Geophysical Survey Report

of

Cambridge South East Transport Phase 2, Stage 2,

Great Abington, Cambridgeshire

For

Cambridge Archaeological Unit

On Behalf Of

Greater Cambridge Partnership

Magnitude Surveys Ref: MSTL645

March 2020

Unit 17, Commerce Court

Challenge Way

Bradford

BD4 8NW

01274 926020

info@magnitudesurveys.co.uk

Report By:

Peter Turner BSc MSc

Jake Dolan BSc FGS

Report Approved By:

Finnegan Pope-Carter BSc (Hons) MSc FGS

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Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c. 43.7ha area of land near Great Abington, Cambridgeshire, as part of the Cambridge South East Transport Project Phase 2 Stage 2. A fluxgate gradiometer survey was successfully completed across the survey area. The geophysical survey identified archaeological activity in the form of a double-ditched enclosure system. Further archaeological activity has been identified in the form of a trackway, further possible enclosures and pit like anomalies. Old field boundaries and ploughing trends associated with historic agriculture have been identified. Natural anomalies related to the underlying chalk bedrock and Quaternary superficial deposits have also been recorded. The impact of modern activity on the results is generally limited and detected as a large area of burning/buried material and interference from ferrous sources such as adjacent roads, services and field boundaries.

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1. Introduction

1.1. Magnitude Surveys Ltd (MS) was commissioned by Cambridge Archaeological Unit on behalf of the Greater Cambridge Partnership to undertake a geophysical survey on a c.43.7ha area of land near land near Great Abington, Cambridgeshire, as part of the Cambridge South East Transport Project Phase 2 Stage 2 (TL 5193 4973).

1.2. The geophysical survey comprised a hand-carried, GNSS-positioned fluxgate gradiometer survey.

1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David et al., 2008), the Chartered Institute for Archaeologists (CIfA, 2014) and the European Archaeological Council (Schmidt et al., 2015).

1.4. It was conducted in line with a WSI produced by MS (Salmon, 2020).

1.5. The survey commenced on 09/03/2020 and took seven days to complete.

2. Quality Assurance

2.1. Magnitude Surveys is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, and a corporate member of ISAP (International Society of Archaeological Prospection).

2.2. The directors of MS are involved in the cutting edge of research and the development of guidance/policy. Specifically, Dr. Chrys Harris is the Vice-Chair of the International Society for Archaeological Prospection (ISAP); Finnegan Pope-Carter is a Fellow of the London Geological Society, as well as a member of GeoSIG (CIfA Geophysics Special Interest Group); Dr. Kayt Armstrong is the Editor of ISAP News, and is the UK Management Committee representative for the COST Action SAGA; Dr. Paul Johnson has been a member of the ISAP Management Committee since 2015, and is currently the nominated representative for the EAA Archaeological Prospection Community to the board of the European Archaeological Association.

2.3. All MS managers have relevant degree qualifications to archaeology or geophysics. All MS field and office staff have relevant archaeology or geophysics degrees and/or field experience.

3. Objectives

3.1. The objective of this geophysical survey was to determine the location, extent, character, and significance of any potential archaeological remains likely to be threatened by the proposed development and any geomorphological anomalies that might inform on the nature of human activity at the site.

3.2. The geophysical survey results will be used to inform a future trench-based evaluation to ground truth the results.

4. Geographic Background

4.1. The survey area was located between c.530m northwest and c.1.2km northeast from Great Abington (Figure 1). Survey was undertaken across five fields under arable use. The eastern-most survey area was bounded by the A1307 to the south, a farm track to the east and was unbounded to the north (Figure 2). The centre-most survey area was bounded by the A1307 to the north, the A11 to the east, a stream and fields to the south and further fields to the west. The western-most survey area was bounded by further agricultural land on all sides.

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
MSTL645_1	Recently ploughed, arable field that sloped down from the north-west to the south-east.	Bounded to the south east by wooden fencing, trees and the M11. Bounded to the south by hedgerow. Bounded to the south-west by wooded area. Bounded to north by wire fencing and wooded area. A ditch and an area of grass ran along eastern edge of survey area. Bounded to east by a wire fence, wooded area and M11. The area was unbounded to the north-west. Manhole located on western boundary. Gas pipeline marker located further west along boundary of survey area. In southern section ploughing ran east to west except along east and western edges where it ran north to south and is heavier plough.
MSTL645_2	Recently ploughed, arable field that sloped down towards the centre of the field from the northwest and east. The field also sloped down to the south.	Bounded to the north by cycle path. Bounded to the east by metal wire fencing, trees and M11. The area was unbounded to the south and east. Two boreholes were located in the north-east corner of survey area along the eastern boundary. A manhole cover was located on eastern boundary. A metal bridge leading over the motorway located just outside survey area in north eastern corner. A single trench/deep plough ran east to west, parallel to northern boundary of survey area.
MSTL645_3	Arable field under young crop that sloped down to the south-west.	Bounded to the south by wire fencing which separated the area from Cambridge Road. Bounded to the southwest by trees and to the east by a grass bank which separated the area from a farm track. The area was unbounded to the north. A telegraph line ran across the centre of the area on a southwest to northeast orientation. A separate telegraph line ran along the grass bank which formed the eastern boundary in a north to south orientation.
MSTL645_4	Arable field under young crop that sloped down to the north. A small ridge ran across the field in a north south orientation, resulting in slight slopes to the east and west coming down off the ridge.	Bounded to the south by a small grass bank with intermittent trees and hedges. The area was unbounded on all other sides.
MSTL645_5	Arable field under young crop that sloped down to the south. A small ridge ran across the field in a north south orientation, resulting in slight slopes to the east and west coming down off the ridge.	Bounded to the north by a small grass bank with intermittent trees and hedges. The area was unbounded on all other sides.

4.3. The underlying geology comprises of Cretaceous chalks of the Holywell Nodular Chalk formation and the New Pit Chalk Formation. Superficial deposits are present across the site; Quaternary river terrace deposits underly Areas 1 and 2 and diamicton of the Lowerstoft formation underly Areas 4 and 5. (British Geological Survey, 2020).

4.4. The soils consist of freely draining lime-rich loamy soils in Area 3 and freely draining slightly acid but base-rich soils in Areas 1, 2, 4 and 5. (Soilscapes, 2020).

5. Archaeological Background

5.1. The following is a summary of a Brief for Archaeological Evaluation produced by Cambridgeshire Historic Environment Team (2019) and a Technical Note produced by Mott Macdonald (2019).

5.2. A range of prehistoric activity has been recorded within the wider environs of the site including a Neolithic shaft, a Bronze Age ring ditch, an Early Bronze Age use of natural hollows, Middle to Late Bronze Age roundhouse, pits and postholes, Late Bronze Age/Early Iron Age post building, possible building eaves drip gullies and a late Iron Age cremation. Bronze Age barrows were also recorded in Fourwentways to the east of the A11. At Bourn Bridge, to the west of the A11, a borrow pit and a Bronze Age ring ditch were found along with Mesolithic and Neolithic activity (CHER 11317). Additional prehistoric activities are recorded in the form of Late Bronze Age/Early Iron Age ring ditches, a Late Neolithic/Early Bronze Age pit cluster and an Iron Age, which were discovered near Babraham Road Park and Ride.

5.3. Late Iron age/Roman activities have been identified in the area. This includes a Romano-British settlement located in Granhams Farm, the Worsted Street Roman Road (NHLE 1003263) and a Late Iron Age/Roman field system (CHER 11317C) located in Bourn Bridge. Roman activities were also found during the exaction at Dale Manor, which includes Roman boundary ditches, enclosures, trackways, pits, postholes and a juvenile burial. Additional Roman activity is

documented to the east of Trumpington, in the form of an Early Roman field system, a kiln (CHER MCB26679), Iron Age/Roman enclosures (CHER 08339), Late Iron Age enclosures, a Roman ditch (CHER MCB20378) and an Early Roman midden (CHER MCB19991).

5.4. Medieval and post-medieval activity in the area has been identified as Post-medieval pits and enclosure ditches located at Granhams Farm and at Bourn Bridge. A Saxon settlement, finds (CHER 13044, CHER CB14745) and ditches have been recorded, which are associated with Babraham water meadows.

6. Methodology

6.1.Data Collection

6.1.1. Geophysical prospection comprised the magnetic method as described in the following table.

6.1.2. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

6.1.3. The magnetic data were collected using MS' bespoke hand-carried, GNSS-positioned system.

6.1.3.1. MS' hand-carried system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a multi-channel, multi-constellation GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The RTK GPS is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.

6.1.3.2. Magnetic and GPS data were stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.

6.1.3.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data were collected by traversing the survey area along the longest possible lines, ensuring efficient collection and processing.

6.2.Data Processing

6.2.1. Magnetic data were processed in bespoke in-house software produced by MS. Processing steps conform to Historic England's standards for "raw or minimally processed data" (see sect 4.2 in David et al., 2008: 11).

Sensor Calibration – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen et al. (2003).

Zero Median Traverse – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

Projection to a Regular Grid – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

6.3.Data Visualisation and Interpretation

6.3.1. This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the lower sensors. The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, some features can be clearer in the respective gradient or total field datasets. Multiple greyscale images at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figure 12, 16, 20, 24, 28 & 32). XY trace plots visualise the magnitude and form of the geophysical response, aiding in anomaly interpretation.

6.3.2. Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historic maps, LiDAR data, and soil and geology maps. Google Earth (2020) was consulted as well, to compare the results with recent land usages.

6.3.3. Geodetic position of results - All vector and raster data have been projected into OSGB36 (ESPG27700) and can be provided upon request in ESRI Shapefile (.SHP) and Geotiff (.TIF) respectively. Figures are provided with raster and vector data projected against OS Open Data.

7. Results

7.1.Qualification

7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. MS actively seek feedback on their reports as well as reports of further work in order to constantly improve our knowledge and service.

7.2.Discussion

7.2.1. The geophysical results are presented in consideration with historic maps (Figure 11, 15, 19, 23, 27 & 31).

7.2.2. The fluxgate gradiometer survey has responded well to the environment of the survey area. The chalk geology, coupled with the thin soil has given rise to a relatively quiet magnetic background, against which more ephemeral features of archaeological, agricultural and natural anomalies related to the erosion properties of the chalk have been identified. Modern interference is limited to buried and overhead services and interference from roads and field boundaries.

7.2.3. Archaeological activity has been identified across the area. In the west of the survey area a double-ditched enclosure with further enclosures adjoining it to the northwest and southeast have been identified. Possible pit like anomalies have been identified within these enclosures, along with linear anomalies appearing to intersect the enclosures in the west. A possible double ditched trackway of an unknown archaeological origin has been identified in the east. Further possible archaeological activity has been identified in the south west of the survey area, in the form of linear and curvilinear anomalies. These enclosures may be related to the double ditched enclosures to the north, although given the weaker magnetic signal of these features it is difficult to be certain of their origins and use.

7.2.4. Agricultural activity has been detected across the survey area, mainly appearing as linear ploughing trends, and as well as instances repeated tractor movement, or tractor tracks. Anomalies have been detected reflecting changes of land usage such as former field boundaries. Further linear trends have been identified relating to drainage features.

7.2.5. Dissolution features corresponding with the calcareous bedrock have been identified across the survey area. Predominantly corresponding with areas of more acid-rich soil material, these features are likely as a result of chemical dissolution of the bedrock layer

from precipitation or possible flooding / waterlogging events within the survey area. The general shape and alignment of these anomalies is likely related to the topography within the survey area – suggesting this dissolution has occurred in relation to run-off on the downslope features. Historic mapping identifies former watercourses within close proximity to these features, at the time, bringing quantities of silty, muddy sediment, depositing it within the survey area (See section 4.1).

7.2.6. Modern activity is present in various areas of the site in the form a service running north to south in the northwest of the survey area, and wire fencing and overhead services and pylons in the northeast. In the west, a large area of possible agricultural burning/buried material has been identified.

7.3.Interpretation

7.3.1. General Statements

7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.

7.3.1.2. **Magnetic Disturbance** – The strong anomalies produced by extant metallic structures along the edges of the field have been classified as 'Magnetic Disturbance'. These magnetic 'haloes' will obscure the response of any weaker underlying features, should they be present, often over a greater footprint than the structure they are being caused by.

7.3.1.3. **Ferrous (Spike)** – Discrete ferrous-like, dipolar anomalies are likely to be the result of isolated modern metallic debris on or near the ground surface.

7.3.1.4. **Ferrous/Debris (Spread)** – A ferrous/debris spread refers to a concentrated deposition of discrete, dipolar ferrous anomalies and other highly magnetic material.

7.3.1.5. **Undetermined** – Anomalies are classified as Undetermined when the anomaly origin is ambiguous through the geophysical results and there is no supporting or correlative evidence to warrant a more certain classification. These anomalies are likely to be the result of geological, pedological or agricultural processes, although an archaeological origin cannot be entirely ruled out. Undetermined anomalies are generally not ferrous in nature.

7.3.2. Magnetic Results - Specific Anomalies

7.3.2.1. **Archaeology Probable/Possible (Strong and Weak)** – In the north-west of Area 4, a group of rectilinear magnetic anomalies [**4a**] have been identified (Figure 26). They exhibit a strong positive magnetic signal most explicit in gradient data (Figure 25). The main rectilinear anomaly measures c.70m by c.40m in length and width. Its longest axis is orientated on a northeast to southwest alignment. There are several small gaps in the magnetic signal of the anomalies on the northern and southern extents, indicating possible entranceways into the enclosure system. On the north eastern edge, another linear anomaly mirrors

the edge of the main rectangular anomaly, to create a double ditch. A 'D' shaped anomaly is recorded, either abutting or respecting the northwest linear of the main rectangular enclosure. This enclosure measures c.40m in width and c.23m in length. A larger but weaker rectilinear anomaly is adjoined to the south western edge of the main rectangular enclosure [**4a**]. This enclosure measures c.108m in length and c.54m in width. Its longest axis is orientated on a northwest to southeast alignment. Within these enclosures, weak and strong pit like anomalies have been recorded. Two weaker, linear anomalies run across the previously mentioned anomalies in a general southwest to northeast orientation. The largest measures c.145m in length, the smallest c.45m in length. This group of anomalies is characteristic of a double-ditched enclosure system with series of additional enclosures of undetermined date.

7.3.2.2. **Archaeology Probable (Weak)** – Along the southern border of Area 4, a small rectilinear anomaly [**4b**] has been identified. It exhibits a weak positive magnetic signal most explicit in gradient data (Figure 25). The anomaly measures c.25m in width and c.20m in length. The 'U' shaped anomaly is possibly incomplete, along its southern edge, being truncated by a modern field boundary. This anomaly is characteristic of an enclosure of an unknown date.

7.3.2.3. **Archaeology Possible (Weak)** – Along the southern border of Area 5, several weak, curvilinear anomalies [**5a**] have been identified (Figure 30). They exhibit a weak positive magnetic signal most explicit in gradient data (Figure 29). The anomalies vary in orientation, shape and size; the northernmost linear anomaly measures c.63m in length on a southwest to northeast orientation. Several smaller linear and curvilinear anomalies are present to the southeast of this linear anomaly, measuring c.30m in length. The full extent of these anomalies could potentially be masked by the slightly stronger natural background. The anomalies are of an unknown date.

7.3.2.4. **Archaeology Possible (Weak)** – A weak disarticulated linear anomaly [**3a**] runs across the southern half of Area 3 on a northeast to southwest orientation (Figure 19). It exhibits a weak positive magnetic signal most explicit in gradient data (Figure 18). The anomaly measures c.275m in length and c.8m in width and is characteristic of trackway of unknown date.

7.3.2.5. **Archaeology Possible (Weak)** – In the southern end of Area 2, two weak curvilinear anomalies [**2a**] have been identified (Figure 19). They exhibit a weak positive magnetic signal most explicit in gradient data (Figure 18). The two anomalies are aligned creating a semi-circular shape, separated by a gap of 15m. The northernmost anomaly measures c.18m in length; the southernmost measures c.28m in length. It is difficult to ascribe a certain interpretation to these anomalies without further evidence or information.

7.3.2.6. **Agricultural (Strong/Weak) –** In the north of Area 2, two parallel linear anomalies [**2d**] have been identified (Figure 11). They exhibit a weak negative magnetic signal most explicit in gradient data (Figure 9). The linear anomalies

are characteristic of a trackway and correlate with a trackway/path depicted on historic mapping (Figure 4). Further Strong and weak positive linear anomalies in Areas 1 and 2 are evident in the data and possibly represent unmapped field boundaries.

7.3.2.7. **Natural (Strong)** – In Area 2, two enhanced curvilinear anomalies [**2b**] have been identified (Figure 14). They exhibit an enhanced magnetic signal most explicit in gradient data (Figure 13). Each measures c.80m in length. These anomalies correlate with an old watercourse shown on 2nd Edition Ordnance Survey mapping and are thus likely indicative of infilled channels (Figure 15).

7.3.2.8. **Natural (Zone)** - Immediately to the northeast of anomalies [**2b**] in Areas 1 and 2, a natural zone has been identified (Figure 14). Corresponding with variations in topography within the survey area, these positively enhanced linear anomalies are a result of chemical dissolution of the limestone bedrock. The more linear nature of these anomalies indicates some degree of flow-based process. As water percolates through the upper acid rich soil layers (See 4.4) it forms a more acid solution. At the bedrock interface this acidic solution dissolves the calcium rich rock forming small channel like features.

7.3.2.9. **Ferrous Debris/Spread –** In the northern half of Area 5, a large, highly magnetic anomaly [**5b**] has been identified (Figure 30). It exhibits a strong dipolar signal most explicit in greyscale data (Figure 29). The anomaly is broadly oval in shape and measures c.90m in length and c.30m in width. This type of anomaly is characteristic of burning or buried material, as evidenced in the strong magnetic signal produced in the XY's (Figure 32).

7.3.2.10. **Undetermined (Weak) –** In the southern half of Area 2, a linear anomaly [**2c**] has been identified (Figure 14). It exhibits a weak positive, continuous signal most explicit in greyscale data (Figure 13). The anomaly measures c.200m in length. The origins of this anomaly are uncertain: it may relate to the former river channel, the possible archaeology in the south [**2a**] or an unmapped field boundary.

8. Conclusions

8.1. A fluxgate gradiometer survey has successfully been undertaken across the survey area. The geophysical survey has detected a range of different types of anomalies of archaeological, natural, agricultural, undetermined and modern origin. The underlying chalk geology and Quaternary superficial deposits have contributed to a strong enhancement of the magnetic background. Modern interference is limited to interference from buried and overhead services, field boundaries and roads. An instance of possible burning/ burial of material is noted within the survey area.

8.2. Archaeological activity has mostly been identified in the west of the survey area, concentrated around two linear features of possible archaeological origin, of age and provenance unknown. A rectilinear and D-shaped enclosure have been detected identifying a degree of overlap either side of a central double ditched enclosure. The slight overlap of these anomalies may indicate

multiphase activity. Pit-like anomalies have also been detected; these appear to be in concentrated clusters mostly within one of the enclosures. An isolated enclosure detected near the southern boundary of the survey area shares a similar form to those in the west; however, no associated trackways or other nearby enclosures have been identified, making relationship difficult to ascertain.

8.3. The survey area has been impacted by natural variations related to surface relief and characteristic irregular erosional processes related to the chalk bedrock. However, overall, the magnetic enhancement of the survey area is relatively quiet which has aided the interpretation of weaker, more ephemeral features of archaeological and agricultural origin. Agricultural activity has been detected across the survey area in form of a trackway/path, unmapped former field boundaries and ploughing regimes.

9. Archiving

9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and un-georeferenced images, XY traces and a copy of the final report.

9.2. MS contributes reports to the ADS Grey Literature Library upon permission from the client, subject to the any dictated time embargoes.

10. Copyright

10.1. Copyright and the intellectual property pertaining to all reports, figures, and datasets produced by Magnitude Services Ltd. is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

11. References

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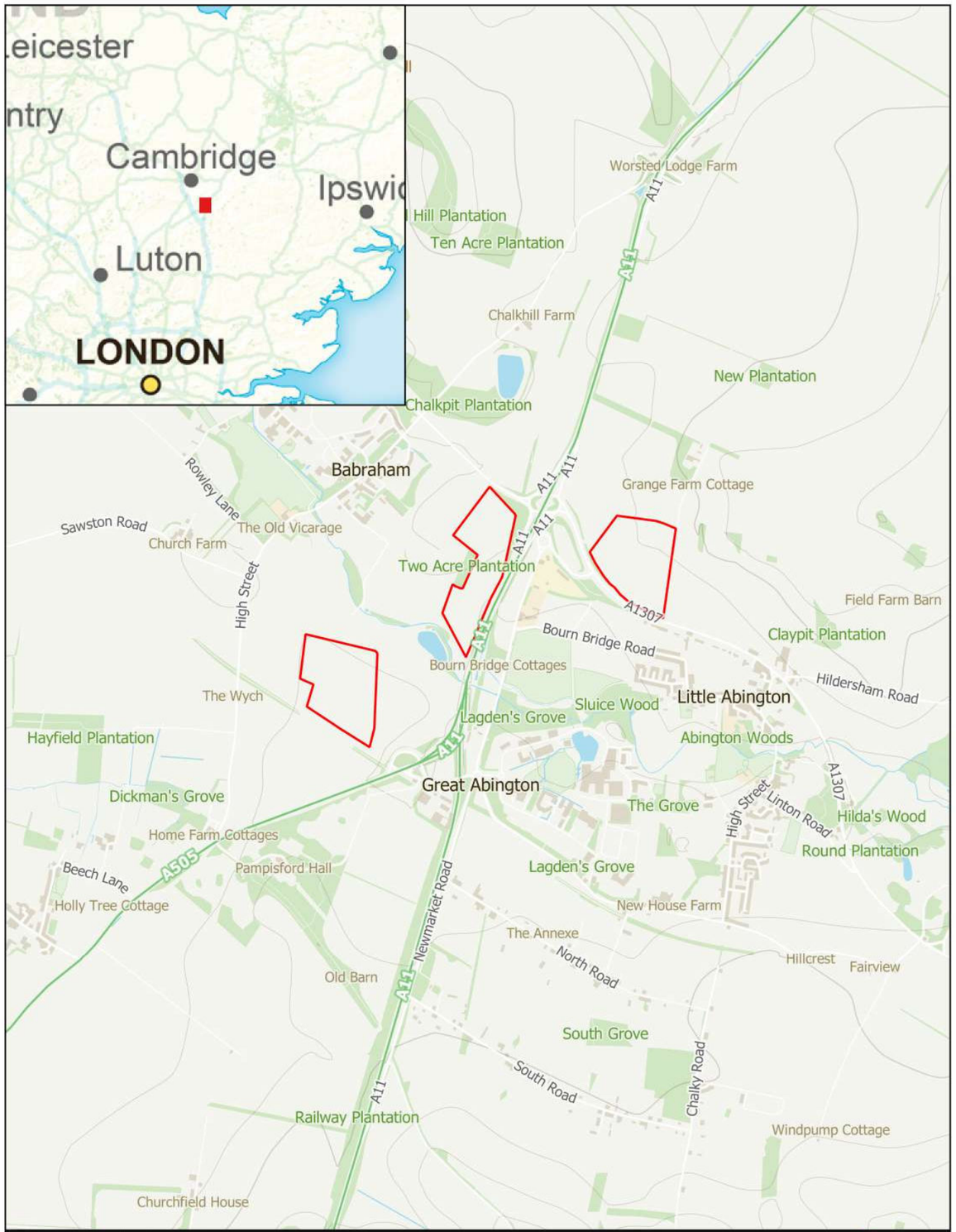
12. Project Metadata

MS Job Code	MSTL645
Project Name	Cambridge South East, Phase 2 Stage 2
Client	Cambridge Archaeological Unit
Grid Reference	TL 5193 4973
Survey Techniques	Magnetometry
Survey Size (ha)	43.7ha (Magnetometry)
Survey Dates	2020-13-09 to 2020-03-20
Project Manager	Finnegan Pope-Carter BSc (Hons) MSc FGS
Project Officer	Freddie Salmon BSc FGS ACIfA
HER Event No	N/A
OASIS No	N/A
S42 Licence No	N/A
Report Version	0.3

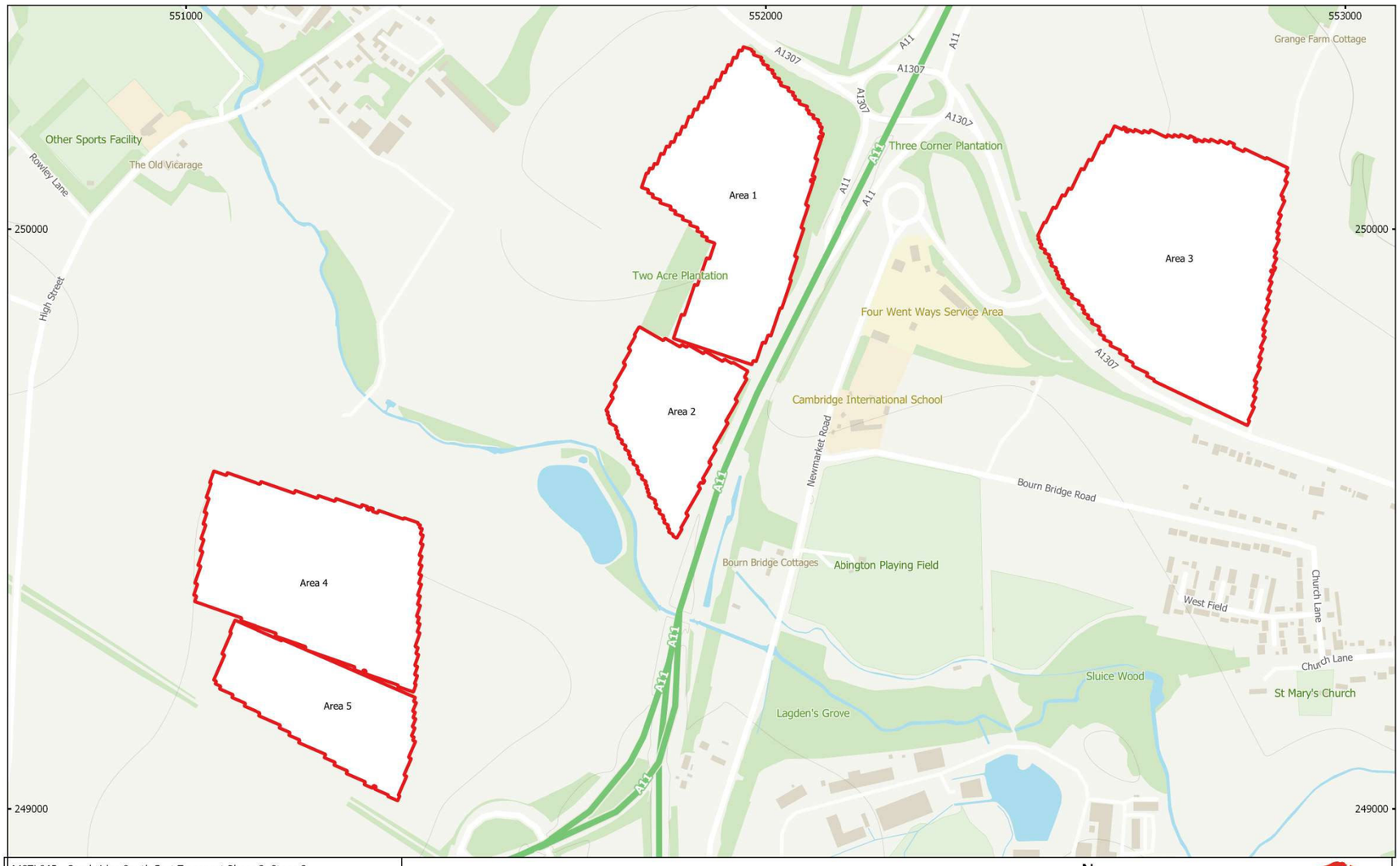
13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Officer to Review	JD PT	FS	25 March 2020
0.2	Initial Draft for Project Manager to Review	AV	FPC	30 March 2020
0.3	First Draft	N/A	FPC	31 March 2020



MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 1 - Site Location
1:25,000 @ A4

Site Boundary
N
0 0.5 1 km
magnitude surveys



MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 2 - Location of Survey Areas
1:6,000 @ A3

Survey Extents

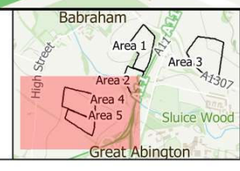
N

0 100 200 300 m

magnitude surveys

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 3 - Magnetic Gradient (West)
1:3,500 @ A3

-1 nT 2



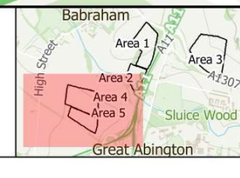
N

0 50 100 150 m

magnitude surveys

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 4 - Magnetic Total Field (Lower Sensor) (West)
1:3,500 @ A3

48,997 nT 49,005

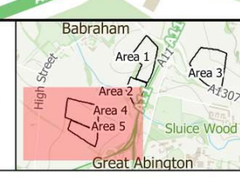


N
0 50 100 150 m

magnitude surveys

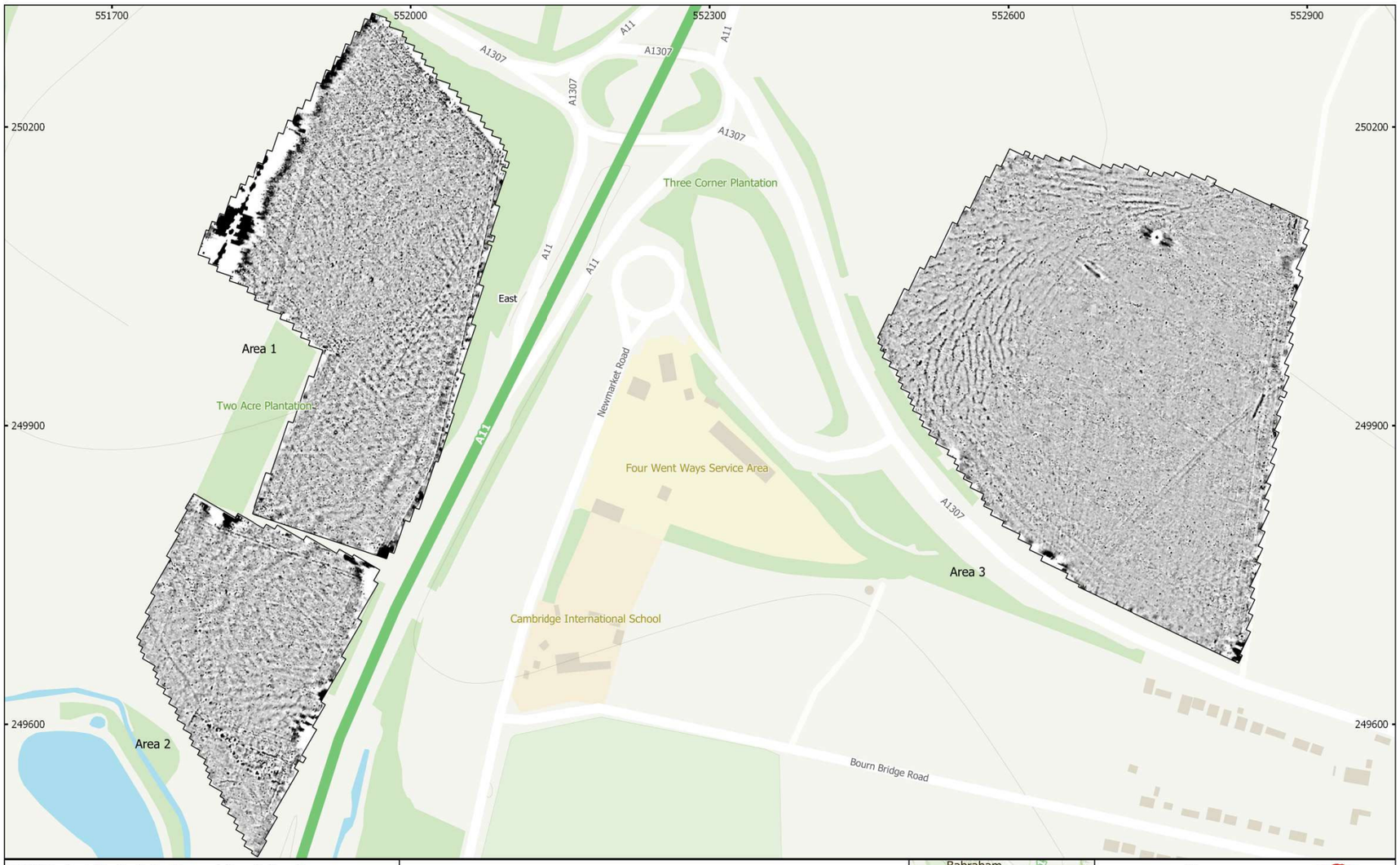
MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 5 - Magnetic Interpretation (West)
1:3,500 @ A3

- Archaeology Probable (Strong)
- Archaeology Probable (Weak)
- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Strong)
- Agricultural (Weak)
- Undetermined (Strong)
- Undetermined (Weak)
- Natural (Strong)
- Natural (Weak)
- Natural Zone
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Agricultural (Trend)
- Ferrous (Spike)



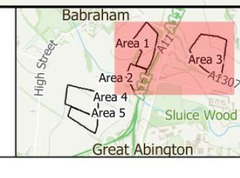
N
0 50 100 150 m

magnitude surveys



MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 6 - Magnetic Gradient (East)
1:3,500 @ A3

-1 nT 2



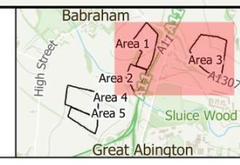
N

0 50 100 150 m

magnitude surveys

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 7 - Magnetic Total Field (Lower Sensor) (East)
1:3,500 @ A3

48,997 nT 49,005



N

0 50 100 150 m

magnitude surveys

551700 552000 552300 552600 552900

250200 249900 249600

A1307 A11 A1307 A11 A1307 A1307 A11 A11 A11

Three Corner Plantation

East

Area 1

Two Acre Plantation

Newmarket Road

A11

Four Went Ways Service Area

A1307

Area 3

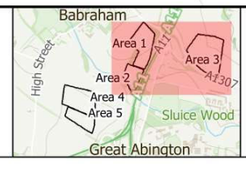
Cambridge International School

Area 2

Bourn Bridge Road

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 8 - Magnetic Interpretation (East)
1:3,500 @ A3

- Archaeology Possible (Weak)
- Agricultural (Strong)
- Agricultural (Weak)
- Undetermined (Strong)
- Undetermined (Weak)
- Natural (Strong)
- Natural (Weak)
- Natural Zone
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Agricultural (Trend)
- Undetermined (Trend)
- Natural (Trend)
- Service
- Ferrous (Spike)



N

0 50 100 150 m

magnitude surveys

249800 250000 250200

Area 1

Two Acre Plantation

552000

A11

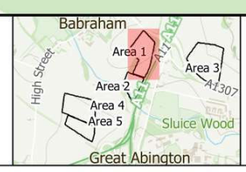
A11 A11

Newmarket Road

A1307 A1307

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 9 - Magnetic Gradient (Area 1)
1:1,500 @ A3

-1 nT 2



N

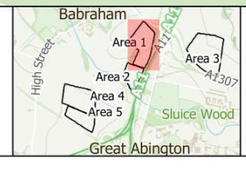
0 20 40 60 m

magnitude surveys

249800
250000
250200
552000
552000
Area 1
Two Acre Plantation
2d
A11
A11
A11
A1307
A1307
Newmarket Road

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 10 - Magnetic Interpretation (Area 1)
1:1,500 @ A3

Agricultural (Strong)
Agricultural (Weak)
Undetermined (Weak)
Natural (Weak)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Service
Ferrous (Spike)

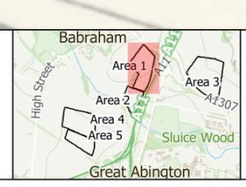


N
0 20 40 60 m
magnitude surveys

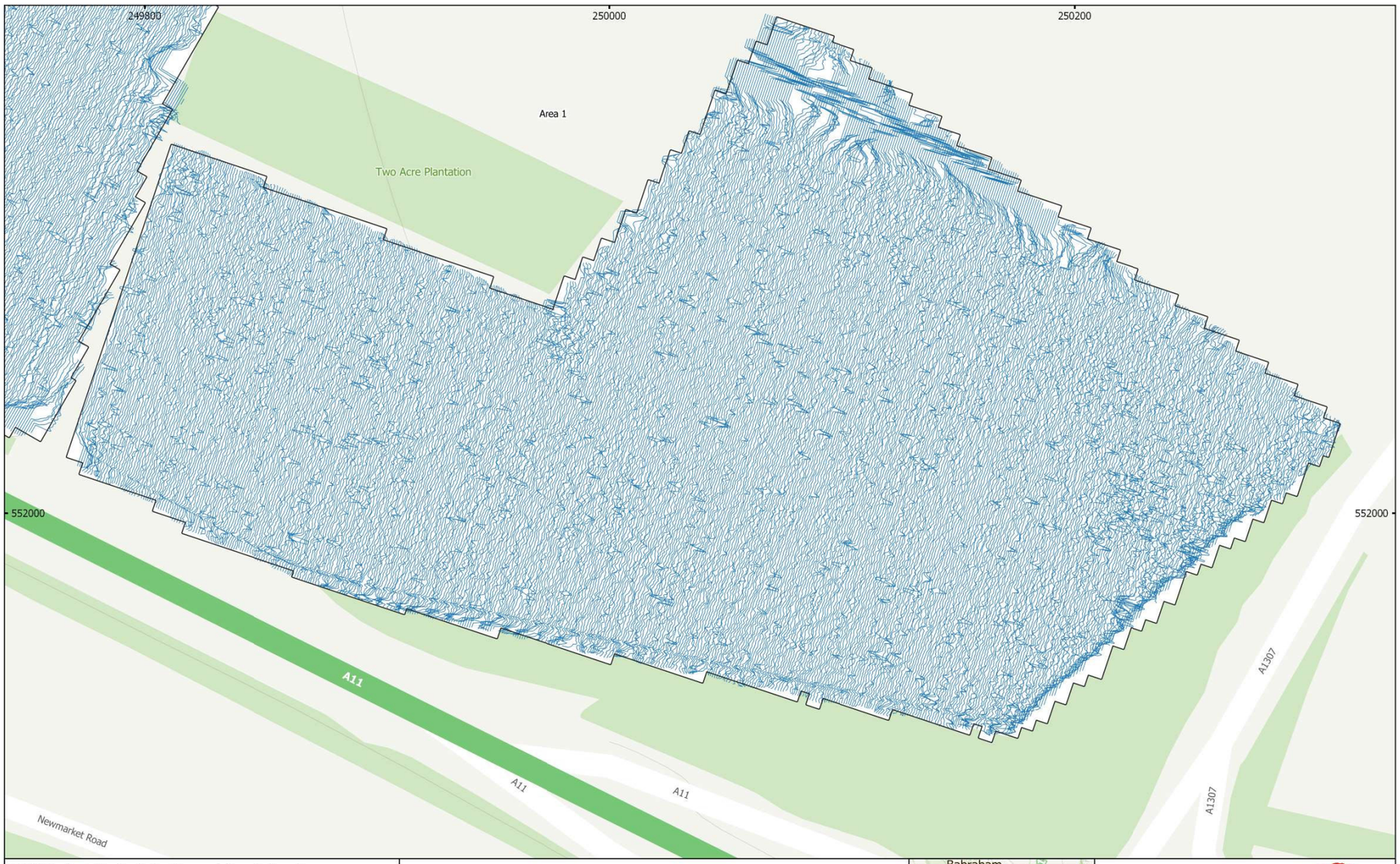
249800
250000
250200
552000
552000
Area 1
2d

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 11 - Magnetic Interpretation Over Historic Mapping (Area 1)
1:1,500 @ A3

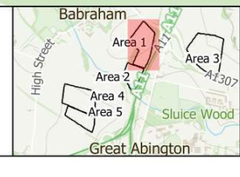
Agricultural (Strong)
Agricultural (Weak)
Undetermined (Weak)
Natural (Weak)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Service
Ferrous (Spike)

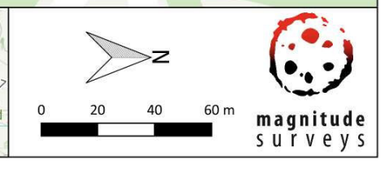


N
0 20 40 60 m
magnitude surveys

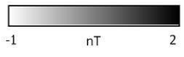


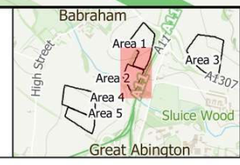
MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 12 - XY Trace Plot (Area 1)
30nT/cm at 1:1,500 @ A3

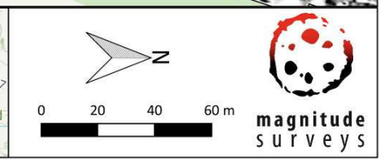




MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 13 - Magnetic Gradient (Area 2)
1:1,500 @ A3



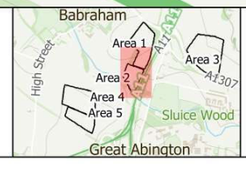




249600
249800
250000
552000
552000
Area 2
Area 1
2a
2b
2c
2b
2d
Two Acre Plantation
A11
Newmarket Road

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 14 - Magnetic Interpretation (Area 2)
1:1,500 @ A3

Archaeology Possible (Weak)
Agricultural (Strong)
Agricultural (Weak)
Undetermined (Strong)
Undetermined (Weak)
Natural (Strong)
Natural (Weak)
Natural Zone
Magnetic Disturbance
Agricultural (Trend)
Ferrous (Spike)



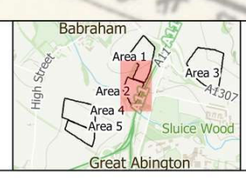
N
0 20 40 60 m

magnitude surveys

249600
249800
250000
552000
552000
Area 2
Area 1
2a
2b
2c
2b
2d
Two Acre Plantation
A11
Newmarket Road

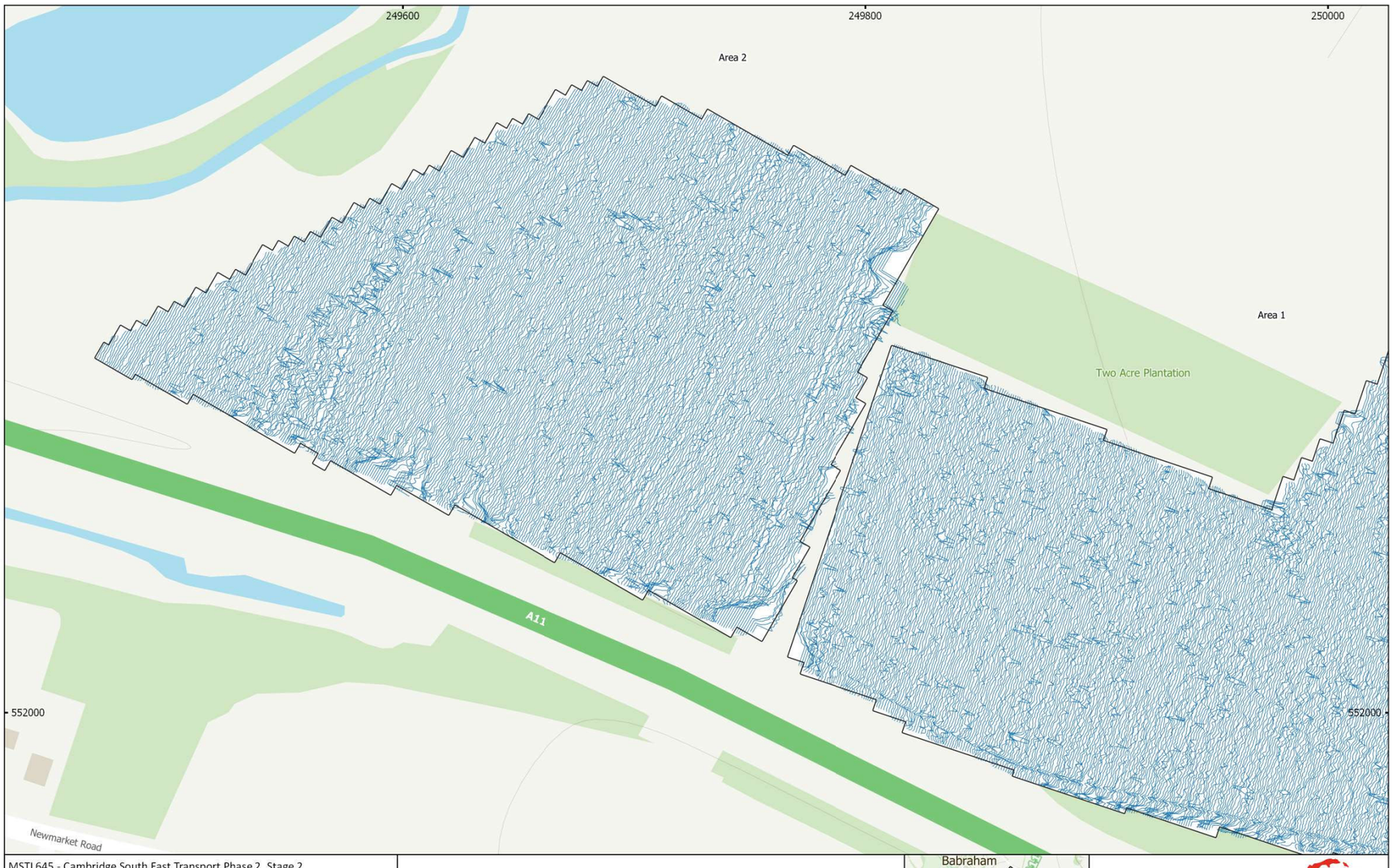
MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 15 - Magnetic Interpretation Over Historic Mapping (Area 2)
1:1,500 @ A3

Archaeology Possible (Weak)
Agricultural (Strong)
Agricultural (Weak)
Undetermined (Strong)
Undetermined (Weak)
Natural (Strong)
Natural (Weak)
Natural Zone
Magnetic Disturbance
Agricultural (Trend)
Ferrous (Spike)

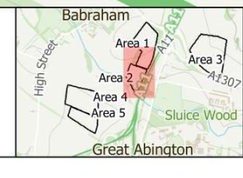


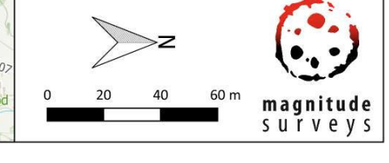
N
0 20 40 60 m

magnitude surveys

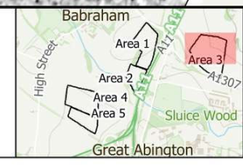


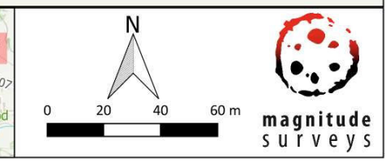
MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 16 - XY Trace Plot (Area 2)
30nT/cm at 1:1,500 @ A3





MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 17 - Magnetic Gradient (Area 3 - North)
1:1,500 @ A3





552500

553000

Area 3

250000

250000

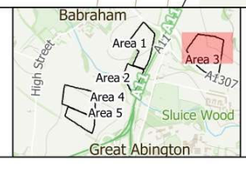
A1307

Newmarket Road

3a

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 18 - Magnetic Interpretation (Area 3 - North)
1:1,500 @ A3

Archaeology Possible (Weak)
Undetermined (Strong)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Undetermined (Trend)
Natural (Trend)
Ferrous (Spike)



N

0 20 40 60 m

magnitude surveys

552500

553000

Area 3

Old Chalk Pit

FP

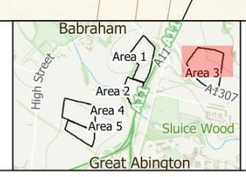
250000

250000

3a

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 19 - Magnetic Interpretation Over Historic Mapping (Area 3 - North)
1:1,500 @ A3

Archaeology Possible (Weak)
Undetermined (Strong)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Undetermined (Trend)
Natural (Trend)
Ferrous (Spike)



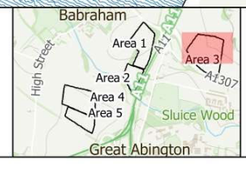
N

0 20 40 60 m

magnitude surveys

552500
553000
Area 3
250000
250000
A1307
Newmarket Road

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 20 - XY Trace Plot (Area 3 - North)
30nT/cm at 1:1,500 @ A3



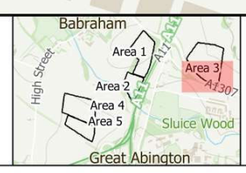
N
0 20 40 60 m

magnitude surveys

552500
553000
Newmarket Road
249800
249800
Area 3
A1307
249600
249600

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 21 - Magnetic Gradient (Area 3 - South)
1:1,500 @ A3

-1 nT 2



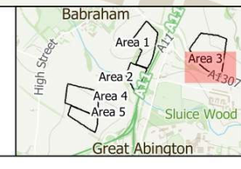
N
0 20 40 60 m

magnitude surveys

552500
553000
249800
249600
Newmarket Road
3a
Area 3
A1307

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 22 - Magnetic Interpretation (Area 3 - South)
1:1,500 @ A3

Archaeology Possible (Weak)
Undetermined (Strong)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Ferrous (Spike)



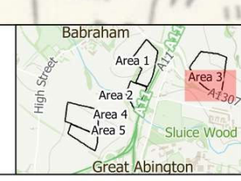
N
0 20 40 60 m

magnitude surveys

552500
553000
249800
249600
3a
Area 3
104
101
110
B. M. 115·6

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 23 - Magnetic Interpretation Over Historic Mapping (Area 3 - South)
1:1,500 @ A3

Archaeology Possible (Weak)
Undetermined (Strong)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Ferrous (Spike)

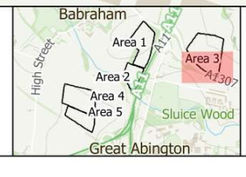


N
0 20 40 60 m

magnitude surveys

552500
553000
Newmarket Road
249800
249800
Area 3
A1307
249600
249600

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 24 - XY Trace Plot (Area 3 - South)
30nT/cm at 1:1,500 @ A3



N
0 20 40 60 m

magnitude surveys

551000
551500
249600
249600
249400
249400
Area 4
Area 5

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 25 - Magnetic Gradient (Area 4)
1:1,500 @ A3

-1 nT 2

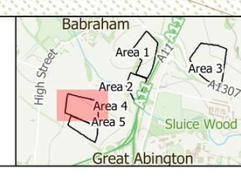
N
0 20 40 60 m

magnitude surveys

551000
551500
249600
249400
4a
4b
Area 4
Area 5

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 26 - Magnetic Interpretation (Area 4)
1:1,500 @ A3

Archaeology Probable (Strong)
Archaeology Probable (Weak)
Archaeology Possible (Strong)
Archaeology Possible (Weak)
Undetermined (Weak)
Natural (Strong)
Natural (Weak)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Ferrous (Spike)



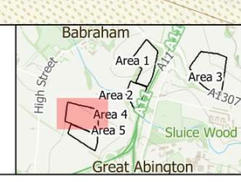
N
0 20 40 60 m

magnitude surveys

551000
551500
249600
249400
4a
4b
Area 4
Area 5

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 27 - Magnetic Interpretation Over Historic Mapping (Area 4)
1:1,500 @ A3

Archaeology Probable (Strong)
Archaeology Probable (Weak)
Archaeology Possible (Strong)
Archaeology Possible (Weak)
Undetermined (Weak)
Natural (Strong)
Natural (Weak)
Natural Zone
Magnetic Disturbance
Ferrous/Debris (Spread)
Agricultural (Trend)
Ferrous (Spike)

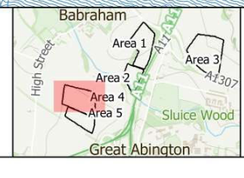


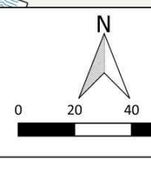
N
0 20 40 60 m

magnitude surveys

551000
551500
249600
249400
Area 4
Area 5

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 28 - XY Trace Plot (Area 4)
30nT/cm at 1:1,500 @ A3

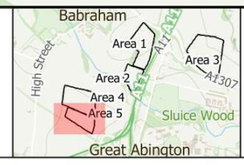


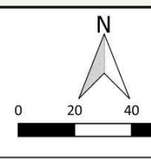


magnitude surveys

551000
551500
249200
Area 5

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 29 - Magnetic Gradient (Area 5)
1:1,500 @ A3





magnitude surveys

551000

551500

Area 5

4b

5b

249200

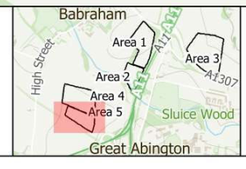
249200

5a

5a

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 30 - Magnetic Interpretation (Area 5)
1:1,500 @ A3

- Archaeology Probable (Weak)
- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Undetermined (Weak)
- Natural (Strong)
- Natural (Weak)
- Natural Zone
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Agricultural (Trend)
- Ferrous (Spike)



N

0 20 40 60 m

magnitude surveys

551000

551500

Area 5

4b

5b

249200

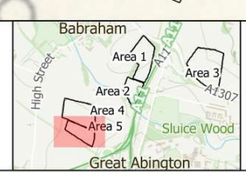
249200

5a

5a

MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 31 - Magnetic Interpretation Over Historic Mapping (Area 5)
1:1,500 @ A3

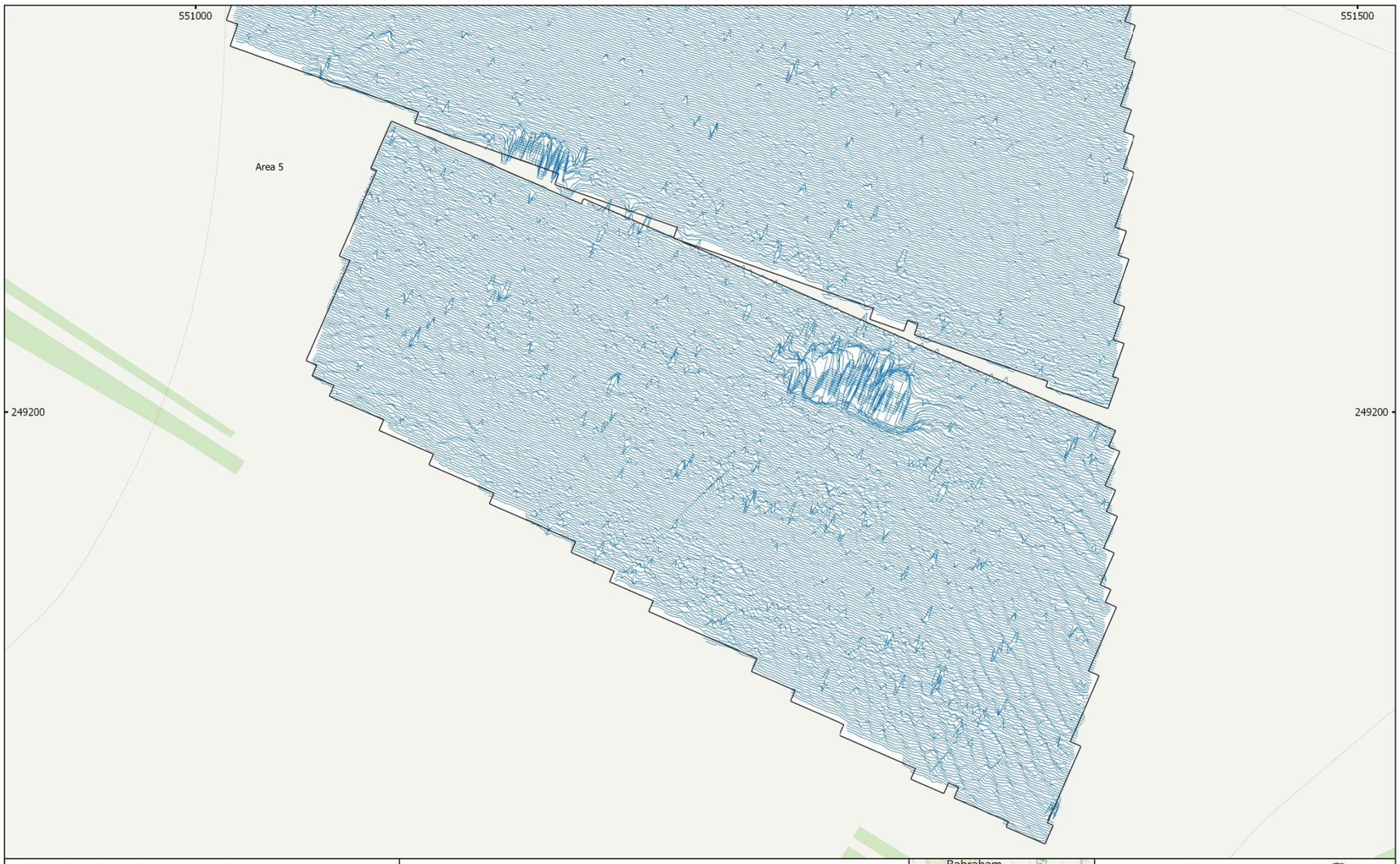
- Archaeology Probable (Weak)
- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Undetermined (Weak)
- Natural (Strong)
- Natural (Weak)
- Natural Zone
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Agricultural (Trend)
- Ferrous (Spike)



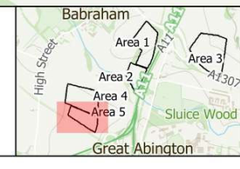
N

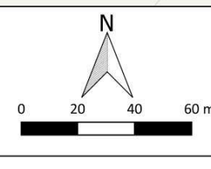
0 20 40 60 m

magnitude surveys



MSTL645 - Cambridge South East Transport Phase 2, Stage 2
Figure 32 - XY Trace Plot (Area 5)
30nT/cm at 1:1,500 @ A3





magnitude surveys