, probably relating to former roundhouses, and small pit-like anomalies, possibly relating to post built structures, were also located. Anomalies are likely to extend beyond the limits of the survey in all directions suggesting that the full extent of the archaeological remains is uncertain and

could be considerably more than that surveyed.

The survey at Feoffee Farm was centred around the location of a number of Roman vessels found during a small excavation. The site contains extant ridge and furrow earthworks with evidence of a past change to their orientation, the combined effect being severe truncation to archaeological features. Several fragmented enclosure ditches were visible in the data but the survey has added little to furthering the understanding of the site.

Previously unreported surveys to the north of the potential villa site at Madhill, adjacent to the A422, have also been included in this report. The results indicate a complex area of enclosures and ditches of archaeological potential disturbed by ridge and furrow but lying immediately south of structural remains of Roman origin identified from fieldwalking.

Magnetometry was also targeted on Windmill Hill, considered to be a possible Iron Age hill fort, and on circular cropmarks to the west of Tysoe. Although several anomalies of uncertain origin were located at both sites, no anomalies could be confidently interpreted as having archaeological potential.

The geophysics has proved successful in locating extensive archaeological deposits of Roman date within the parish of Tysoe and provide a significant resource for future research and investigation.

1 INTRODUCTION

1.1 *Survey background*

- 1.1.1 Archaeological Surveys Ltd was commissioned by Kevin Wyles to undertake a magnetometer survey initially over two Romano-British settlement sites near Tysoe, Warwickshire. The work is part of a programme of continuing research into Romano-British settlement by Kevin who is a resident of Tysoe and has spent several decades investigating Roman sites within the parish. The Council for British Archaeology's Mick Aston Archaeology Fund provided the financial resources to carry out the geophysics and produce this report after an application by Kevin under the project title of 'The Roman History of Tysoe'.
- 1.1.2 Although two sites for study were initially identified, surveying was expanded to include three additional sites considered to contain potential for Romano-British settlement and activity. To assist future research within the parish, this report also includes the results of several other earlier geophysical surveys carried out by Archaeological Surveys Ltd (Archaeological Surveys, 2010), including areas that have been considered incomplete and not previously reported on.
- 1.1.3 The survey areas do not contain scheduled monuments and have been

recognised through fieldwalking and finds of Romano-British material. There is no immediate risk to the areas from development, though arable cultivation is likely to cause continuing degradation of the remains at some of the sites. Non-intrusive investigations are considered the most appropriate way of investigating archaeological remains over wide areas within the parish, particularly magnetometry as the geology and soil across the southern part of Warwickshire produce excellent results.

1.2 Survey objectives and techniques

- 1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may assist in researching 'The Roman history of Tysoe'. The data can assist in understanding the extent of sites, type of activity, period of use, presence of structures and preservation of the archaeological resource.
- 1.2.2 Previous magnetometry within the parish of Tysoe has produced very good results and is considered to be the primary technique for geophysical investigations in the region. Resistivity may be superior to magnetometry for mapping structural remains; however, no resistivity was carried out due to limited time and resources.

1.3 Standards and guidance

- 1.3.1 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation*; European Archaeological Council (2015) *Guidelines for the Use of Geophysics in Archaeology*; Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations*. The work has been carried out to the Chartered Institute for Archaeologists (2014) *Standard and Guidance for Archaeological Geophysical Survey*.
- 1.3.2 The work was also carried out with adherence to the *Essential Conditions* set out by the Council for British Archaeology as a requirement of their funding. In addition, the majority of the *Desirable Conditions* have also been met.

1.4 Survey locations, description and conditions

- 1.4.1 The geophysical surveys have been carried out along the south eastern portion of the parish and are listed in Table 1 below. The survey sites are referred to by farm names, field names or other names used by previous investigations. Areas 1 to 10 are the current locations surveyed as part of research funded by the Council for British Archaeology's Mick Aston Archaeology Fund. The areas represent five separate sites. Previous geophysical surveys, funded and carried out by Archaeological Surveys Ltd, have also been included with this report. These previous surveys include both reported and unreported work that at the time was considered incomplete. The location of the areas is also plotted in Fig 03.

Survey Area	Location	Central OS NGR	Site name
Area 1	Part of field 200m north west of Downs Farm.	434055 242500	Downs Farm
Area 2	Part of field 100m north west of Downs Farm.	434165 242320	Downs Farm
Area 3	Part of field 230m south east of Tysoe football pitch.	434225 243785	Feoffee Farm
Area 4	Part of field 180m south east of Tysoe football pitch.	434195 243830	Feoffee Farm
Area 5	Part of field 160m south south east of Tysoe football pitch.	434145 243785	Feoffee Farm
Area 6	Small field surrounding windmill on Windmill Hill.	433170 242710	Windmill Hill
Area 7	Field 650m east north east of Hopkins Farm.	435230 245290	Hopkins Farm
Area 8	Field 650m north east of Hopkins Farm.	435050 245565	Hopkins Farm
Area 9	Field 750m east north east of Hopkins Farm.	435265 245375	Hopkins Farm
Area 10	Part of field 600m west of Mill Farm.	433325 244520	Mill Farm
Madhill – Upton Estate (Archaeological Surveys, 2010)	Part of field 470m north west of Sunrising House.	435630 246010	Madhill
Lingcroft (Archaeological Surveys, 2010)	Part of field 470m east north east of Tysoe church.	434580 244540	Lingcroft
Old Lodge Farm – Upton Estate (Archaeological Surveys, 2010)	Part of field 190m south west of Old Lodge Farm.	435890 244780	Old Lodge Farm
Twenty Seven Acres – Upton Estate (Archaeological Surveys, 2010)	Part of field 630m west of Sunrising House.	435360 245890	Twenty Seven Acres
Bean Hill (Previously unreported 2011 survey)	Part of field 530m north west of Sunrising House.	435760 246265	Bean Hill
Little Meadow (Previously unreported 2011 survey)	Part of field 450m north west of Sunrising House.	435700 246110	Little Meadow
Lingcroft additional survey (Previously unreported 2011 survey)	Part of field 230m north east of Tysoe church.	434295 244405	Lingcroft
Downs Farm (Previously unreported 2011 survey)	Part of field 230m north north west of Downs Farm.	434185 242470	Downs Farm

Table 1: Location of survey areas and site names

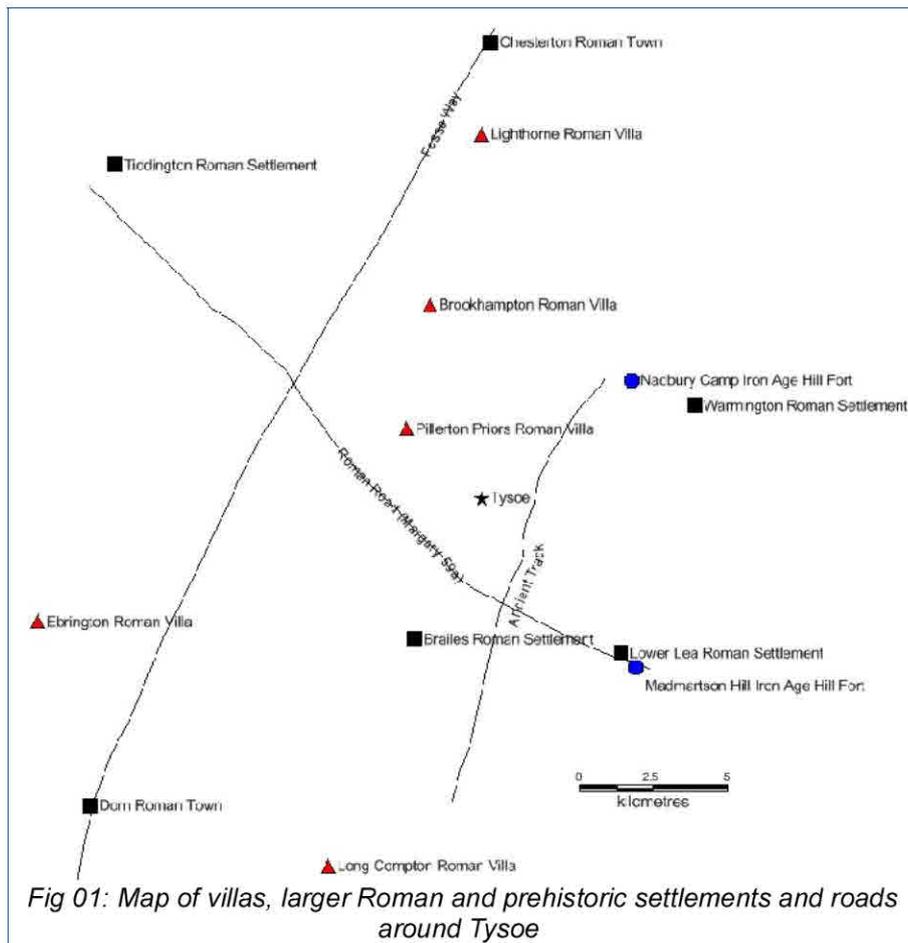
1.4.2 Table 2 below lists details of the 10 new survey areas and previously unreported areas surveyed in 2011. The list does not include areas previously reported on (Archaeological Surveys, 2010) and included with this report. The new survey areas amount to approximately 15.2ha with previously unreported surveys amounting to 6.6ha.

Survey Area	Area (ha)	Survey date	Surface conditions	Topographic notes
Area 1	3.5	22/02/17 & 07/03/17	Dryish soil with emerging crop.	Elevated site on escarpment with land falling away to the north and a shallow valley to the south.
Area 2	0.5	22/02/17	Pasture, good conditions.	Base of shallow valley.
Area 3	0.4	07/03/17	Pasture, good conditions.	Land below escarpment with extant ridge and furrow.
Area 4	0.2	07/03/17	Pasture, steep ridge and furrow.	Land below escarpment with extant ridge and furrow.
Area 5	0.3	07/03/17	Pasture, good conditions.	Flat area below escarpment.
Area 6	1.5	10/04/17	Pasture, some rough vegetation in places.	Elevated hill top with land falling in all directions with the exception of the south.
Area 7	2.8	08/08/17 & 20/08/17	Pasture, good conditions.	Land below escarpment slopes down to the north and west with a brook running n.w. along the northern boundary.
Area 8	4.6	20/08/17 & 26/10/17	Pasture, good conditions.	Mainly flat area except for eastern side which rises up towards the east.
Area 9	0.4	26/10/17	Pasture, disturbance by badgers avoided.	Near base of valley with land rising to the north and south.
Area 10	1	29/05/17	Pasture, good conditions.	Flat area.
Bean Hill	2.1	11/08/11	Pasture, good conditions.	Elevated site on lower part of escarpment with land falling to the south west.
Little Meadow	1.6	08/08/11	Pasture, good conditions.	Elevated site on lower part of escarpment with land falling to the north.
Lingcroft additional survey	2.1	26/08/11 & 05/09/11	Stubble, good conditions.	Flat area with some low ridge and furrow.
Downs Farm	0.8	28/08/11	Pasture, good conditions.	Elevated area with land sloping down to the north and south.

Table 2: Survey areas, dates and conditions

1.5 *Site history and archaeological potential*

- 1.5.1 The following information is based mainly on non-intrusive fieldwalking, geophysics and metal detection. There are significant biases to the distribution of these surveys with the focus of work undertaken along the base, middle and upper parts of the Edge Hill escarpment that runs along the south eastern edge of the parish boundary. Fieldwalking finds recorded by the Warwickshire Historic Environment Record include those made during both measured and unmeasured survey. Geophysical survey and metal detection has focused on those sites identified by fieldwalking.
- 1.5.2 It would seem likely that Roman settlement at Tysoe links into the wider Roman road network. Approximately 2km south west of the village is the line of a Roman road that can be traced for some distance to the north west and south east (Margary 56a). It passes the south eastern limit of the parish boundary by just a few hundred metres where it is partly overlain by the current lane passing Compton Wynnyates as it heads south easterly towards the Lower Lea Roman settlement site, near Swacliffe in Oxfordshire, and beyond. To the north west of the Shipston Road it is fossilised by hedgerows and continues just to the east of Whatcote, possibly heading towards Ettington and continuing beyond as the A422 to Stratford-Upon-Avon. To the west of Pillerton Priors the road must meet and cross the Fosse Way approximately 7.5km north west of Tysoe. It is possible that the route is a military road running between Alcester in Warwickshire and Alchester in Oxfordshire.
- 1.5.3 Fig 01 indicates the location of some of the more major Roman and late prehistoric sites around Tysoe and the layout of more major parts of the road system during this period. In general, it can be said that the region has not been subject to intensive archaeological investigation or research which may be due to the lack of large scale modern development combined with poor conditions for the formation of cropmarks (with the exception of the higher parts of the Edge Hill escarpment). Many archaeological sites are also heavily disturbed by medieval ridge and furrow cultivation. Where geophysical and fieldwalking surveys have been carried out in recent years, the evidence builds a picture of an intensively utilised landscape from the late prehistoric through to the end of the Roman period. At present it is only possible to presume that the Roman population within the parish of Tysoe interacted with the surrounding larger settlements and villas via both the major roads and much smaller localised trackways.



1.5.4 Minor Roman roads and trackways would have linked settlement sites within the parish and provided routes to fields, woods and quarries. To the north of the A422, where the road climbs the first part of the escarpment of Sun Rising Hill (also known as Madhill), an area of pasture land contains evidence of a series of tracks as holloways. Although the majority probably relate to medieval and post-medieval routes for climbing the hill, one appears to take a different course and heads straight for a Roman settlement site that is located immediately to the south of the A422. Other deep holloways exist within the woodlands that extend along the Edge Hill escarpment, and it is possible that some of these are also of great age allowing access to the upland plateau and a possible ancient track known locally as Sugarswell Lane.

1.5.5 The Warwickshire Historic Environment Record lists a number of sites and finds of Roman and prehistoric date, see Table 3 & Fig 02. Several sites are indicative of Roman settlement and have been subject to fieldwalking, metal detection and geophysical survey. Four sites, referred to by field names or other nearby features, were surveyed and reported on in 2010 (Archaeological Surveys): Madhill (OS NGR 435630 246010), Lingcroft (OS NGR 434580 244540), Old Lodge Farm (OS NGR 435890 244780) and Twenty Seven Acres (OS NGR 435360 245890).

- 1.5.6 Geophysical surveys have previously been carried out on a Romano-British settlement site identified during fieldwalking by Kevin Wyles and centred around OS NGR 435065 245490 (Warwickshire HER no. MWA12445). Magnetometry was carried out by Warwickshire Museum Services (Morton, 2009) aided by volunteers. The results of the survey suggest the presence of anomalies that may indicate substantial surviving archaeological deposits of Roman date. Both magnetometry and resistivity surveys were carried out on the site by Richard Grove as part of an undergraduate dissertation (Grove, 2010). The results indicate the presence of a number of features and provide supporting evidence for widespread archaeological remains.
- 1.5.7 In addition to the geophysical surveys outlined above, incomplete magnetometer surveys have been carried out by David Sabin at Bean Hill and Downs Farm with additional work near to Lingcroft. These surveys are reported on within this document. The Bean Hill survey is associated with Roman material identified by fieldwalking at OS NGR 435805 246350 (Warwickshire HER no. MWA8791); numerous linear features associated with enclosures were located. The Downs Farm survey was restricted to an area to the east of the main site identified by fieldwalking at OS NGR 434100 242450 (Warwickshire HER nos. MWA8143 & MWA9155); several linear anomalies were located. The additional work at Lingcroft located several linear anomalies partly truncated by the furrows of medieval ridge and furrow cultivation.
- 1.5.8 Field drainage works carried out in 1970 at Feoffee farm (OS NGR 434280 243725) disturbed numerous Romano-British pottery sherds belonging to the Flavian-Antonine period (Warwickshire HER no. MWA2082). Kevin Wyles assisted in the retrieval of the fragments of fifteen coarse ware vessels in an area of 2m² at a depth of 0.9m - 1.2m. Three vessels were half complete: a decorated Samian Form 37, a grey poppyhead vessel with barbotine decoration and a tankard in red-brown ware. A second tankard was also found. Associated finds included sharpened animal bone, flint, iron clinker and pebbles of which some appear to have been heated.
- 1.5.9 Roman activity within the parish of Tysoe appears widespread and there is considerable potential for non-intrusive survey, mainly geophysics, to build on the previous work and further improve understanding of the origins of the village.

HER Record no.	Location (OS NGR)	Description
MWA2061	433320 244490	Several possible enclosures of unknown date visible as cropmarks.
MWA2080 MWA2099	433900 243455	Roman coin (4 th century) found in Upper Tysoe allotments.
MWA2081	434550 244500	Several Roman coins found near Avon Avenue.
MWA2082	434280 243725	Roman pottery discovered in 1970 during field drainage works. At least 15 vessels in an are of 2 square metres and depth of 0.9 – 1.2m.

MWA2083	435315 244215	Four fragments of Roman pottery found during excavations intended to locate the Red Horse of Tysoe in 1964.
MWA2091	433115 242720	Flint finds of Neolithic or Bronze Age date located on Windmill Hill.
MWA2092	433115 242720	The site of a possible Iron Age hillfort suggest by slight earthworks on Windmill Hill.
MWA4497	(Tysoe village)	Various Roman pottery sherds from a hole in the middle of the village.
MWA7061	435665 246005	Roman pottery and metalwork including brooches, a finger ring, steelyard weight and part of a silver plate.
MWA8142 MWA9749 MWA12486	435095 244760	Roman pottery and coins (3 rd and 4 th centuries). A magnetometer survey carried out by David Sabin revealed ditches and pits suggesting a settlement site.
MWA8143 MWA9155	434100 242450	Roman pottery, coins and a lead weight found near Downs Farm.
MWA8159 MWA12487	435415 245895	Roman pottery, tile and animal bone discovered during a fieldwalking survey by the Edgehill Project Group. A magnetometer survey carried out by David Sabin revealed ditches and pits suggesting a settlement site.
MWA8163 MWA9750 MWA12487	434515 244495	Roman pottery, tile and coins, including a silver siliqua of Honorius (AD 393-423), discovered during a fieldwalking survey by the Edgehill Project Group. A magnetometer survey carried out by David Sabin revealed ditches and pits suggesting a settlement site.
MWA8169 MWA10249	434435 244440	A flint scatter consisting of 25 waste flakes and 5 implements discovered during a fieldwalking survey by the Edgehill Project Group.
MWA8784	435665 246005	Fieldwalking by the Edgehill Project Group located a concentrated scatter of Roman pottery and stones. A resistivity survey carried out by David Sabin associated slight earthworks with a high resistance feature probably indicative of substantial structural remains. Further magnetometry survey also located numerous cut features, including a ring ditch, and possible structural remains.
MWA8789	435690 244945	A rectangular enclosure of unknown date visible as a cropmark.
MWA8790	435815 244980	A double ditched enclosure of unknown date visible as a cropmark.
MWA8791	435805 246350	Roman pottery, tile, quernstone, worked flints and burnt clay or daub located during fieldwalking by the Edgehill Project Group.
MWA9587	436125 247240	A scatter of Roman pottery sherds discovered by the Edgehill Project Group during fieldwalking.
MWA10080	435465 246435	Part of a bronze Roman key.
MWA12445	435065 245490	Roman pottery finds. A magnetometer survey carried out by Warwickshire Museum Services suggests evidence for possible industrial activity possibly in the form of drain driers.

Table 3: Roman and prehistoric sites and finds listed in the Warwickshire HER

Survey Area	Geology (Previous terminology or former classification shown in brackets)	Soil
Area 1	Dyrham Formation (Middle Lias) with the Whitby Mudstone Formation (Upper Lias) intruding into the southern part of the survey area. The southern part may also overlie the Epwell Fault.	Banbury association – ferritic brown earth. A well drained, brashy, fine and coarse, loamy, ferruginous soil over ironstone. Some deep, fine, loamy over clayey soil with slowly permeable subsoil and slight seasonal waterlogging.
Area 2	Whitby Mudstone Formation (Upper Lias). The Epwell Fault lies immediately to the north.	Denchworth association – pelostagnogley. A slowly permeable seasonally waterlogged clayey soil.
Area 3	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association – a typical calcareous pelosol. A slowly permeable clayey soil.
Area 4	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Area 5	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Area 6	Northampton Sand Formation (Northampton Sands). The site lies close to the Epwell Fault.	Oxpasture association – stagnogleyic argillic brown earth. Fine, loamy over clayey soil with slowly permeable subsoil and slight seasonal waterlogging.
Area 7	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Area 8	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Area 9	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Area 10	Charmouth Mudstone Formation (Lower Lias).	Denchworth association.
Madhill	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Lingcroft (including additional survey area)	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Old Lodge Farm	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Twenty Seven Acres	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Bean Hill	Charmouth Mudstone Formation (Lower Lias). The eastern edge of the survey area may contain Head deposits formed in the Quaternary and derived from the nearby escarpment.	Evesham 2 association.
Little Meadow	Charmouth Mudstone Formation (Lower Lias).	Evesham 2 association.
Downs Farm	Dyrham Formation (Middle Lias) in the northern part with Whitby Mudstone Formation (Upper	Banbury association – ferritic brown earth.

	Lias) in the southern part and Marlstone Rock Formation (Marlstone Rock Bed) on the eastern edge.	
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Table 4: Survey area geology and soil type

- 1.6.4 Magnetometry carried out over similar geologies and soils generally produces very good results. The sites are, therefore, considered suitable for magnetic survey.

2 METHODOLOGY

2.1 *Technical synopsis*

- 2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.
- 2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.
- 2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.
- 2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T).

2.2 *Equipment configuration, data collection and survey detail*

- 2.2.1 The detailed magnetometry over Areas 1 - 10 was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5m apart with readings recorded at 20Hz. The cart is pushed at walking speed and not towed. Each sensor is not zeroed in the field as the vertical axis alignment is precisely fixed leaving sensor offsets that are removed during data processing. The fixing of the vertical alignment ensures the sensors are not unduly influenced by localised magnetic fields and that the vertical component of a magnetic anomaly is measured. The gradiometers have a range of recording data between ± 0.1 nT and $\pm 10,000$ nT. They are linked to a Leica GS10

RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

- 2.2.2 Due to the fixed offsets within the fluxgate sensors, as a result of the manufacturing and tensioning process, the survey data do not provide a visually useful dataset until a zero median traverse algorithm is applied. It is recognised that this has the potential to affect some anomalies detrimentally by removing linear features orientated parallel to survey transects. However, this has not been noted as a particular problem with the system due to the high resolution data collection, generally long length of traverses and variability within the magnetic characteristics of a linear anomaly.
- 2.2.3 Data are collected along a series of parallel survey transects to achieve 100% coverage of the surveyable land. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses. Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).
- 2.2.4 Fluxgate sensors are highly sensitive to temperature change and this is manifest as drift during the course of a survey. This can be particularly noticeable during the morning as temperatures rise and the equipment warms or cools. Sensor drift within the course of a traverse will appear as a line trending from negative to positive after processing with a zero median traverse algorithm. To remove the potential for temperature drift data were collected after a 20 minute stabilisation period and traverses were limited to a time of generally <100s.
- 2.2.5 Magnetometry carried out for previous surveys in 2010 and 2011 used a Bartington Grad601-2 fluxgate gradiometer. The instrument effectively measures a magnetic gradient between two fluxgate sensors mounted vertically 1m apart. Two sets of sensors are mounted on a single frame 1m apart horizontally.
- 2.2.6 The instrument is extremely sensitive and is able to measure magnetic variation to 0.01nanoTesla (nT) with an effective resolution of 0.03nT. The data range are limited to ± 100 nT when surveying with the highest sensitivity. All readings are saved to an integral data logger for analysis and presentation.
- 2.2.7 The instrument is operated according to the manufacturer's instructions with consideration given to the local conditions. An adjustment procedure is required, prior to collection of data, in order to balance the sensors and remove the effects of the Earth's magnetic field; further adjustment is required during the survey due to instrument drift often associated with temperature change.
- 2.2.8 It can be very difficult to obtain optimum balance for the sensors due to localised magnetic vectors that may be associated with large ferrous objects, geological/pedological features, 'magnetic debris' within the topsoil and natural temperature fluctuations. Imperfect balance results in a heading error often visible

as striping within the data; this can be effectively removed by software processing and generally has little effect on the data unless extreme.

- 2.2.9 Data were collected at 0.125m centres along traverses 1m apart. The survey areas were separated into 30m by 30m grids (900m²) giving 7200 recorded measurements per grid. This sampling interval is very effective at locating archaeological features and is the recommended methodology for archaeological prospection (English Heritage, 2008).
- 2.2.10 The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS. The GPS was used in conjunction with Topcon's TopNet service where positional corrections are sent via a mobile telephone link. Positional accuracy of around 10 – 20mm is possible using the system. The instrument is regularly checked against the ETRS89 reference framework using Ordnance Survey ground marker C1ST7784 (Horton).

2.3 *Data processing and presentation*

- 2.3.1 Magnetic data collected by the MAGNETO@MXPDA cart-based system are initially prepared using SENSYS MAGNETO@DLMGPS software. The software effectively allocates a geographic position for each data point and can compensate for fixed offsets present within the FGM650 sensors. The offsets are positive or negative values present on all fluxgate gradiometer sensors. Some systems use manual or electronic balancing to effectively zero the sensors; however, this is a short term measure that is prone to drift through temperature changes and vibration and can easily be incorrectly set due to localised magnetic fields. The FGM650 sensors are very accurately aligned to the vertical magnetic gradient and are highly stable showing negligible drift on long traverses. The offset values are removed using TerraSurveyor software.
- 2.3.2 Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display within TerraSurveyor. The removal of offset values (compensation) of the sensors is also carried out in TerraSurveyor using a zero median traverse function. Data are then considered to be minimally processed. Note: without the zero median traverse function it is not possible to create a meaningful data plot as all sensors have a different offset value. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.
- 2.3.3 The minimally processed data are collected between limits of ± 10000 nT and clipped for display. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track.
- 2.3.4 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix

B for further information on processing.

- 2.3.5 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (to OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot. With regard to the Sensys MXPDA, minimally processed data is considered by the manufacturer to be data that is compensated by SENSYS MAGNETO DLMGPS software, see 2.3.1 and 2.3.2. Note: traceplots are not considered to be appropriate as they do not provide an accurate or useful assessment of the magnetic anomalies due to very high density of data collection.
- 2.3.6 Magnetometry data downloaded from the Grad 601-2 data logger are analysed and processed in TerraSurveyor. The software allows greyscale and trace plots to be produced for presentation and display. Survey grids are assembled to form an overall composite of data (composite file) creating a dataset of the complete survey area. Appendix C contains specific information concerning the survey and data attributes and is derived directly from TerraSurveyor.
- 2.3.7 Only minimal processing is carried out in order to enhance the results of the survey for display. Raw data are always analysed as processing can modify anomalies. Reference should be made to Appendix B for further information on the specific processes carried out on the data. Appendix C metadata includes details on the processing sequence used for each survey area.
- 2.3.8 The raster images are combined with base mapping using ProgeCAD Professional 2016, creating DWG (2010) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The CAD plots are effectively georeferenced facilitating relocation of features using GPS, resection method, etc.
- 2.3.9 An abstraction and interpretation is also drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.
- 2.3.10 A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within each survey area. Where further interpretation is possible, or where a number of possible origins should be considered, more subjective discussion is set out in Section 4.
- 2.3.11 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 *General assessment of survey results*

- 3.1.1 The detailed magnetic survey, carried out as part of the CBA Mick Aston Archaeology Fund, has targeted ten separate survey areas covering approximately 15.2ha. The results also include four areas previously reported on (Archaeological Surveys, 2010), covering approximately 5.9ha, and three areas previously surveyed in 2011 but unreported, covering 6.6ha.
- 3.1.2 Magnetic anomalies located within the survey areas are numbered and grouped within categories set out in Table 5 below. Subsequent discussion is set out within Section 4.

3.2 *Statement of data quality and factors influencing the interpretation of anomalies*

- 3.2.1 Data are considered representative of the magnetic anomalies present within the survey areas. There are no significant defects within the datasets.
- 3.2.2 Anomalies are frequently severely disturbed by medieval ridge and furrow cultivation and as a consequence abstraction and interpretation may be limited. However, anomalies disturbed by ridge and furrow are considered to be earlier and of archaeological potential.
- 3.2.3 Several sites contain complex masses of anomalies relating to different phases of activity and as a consequence the morphology of features may be unclear limiting interpretation. The superimposition of features is often impossible to determine from magnetic data.

3.3 *Data interpretation*

- 3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, see Table 5.

Interpretation category	Description and origin of anomalies
<i>Anomalies with archaeological potential</i>	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, ring ditches, enclosures, etc. The category is used where there is a high level of confidence which may be due to additional supporting information where morphology is unclear or uncharacteristic.
<i>Anomalies with an uncertain origin</i>	The category applies to a range of anomalies where <u>there is not enough evidence to confidently suggest an origin</u> . Anomalies in this category <u>may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered</u> . Morphology may be unclear or uncharacteristic and there may be a lack of additional supporting information. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
<i>Anomalies relating to land management</i>	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates ceramic land drains.
<i>Anomalies with an agricultural origin</i>	The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries. Where the response is broad, former ridge and furrow is likely; narrow response is often related to modern ploughing. This category does not include agricultural features of early date or considered to be of archaeological potential (e.g. animal stockades, enclosures, farmsteads, etc).
<i>Anomalies associated with magnetic debris</i>	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. They often occur where there has been dumping or ground make-up and are related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, hearths and nail spreads from former wooden structures or rooves and <u>may, therefore, be archaeologically significant</u> . It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
<i>Anomalies with a modern origin</i>	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around these features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.
<i>Anomalies with a natural origin</i>	Naturally formed magnetic anomalies are caused by localised variability in the magnetic susceptibility of soils, subsoils and other drift or solid geologies. Anomalies may be amorphous, linear or curvilinear and may appear 'fluvial' or discrete; the latter are <u>almost impossible to distinguished from pit-like anomalies with an anthropogenic origin</u> . Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. Igneous and metamorphic activity can lead to anomalies within more solid geology.

Anomalies associated with ground disturbance/quarrying	Magnetically variable anomalies which may be negative indicating a response to geology/drift deposits and/or positive indicating an increased depth of topsoil. Very strongly magnetic anomalies are a response to highly magnetic material of modern origin which can be used to infill a quarry depression. <u>It should be considered that former quarry pits may be of archaeological potential.</u>
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Table 5: List and description of interpretation categories

3.4 List of anomalies - Area 1 (Downs Farm)

Area centred on OS NGR 434055 242500, see Figures 04 – 06.

Anomalies of archaeological potential

- (1) – A complex zone of curvilinear and rectilinear enclosure ditches likely to be associated with a core settlement area.
- (2) – Area of multiple rectilinear and curvilinear enclosure ditches.
- (3) – Evidence of two possible ring ditches, approximately 12m in diameter, and an oval ditch approximately 13m by 6m. The ring ditches probably relate to settlement features although oval ditches can be associated with funerary monuments.
- (4) – Former ditches indicative of a possible trackway in the northern part of the survey area. The ditches may also relate to enclosures.
- (5) – Parallel ditches possibly indicative of a former trackway running along the southern part of the survey area.
- (6) – Magnetically enhanced zones forming broad linear anomalies cut by furrows within the southern part of the area. They may be associated with anomalies (5), possibly representing an infilled holloway.
- (7) – The area contains numerous former ditches that may represent enclosures, tracks, etc.
- (8) – Numerous discrete positive anomalies indicative of pit-like features or soils subject to intense burning as found in hearths and industrial features.

Anomalies with an uncertain origin

- (9) – Amorphous positive zones located on a natural ridge and along a former field boundary. The anomalies may be associated with increased depth of soil within shallow quarries. There is evidence that the anomalies have truncated both former ridge and furrow and other anomalies of archaeological potential, suggesting they are likely to be post-medieval to modern in date.

(10) – A rectangular anomaly that cuts both ridge and furrow and anomalies of archaeological potential. It is likely to be modern in origin.

(11) – Several curving linear anomalies of uncertain origin. It is unclear as to whether they relate to archaeological features or ridge and furrow cultivation.

Anomalies with an agricultural origin

(12) – The area is crossed by a series of positive anomalies representing the infilled furrows of former ridge and furrow cultivation.

(13) – Weak anomalies associated with modern cultivation.

Anomalies associated with magnetic debris

(14) – Dipolar anomalies caused by ferrous objects.

3.5 List of anomalies - Area 2 (Downs Farm)

Area centred on OS NGR 434165 242320, see Figures 04 – 06.

Anomalies with an uncertain origin

(15) – The survey area contains several discrete positive anomalies that may represent pit-like features. Their archaeological potential cannot be determined.

(16) – Positive and negative linear anomalies that may be associated with land drainage or water pipes.

(17) – The survey area contains several circular negative anomalies that may have been caused by animal feeders although their origin cannot be confidently determined.

Anomalies with an agricultural origin

(18) – Linear anomalies representing former ridge and furrow cultivation.

Anomalies associated with magnetic debris

(19) – Dipolar anomalies caused by ferrous objects.

Anomalies with a modern origin

(20) – Magnetic disturbance at the south eastern end of the survey area has been caused by modern ferrous material.

3.6 *List of anomalies – Downs Farm (previously surveyed area)*

Area centred on OS NGR 434185 242470, see Figures 04 – 06.

Anomalies of archaeological potential

(21) – Positive linear anomalies within the northern part of the survey area are associated with the complex of archaeological features within Area 1 to the west.

(22) – Several discrete positive anomalies were located and considered to be of archaeological potential given the presence of archaeological features a short distance to the west. They are likely to represent pit-like features.

Anomalies with an uncertain origin

(23) – The survey area contains several weak positive and negative anomalies of uncertain origin. It is possible that they are associated with the complex of archaeological features within Area 1.

Anomalies with an agricultural origin

(24) – Linear anomalies representing former ridge and furrow cultivation.

(25) – Linear anomalies around the periphery of the field are likely to be associated with modern cultivation.

Anomalies associated with magnetic debris

(26) – Dipolar anomalies caused by ferrous objects.

3.7 *List of anomalies - Area 3 (Feoffee Farm)*

Area centred on OS NGR 434225 243785, see Figures 07 – 09.

Anomalies of archaeological potential

(27) – Positive linear anomalies representing enclosures that are very disturbed and fragmented by ridge and furrow.

(28) – The southern part of the survey area contains at least two ditch-like features disturbed by ridge and furrow.

Anomalies with an uncertain origin

(29) – Positive and negative linear anomalies that appear to cross or truncate the

ridge and furrow suggesting they are of more recent date.

Anomalies with an agricultural origin

(30) – Linear anomalies caused by extant ridge and furrow. The furrows are represented by negative anomalies. Fragmented linear anomalies indicative of earlier ridge and furrow, orientated perpendicular to the extant earthwork system, have also been located. These two different orientations have severely disturbed and truncated archaeological anomalies.

Anomalies with a modern origin

(31) – Magnetic disturbance caused by a water trough.

3.8 List of anomalies - Area 4 (Feoffee Farm)

Area centred on OS NGR 434195 243830, see Figures 07 – 09.

Anomalies of archaeological potential

(32) – Weak and fragmented positive linear anomalies indicative of enclosure ditches. The features are highly disturbed by ridge and furrow.

Anomalies with an agricultural origin

(33) – Linear anomalies associated with extant ridge and furrow.

Anomalies with a modern origin

(34) – Magnetic disturbance caused by ferrous fencing.

3.9 List of anomalies - Area 5 (Feoffee Farm)

Area centred on OS NGR 434145 243785, see Figures 07 – 09.

Anomalies with an agricultural origin

(35) – Linear anomalies associated with former ridge and furrow.

Anomalies with a modern origin

(36) – Magnetic disturbance caused ferrous fencing.

3.10 *List of anomalies - Area 6 (Windmill Hill)*

Area centred on OS NGR 433170 242710, see Figures 10 – 12.

Anomalies with an uncertain origin

(37) – Part of a positive curvilinear anomaly that probably extends beyond the southern limit of the survey area. The anomaly represents a ditch-like feature and may be part of an oval enclosure ditch. Its archaeological potential cannot be confidently determined.

(38) – A weak, positive rectilinear anomaly of uncertain origin. Although a small enclosure is possible, it may well relate to shallow solid geology.

(39) – Low magnitude negative curvilinear anomalies located in the northern part of the survey area. The origin of these anomalies is uncertain and may be natural.

(40) – Positive linear anomalies that do not appear to form coherent features cannot be confidently interpreted. It is possible that they relate to anthropogenically or naturally formed features.

(41) – Amorphous positive anomalies of uncertain origin may relate to ground disturbance, areas of burning or naturally formed features.

(42) – Positive and negative linear anomalies occur along the line of a public footpath and may have been formed by a former track or boundary.

(43) – Positive and negative linear anomalies along the northern edge of the survey area may be associated with former cultivation or soil creep.

(44) – A small cluster of pit-like anomalies within the northern part of the survey area.

(45) – The survey area contains several pit-like anomalies of uncertain origin.

Anomalies associated with ground disturbance/quarrying

(46) – An oval anomaly close to the eastern side of the survey area appears likely to relate to a small area of quarrying.

Anomalies associated with magnetic debris

(47) – A zone of magnetic debris surrounds the extant windmill. This may indicate the presence of magnetically thermoremanent and ferrous material used in ground consolidation.

(48) – High magnitude magnetic debris possibly relating to former areas of burning.

(49) – The survey area contains numerous strong dipolar anomalies caused by ferrous objects within the topsoil.

Anomalies with a natural origin

(50) – Several irregularly shaped linear anomalies are likely to be associated with the soil fill of naturally formed cracks within the underlying solid geology. The cracks may have resulted from cambering although the site is located adjacent to a significant fault.

3.11 *List of anomalies - Area 7 (Hopkins Farm)*

Area centred on OS NGR 435230 245290, see Figures 13 – 15.

Anomalies of archaeological potential

(51) – The majority of the survey area contains a complex series of rectilinear enclosure ditches frequently fragmented by furrows. The enclosures tend to have a similar orientation although they are often overlapping. There is evidence of a small number of anomalies extending further north into Area 9.

(52) – The north eastern part of the survey area contains evidence for several fragmented ring ditches probably associated with former settlement structures. At least one has clear evidence of a westerly entrance flanked by terminal pits.

(53) – Pit-like anomalies of archaeological potential tend to cluster in the western part of the survey area.

(54) – Variable magnetic responses in the northern part of the area probably represent disturbed and truncated archaeological features.

(55) – Magnetically enhanced areas that may indicate burning, industrial activity or large pits infilled with refuse etc.

(56) – Weakly enhanced magnetic areas of archaeological potential that appear partially truncated by furrows.

(57) – Several fragmented linear anomalies appear to converge but are not clearly associated with the enclosures as they have a very different orientation. They tend to curve with one extending for some distance to the southern boundary of the survey area. It is possible that they are associated with a series of trackways.

(58) – The survey area contains fragmented linear anomalies that relate to ditches of archaeological potential.

Anomalies with an uncertain origin

(59) – Several linear anomalies located within the eastern part of the survey area may relate to ditch-like features although land drainage is also possible.

Anomalies with an agricultural origin

(60) – Linear anomalies relating to the furrows of former ridge and furrow cultivation.

(61) – A multiple dipolar linear anomaly typical of a ceramic land drain.

Anomalies associated with magnetic debris

(62) – The survey area contains numerous dipolar anomalies caused by ferrous objects within the topsoil. Larger dipolar anomalies can relate to industrial features.

3.12 List of anomalies - Area 8 (Hopkins Farm)

Area centred on OS NGR 435050 245565, see Figures 16 – 18.

Anomalies of archaeological potential

(63) – The survey area contains a complex series of rectilinear enclosure ditches frequently fragmented by furrows. The enclosures tend to have a similar orientation although they are often overlapping.

(64) – Several ring ditches are located within the zone of enclosures. Their size would be consistent with settlement features.

(65) – A partially truncated ring ditch close to the northern survey boundary more remote from the core area of enclosures.

(66) – Small pit-like anomalies in the northern part of the survey area appear to form an arc which may have related to a post built circular structure.

(67) - Small pit-like anomalies near the northern corner of the area are likely to have archaeological potential.

(68) – A roughly circular area of irregularly shaped pit-like anomalies in the south western part of the site. The anomalies are likely to have archaeological potential.

(69) – Long linear anomalies in the vicinity of (68) may relate to a trackway .

(70) – The survey area contains numerous positive linear and amorphous anomalies relating to features of archaeological potential.

(71) – Several curving linear anomalies in the northern part of the survey area probably relate to broad trackways.

Anomalies with an uncertain origin

(72) – Variable magnetic responses visible as broad linear and curvilinear anomalies. They appear to partly respect a medieval field boundary between ridge and furrow of different orientations. However, similar responses also appear to be cut by furrows but respect the Roman enclosures. The anomalies may, therefore, relate to magnetically enhanced soil deposited within a former fluvial feature over a long period of time.

(73) – Positive and negative linear anomalies parallel with the adjacent field boundary may be of recent agricultural origin.

Anomalies with an agricultural origin

(74) – Linear anomalies relating to former ridge and furrow cultivation.

Anomalies associated with magnetic debris

(75) – The survey area contains numerous dipolar anomalies caused by ferrous objects within the topsoil. Larger dipolar anomalies can relate to industrial features.

3.13 Area 9 (Hopkins Farm)

Area centred on OS NGR 435265 245375, see Figures 13 – 15.

A small area of survey was carried out in order to determine the presence of anomalies extending into a separate field from Areas 7 and 8. The survey has located several linear anomalies that suggest the field does indeed contain associated features of archaeological potential.

3.14 *List of anomalies - Area 10 (Mill Farm)*

Area centred on OS NGR 433325 244520, see Figures 19 – 21.

Anomalies with an uncertain origin

(76) – The survey area contains several very low magnitude positive curvilinear anomalies. Although they cannot be confidently interpreted, they may represent former cut ditch-like features.

(77) – Several discrete positive anomalies appear to be aligned. Although they may represent pit-like features they may relate to an adjacent land drain with a similar orientation to the alignment.

(78) – The survey area contains several pit-like anomalies.

Anomalies with an agricultural origin

(79) – Linear anomalies relating to former ridge and furrow cultivation.

Anomalies associated with magnetic debris

(80) – An area of magnetic debris is located close to barns and is associated with ground consolidation.

Anomalies with a modern origin

(81) – Magnetic disturbance caused by ferrous objects in the nearby field boundary.

3.15 *List of anomalies - Madhill*

Area centred on OS NGR 435630 246010, see Figures 22 – 24.

Anomalies of archaeological potential

(82) – Positive linear and rectilinear anomalies representing ditch-like features and/or accumulations of magnetically enhanced material. The anomalies are consistent with Romano-British features at the site and the complexity of the layout suggests a long period of occupation.

(83) – Linear and rectilinear negative anomalies within the north western part of the site have been caused by material of low magnetic susceptibility such as stone. The anomalies are consistent with structural remains and may represent a Romano-British building approximately 45m by 20m.

(84) – Linear and rectilinear negative anomalies within the central northern part of the site have been caused by material of low magnetic susceptibility such as stone. The anomalies are consistent with structural remains and may represent a Romano-British building approximately 30m by 20m.

(85) – Negative rectilinear elements within the northern part of the survey area may indicate structural remains.

(86) – Negative rectilinear anomalies within the central part of the survey area may represent further structural remains.

(87) – Linear and rectilinear anomalies within the southern part of the survey area may represent former boundary ditches associated with earlier field systems and/or a trackway.

(88) – A ring ditch with a diameter of approximately 12m and a second more fragmented ring ditch immediately to the north east. The anomalies may indicate former roundhouses associated with late prehistoric or earlier Roman occupation at the site.

(89) – A series of discrete dipolar anomalies appear to form a linear feature associated with (7). The dipolar response would be indicative of ferrous material or intense burning that has caused magnetic thermoremnance of the subsoil.

Anomalies with an uncertain origin

(90) – Negative linear anomalies within the south eastern part of the survey area are uncertain in origin although they may have been caused by land drainage.

Anomalies with an agricultural origin

(91) – Linear anomalies probably caused by modern cultivation.

Anomalies associated with magnetic debris

(92) – The area contains a number of discrete dipolar anomalies indicative of shallow ferrous objects. It is possible that some may be of archaeological significance.

3.16 *List of anomalies – Little Meadow*

Area centred on OS NGR 435700 246110, see Figures 22 – 24.

Anomalies of archaeological potential

(93) – The survey area contains several positive linear and rectilinear

anomalies of low magnitude. It is likely that they are associated with settlement sites to the north and south.

(94) – Several weak linear anomalies are associated with a shallow holloway crossing the survey area and continuing to the Roman site at Madhill. It is likely that they are associated with a trackway.

Anomalies with an uncertain origin

(95) – Variable magnetic anomalies partly associated with a holloway. The responses may be associated with enhanced topsoil washed down slope.

(96) – Linear anomalies that may extend beyond the limit of the survey to nearby Rupert Cottage.

Anomalies associated with ground disturbance/quarrying

(97) – A zone of variable magnetic anomalies may be associated with modern ground disturbance.

Anomalies associated with magnetic debris

(98) – Weak magnetic debris in the western part of the survey area is of uncertain origin although could potentially relate to industrial activity or heavily disturbed archaeological material.

(99) – Ferrous objects likely to be modern in origin.

3.17 List of anomalies – Bean Hill

Area centred on OS NGR 435760 246265, see Figures 22 – 24.

Anomalies of archaeological potential

(100) – The survey area contains several curvilinear and rectilinear positive anomalies that relate to enclosure ditches. The anomalies are very disturbed by high magnitude magnetic responses associated with ridge and furrow.

(101) – Parallel positive linear anomalies associated with enclosure ditches may represent a trackway.

(102) – The survey area contains numerous fragmented linear anomalies of archaeological potential.

(103) – Linear anomalies within a holloway may be associated with a former trackway climbing Sunrising Hill. The feature appears to partly truncate a

Roman enclosure ditch suggesting a much later date for its formation.

Anomalies with an agricultural origin

(104) – Strong linear anomalies associated with ridge and furrow.

3.18 *List of anomalies – Twenty Seven Acres*

Area centred on OS NGR 435360 245890, see Figures 22, 25 & 26.

Anomalies of archaeological potential

(105) – Positive linear and rectilinear anomalies representing enclosures and other ditch-like features. The anomalies are consistent with Romano-British features at the site and the complexity of the layout suggests a long period of occupation.

(106) – Negative linear anomalies within the central eastern part of the site may indicate structural remains.

(107) – The survey area contains evidence of several partly truncated ring ditches that would be consistent with those surrounding roundhouses.

Anomalies with an agricultural origin

(108) – A series of parallel linear anomalies crossing the survey area is indicative of medieval ridge and furrow. The furrows are likely to have severely disturbed or destroyed features of archaeological potential.

Anomalies associated with magnetic debris

(109) – Magnetic debris possibly forms a linear feature close to the eastern limit of the survey area and may indicate the position of a recently removed field boundary.

3.19 *List of anomalies – Old Lodge Farm*

Area centred on OS NGR 435890 244780, see Figures 27 – 29.

Anomalies of archaeological potential

(110) – A positive linear feature that may form a small enclosure.

(111) – A curvilinear enclosure that may extend beyond the north eastern limit of the survey area.

(112) – The survey area contains a small ring ditch likely to be associated with a roundhouse.

(113) – A discrete dipolar area within the northern part of the site may indicate burning.

(114) – The western part of the area contains a number of discrete positive anomalies that indicate pit-like features. The anomalies may extend beyond the southern limit of the survey and there is tentative evidence for a pit alignment.

Anomalies with an uncertain origin

(115) – Positive areas located close to the eastern limit of the survey. The anomalies have been caused by magnetically enhanced material although it is uncertain as to whether they are archaeologically significant.

(116) – Positive linear anomalies within the western part of the survey area are uncertain in origin although may have been caused by agricultural activity and/or land drainage.

Anomalies with an agricultural origin

(117) – The survey area is crossed by a series of parallel anomalies indicative of medieval ridge and furrow. The furrows are likely to have caused severe disturbance or destruction of archaeological features.

3.20 *List of anomalies – Lingcroft*

Area centred on OS NGR 434580 244540, see Figures 07 – 10.

Anomalies of archaeological potential

(118) – Positive rectilinear and curvilinear anomalies representing a complex series of enclosure ditches across the survey area.

(119) – The survey area contains evidence of several partly truncated ring ditches that would be consistent with those surrounding roundhouses.

(120) – A negative linear anomaly in the central part of the survey area may indicate the survival of structural remains beneath a ridge within a medieval ridge and furrow field system.

(121) – The survey area contains numerous positive linear anomalies representing ditch-like features with archaeological potential.

Anomalies with an agricultural origin

(122) – A series of parallel linear anomalies have been caused by a medieval ridge and furrow field system. The furrows have been abstracted and appear to have caused severe truncation and destruction of features of archaeological potential.

3.21 *List of anomalies – Lingcroft (additional survey)*

Area centred on OS NGR 434295 244405, see Figures 30 – 32.

Anomalies of archaeological potential

(123) – The survey area contains several positive linear anomalies that appear to have been fragmented by the furrows of medieval ridge and furrow cultivation. It is, therefore, considered likely that they are associated with ditch-like features of archaeological potential.

Anomalies with an uncertain origin

(124) – Negative linear anomalies may be associated land drainage.

Anomalies with an agricultural origin

(125) – A series of parallel linear anomalies have been caused by a medieval ridge and furrow field system.

Anomalies associated with magnetic debris

(126) – A zone of magnetic debris related to material of recent origin.

4 DISCUSSION

4.1 *Assessment of survey results*

- 4.1.1 The geological and pedological conditions across the parish have proved very effective for magnetometry. Former cut features have produced strongly contrasting anomalies with several sites revealing a complex mass of enclosures and ditches. The presence of surviving structural remains has been harder to determine using magnetometry and future geophysical investigation may benefit from earth resistance survey and possibly ground penetrating radar.
- 4.1.2 The improvements in equipment between the current survey results and those of previous surveys has proved beneficial. The high resolution of data collection and RTK GNSS positioning have produced greater accuracy to the

morphology of archaeological features. The cart-based system provides a stable platform with consistent sensor height and, combined with the much higher density of readings logged, the signal to noise ratio is significantly improved; this results in higher readings for weak features and the location of physically smaller features when compared to the previous work. Significant improvements are observed in the location of small pit-like features associated with individual post holes that tend to be invisible in the results of earlier surveys using lower resolution data collection across grids. In addition, the current results can be used more effectively to unravel the mass of features recorded from several of the sites and, as a consequence, provide improvements to the accuracy and confidence of the associated abstractions and interpretations.

- 4.1.3 The magnetometry has demonstrated the extent and complexity of archaeology within several sites previously only known from surface collections or minor intrusive works. The results build on previous surveys and demonstrate a significant Roman presence at Tysoe associated with an intensively utilised landscape. Individual sites are discussed in more detail below.

4.2 Downs Farm (Areas 1 and 2)

- 4.2.1 The site is defined by a complex of cut features across an area of approximately 3.5ha. The anomalies occur along a ridge of high ground and extend onto both south west facing and north facing slopes. The site is likely to continue beyond the limit of the survey towards both the north east and south west, though it is considered that the core area has been covered.
- 4.2.2 During the course of the survey many sherds of Romano-British pottery were observed along with a smaller number of sherds more typical of prehistoric fabrics presumed to be of Iron Age date. Some stone scatters were also observed across the most elevated part of the site, but it is uncertain as to whether this is natural material or fragmented structural remains. On the south west facing slope several large burnt pebbles were noted. No material was collected.
- 4.2.3 A significant proportion of the anomalies located could be interpreted as former ditches associated with enclosures. It is likely that many other ditches classified as having archaeological potential are also associated with enclosures but they are more fragmented or less coherent. There appears to be two main groups of enclosures with a north westerly group extending along the northern limit of the site and a south eastern group separated from it by approximately 50m. Both groups have curvilinear and rectilinear elements and show phases of development and re-cutting resulting in complex masses of anomalies.
- 4.2.4 The rectilinear elements in both enclosure groups appear to have a similar orientation with their longer east north east axes parallel with a possible trackway running along the south western edge of the surveyed area. It is, therefore, considered possible that the rectilinear enclosures represent more regular

development within the Roman period and that the more curvilinear enclosures represent earlier phases of settlement at the site.

- 4.2.5 The enclosures are considered likely to form part of, and be located immediately adjacent to, settlement structures. They effectively form small paddocks with the larger being approximately 0.3ha and the smaller less than 0.02ha. The settlement structures themselves are very difficult to recognise within magnetic data and may be inferred through the presence of ring ditches, in the case of roundhouses, or negative rectilinear anomalies where stone footings survive. These formerly upstanding features are frequently completely destroyed by medieval and modern cultivation. At the Downs Farm site anomalies (3) appear to be associated with ring ditches that typically surround roundhouses. A number of burnt pebbles were noted within this part of the site and these also may be associated with former settlement structures and related activity. It is almost certain that settlement features were far more widespread across the site, but it has not been possible to confidently abstract and interpret them from the complex mass of anomalies.
- 4.2.6 The site contains numerous discrete positive anomalies the majority of which probably represent former pit-like features, although industrial features subject to intense heat should also be considered. They tend to occur mainly on the south westerly facing ground and there is some evidence of grouping. Pit-like features can occur in close proximity to former settlement structures.
- 4.2.7 In the northern part of the site parallel linear anomalies have been interpreted as potentially relating to a broad trackway. These tracks or droves are associated with moving animals and frequently discovered in close proximity to prehistoric settlement.

4.3 *Feoffee Farm (Areas 3, 4 & 5)*

- 4.3.1 The results from Feoffee Farm were disappointing as a result of severe disturbance and truncation by well developed ridge and furrow still extant in Areas 3 and 4. In addition, data from Area 3 indicate a past change in the orientation of the ridge and furrow showing that it was at one time perpendicular to the extant system; this is unusual and may extend into Area 4 also. The disturbance to archaeological features is, therefore, very severe and as a consequence the area surveyed was limited.
- 4.3.2 Despite the severe disturbance, anomalies of archaeological potential, including several fragmented enclosures, were located. Given the nature of the Romano-British material previously discovered by Kevin Wyles at this site, there is undoubtedly high archaeological potential; however, geophysical survey is unlikely to add significantly to the understanding of Roman activity and settlement here.

4.4 *Windmill Hill (Area 6)*

- 4.4.1 As a prominent location within the parish and potential location of an Iron Age hill fort, magnetometry was carried out in order to determine whether the site could be

significant in understanding the pre-Roman background to the area. Evidence from fieldwalking and previous geophysical surveys tends to imply pre-Roman activity at most of the Roman sites in the parish.

- 4.4.2 Numerous anomalies were located by the magnetometry although none could be confidently interpreted as having archaeological potential. Anomalies were mainly classified as having uncertain origin as they lack clearly definable morphological characteristics. Several anomalies have been caused by the underlying solid geology, and it is possible that others of uncertain origin are also related to naturally formed features.
- 4.4.3 The results cannot be used to provide supporting evidence for the postulated Iron Age hill fort. However, several pit-like anomalies and some linear features may be archaeological so the potential for early activity on the site cannot be dismissed. Given the nature of the soils and underlying geology though, any period of settlement of the site within the Iron Age should have produced numerous anomalies and there is no convincing evidence for this. In addition, survey was carried out partly down the northern and eastern slopes of the site where any defensive bank and ditch should be present but no corresponding anomalies were located.

4.5 Hopkins Farm (Areas 7, 8 & 9)

- 4.5.1 The site is defined by a complex series of enclosures and ditches over an area of approximately 7.5ha. The features are located on flat ground and the lower slopes of the nearby escarpment. Anomalies are also likely to extend into all adjacent fields so the full extent of the site remains uncertain.
- 4.5.2 The enclosures are predominantly formed by rectilinear ditches with similar orientations. The former enclosure ditches are frequently disturbed or fragmented by the furrows of former ridge and furrow; however, the north north east to south south west orientation of the medieval cultivation does tend to respect the enclosures by running parallel or perpendicular to the ditches. The extant field layout within this part of the parish may, therefore, have been established by the Roman period or earlier.
- 4.5.3 The complexity of the enclosure ditches relates to phases of activity and re-cutting probably over a long period. Similar to Downs Farm, the enclosures range in size from approximately 0.3ha to less than 0.02ha; however, there is less evidence for curvilinear enclosure morphology at the Hopkins Farm site.
- 4.5.4 Fragmented ring ditches have been located within both Areas 7 and 8 and these are likely to be associated with the location of roundhouses. Within Area 8 they appear located in the core of the enclosures that presumably function as a series of paddocks etc. immediately surrounding the settlement structures. In Area 7 several fragmented ring ditches have been located in the eastern part of the field more distant from the core area of enclosures. These rings also have evidence for pit-like termini either side of an entrance, not seen within other ring ditch features in the

parish. It is possible that they are of different status or date, fieldwalking by Kevin Wyles indicated stone and tile indicative of a substantial stone built Roman building a short distance to the west of these rings; however, the magnetometry has not produced clear anomalies relating to stone built structural remains.

- 4.5.5 Pit-like anomalies form clusters within the western part of Area 7 and in the northern and south western parts of Area 8. Discrete pit-like anomalies are located within the enclosure complexes also. Small pits near the northern corner of Area 8 demonstrate at least one curving alignment suggesting they relate to a post built structure. There are few ditch-like anomalies in the vicinity although there is evidence for trackways or droves, anomalies (71), that extend beyond Area 8 to the north. The features within this part of the site may infer an earlier period of occupation in the prehistoric. Curving linear anomalies possibly associated with trackways or droves have also been located in the central part of Area 7, anomalies (57). It is possible that these too represent a prehistoric phase of activity associated with the ring ditches in the eastern part of the survey area.
- 4.5.6 The survey located variable, though generally positive, anomalies in the western part of Area 8 that form broad linear and curvilinear features (72). The magnetic response is similar to anomalies associated with deposits of fluvial origin. Part of the anomaly follows a medieval boundary between ridge and furrow having different orientations, although conversely the eastern part of the feature has been fragmented and cut through by furrows. This eastern extension does, however, appear to respect enclosures of Roman or earlier origin. If the feature is related to fluvial deposits it implies the presence of a former channel, possibly a palaeochannel feature, although it may have been utilised within the Roman period.

4.6 *Mill Farm (Area 10)*

- 4.6.1 Survey was carried out in order to assess the archaeological potential of circular cropmarks. The results indicate some weak curving anomalies and possible pit-like features, but there is little evidence to support an archaeological interpretation.

4.7 *Madhill*

- 4.7.1 The results from Madhill have provided strong evidence of Romano-British structural remains. The site contains low earthworks and over the last 30 years, it is known that much masonry has been removed from the site. The evidence suggests a much better survival of structures at Madhill, when compared to the other sites, and it is likely that medieval ridge and furrow has either never occurred on the site or has not been carried out over an extended period of time. There is no clear evidence for ridge and furrow in the data, unusual in this part of Warwickshire, and it is possible that attempts at medieval ploughing were thwarted by very substantial building remains.
- 4.7.2 The site lies on a small plateau midway up the Edge Hill escarpment with very extensive views to the north and north west and the finds from the site hint at a period of settlement with some status. These two factors may distinguish the site

somewhat when compared to the other sites surveyed and other Romano-British sites known to occur within the vicinity. The evidence possibly indicates the former location of a substantial 'villa' type agricultural complex.

- 4.7.3 Assessing the structural remains visible within the magnetic data, it would appear that there are two substantial buildings although it must be noted that magnetometry does not respond well to structural remains, particularly when compared to resistivity and ground penetrating radar. It is possible that the two structures are actually linked along the north eastern side which would form a large winged building, with the central part facing to the west of south. Although the more usual orientation for this type of Roman structure is to the south or south east, the local topography may influence the orientation so that the building is not facing the nearby scarp face.
- 4.7.4 At least one ring ditch was located in the southern part of the survey area. There is some evidence for a fragmented second ring ditch immediately to the north east. The diameter of the main ring (approximately 12m) would be consistent with a substantial dwelling of prehistoric or early Roman date; however, there is no clear evidence for a gap in the ring towards the south or south east, which is typically associated with an entrance to this type of feature. There is, however, a gap on the western side and this may be associated with the local topography in that a clear view across the Red Horse Vale may be preferable to the Edge Hill scarp face to the south and south east. If the gap is an entrance, there appears to be some associated pits and more elongated discrete features extending from it towards the south west. The strongly dipolar magnetic response recorded by the data would suggest intense burning or the presence of ferrous objects. It is tentatively suggested that these features may represent a former boundary or protection from prevailing winds in this very exposed location. The dipolar response may occur with the burning of substantial timbers.

4.8 *Little Meadow*

- 4.8.1 The area contains several positive linear anomalies that are comparatively weak compared to those located immediately to the south at Madhill and those to the north at Bean Hill. However, given their close proximity to these sites it is likely that they too represent former ditches with archaeological potential.
- 4.8.2 The area contains a series of linear anomalies associated with a holloway that heads towards the complex of Roman structures and features located at Madhill to the south. It is likely that the anomalies are associated with a former Roman road or trackway climbing the lower part of the escarpment.

4.9 *Bean Hill*

- 4.9.1 A series of rectilinear and curvilinear enclosures define a site severely disturbed by ridge and furrow cultivation. Within arable land immediately to the north, fieldwalking located Roman cultural material with stone and tile suggesting structural remains. However, the complex of enclosures implies a long period of

development possibly from the prehistoric.

4.10 *Twenty Seven Acres*

- 4.10.1 The magnetometry revealed a complex site disturbed by ridge and furrow. Evidence for former cut features tends to support activity over a long period with the establishment and development of a number of enclosures and land boundaries. Negative linear anomalies may support evidence for structural remains in the eastern part of the survey area where there are notable concentrations of masonry and Romano-British pottery on the field surface.
- 4.10.2 The extensive nature of the anomalies was not expected from the distribution of Roman pottery across the site. The presence of ring ditches may indicate development from the late prehistoric/ early Roman with the construction of masonry structures in the later Roman period. Madhill Roman site lies only 130m to the north east and it is possible that the two sites are linked although they are separated by a moderately steep slope.

4.11 *Old Lodge Farm*

- 4.11.1 The results appear less complex than other sites, the main features being a rectilinear enclosure, curvilinear enclosure, ring ditch and a number of pit-like features. The archaeology has again been severely disturbed and partly truncated by former ridge and furrow, possibly exacerbated by modern ploughing. Survival of features is also more likely where former ridges crossed the site.
- 4.11.2 A series of pit-like features may exhibit some alignment and probably extend to the south beyond the survey area. Fieldwalking by the Edgehill Project Group certainly recorded a concentration of worked flint that tends to correlate with the location of the pits and it is possible that some of the features located by the geophysics are Bronze Age. This would again suggest a favoured site with long standing occupation.

4.12 *Lingcroft*

- 4.12.1 The magnetometry results from Lingcroft have revealed a complex site heavily disturbed by former ridge and furrow. The furrows appear to have completely removed the archaeology across the site and indicate that survival is probably constrained to a series of strips that underlie the former ridges. Survival under the ridges may have been good until relatively recently but the field has now almost been flattened by modern agriculture, and masonry fragments appear in strips that undoubtedly represent the former ridges.
- 4.12.2 The geophysics is complex and often incoherent which would tend to support the fieldwalking evidence for a long period of occupation through the Roman period. The fieldwalking located a very small amount of organically tempered pottery and a late Roman coin of Honorius which may suggest continuing occupation in the sub Roman period. More recent fieldwalking carried out by Kevin Wyles also located a

decorated pottery sherd dating to the Early Saxon (5th to 7th C.). The medieval settlement of Middle Tysoe occurs a short distance to the south west with St Mary's church approximately 350m away. It is possible that the site contains significant evidence for early medieval activity and may be key to the development of the nearby village after the Roman period.

5 CONCLUSION

- 5.1.1 Magnetometry has proved to be a very effective geophysical technique for furthering knowledge of the Roman history of Tysoe. The soils within the parish readily produce enhanced magnetic susceptibility on sites subject to human activity, and anomalies contrast strongly against the surrounding natural subsoil or solid geology.
- 5.1.2 The results have provided a valuable addition to fieldwalking studies where Roman sites have been identified from surface scatters of cultural material. Previous geophysical surveys demonstrated Roman settlement and intensive activity at Madhill, Bean Hill and Twenty Seven Acres, on the lower slopes of the escarpment near Sunrising Hill, with sites also close to Old Lodge Farm and Lingcroft on the northern periphery of the village. The new surveys, supported by the CBA Mick Aston Archaeology Fund, have provided detail of a complex site close to Downs Farm in the southern part of the parish, a badly disturbed site at Feoffee Farm to the east of Middle Tysoe and very extensive archaeological features to the north east of Hopkins Farm at Lower Tysoe.
- 5.1.3 There is a high potential for the location of further extensive Roman remains surrounding those identified in this report. Anomalies at the Hopkins Farm site cover an area of around 7.5ha but clearly must continue into adjacent unsurveyed land, perhaps extending as far north as those already identified below Sunrising Hill and to the south near Old Lodge Farm. The wider implications for the research of both prehistoric and Roman occupation within Warwickshire should also be considered given the results obtained from Tysoe.
- 5.1.4 The Roman sites appear to be concentrated along the south eastern part of the parish either immediately adjacent to, or on the lower or mid slopes of, the Edge Hill escarpment. However, this may well represent biases in land access and previous investigation rather than the nature of soils and the presence of springs etc. Where fieldwalking surveys have been carried out on land further to the north west, within the parish of Pillerton Priors, well away from the escarpment, numerous Roman sites were also located including a high status Roman villa with mosaic floor. Future research at Tysoe may change the pattern of settlement that has emerged so far.
- 5.1.5 Further magnetometry within the parish should be focussed on defining the full extent of the sites already identified and how land in between the sites is

utilised. The good conditions for magnetometry may allow the study of more extensive field systems that in other parts of the country cannot be recognised due to lack of magnetic contrast. Some sites may also benefit from targeted resistivity or ground penetrating radar that could potentially provide superior results where structural remains are present.

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Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremanent material. Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field. Thermoremanent magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremanent features include ovens, hearths, and kilns. In addition thermoremanent material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65cm apart. The instrument is carried about 10-20cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried magnetic field. The difference between the two sensors will relate to the strength of the magnetic field created by the buried feature.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between $\pm 5\text{nT}$ and $\pm 3\text{nT}$ often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero (destripe) Median/Mean Traverse

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the baseline value of gradiometer sensors.

High Pass Filtering

A mathematical process used to remove low frequency anomalies relating to survey tracks, modern agricultural features and other large magnetic bodies within or adjacent to survey areas.

Low Pass Filtering

A mathematical process used to remove high frequency anomalies relating to uneven ground, vibration, etc.

Units: nT
 UTM Zone: 30U
 Survey corner coordinates (X/Y):
 Northwest corner: 434196.615907646, 243750.214570615 m
 Southeast corner: 434285.115907646, 243671.014570615 m
 Dummy Value: 32702
 Source GPS Points: 86600
 Dimensions
 Composite Size (readings): 590 x 528
 Survey Size (meters): 88.5 m x 79.2 m
 Grid Size: 88.5 m x 79.2 m
 X Interval: 0.15 m
 Y Interval: 0.15 m
 Stats
 Max: 11.05
 Min: -11.00
 Std Dev: 2.11
 Mean: 0.04
 Median: 0.00
 Composite Area: 0.70092 ha
 Surveyed Area: 0.30476 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 1
 1 Base Layer
 GPS based Proce4
 1 Base Layer.
 2 Unit Conversion Layer (Lat/Long to OSGB36).
 3 DeStripe Median Traverse:
 4 Clip from -10.00 to 10.00 nT

Area 6

Path: C:\Business\Jobs\J705 Tysoe CBA Research\Data\Area
 6\comps\
 Filename: J705-mag-Area6-proc.xcp
 Description: Imported as Composite from: J705-mag-Area6.asc
 Instrument Type: Sensys DLMGPS
 Units: nT
 UTM Zone: 30U
 Survey corner coordinates (X/Y):
 Northwest corner: 433085.947107947, 242773.917863722 m
 Southeast corner: 433253.047107947, 242651.367863722 m
 Dummy Value: 32702
 Source GPS Points: 456000
 Dimensions
 Composite Size (readings): 1114 x 817
 Survey Size (meters): 167 m x 123 m
 Grid Size: 167 m x 123 m
 X Interval: 0.15 m
 Y Interval: 0.15 m
 Stats
 Max: 5.53
 Min: -5.50
 Std Dev: 1.86
 Mean: 0.09
 Median: -0.01
 Composite Area: 2.0478 ha
 Surveyed Area: 1.4252 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 1
 1 Base Layer
 GPS based Proce4
 1 Base Layer.
 2 Unit Conversion Layer (Lat/Long to OSGB36).
 3 DeStripe Median Traverse:
 4 Clip from -5.00 to 5.00 nT

Area 7

Path: C:\Business\Jobs\J705 Tysoe CBA Research\Data\Area
 7\comps\
 Filename: J705-mag-Area7-proc.xcp
 Description: Imported as Composite from:
 Instrument Type: Sensys DLMGPS
 Units:
 UTM Zone: 30U
 Survey corner coordinates (X/Y):
 Northwest corner: 435108.280897834, 245402.850993908 m
 Southeast corner: 435362.830897834, 245200.050993908 m
 Dummy Value: 0
 Source GPS Points: 638191
 Dimensions

Composite Size (readings): 1697 x 1352
 Survey Size (meters): 255 m x 203 m
 Grid Size: 255 m x 203 m
 X Interval: 0.15 m
 Y Interval: 0.15 m
 Stats
 Max: 5.53
 Min: -5.50
 Std Dev: 1.34
 Mean: 0.06
 Median: -0.02
 Composite Area: 5.1623 ha
 Surveyed Area: 2.7425 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 1
 1 Base Layer

GPS based Proce4

1 Base Layer.
 2 Unit Conversion Layer (Lat/Long to OSGB36).
 3 DeStripe Median Traverse:
 4 Clip from -5.00 to 5.00

Area 8

Path: C:\Business\Jobs\J705 Tysoe CBA Research\Data\Area
 8\comps\
 Filename: J705-mag-Area8-proc.xcp
 Description: Imported as Composite from:
 Instrument Type: Sensys DLMGPS
 Units:
 UTM Zone: 30U
 Survey corner coordinates (X/Y):
 Northwest corner: 434885.828176042, 245693.764820355 m
 Southeast corner: 435223.628176042, 245436.064820355 m
 Dummy Value: 0
 Source GPS Points: 1082800
 Dimensions
 Composite Size (readings): 2252 x 1718
 Survey Size (meters): 338 m x 258 m
 Grid Size: 338 m x 258 m
 X Interval: 0.15 m
 Y Interval: 0.15 m
 Stats
 Max: 5.53
 Min: -5.50
 Std Dev: 1.44
 Mean: 0.08
 Median: -0.02
 Composite Area: 8.7051 ha
 Surveyed Area: 4.5984 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 1
 1 Base Layer
 GPS based Proce4
 1 Base Layer.
 2 Unit Conversion Layer (Lat/Long to OSGB36).
 3 DeStripe Median Traverse:
 4 Clip from -5.00 to 5.00

Area 9

Path: C:\Business\Jobs\J705 Tysoe CBA Research\Data\Area
 9\comps\
 Filename: J705-mag-Area9-proc.xcp
 Description: Imported as Composite from:
 Instrument Type: Sensys DLMGPS
 Units:
 UTM Zone: 30U
 Survey corner coordinates (X/Y):
 Northwest corner: 435166.327428801, 245455.832527948 m
 Southeast corner: 435361.477428801, 245307.482527948 m
 Dummy Value: 0
 Source GPS Points: 89000
 Dimensions
 Composite Size (readings): 1301 x 989
 Survey Size (meters): 195 m x 148 m
 Grid Size: 195 m x 148 m
 X Interval: 0.15 m
 Y Interval: 0.15 m
 Stats
 Max: 5.53

Min: -5.50
 Std Dev: 1.39
 Mean: 0.03
 Median: 0.02
 Composite Area: 2.8951 ha
 Surveyed Area: 0.35447 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 1
 1 Base Layer
 GPS based Proce4
 1 Base Layer.
 2 Unit Conversion Layer (Lat/Long to OSGB36).
 3 DeStripe Median Traverse:
 4 Clip from -5.00 to 5.00

Area 10

Path: C:\Business\Jobs\J705 Tysoe CBA Research\Data\Area
 10\comps\
 Filename: J705-mag-Area10-proc.xcp
 Description: Imported as Composite from: J705-mag-Area10.asc
 Instrument Type: Sensys DLMGPS
 Units: nT
 UTM Zone: 30U
 Survey corner coordinates (X/Y):
 Northwest corner: 433269.805898537, 244593.495237333 m
 Southeast corner: 433382.005898537, 244445.895237333 m
 Dummy Value: 32702
 Source GPS Points: 229900
 Dimensions
 Composite Size (readings): 748 x 984
 Survey Size (meters): 112 m x 148 m
 Grid Size: 112 m x 148 m
 X Interval: 0.15 m
 Y Interval: 0.15 m
 Stats
 Max: 3.32
 Min: -3.30
 Std Dev: 0.88
 Mean: -0.02
 Median: 0.01
 Composite Area: 1.6561 ha
 Surveyed Area: 1.0096 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 1
 1 Base Layer
 GPS based Proce4
 1 Base Layer.
 2 Unit Conversion Layer (Lat/Long to OSGB36).
 3 DeStripe Median Traverse:
 4 Clip from -3.00 to 3.00 nT

Little Meadow

Path: C:\Business\Jobs\J705 Tysoe CBA Research\J311 Tysoe
 working folder\Little Meadow\Data\Session 1\comps\
 Filename: mag-proc (2).xcp
 Instrument Type: Bartington (Gradiometer)
 Units: nT
 Collection Method: ZigZag
 Sensors: 2 @ 1.00 m spacing.
 Dummy Value: 32702
 Dimensions
 Composite Size (readings): 720 x 210
 Survey Size (meters): 180 m x 210 m
 Grid Size: 30 m x 30 m
 X Interval: 0.25 m
 Y Interval: 1 m
 Stats
 Max: 3.00
 Min: -3.00
 Std Dev: 0.94
 Mean: -0.01
 Median: -0.02
 Composite Area: 3.78 ha
 Surveyed Area: 1.6055 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 4
 1 Base Layer

2 Clip from -30.00 to 30.00 nT
 3 DeStripe Mean Traverse: Grids: All Threshold: 1 SDs
 4 Clip from -3.00 to 3.00 nT
 Source Grids: 25
 1 Col:0 Row:5 grids\16.xgd
 2 Col:1 Row:3 grids\15.xgd
 3 Col:1 Row:4 grids\17.xgd
 4 Col:1 Row:5 grids\18.xgd
 5 Col:1 Row:6 grids\19.xgd
 6 Col:2 Row:1 grids\12.xgd
 7 Col:2 Row:2 grids\13.xgd
 8 Col:2 Row:3 grids\14.xgd
 9 Col:2 Row:4 grids\20.xgd
 10 Col:2 Row:5 grids\21.xgd
 11 Col:2 Row:6 grids\22.xgd
 12 Col:3 Row:0 grids\08.xgd
 13 Col:3 Row:1 grids\09.xgd
 14 Col:3 Row:2 grids\10.xgd
 15 Col:3 Row:3 grids\11.xgd
 16 Col:3 Row:4 grids\23.xgd
 17 Col:3 Row:5 grids\24.xgd
 18 Col:3 Row:6 grids\25.xgd
 19 Col:4 Row:0 grids\04.xgd
 20 Col:4 Row:1 grids\05.xgd
 21 Col:4 Row:2 grids\06.xgd
 22 Col:4 Row:3 grids\07.xgd
 23 Col:5 Row:1 grids\01.xgd
 24 Col:5 Row:2 grids\02.xgd
 25 Col:5 Row:3 grids\03.xgd

Bean Hill

Path: C:\Business\Jobs\J705 Tysoe CBA Research\J311 Tysoe
 working folder\Bean Hill villa site\Data\All\comps\
 Filename: mag-proc (3).xcp
 Instrument Type: Bartington (Gradiometer)
 Units: nT
 Collection Method: ZigZag
 Sensors: 2 @ 1.00 m spacing.
 Dummy Value: 32702
 Dimensions
 Composite Size (readings): 1680 x 240
 Survey Size (meters): 210 m x 240 m
 Grid Size: 30 m x 30 m
 X Interval: 0.125 m
 Y Interval: 1 m
 Stats
 Max: 45.41
 Min: -43.05
 Std Dev: 13.69
 Mean: 0.99
 Median: 0.00
 Composite Area: 5.04 ha
 Surveyed Area: 2.0907 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.23.0
 Processes: 5
 1 Base Layer
 2 Clip from -50.00 to 50.00 nT
 3 De Stagger: Grids: 06.xgd Mode: Both By: 0 intervals, -40.00cm
 4 DeStripe Median Traverse: Grids: All
 5 Clip at 3.00 SD
 Source Grids: 32
 1 Col:0 Row:3 grids\29.xgd
 2 Col:0 Row:4 grids\30.xgd
 3 Col:0 Row:5 grids\31.xgd
 4 Col:0 Row:6 grids\32.xgd
 5 Col:1 Row:2 grids\24.xgd
 6 Col:1 Row:3 grids\25.xgd
 7 Col:1 Row:4 grids\26.xgd
 8 Col:1 Row:5 grids\27.xgd
 9 Col:1 Row:6 grids\28.xgd
 10 Col:2 Row:1 grids\11.xgd
 11 Col:2 Row:2 grids\12.xgd
 12 Col:2 Row:3 grids\13.xgd
 13 Col:2 Row:4 grids\01.xgd
 14 Col:2 Row:5 grids\02.xgd
 15 Col:2 Row:6 grids\03.xgd
 16 Col:2 Row:7 grids\04.xgd
 17 Col:3 Row:1 grids\14.xgd
 18 Col:3 Row:2 grids\15.xgd
 19 Col:3 Row:3 grids\16.xgd
 20 Col:3 Row:4 grids\05.xgd
 21 Col:3 Row:5 grids\06.xgd

22 Col:3 Row:6 grids\07.xgd
 23 Col:4 Row:0 grids\17.xgd
 24 Col:4 Row:1 grids\18.xgd
 25 Col:4 Row:2 grids\19.xgd
 26 Col:4 Row:3 grids\08.xgd
 27 Col:4 Row:4 grids\09.xgd
 28 Col:5 Row:1 grids\20.xgd
 29 Col:5 Row:2 grids\21.xgd
 30 Col:5 Row:3 grids\10.xgd
 31 Col:6 Row:1 grids\22.xgd
 32 Col:6 Row:2 grids\23.xgd

Lincroft (additional survey)

Path: C:\Business\Jobs\J705 Tysoe CBA Research\J311 Tysoe
 working folder\Lincroft additional survey\Data\All\comps\

Filename: mag-proc.xcp

Instrument Type: Bartington (Gradiometer)

Units: nT

Collection Method: ZigZag

Sensors: 2 @ 1.00 m spacing.

Dummy Value: 2047.5

Dimensions

Composite Size (readings): 1920 x 240

Survey Size (meters): 240 m x 240 m

Grid Size: 30 m x 30 m

X Interval: 0.125 m

Y Interval: 1 m

Stats

Max: 4.02

Min: -3.65

Std Dev: 0.95

Mean: 0.05

Median: 0.00

Composite Area: 5.76 ha

Surveyed Area: 2.0484 ha

PROGRAM

Name: TerraSurveyor

Version: 3.0.23.0

Processes: 9

- 1 Base Layer
- 2 DeStripe Median Traverse: Grids: All
- 3 Clip from -3.00 to 3.00 nT
- 4 De Stagger: Grids: 11.xgd Mode: Both By: 0 intervals, 20.00cm
- 5 De Stagger: Grids: 11.xgd Mode: Both By: 0 intervals, 10.00cm
- 6 De Stagger: Grids: 10.xgd Mode: Both By: 0 intervals, 30.00cm
- 7 De Stagger: Grids: 17.xgd Mode: Both By: 0 intervals, 20.00cm
- 8 De Stagger: Grids: 15.xgd Mode: Both By: 0 intervals, 20.00cm
- 9 De Stagger: Grids: 12.xgd Mode: Both By: 0 intervals, 20.00cm

Source Grids: 31

1 Col:0 Row:5 grids\19.xgd
 2 Col:0 Row:6 grids\20.xgd
 3 Col:1 Row:4 grids\21.xgd
 4 Col:1 Row:5 grids\22.xgd
 5 Col:1 Row:6 grids\23.xgd
 6 Col:1 Row:7 grids\24.xgd
 7 Col:2 Row:3 grids\01.xgd
 8 Col:2 Row:4 grids\25.xgd
 9 Col:2 Row:5 grids\26.xgd
 10 Col:2 Row:6 grids\27.xgd
 11 Col:2 Row:7 grids\28.xgd
 12 Col:3 Row:2 grids\03.xgd
 13 Col:3 Row:3 grids\04.xgd
 14 Col:3 Row:4 grids\29.xgd

15 Col:3 Row:5 grids\30.xgd
 16 Col:3 Row:6 grids\31.xgd
 17 Col:3 Row:7 grids\32.xgd
 18 Col:4 Row:0 grids\05.xgd
 19 Col:4 Row:1 grids\06.xgd
 20 Col:4 Row:2 grids\07.xgd
 21 Col:4 Row:3 grids\08.xgd
 22 Col:5 Row:0 grids\09.xgd
 23 Col:5 Row:1 grids\10.xgd
 24 Col:5 Row:2 grids\11.xgd
 25 Col:5 Row:3 grids\12.xgd
 26 Col:6 Row:1 grids\13.xgd
 27 Col:6 Row:2 grids\14.xgd
 28 Col:6 Row:3 grids\15.xgd
 29 Col:7 Row:1 grids\16.xgd
 30 Col:7 Row:2 grids\17.xgd
 31 Col:7 Row:3 grids\18.xgd

Downs

Path: C:\Business\Jobs\J705 Tysoe CBA Research\J311 Tysoe
 working folder\Downs Farm villa site\Data\Session 1\comps\

Filename: J311-downs-mag-proc.xcp

Instrument Type: Bartington (Gradiometer)

Units: nT

Collection Method: ZigZag

Sensors: 2 @ 1.00 m spacing.

Dummy Value: 32702

Dimensions

Composite Size (readings): 1200 x 90

Survey Size (meters): 150 m x 90 m

Grid Size: 30 m x 30 m

X Interval: 0.125 m

Y Interval: 1 m

Stats

Max: 10.00

Min: -10.00

Std Dev: 2.36

Mean: 0.05

Median: 0.00

Composite Area: 1.35 ha

Surveyed Area: 0.74003 ha

PROGRAM

Name: TerraSurveyor

Version: 3.0.23.0

Processes: 4

- 1 Base Layer
- 2 Clip from -30.00 to 30.00 nT
- 3 DeStripe Median Traverse: Grids: All
- 4 Clip from -10.00 to 10.00 nT

Source Grids: 11

1 Col:0 Row:1 grids\01.xgd
 2 Col:0 Row:2 grids\02.xgd
 3 Col:1 Row:1 grids\03.xgd
 4 Col:1 Row:2 grids\04.xgd
 5 Col:2 Row:0 grids\05.xgd
 6 Col:2 Row:1 grids\06.xgd
 7 Col:2 Row:2 grids\07.xgd
 8 Col:3 Row:0 grids\08.xgd
 9 Col:3 Row:1 grids\09.xgd
 10 Col:3 Row:2 grids\10.xgd
 11 Col:4 Row:2 grids\11.xgd

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. Table 6 sets out the file naming scheme with type and description.

A PDF copy of the report will be supplied to the Council for British Archaeology and Warwickshire Historic Environment Record. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS). A summary of the survey will also be supplied to *West Midlands Archaeology*.

File type	Naming scheme	Description
Data	J705-mag-[area number/name].xcp J705-mag-[area number/name]-proc.xcp	Raw data Minimally processed data
Graphics	J705-mag-[area number/name]-proc.tif	Image in TIF format
Drawing	J705-version6.dwg	CAD file in 2010 dwg format
Report	J705-report.odt	Report text in Open Office odt format

Table 6: Archive contents

Appendix E – CAD layers for abstraction and interpretation plots

Table 7 sets out Archaeological Surveys Ltd CAD layer names with associated colours and graphical content. Where CAD files are available layers may be extracted for further CAD/GIS use. Note: hatched polygon boundaries are contained within layers with the RGB colour code 254, 255, 255 (near white) in order to prevent their visibility.

Report sub-heading and associated CAD layer names	Colour with RGB index	Layer content
Anomalies with archaeological potential		
AS-ABST MAG POS DISCRETE ARCHAEOLOGY	 Red 255,0,0	Solid donut, point or polygon (solid)
AS-ABST MAG POS ARCHAEOLOGY	 Red 255,0,0	Polygon (cross hatched ANSI37)
AS-ABST MAG POS CURVILINEAR RING DITCH	 Magenta 255,0,255	Polyline or polygon (solid)
AS-ABST MAG TRACK ARCHAEOLOGY	 127,63,79	Line, polyline or polygon (solid)
AS-ABST MAG VARIABLE ARCHAEOLOGY	 159, 127, 255	Polygon (cross hatched ANSI37)
AS-ABST MAG POS STRUCTURAL ARCHAEOLOGY	 255,0,127	Line, polyline or polygon (solid)
AS-ABST MAG NEG STRUCTURAL ARCHAEOLOGY	 0,78,36	Line, polyline or polygon (solid)
AS-ABST MAG NEG LINEAR ARCHAEOLOGY	 127,0,255	Line, polyline or polygon (solid)
AS-ABST MAG POS ENCLOSURE DITCH	 127,0,255	Line, polyline or polygon (solid)
Anomalies with an uncertain origin		
AS-ABST MAG POS LINEAR UNCERTAIN	 255,127,0	Line, polyline or polygon (solid)
AS-ABST MAG NEG LINEAR UNCERTAIN	 Blue 0,0,255	Line, polyline or polygon (solid)
AS-ABST MAG POS DISCRETE UNCERTAIN	 255,127,0	Solid donut, point or polygon (solid)
AS-ABST MAG NEG DISCRETE UNCERTAIN	 Blue 0,0,255	Solid donut, point or polygon (solid)
AS-ABST MAG POS UNCERTAIN	 255,127,0	Polygon (cross hatched ANSI37)
AS-ABST MAG NEG UNCERTAIN	 Blue 0,0,255	Polygon (cross hatched ANSI37)
Anomalies relating to land management		
AS-ABST MAG BOUNDARY	 127,0,0	Line, polyline or polygon (solid or cross hatched ANSI37)
AS-ABST MAG PATH/ROAD/TRACK	 0, 153,153	Line, polyline or polygon (solid or partly cross hatched ANSI38)
AS-ABST MAG LAND DRAIN	 Cyan 0,255,255	Line or polyline
Anomalies with an agricultural origin		
AS-ABST MAG AGRICULTURAL	 Green 0,255,0	Line or polyline
AS-ABST MAG RIDGE AND FURROW	 0,127,63	Line, polyline or polygon (cross hatched ANSI37)
Anomalies associated with magnetic debris		
AS-ABST MAG DEBRIS	 132, 132, 132	Polygon (cross hatched ANSI37)
AS-ABST MAG STRONG DIPOLAR	 132, 132, 132	Solid donut, point or polygon (solid)
Anomalies with a modern origin		

AS-ABST MAG DISTURBANCE		132, 132, 132	Polygon (hatched ANSI31)
AS-ABST MAG SERVICE		132, 132, 132	Line or polyline
Anomalies with a natural origin			
AS-ABST MAG NATURAL FEATURES		Yellow 255,255,0	Polygon (cross hatched ANSI37)
Anomalies associated with ground disturbance/quarrying			
AS-ABST MAG QUARRYING/ GROUND DISTURBANCE		255,255, 127 or 255,223,127	Polygon (net)
AS-ABST MAG ROCK		102, 178,204	Polygon (net)

Table 7: CAD layers, colours and contents

Appendix F – copyright and intellectual property

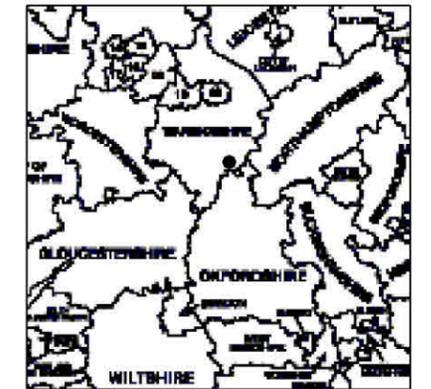
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The Roman History of Tysoe
CBA Mick Aston
Archaeology Fund

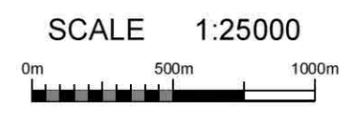
Map of survey areas



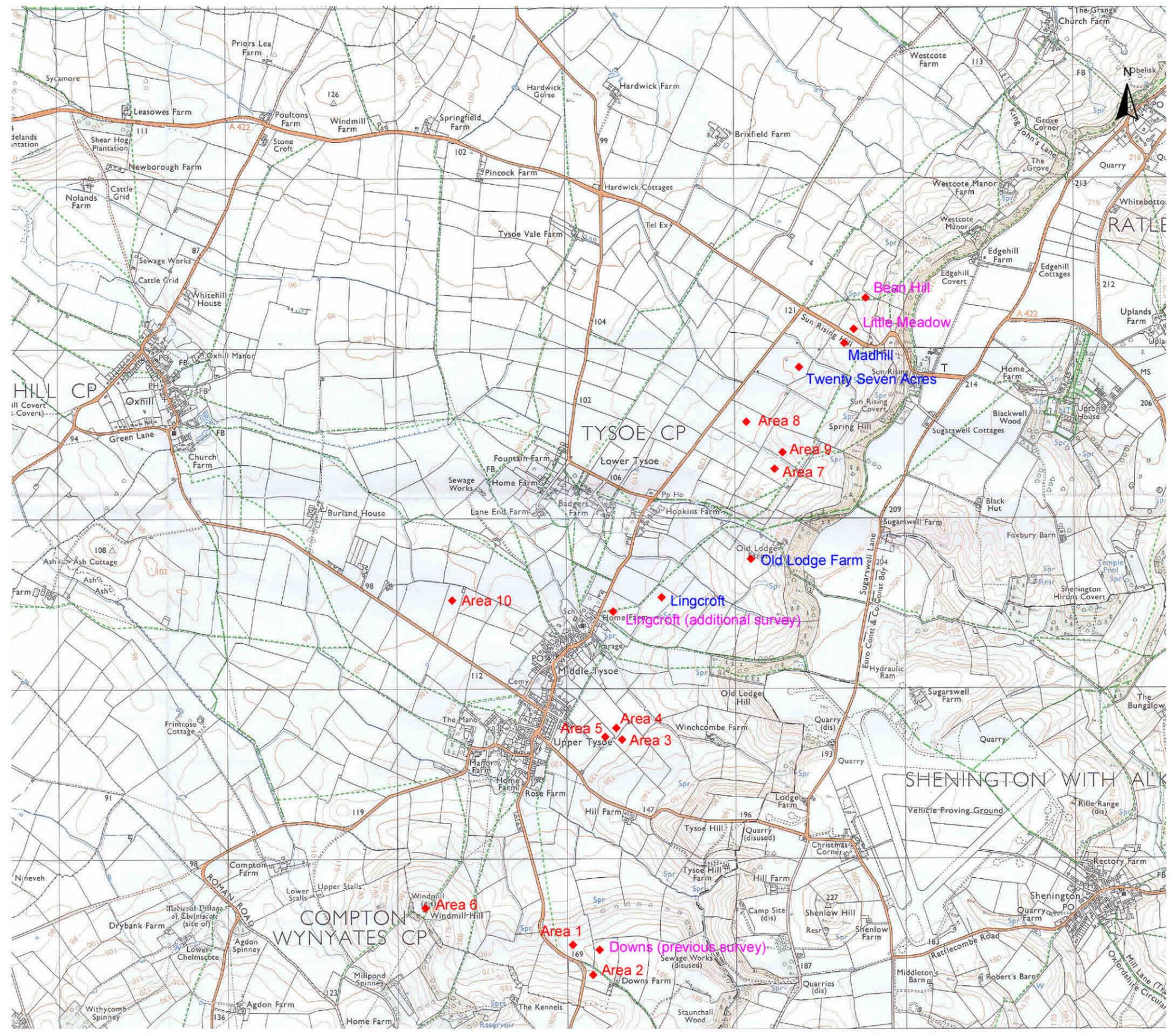
● Tysoe, Warwickshire

- Locations labelled in red - CBA Mick Aston Archaeology Fund
- Locations labelled in blue - previous research surveys by Archaeological Surveys Ltd (report J311)
- Locations labelled in magenta - previous research surveys by Archaeological Surveys Ltd (unreported)

Reproduced from OS Explorer map no.206 1:25 000 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office.
© Crown copyright. All rights reserved.
Licence number 100043739.



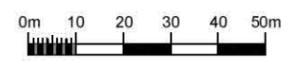
SCALE TRUE AT A3



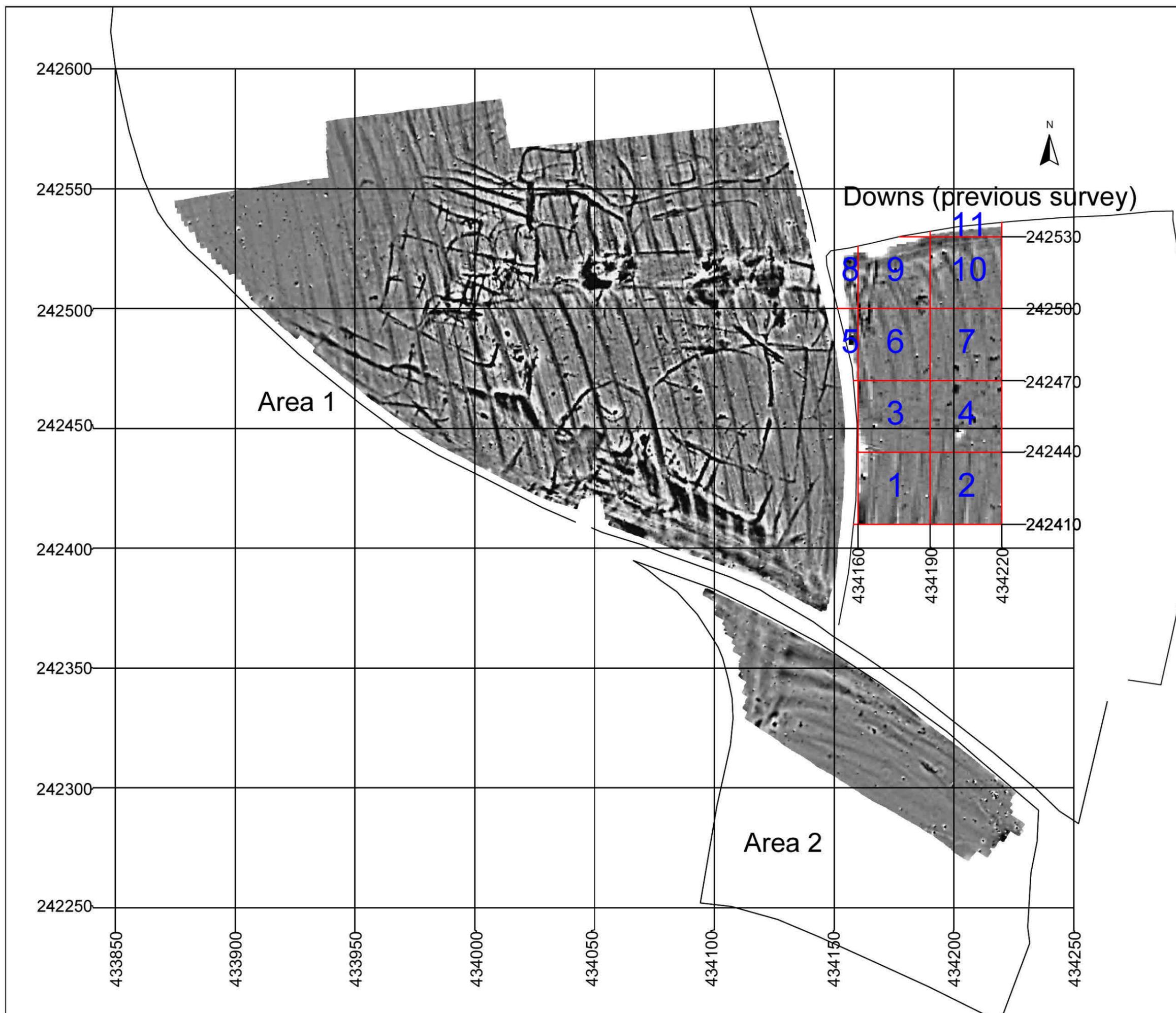
Referencing information -
Downs Farm, Tysoe
(Areas 1 & 2)

Referencing grid to OSGB36 datum at 50m intervals.
Areas 1 & 2 data georeferenced to ETRS89 Zone 30 using RTK GNSS with subsequent conversion to OSGB36 via OSTN02 during data processing.
Downs previous survey data collected within 30m grids (numbered) set out to OSGB36 using RTK GNSS.

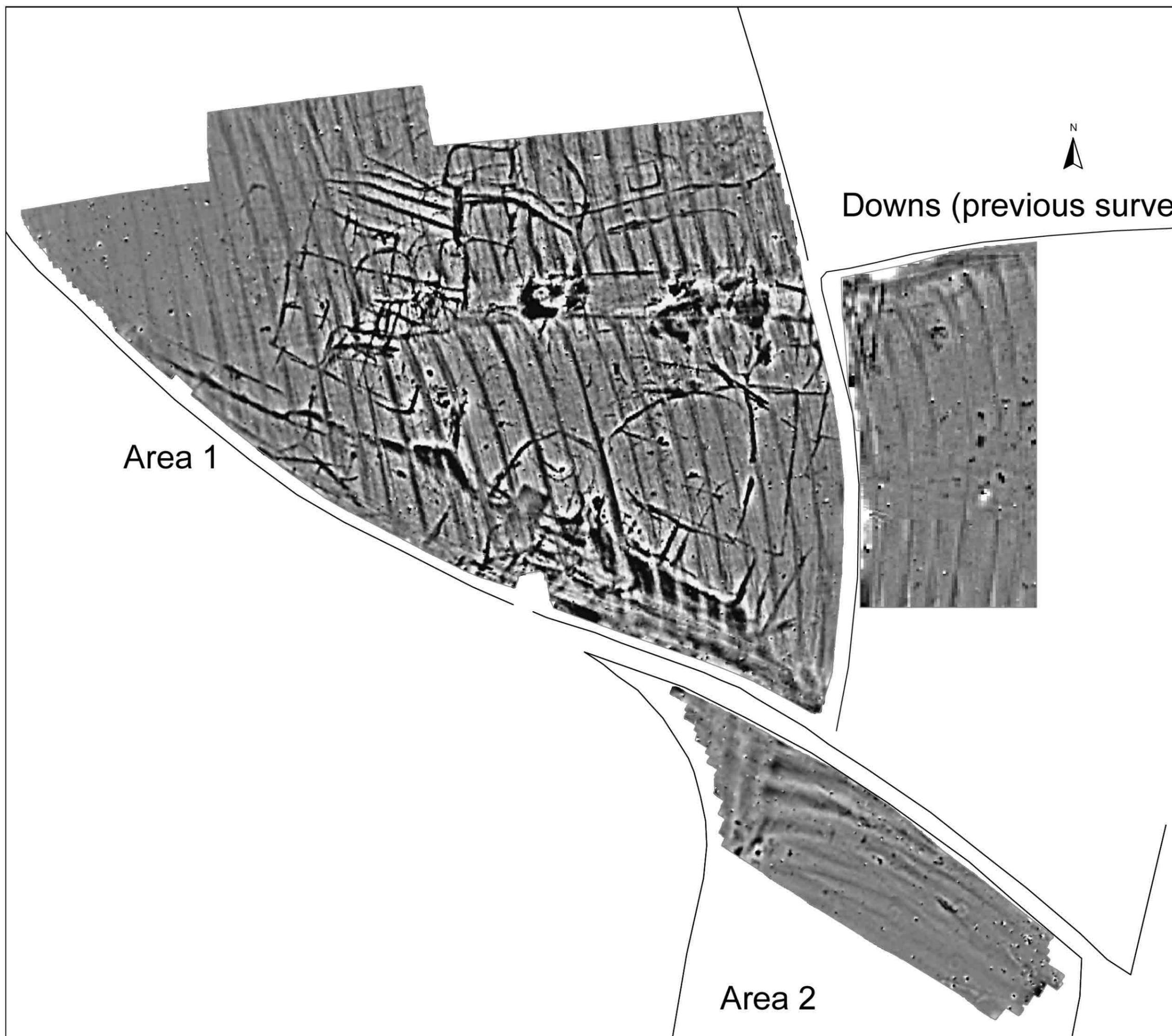
SCALE 1:1500



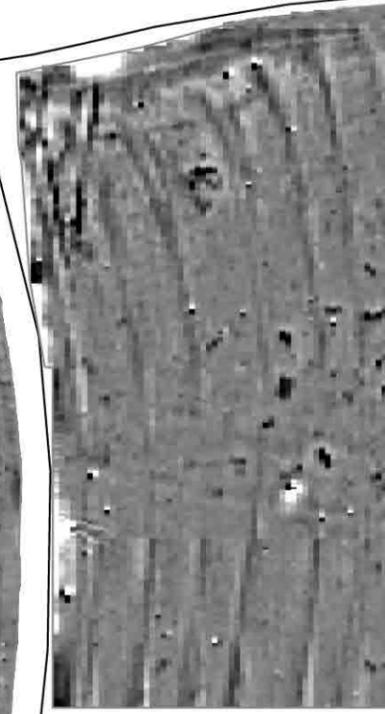
SCALE TRUE AT A3



Greyscale plot of minimally processed magnetometer data -
Downs Farm, Tysoe
(Areas 1 & 2)

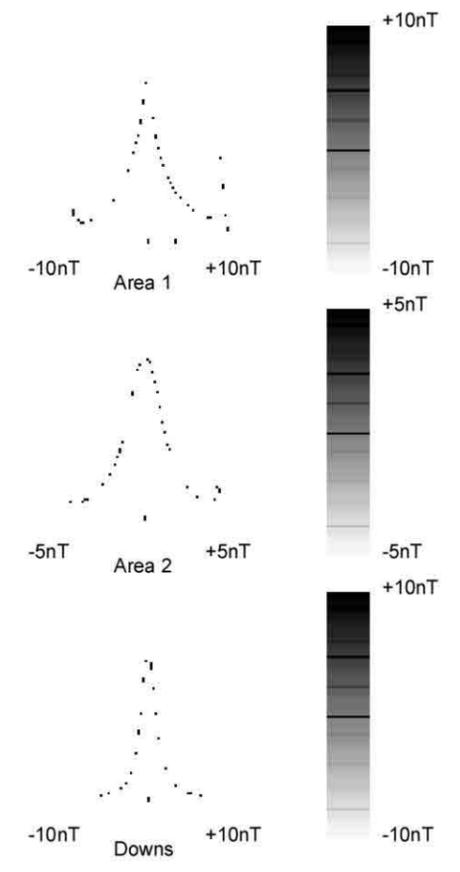


Downs (previous survey)



Area 1

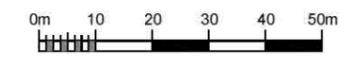
Area 2



Data processing

All areas subject to zero median traverse (destripe) and clipping.

SCALE 1:1250



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

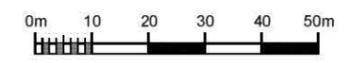
FIG 05

Abstraction and interpretation of magnetic anomalies -
Downs Farm, Tysoe
(Areas 1 & 2)



- Positive curvilinear/rectilinear anomaly - enclosure ditch
- Positive curvilinear anomaly - ring ditch
- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - ditch-like feature associated with track
- Negative linear anomaly of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly of agricultural origin
- Linear anomaly - ridge and furrow
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature of archaeological potential
- Discrete positive response - possible pit-like feature
- ▨ Positive anomaly - magnetically enhanced material
- ▨ Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1250

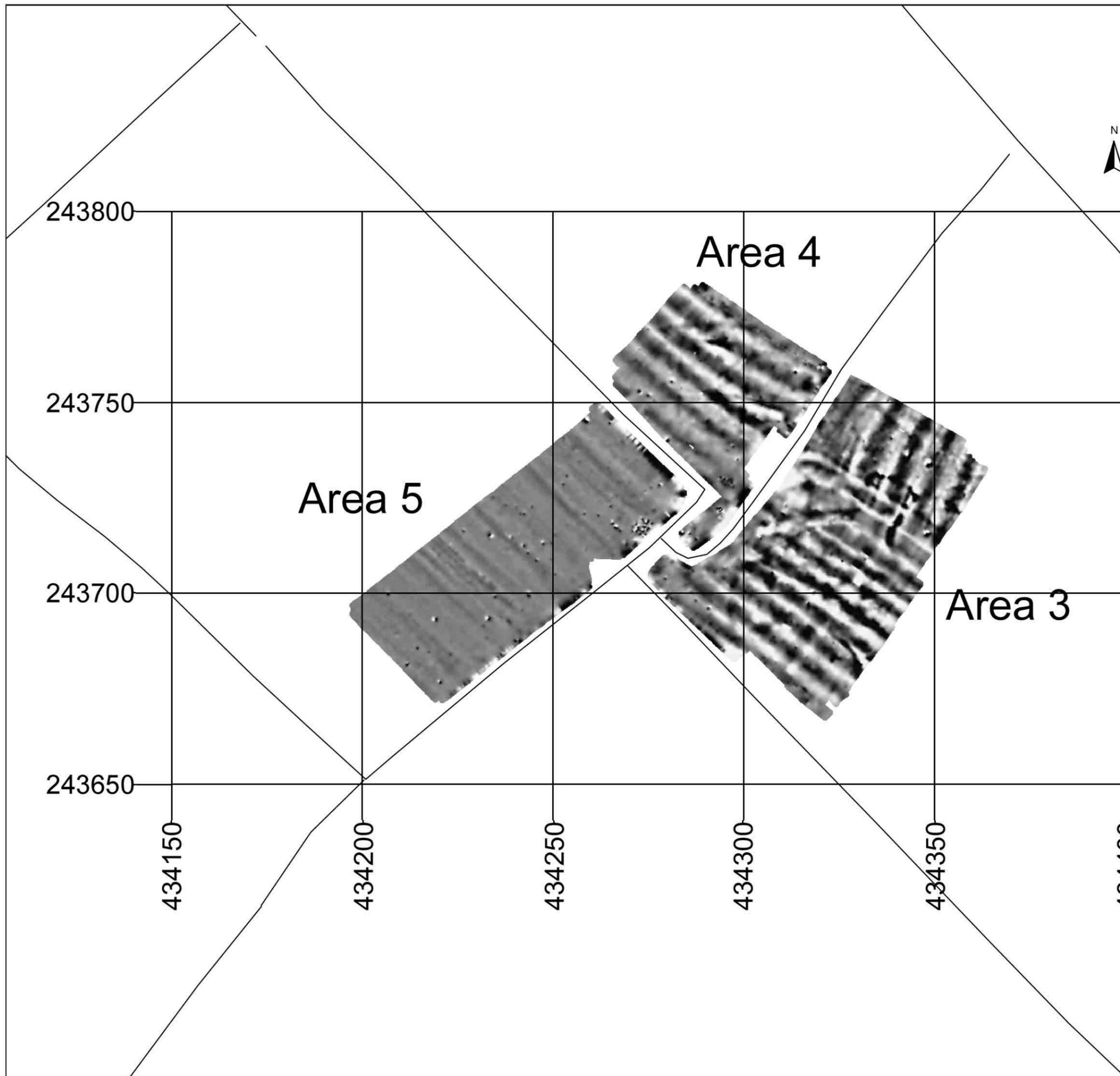


SCALE TRUE AT A3

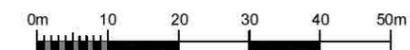


Referencing grid to OSGB36 datum at 50m intervals.

Data georeferenced to ETRS89 Zone 30 using RTK GNSS with subsequent conversion to OSGB36 via OSTN02 during data processing.



SCALE 1:1000



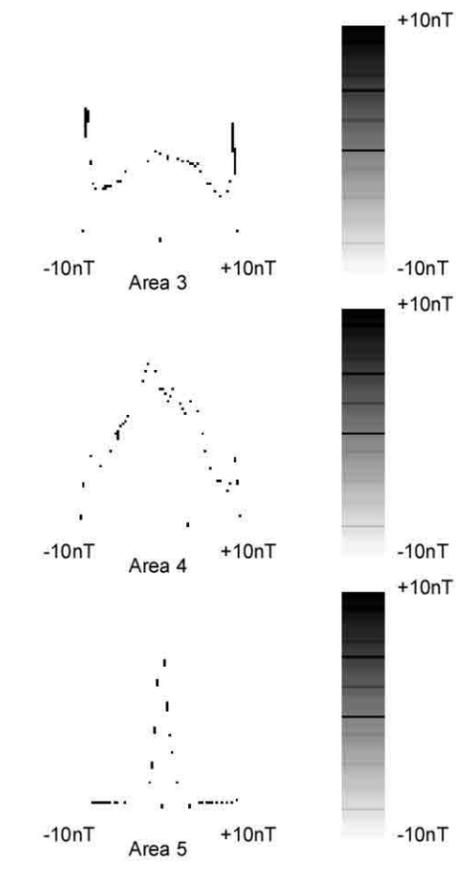
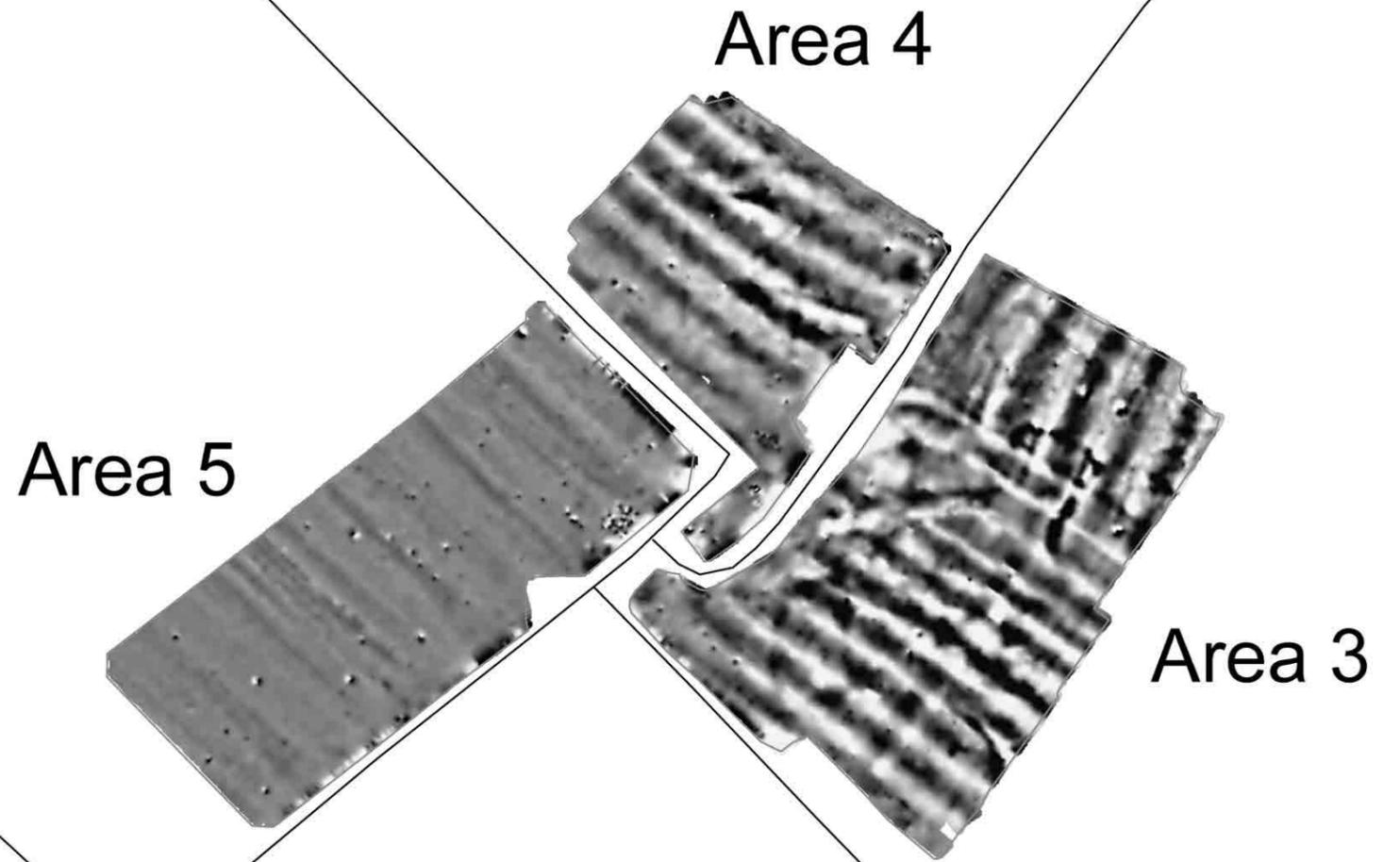
SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 07

Greyscale plot of minimally
processed magnetometer data -
Feoffee Farm, Tysoe
(Areas 3, 4 & 5)



Data processing

All areas subject to zero median
traverse (destripe) and clipping.

SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 08



The Roman History of Tysoe
CBA Mick Aston
Archaeology Fund

Abstraction and interpretation of
magnetic anomalies -
Feoffee Farm, Tysoe
(Areas 3, 4 & 5)

-  Positive curvilinear/rectilinear anomaly - enclosure ditch
-  Positive linear anomaly - cut feature of archaeological potential
-  Positive linear anomaly - possible ditch-like feature
-  Linear anomaly - ridge and furrow
-  Negative linear anomaly - material of low magnetic susceptibility
-  Magnetic disturbance from ferrous material
-  Strong dipolar anomaly - ferrous object



SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

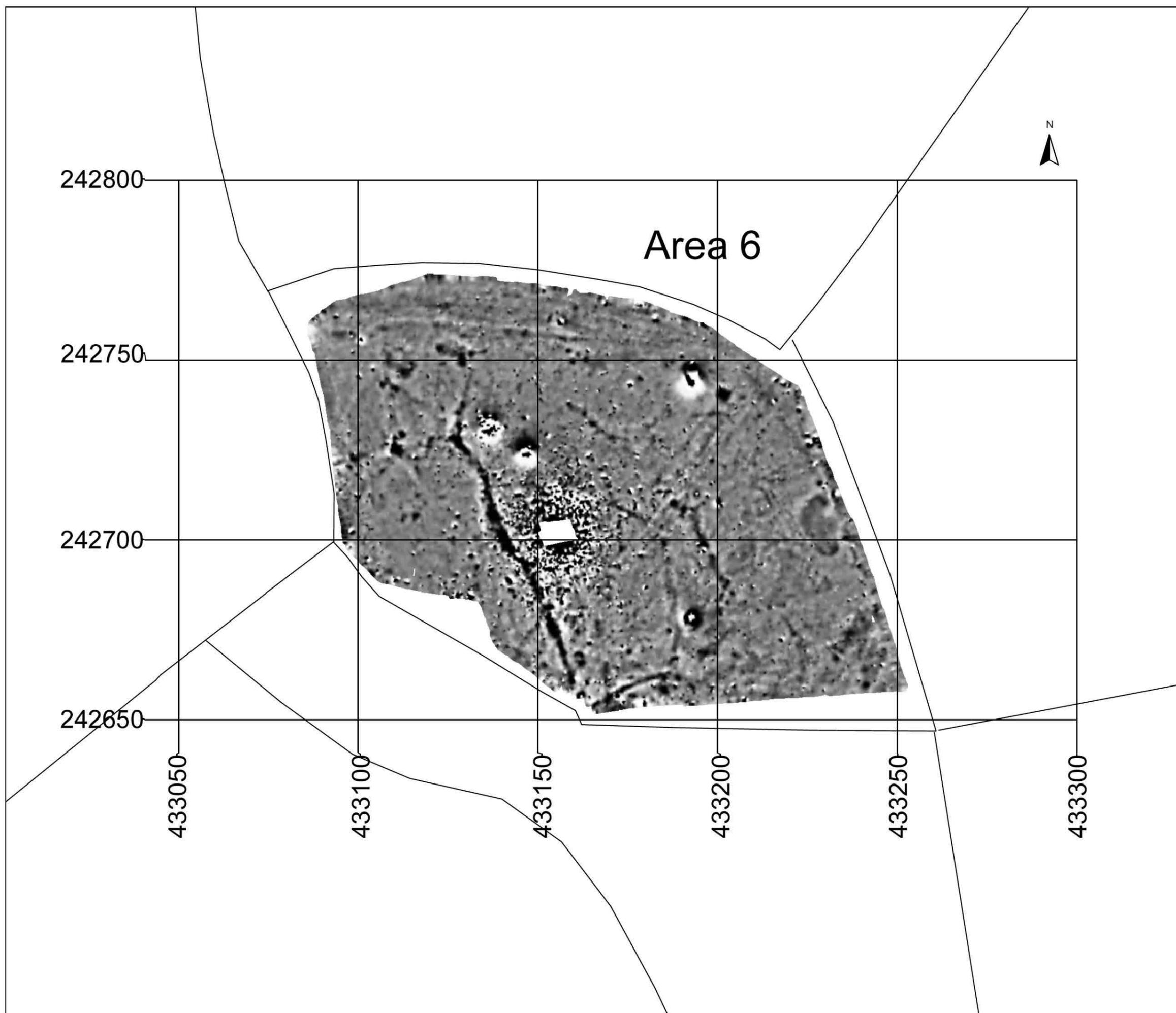
CHECKED BY
KTD

FIG 09

Referencing information -
Windmill Hill, Tysoe
(Area 6)

Referencing grid to OSGB36 datum at 50m intervals.

Data georeferenced to ETRS89 Zone 30 using RTK GNSS with subsequent conversion to OSGB36 via OSTN02 during data processing.



SCALE 1:1000



SCALE TRUE AT A3

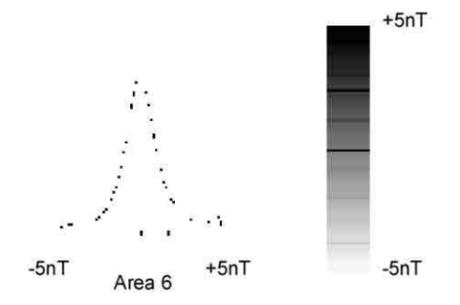
DRAWN BY
DJS

CHECKED BY
KTD

FIG 10

The Roman History of Tysoe
CBA Mick Aston
Archaeology Fund

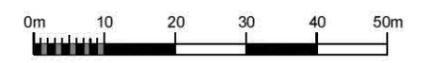
Greyscale plot of minimally
processed magnetometer data -
Windmill Hill, Tysoe
(Area 6)



Data processing

Area subject to zero median
traverse (destripe) and clipping.

SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

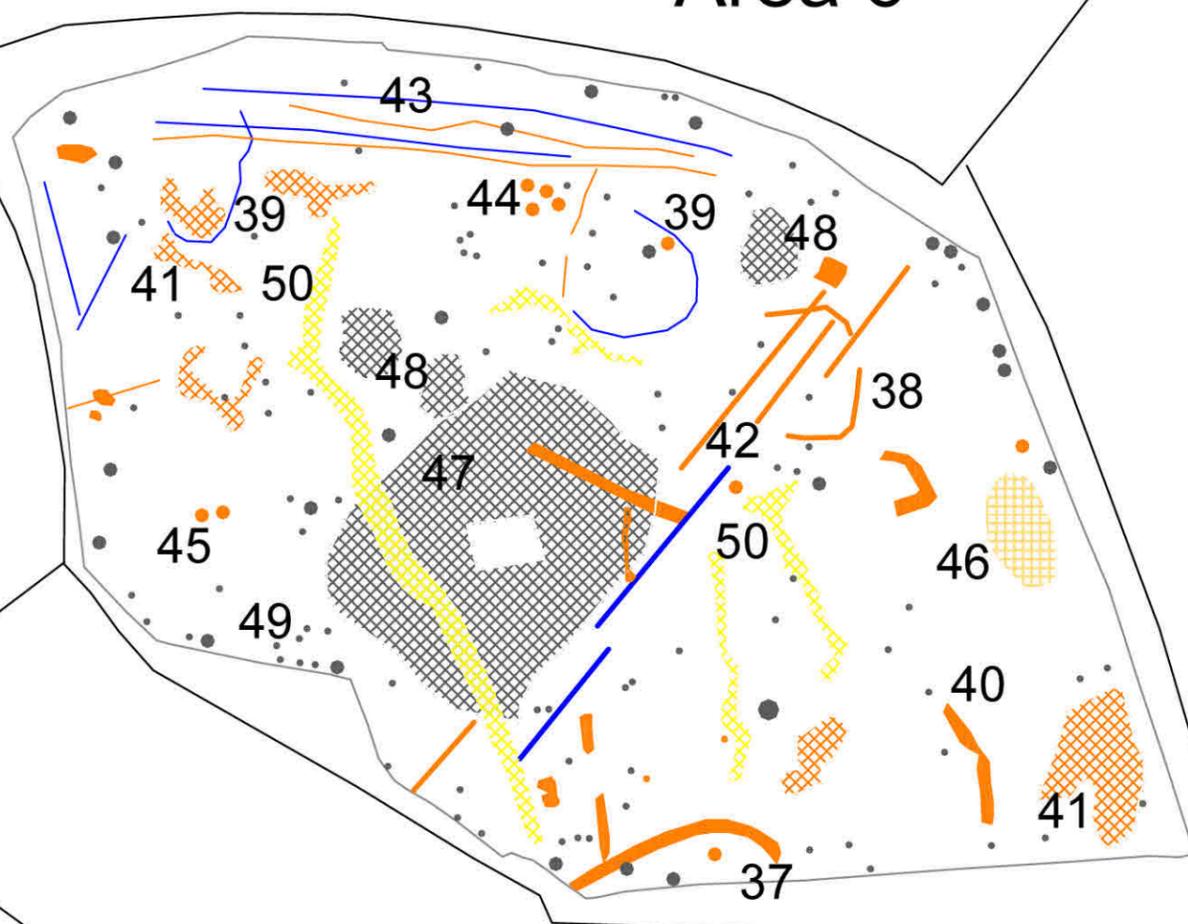
CHECKED BY
KTD

FIG 11

Abstraction and interpretation of
magnetic anomalies -
Windmill Hill, Tysoe
(Area 6)

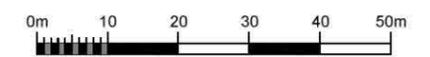


Area 6



-  Positive linear anomaly - possible ditch-like feature
-  Negative linear anomaly - material of low magnetic susceptibility
-  Discrete positive response - possible pit-like feature
-  Positive anomaly - magnetically enhanced material
-  Variable magnetic response - of natural origin
-  Variable magnetic response - possible quarrying
-  Magnetic debris - spread of magnetically thermoremnant/ferrous material
-  Strong dipolar anomaly - ferrous object

SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 12



The Roman History of Tysoe
CBA Mick Aston
Archaeology Fund

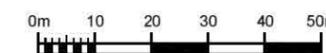
Referencing information -
Hopkins Farm, Tysoe
(Areas 7 & 9)

Referencing grid to OSGB36 datum at 50m intervals.

Data georeferenced to ETRS89 Zone 30 using RTK GNSS with subsequent conversion to OSGB36 via OSTN02 during data processing.



SCALE 1:1250



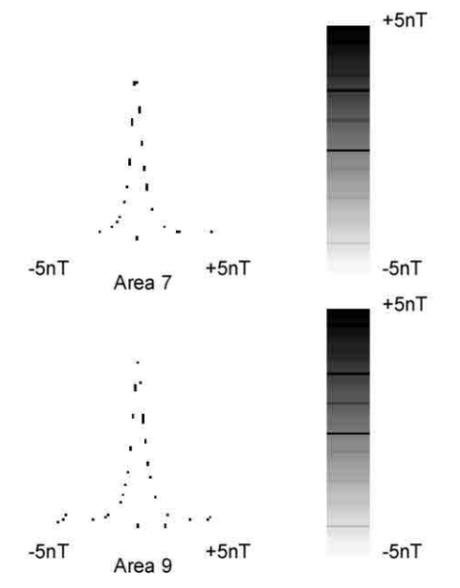
SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 13

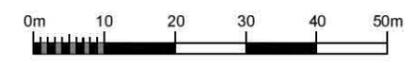
Greyscale plot of minimally processed magnetometer data - Hopkins Farm, Tysoe (Areas 7 & 9)



Data processing

All areas subject to zero median traverse (destripe) and clipping.

SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 14

Abstraction and interpretation of
magnetic anomalies -
Hopkins Farm, Tysoe
(Areas 7 & 9)

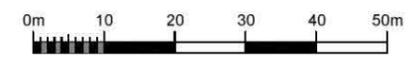
- Positive curvilinear/rectilinear anomaly - enclosure ditch
- Positive curvilinear anomaly - ring ditch associated with round house
- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - ditch-like feature associated with track
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly of agricultural origin
- Linear anomaly - ridge and furrow
- Land drain
- Discrete positive response - cut feature of archaeological potential
- Positive anomaly - magnetically enhanced material
- Magnetic debris - spread of magnetically thermoremanent/ferrous material
- Strong dipolar anomaly - ferrous object



Area 9

Area 7

SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 15

Referencing information -
Hopkins Farm, Tysoe
(Area 8)

Referencing grid to OSGB36 datum at 50m intervals.

Data georeferenced to ETRS89 Zone 30 using RTK GNSS with subsequent conversion to OSGB36 via OSTN02 during data processing.

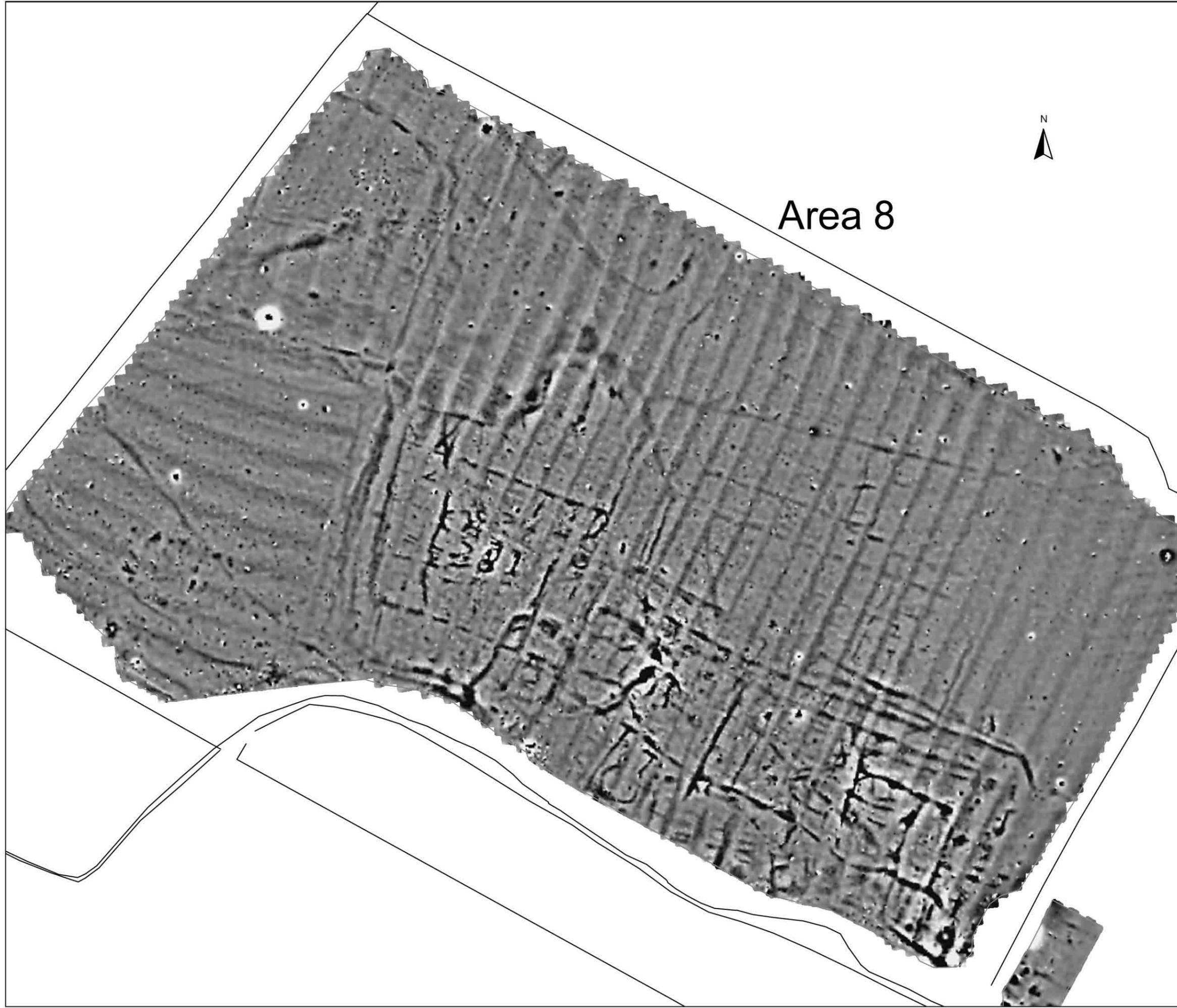


SCALE 1:1500

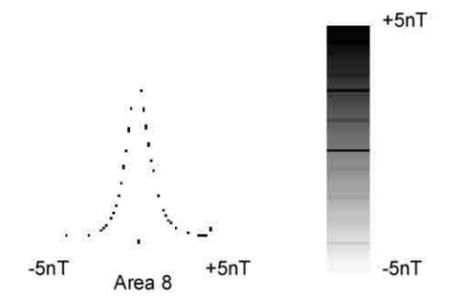


SCALE TRUE AT A3

Greyscale plot of minimally processed magnetometer data - Hopkins Farm, Tysoe (Area 8)



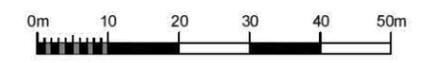
Area 8



Data processing

Area subject to zero median traverse (destripe) and clipping.

SCALE 1:1000



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

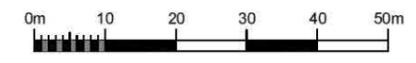
FIG 17

Abstraction and interpretation of
magnetic anomalies -
Hopkins Farm, Tysoe
(Area 8)



- Positive curvilinear/rectilinear anomaly - enclosure ditch
- Positive curvilinear anomaly - ring ditch associated with round house
- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - ditch-like feature associated with track
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - ridge and furrow
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature of archaeological potential
- Strong dipolar anomaly - ferrous object
- ▣ Variable response of uncertain archaeological potential

SCALE 1:1000



SCALE TRUE AT A3



The Roman History of Tysoe
CBA Mick Aston
Archaeology Fund

Referencing information -
Mill Farm, Tysoe
(Area 10)

Referencing grid to OSGB36 datum at 50m intervals.

Data georeferenced to ETRS89 Zone 30 using RTK GNSS with subsequent conversion to OSGB36 via OSTN02 during data processing.



244600

244550

244500

244450

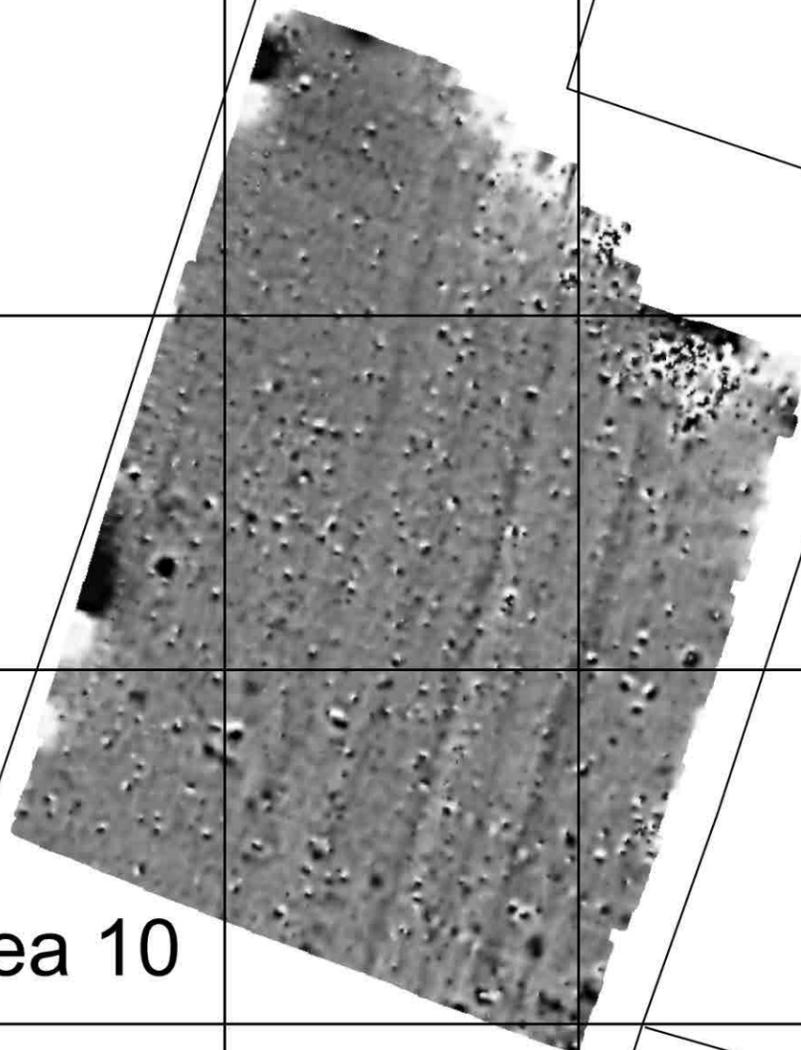
433250

433300

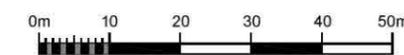
433350

433400

Area 10



SCALE 1:1000



SCALE TRUE AT A3

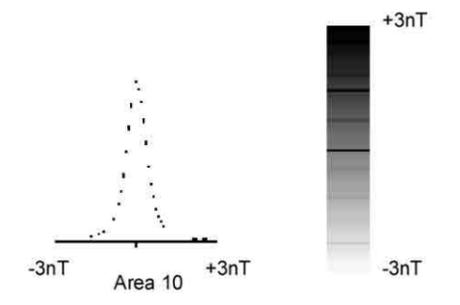
DRAWN BY
DJS

CHECKED BY
KTD

FIG 19

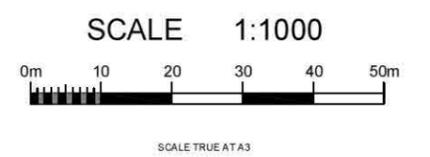
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Greyscale plot of minimally
processed magnetometer data -
Mill Farm, Tysoe
(Area 10)



Area 10

Data processing
Area subject to zero median
traverse (destripe) and clipping.



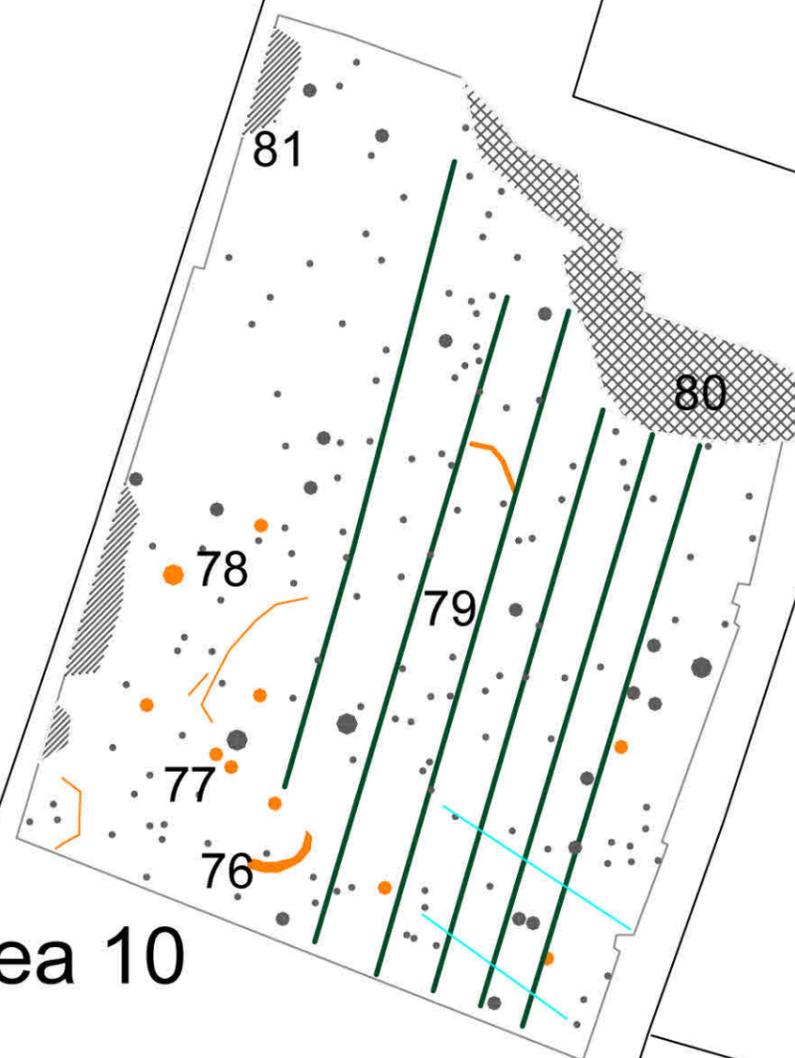


The Roman History of Tysoe
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Abstraction and interpretation of
magnetic anomalies -
Mill Farm, Tysoe
Area 10

-  Positive linear anomaly - possible ditch-like feature
-  Linear anomaly - ridge and furrow
-  Positive linear anomaly - land drain
-  Discrete positive response - possible pit-like feature
-  Magnetic debris - spread of magnetically thermoremanent/ferrous material
-  Magnetic disturbance from ferrous material
-  Strong dipolar anomaly - ferrous object

Area 10



SCALE 1:1000



SCALE TRUE AT A3

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DJS

CHECKED BY
KTD

FIG 21

Referencing information -
Twenty Seven Acres, Madhill,
Little Meadow and Bean Hill
Tysoe

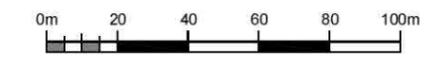
Survey grids (30m x 30m) set out to OSGB36 using RTK GNSS.

Madhill and Twenty Seven Acres reported on previously. Little Meadow and Bean Hill surveyed in 2011 but not previously reported on.

— Survey start and traverse direction

1 Grid reference number and filename

SCALE 1:2000

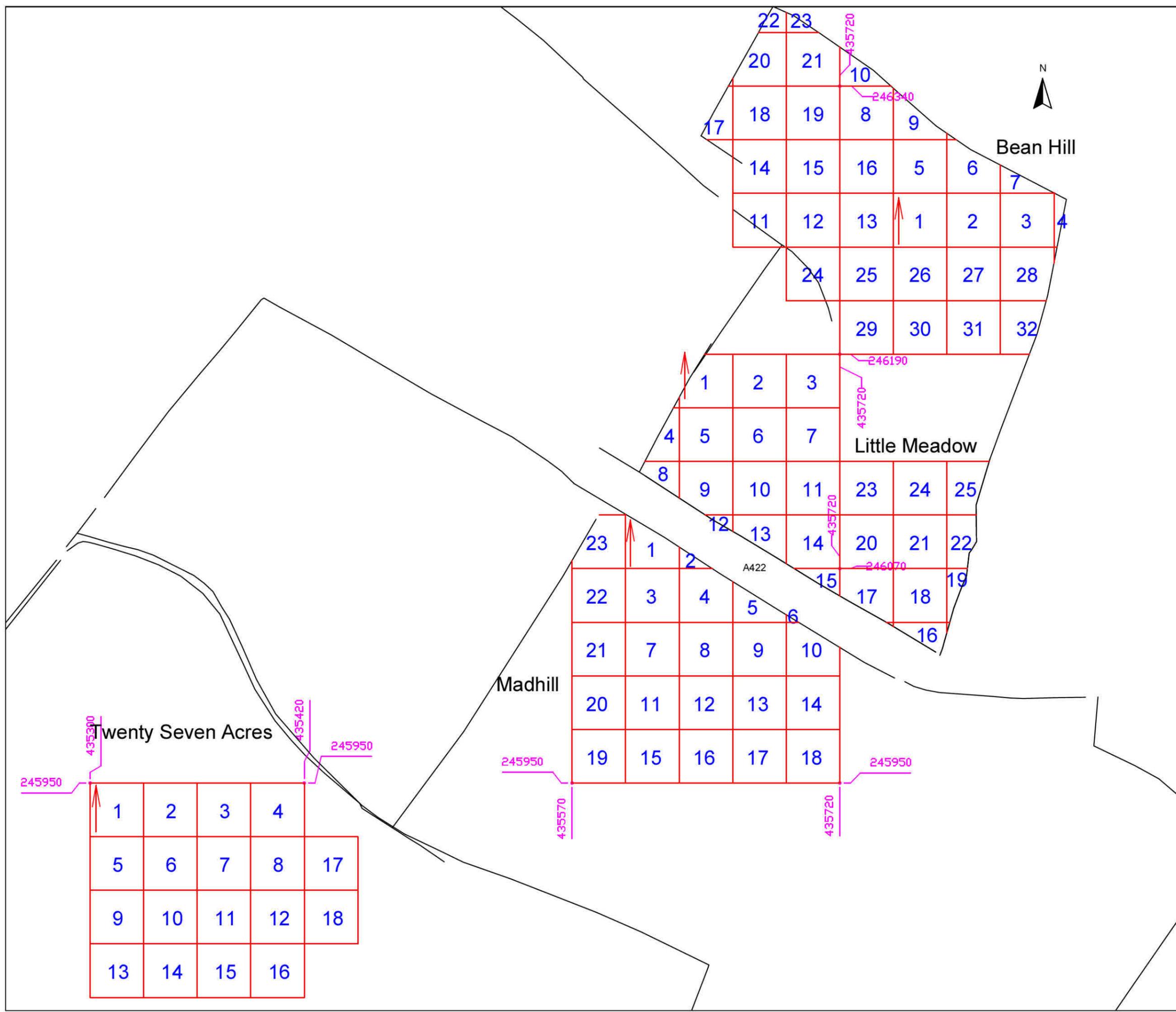


SCALE TRUE AT A3

DRAWN BY
DJS

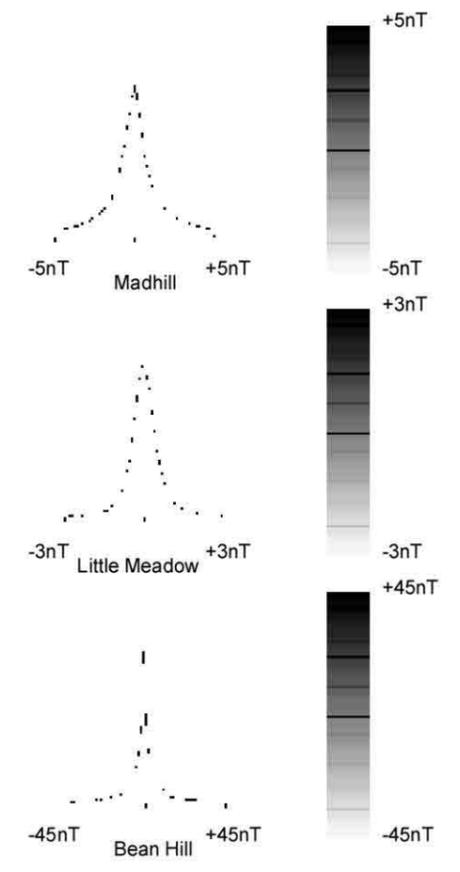
CHECKED BY
KTD

FIG 22



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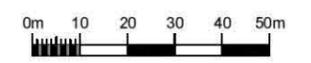
Greyscale plot of minimally processed magnetometer data -
Madhill, Little Meadow and Bean Hill, Tysoe



Data processing

All areas subject to zero median traverse (destripe) and clipping.

SCALE 1:1500



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

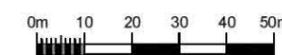
FIG 23

**The Roman History of Tysoe
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**Abstraction and interpretation of
magnetic anomalies - Madhill,
Little Meadow and Bean Hill,
Tysoe**

- Positive curvilinear/rectilinear anomaly - enclosure ditch
- Positive curvilinear anomaly - ring ditch associated with round house
- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - ditch-like feature associated with track
- Negative linear anomaly - structural remains of archaeological potential
- Negative linear anomaly of archaeological potential
- Dipolar responses of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly of agricultural origin
- Linear anomaly - ridge and furrow
- Positive linear anomaly - land drain
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature of archaeological potential
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremanent/ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1500



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

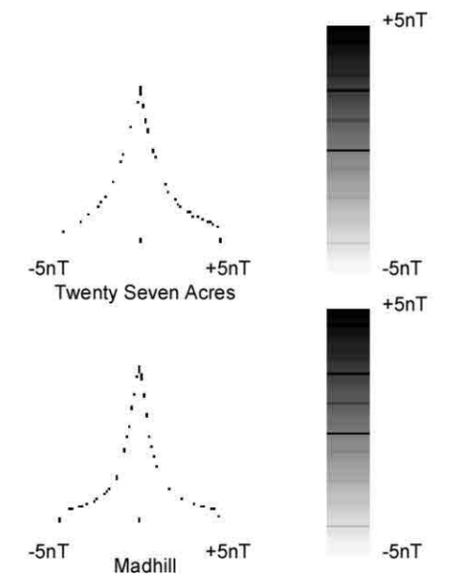
FIG 24





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Greyscale plot of minimally
processed magnetometer data -
Twenty Seven Acres and Madhill,
Tysoe



Data processing

All areas subject to zero median
traverse (destripe) and clipping.

SCALE 1:1500



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

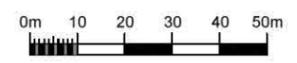
FIG 25

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Abstraction and interpretation of
magnetic anomalies -
Twenty Seven Acres and Madhill,
Tysoe

-  Positive curvilinear/rectilinear anomaly - enclosure ditch
-  Positive curvilinear anomaly - ring ditch associated with round house
-  Positive linear anomaly - cut feature of archaeological potential
-  Positive linear anomaly - ditch-like feature associated with track
-  Negative linear anomaly - structural remains of archaeological potential
-  Negative linear anomaly of archaeological potential
-  Linear anomaly of agricultural origin
-  Linear anomaly - ridge and furrow
-  Negative linear anomaly - material of low magnetic susceptibility
-  Discrete positive response - cut feature of archaeological potential
-  Magnetic debris - spread of magnetically thermoremanent/ferrous material
-  Strong dipolar anomaly - ferrous object

SCALE 1:1500

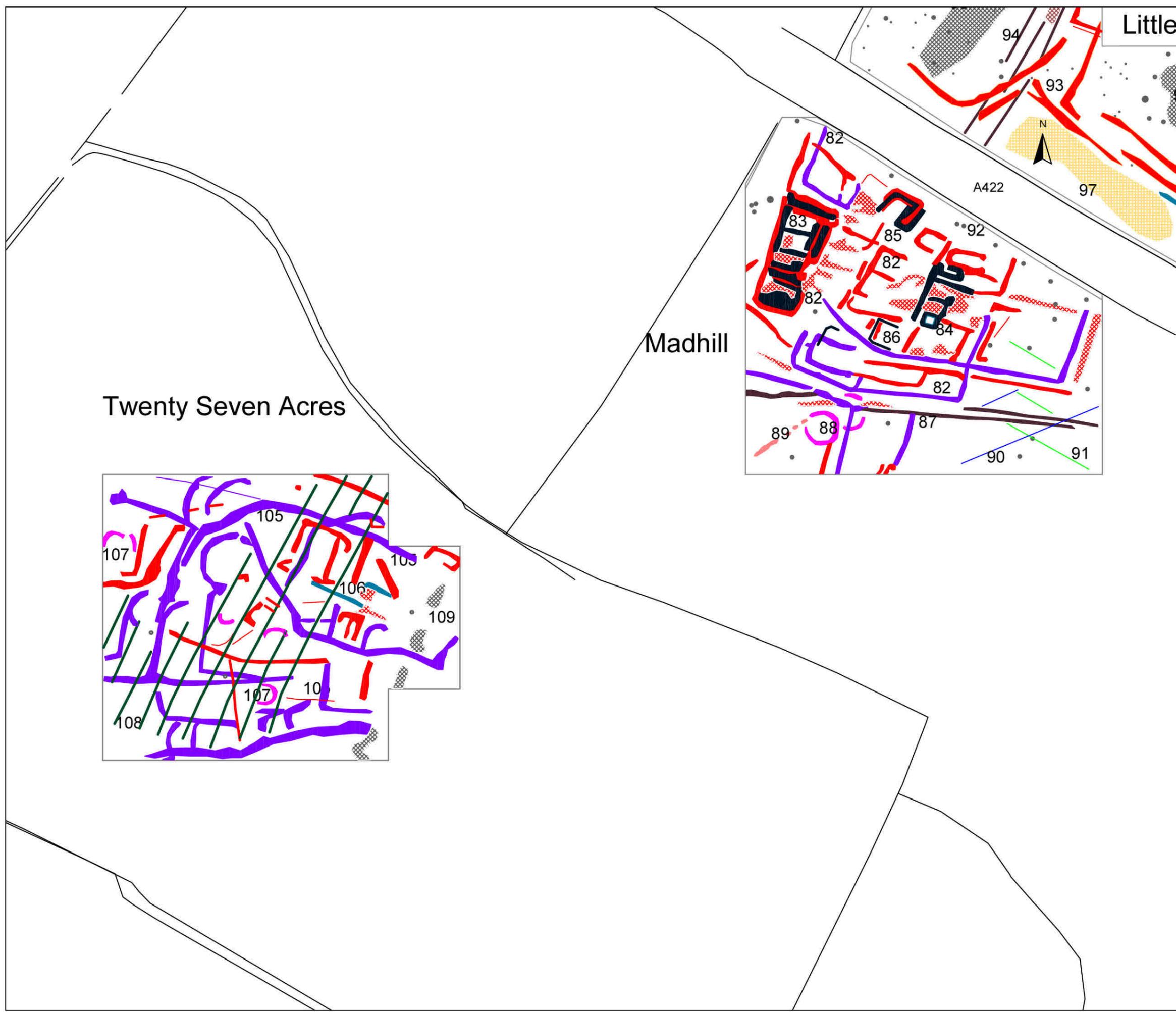


SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 26





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CBA Mick Aston
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Referencing information -
Old Lodge Farm, Tysoe

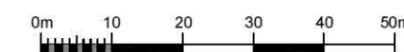
Survey grids (30m x 30m) set out to OSGB36
using RTK GNSS.

Area reported on previously.

Survey start and traverse direction

Grid reference number and filename

SCALE 1:1000

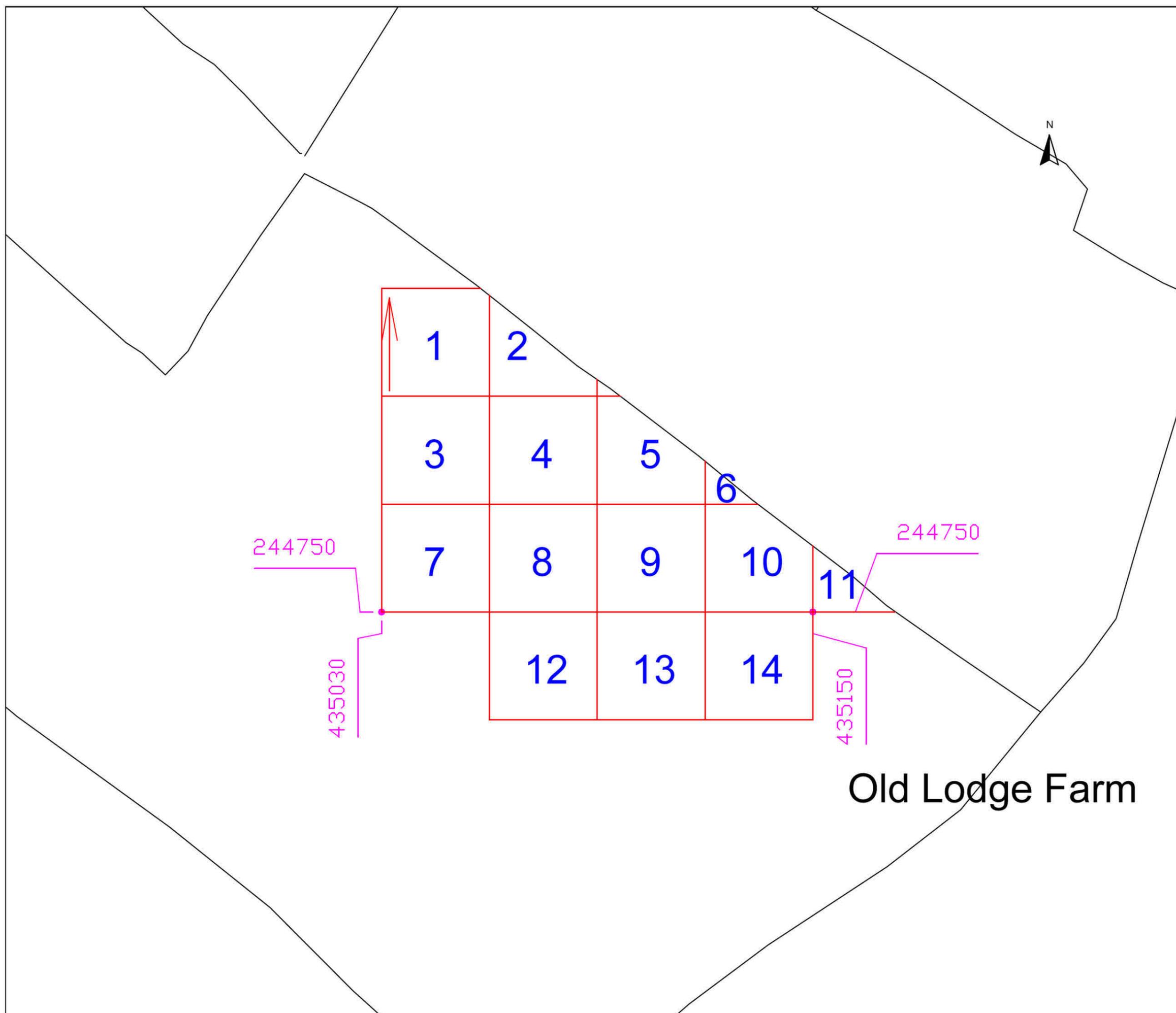


SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

FIG 27



Old Lodge Farm

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244750

244750

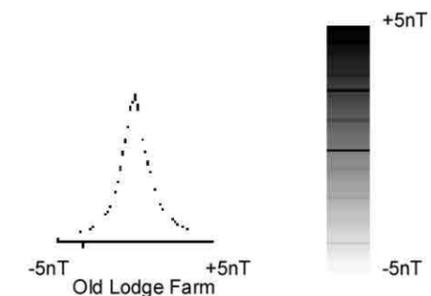
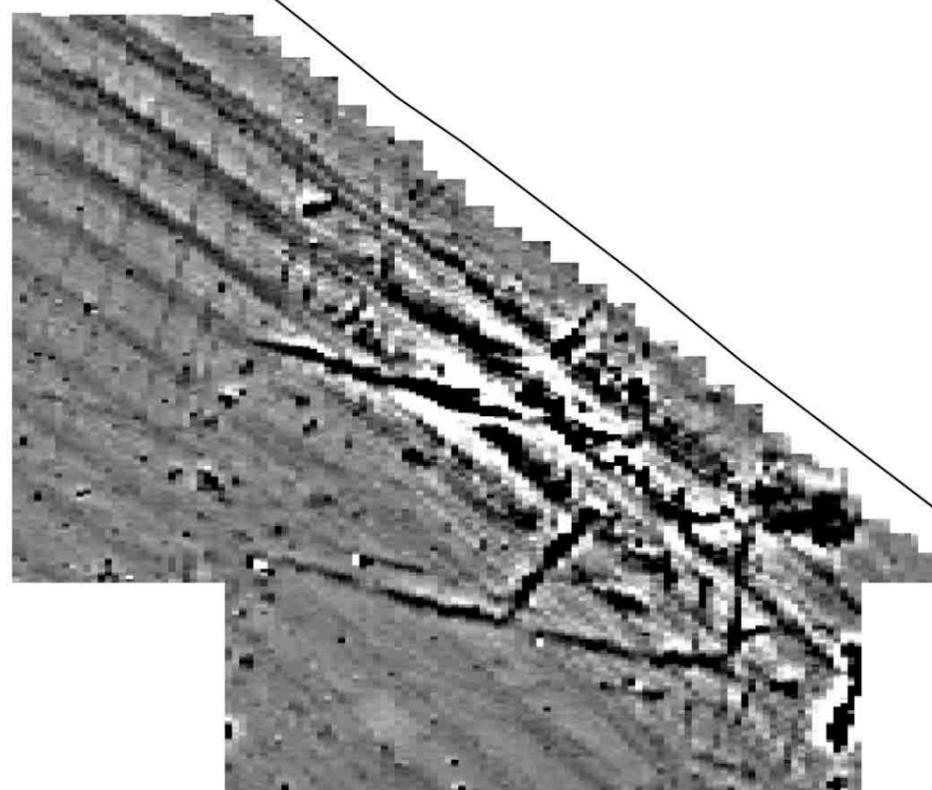
435030

435150



The Roman History of Tysoe
CBA Mick Aston
Archaeology Fund

Greyscale plot of minimally
processed magnetometer data -
Old Lodge Farm, Tysoe



Old Lodge Farm

Data processing

Area subject to zero median
traverse (destripe) and clipping.

SCALE 1:1000



SCALE TRUE AT A3

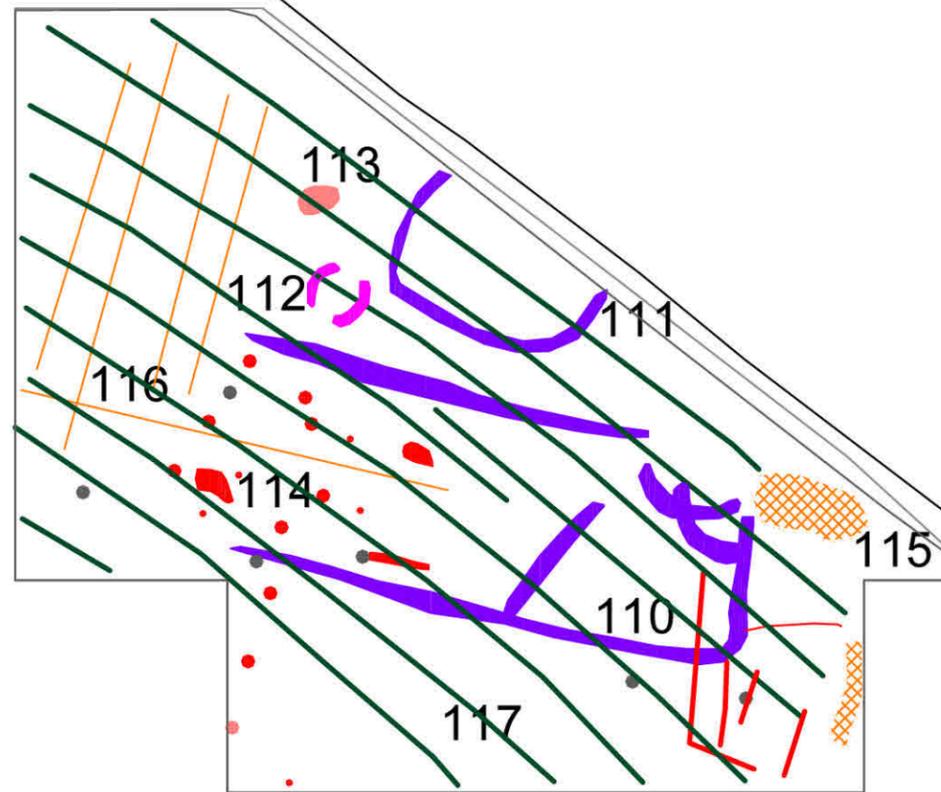
DRAWN BY
DJS

CHECKED BY
KTD

FIG 28

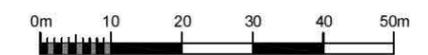
Abstraction and interpretation of
magnetic anomalies -
Old Lodge Farm, Tysoe

-  Positive curvilinear/rectilinear anomaly - enclosure ditch
-  Positive curvilinear anomaly - ring ditch associated with round house
-  Positive linear anomaly - cut feature of archaeological potential
-  Positive linear anomaly - possible ditch-like feature
-  Linear anomaly - ridge and furrow
-  Discrete positive response - cut feature of archaeological potential
-  Positive anomaly - magnetically enhanced material
-  Strong dipolar anomaly - ferrous object



Old Lodge Farm

SCALE 1:1000



SCALE TRUE AT A3

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DJS

CHECKED BY
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FIG 29

Referencing information -
Lingcroft, Tysoe

Survey grids (30m x 30m) set out to OSGB36 using RTK GNSS.

Lingcroft reported on previously. Lingcroft (additional survey) carried out in 2011 but not previously reported on.

Survey start and traverse direction

1 Grid reference number and filename

SCALE 1:1500

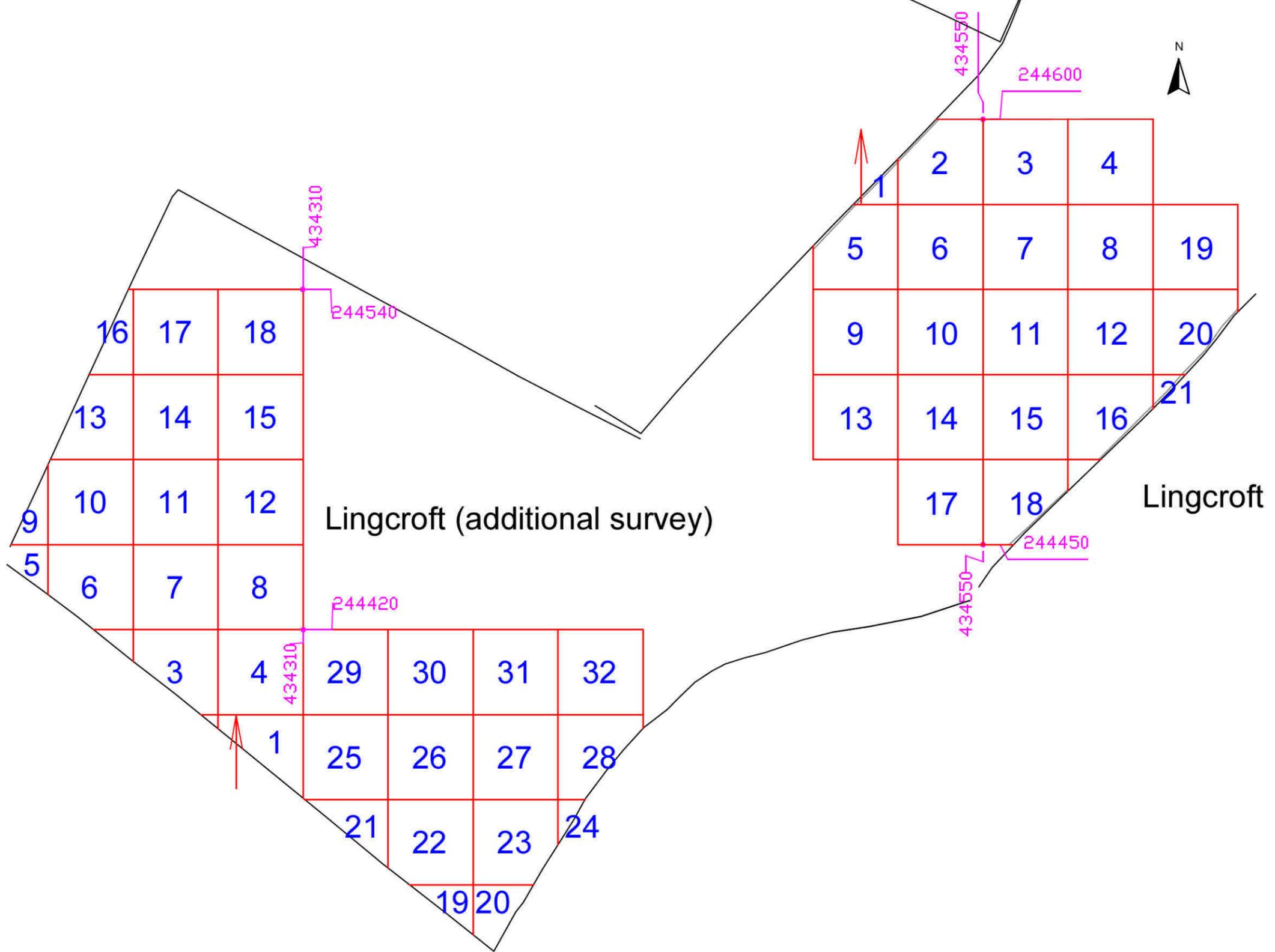


SCALE TRUE AT A3

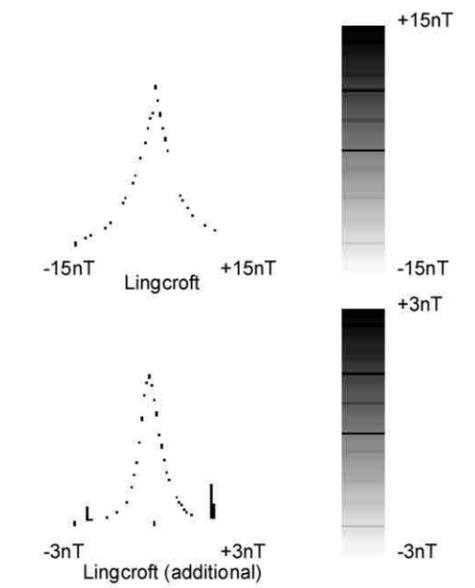
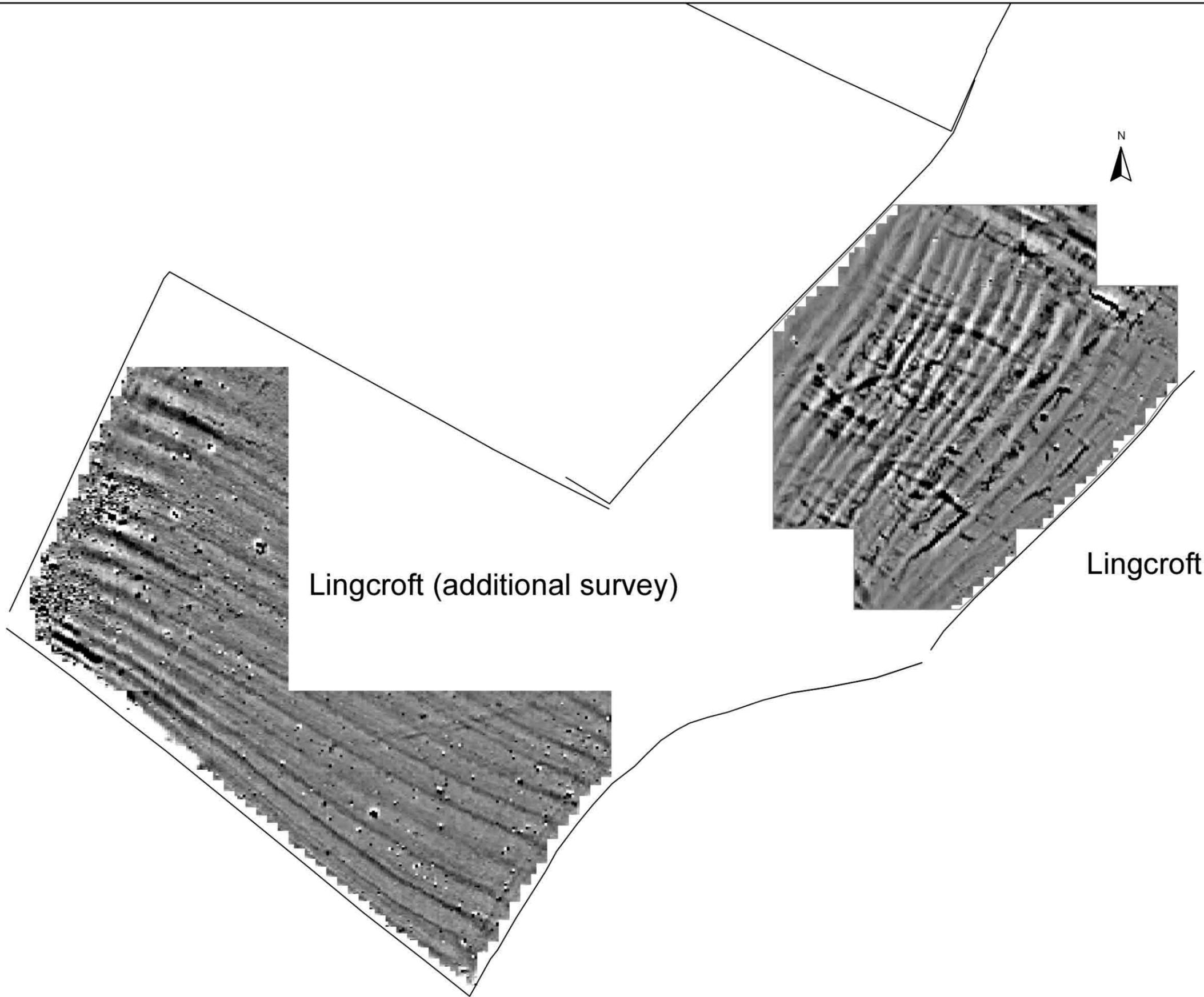
DRAWN BY
DJS

CHECKED BY
KTD

FIG 30



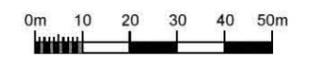
Greyscale plot of minimally processed magnetometer data -
Lingcroft, Tysoe



Data processing

All areas subject to zero median traverse (destripe) and clipping.

SCALE 1:1500



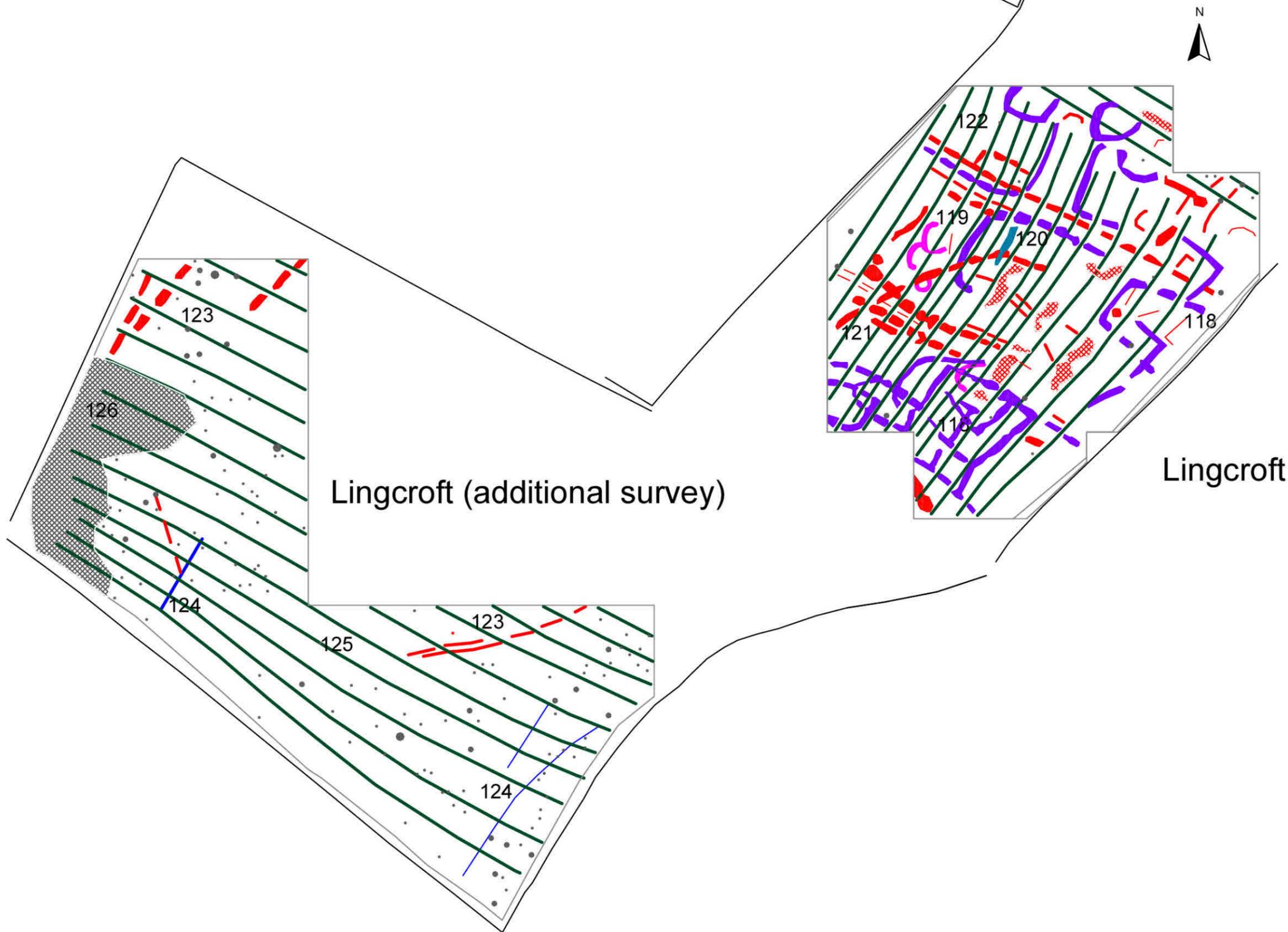
SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
KTD

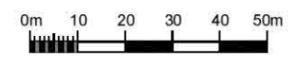
FIG 31

Abstraction and interpretation of magnetic anomalies - Lingcroft Tysoe



- Positive curvilinear/rectilinear anomaly - enclosure ditch
- Positive curvilinear anomaly - ring ditch associated with round house
- Positive linear anomaly - cut feature of archaeological potential
- Negative linear anomaly - structural remains of archaeological potential
- Negative linear anomaly of archaeological potential
- Linear anomaly - ridge and furrow
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature of archaeological potential
- ⊠ Positive anomaly - magnetically enhanced material of archaeological potential
- ⊠ Magnetic debris - spread of magnetically thermoremanent/ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1500



SCALE TRUE AT A3

DRAWN BY
DJS

CHECKED BY
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FIG 32