

GEOPHYSICAL SURVEY REPORT

Loddon Garden Village, Arborfield, Berkshire

Client

RPS

Survey Report

22424

OASIS Ref. No.

Sumogeop1-533757

Date

18 June 2025



Survey Report 22424: Loddon Garden Village, Arborfield, Berkshire

Survey dates	02 - 09 June 2025
Field co-ordinator	Craig Wakefield MSc Liam Brice-Bateman BA
Field Team	Gabriel Mazeski BA Max Moran BA (Hons) Stephen Weston BA
Report Date	18 June 2025
CAD Illustrations	Rebecca Fradgley BSc (Hons) ACIfA
Report Author	Rebecca Fradgley BSc (Hons) ACIfA
Project Manager	Rebecca Fradgley BSc (Hons) ACIfA
Report approved	Dr John Gater BSc DSc(Hon) MCIfA FSA

SUMO GeoSurveys
Suite1
Deer Park Business Centre
Woollas Hill
Eckington
Pershore
Worcestershire
WR10 3DN
T: 01684 592266
www.sumoservices.com
geophysics@sumoservices.com

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Appendix D	Data Management Plan & Archive Selection Strategy

3 SURVEY TECHNIQUE

- 3.1 Detailed magnetic survey (magnetometry) was chosen as the most efficient and effective method of locating the type of archaeological anomalies which might be expected at this site.

All survey techniques followed the guidance set out by ClfA (2020) and the European Archaeology Council (EAC) (2016).

Bartington Grad 601-2
Bartington Cart System

Traverse Interval 1.0m
Traverse Interval 1.0m

Sample Interval 0.25m
Sample Interval 0.125m

The only processes performed on data are the following unless specifically stated otherwise:

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes instrument striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

4 EXECUTIVE SUMMARY OF RESULTS

- 4.1 A detailed magnetometer survey was conducted over approximately 14 hectares of land covering a linear road scheme at Arborfield, Berkshire. It has identified one feature of definite archaeological interest; a ring ditch which can be corroborated with a known cropmark feature (MWK1127). Additional ditch-like anomalies, linear trends and discrete anomalies of possible archaeological interest have also been detected. Several other linear, curvilinear and discrete anomalies have an uncertain origin; they could be archaeological, given the proximity of cropmark features recorded in the area or be a result of agricultural and natural processes. Modern ploughing effects, land drains and a former pond have been mapped in the results, along with underground services, areas of natural magnetic variation and modern ferrous disturbance

5 INTRODUCTION

- 5.1 **SUMO GeoSurveys** was commissioned to undertake a geophysical survey of an area outlined for the construction of a spine road associated with a new garden village. This survey forms part of an archaeological investigation being undertaken by **RPS**.

5.2 Site Details

NGR / Postcode	SU 75788 68596 / RG2 9JD
Location	The survey area comprises a linear scheme which is to the south of Reading, and immediately north of Arborfield, Berkshire. It is bounded by the B3270 to the north, Mill Lane to the east, Mole Road to the south-east, the A327 / Arborfield Road to the south-west, and the Eastern Relief Road to the east. The M4 crosses the north of the study site, and the River Loddon crosses the site from south-west to north-east.
HER	Berkshire HER
OASIS Ref. No.	Sumogeop1-533757
District	Wokingham
Parish	Arborfield and Newland
Topography	Undulating
Land Use	Arable / Pasture
Geology (BGS 2025)	Bedrock: London Clay Formation - clay, silt and sand. Superficial: Brickearth - clay, silt and sand; River Terrace Deposits, 2 - sand and gravel; Alluvium - clay, silt, sand and gravel; River Terrace Deposits, 3 - sand and gravel.
Soils (CU 2025)	Soilscape 22: loamy soils with naturally high groundwater; Soilscape 20: loamy and clayey floodplain soils with naturally high groundwater.
Survey Methods	Magnetometer survey (fluxgate gradiometer)
Study Area	c. 22ha - approximately 14ha was surveyed in total, with several areas being unsuitable for survey due to crop, livestock, vegetation and construction work (detailed below): Areas 2, 3, 6 and 10 - crop; Area 13 - livestock (cattle); Area 15 - copse / wooded; Areas 18 and 19 - heavily overgrown; Areas 22 and 23 - under construction; Areas 24 and 25 - livestock (horses)

5.3 **Archaeological Background** (RPS 2022)

- 5.3.1 An archaeological desk-based assessment for the survey corridor and wider area identifies a number of archaeological finds and features within the survey area and its immediate environs. Within the northeastern part of the survey corridor (Area 16), cropmarks identified as a possible late Neolithic to early Bronze Age ring ditch (MWK1127) are recorded, close to a linear feature of unknown date (MWK1128). A denticulate flint (MWK15141) and flint flake (MWK15142) were also recovered close to the location of the ring ditch. Slightly to the south (within Area 14) two irregular, and dubious, ring ditches are visible as cropmarks (MWK1155), with further flint finds recorded during fieldwalking to the south of Loader Copse (MWK6758, MWK15183 and MWK15144) to the north of Parkcorner Lane. A medieval pottery sherd (MWK1123) was also recovered during the fieldwalking at Parkcorner Lane.
- 5.3.2 A number of cropmarks were identified on historic aerial photographs to the north-east of Cedar Hall Farm (within close proximity of Areas 11 and 12). They include enclosures (MWK1145, MWK1147), a field system (MWK1146), a trackway (MWK1148), and a pit cluster (MWK1149); geological factors make it difficult to ascertain a date for the features.
- 5.3.3 To the south-east of Cedar Hall Farm, between c. 70m and 120m northwest of Area 7, two rectangular enclosures, including one with double ditches, are identified as cropmarks (MWK1134). Other cropmarks in the same field include enclosures (MWK1151, MWK1143, MWK1144) a field system (MWK1142), which along with a number of pits are thought to represent an area of settlement (MWK1141). Cropmarks of a square enclosure and numerous fragmented ditches (MRM18429) and a complex of intersecting ditches (MWK1139) were also identified from aerial photography.
- 5.3.4 Cropmarks of a trackway leading to a rectangular enclosure with internal features (MWK1138), scattered cropmark pits (MWK1140), and a field system (MWK1136), were identified in aerial photography within the survey corridor in Area 4 and immediately to its north. They are considered indicative of another possible area of settlement (MWK1135) to the south-east of Hall Farm, with possible Medieval and post-Medieval phases (1594228).

5.4 **Aims and Objectives**

- 5.4.1 To locate and characterise any anomalies of possible archaeological interest within the study area.

6 **RESULTS**

- 6.1 *The survey has been divided into twenty-five survey areas (Areas 1-25) and specific anomalies have been given numerical labels [1] [2] which appear in the text below, as well as on the Interpretation Figure(s).*

6.2 **Known (corroborated) Archaeology** (Area 16 - Figs.15-17)

- 6.2.1 A circular anomaly [1], approximately 22m in diameter, has been detected within the survey corridor in Area 16. It corresponds with the recorded location of a cropmark interpreted as being a possible late Neolithic to Early Bronze Age ring ditch (MWK1127) (see Plate 1, below). A couple of linear and discrete responses adjoining the ring ditch could have a possible archaeological origin or could simply be a result of agricultural processes.



Plate 1: Circular cropmark feature (circled) visible on 2018 aerial imagery (©2025 Google Earth)

6.3 **Possible Archaeology**

- 6.3.1 A number of linear, ditch-like responses and trends [2] plus a cluster of discrete anomalies [3] have been detected in Area 4 (Figs. 06-08) which have been assigned to the category of *Possible Archaeology*. The responses lie within immediate proximity of a cropmark field system (MWK1136) which is thought to represent an area of medieval or post-medieval settlement; it is possible that the response are also associated, however the limitations of the narrow survey corridor make further interpretation difficult. The moderate-strength discrete anomalies [3] could be indicative of having a burnt or fired origin, perhaps suggestive of ovens or kilns; however deeply buried iron objects may result in a similar magnetic response.

6.4 **Uncertain**

- 6.4.1 A large number of linear and curvilinear trends have been identified across the survey corridor, with clusters of discrete anomalies and areas of enhancement in Areas 4, 8, 16 and 17. They have all been assigned to the category of *Uncertain* as the responses generally lack the defined morphology of anomalies that would usually be interpreted as being of archaeological interest. Many of the responses lie in close proximity to cropmark features recorded on the HER, suggesting that a possible archaeological explanation cannot be entirely ruled out; however, they could equally be a result of a combination of natural or agricultural processes. It is noted that the responses at [4] in Area 8 (Figs. 09-11) could indicate a series of pits or other features and that they form an apparent sub-circular feature, while a further cluster of discrete anomalies [5] in Area 16 (Figs. 15-17) could also represent pit-like anomalies, although their exact origin remains unclear.

6.5 **Agricultural – Ploughing / Land Drains**

- 6.5.1 Two straight linear anomalies comprising positive and negative components have been detected on an approximate northeast-southwest alignment in Area 4. They are typical of responses associated with modern land drains.
- 6.5.2 Magnetically weak, closely spaced, parallel linear trends have been identified in Areas 5, 7, 14, 16 and 21 and they are a result of modern ploughing effects.

6.6 **Natural / Geological / Pedological**

- 6.6.1 Sinuous bands of slightly enhanced magnetic response can be seen across Areas 1 and 14. They are likely to have a natural explanation and reflect localised variations in the underlying geology or superficial deposits.

6.7 **Service**

- 6.7.1 Strong dipolar linear anomalies have been detected in Areas 5 and 20 which are typical of responses associated with underground services, such as pipes or cables.

6.8 **Ferrous / Magnetic Disturbance / Former Pond**

- 6.8.1 A discrete zone of strong magnetic disturbance [6] is visible at the east of Area 14 (Figs. 15-17). It corresponds with the location of a former pond that can be seen on historic Ordnance Survey mapping (Fig. 21).
- 6.8.2 Ferrous responses close to boundaries are due to adjacent fences and gates, while an area of magnetic disturbance in the east of Area 20 (Figs. 18-20) could reflect an area of consolidation or made ground. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick / tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretation diagram.

7 **DATA APPRAISAL & CONFIDENCE ASSESSMENT**

- 7.1 Historic England Table 4 (EH 2008) states that the typical magnetic response on the local soils / geology is generally poor. The results from this survey indicate the presence of a ring ditch, corroborated with a cropmark, along with other ditch-like anomalies of possible archaeological and uncertain origin. Consequently, there is no *a priori* reason why archaeological features would not have been detected, though the narrow survey corridor does hinder interpretation of some responses.

8 **CONCLUSION**

- 8.1 The magnetometer survey at Arborfield has identified a single feature of definite archaeological interest; a ring ditch measuring some 22m in diameter which can be corroborated with a cropmark feature (MWK1127). Additional ditch-like anomalies, linear trends and discrete anomalies of possible archaeological interest have also been detected. These lie in the vicinity of a cropmark field system (MWK1136); however, the limited survey corridor makes further interpretation difficult. A large number of linear, curvilinear and discrete anomalies have an uncertain origin. It is possible that some may have an archaeological explanation, given the proximity of cropmark features including enclosures, ditches and pits, though an agricultural or natural origin is equally feasible. Modern ploughing effects, land drains and a former pond have been mapped in the results, along with underground services, areas of natural magnetic variation and modern ferrous disturbance.

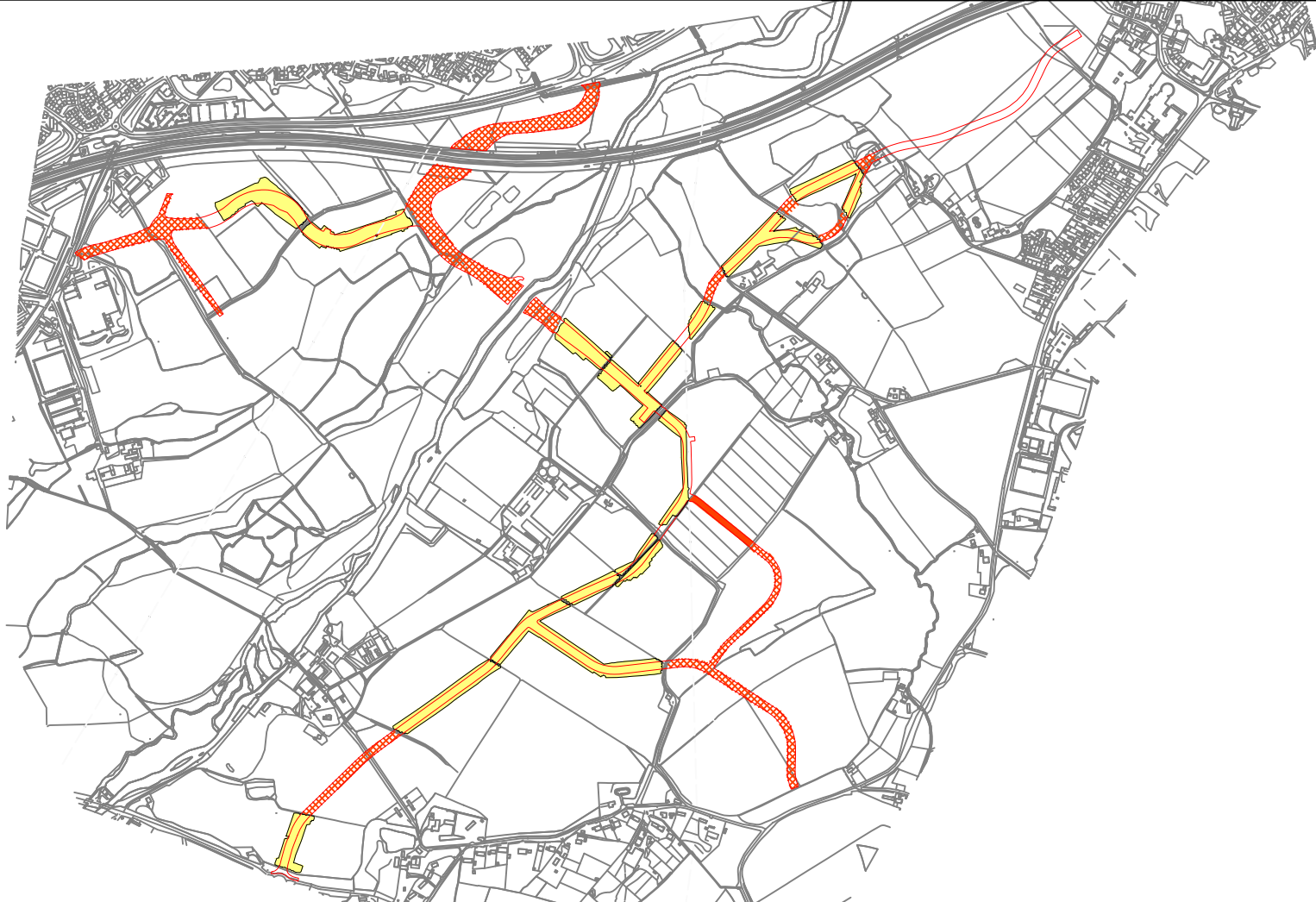
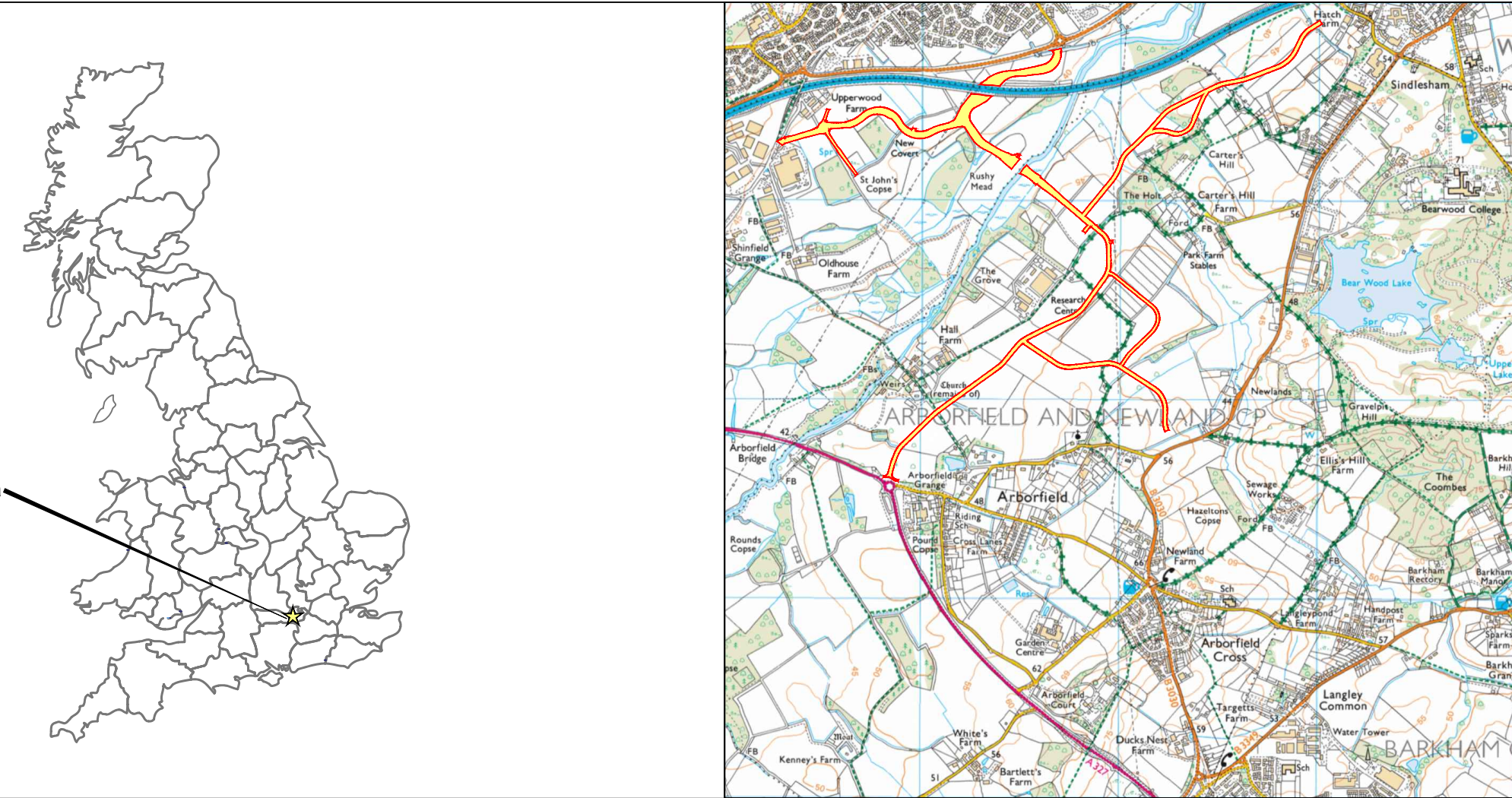
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- ClfA 2020 *Standard and Guidance for Archaeological Geophysical Survey*. 2014 amended 2020. ClfA Guidance note. Chartered Institute for Archaeologists, Reading
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- CU 2025 *The Soils Guide*. www.landis.org.uk. Cranfield University, UK. website:
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- EAC 2016 *EAC Guidelines for the Use of Geophysics in Archaeology*, European Archaeological Council, Guidelines 2.
- EH 2008 *Geophysical Survey in Archaeological Field Evaluation*. English Heritage, Swindon
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unpublished report. Report No. JAC28072

10 ARCHIVE

- 10.1 The minimally processed data, data images, XY traces and a copy of this report are stored in **SUMO GeoSurveys'** digital archive, on an internal RAID configured NAS drive in the Midlands Office. These data are also backed up to the Cloud for off-site storage.
- 10.2 The Grey Literature will be archived with OASIS and the relevant HER within a period of 12 months.

Survey Area

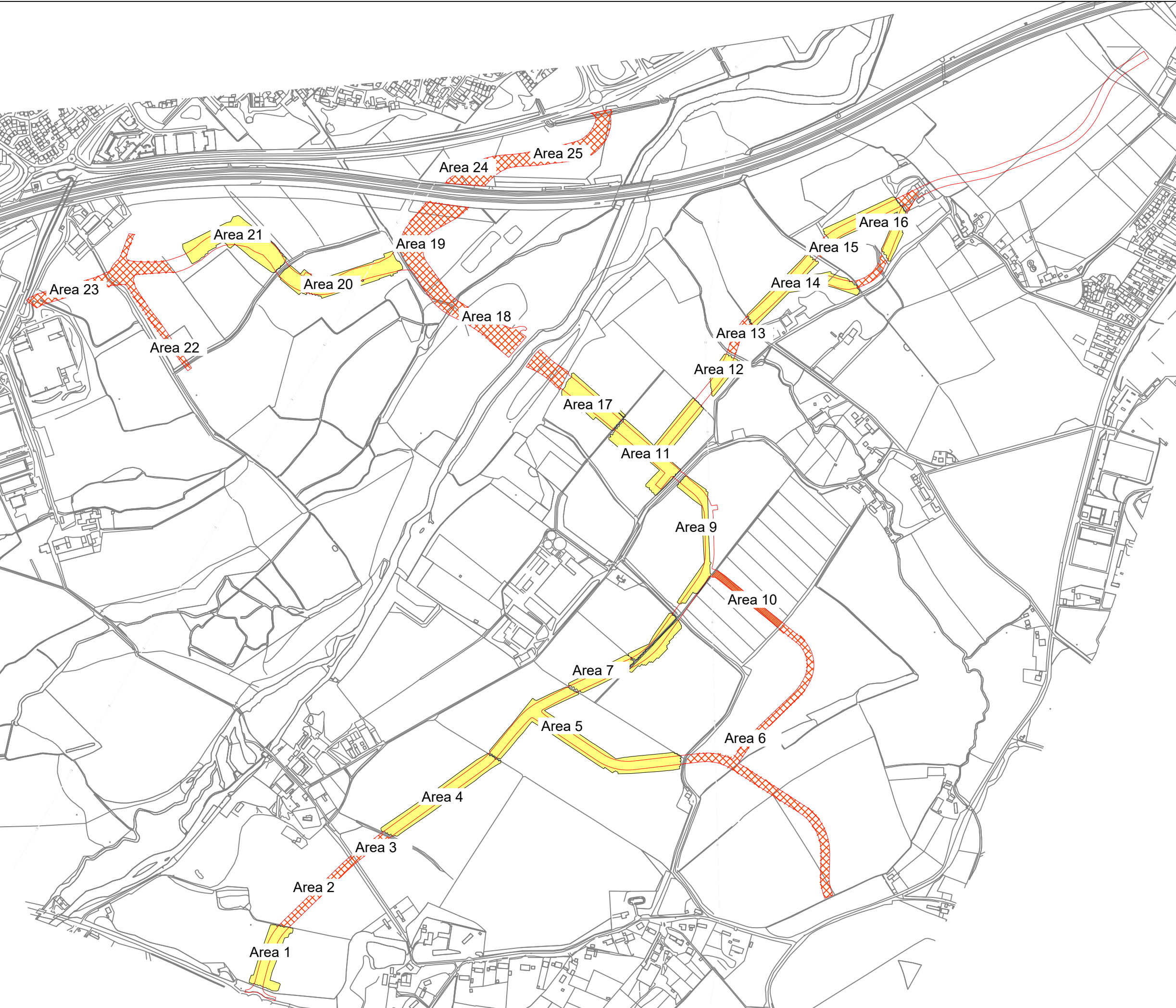


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	Survey Areas
	Unsurveyable



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Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
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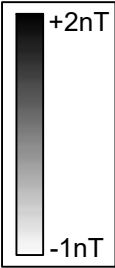


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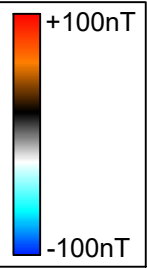
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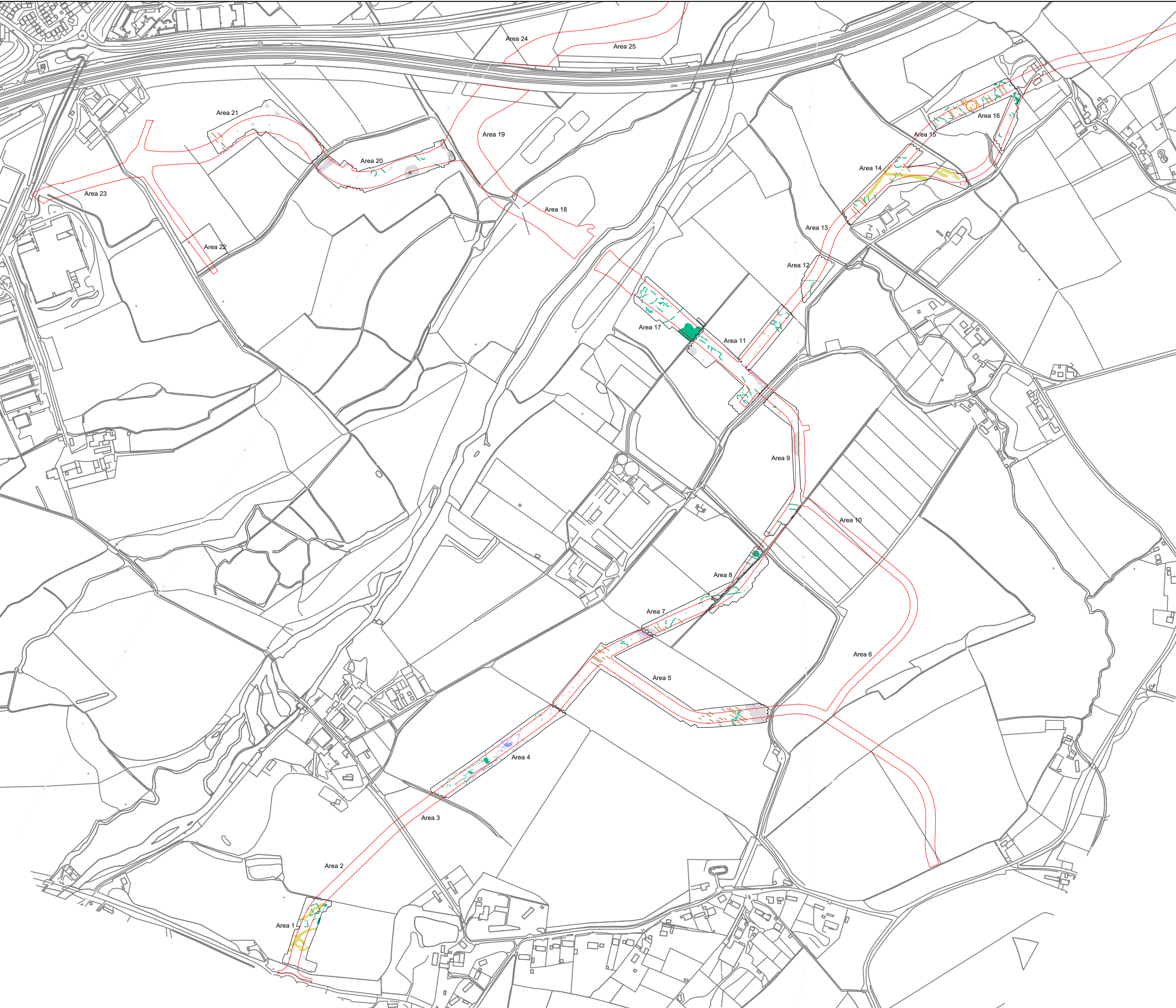
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Client: RPS		
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire		
Scale: 0 metres 400 1:8000 @ A3	Fig No: 03	



Title: Magnetometer Survey - Colour Plots	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 metres 400 1:8000 @ A3	Fig No: 04



KEY

	Known (corroborated) archaeology (discrete anomaly)
	Possible archaeology (discrete anomaly / trend / increased response)
	Uncertain Origin (discrete anomaly / trend / increased response)
	Agriculture (plough)
	Natural (e.g. geological / pedological)
	Former pond (corroborated)
	Magnetic disturbance
	Service
	Ferrous



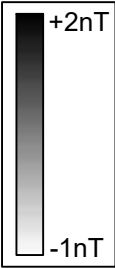
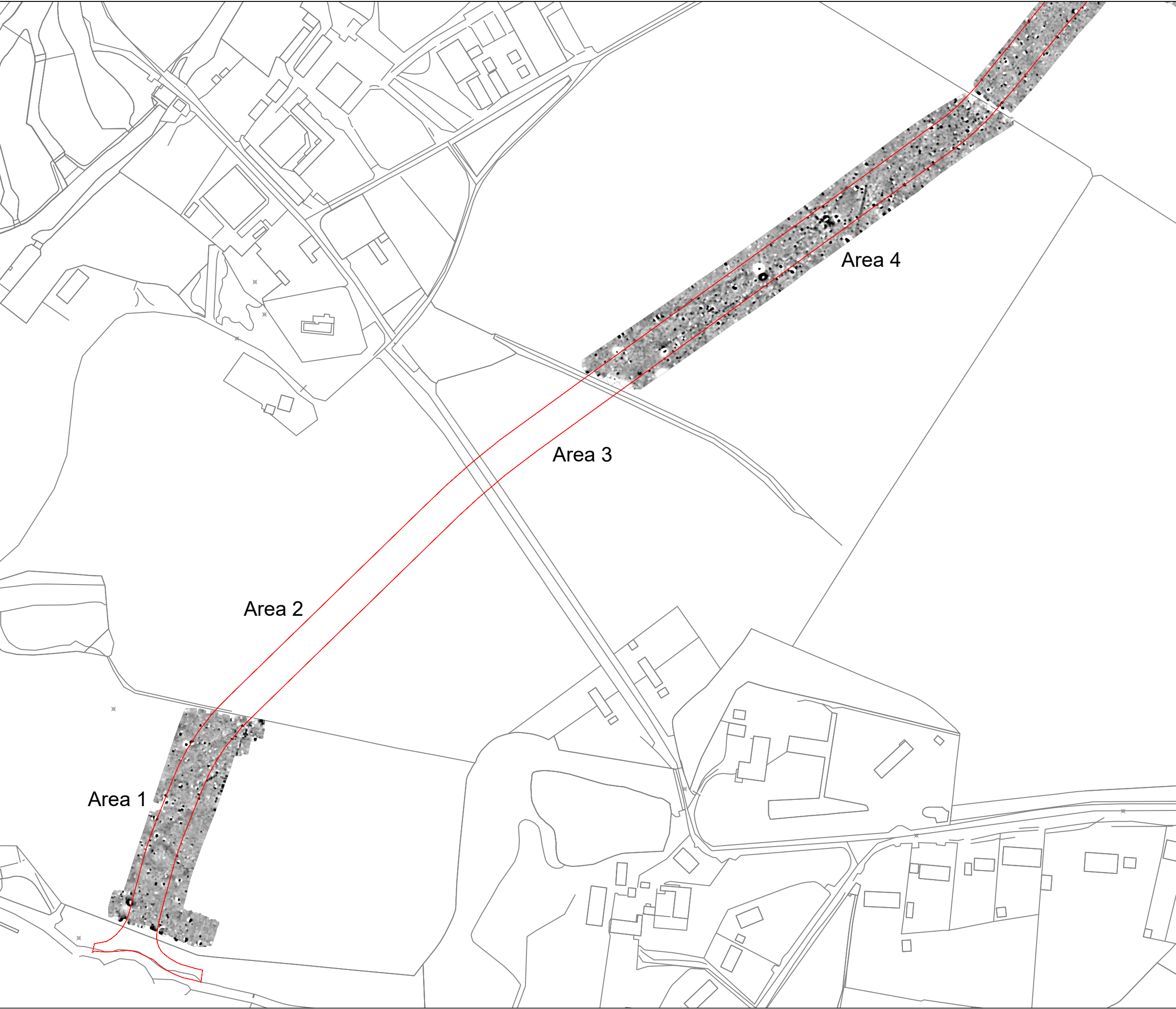
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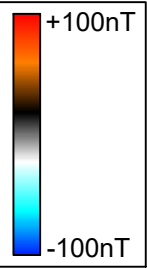
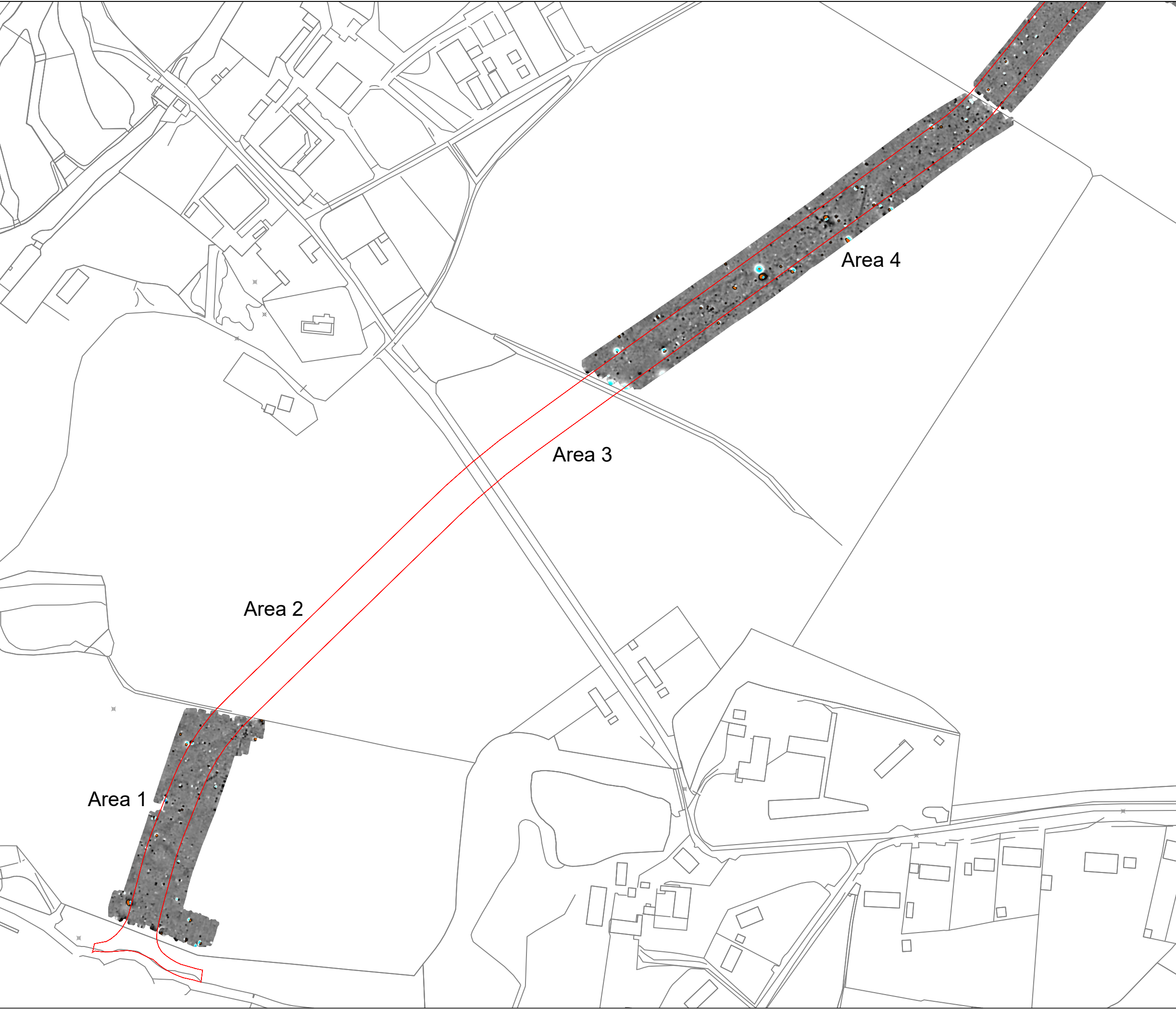
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Fig No: 05



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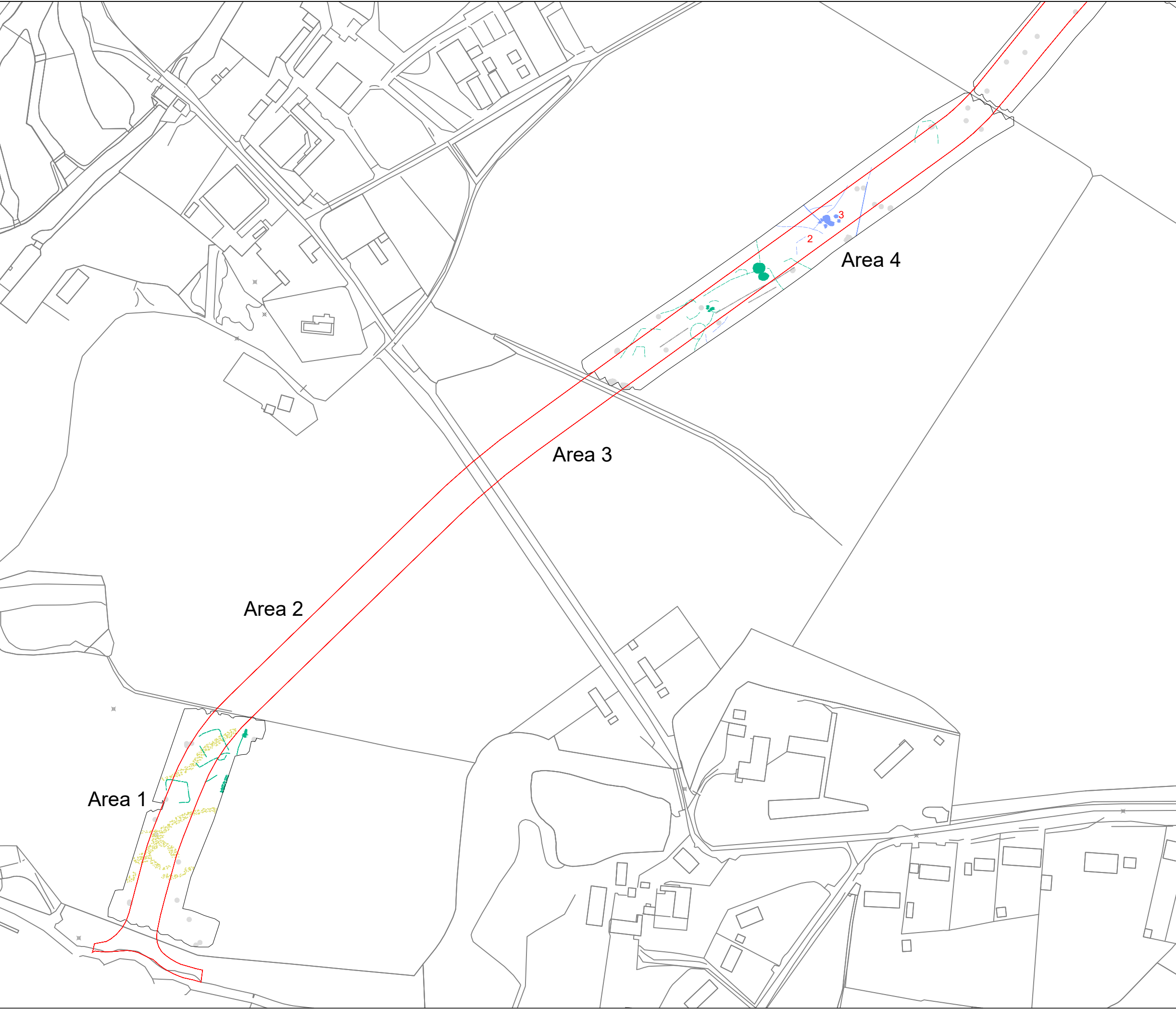
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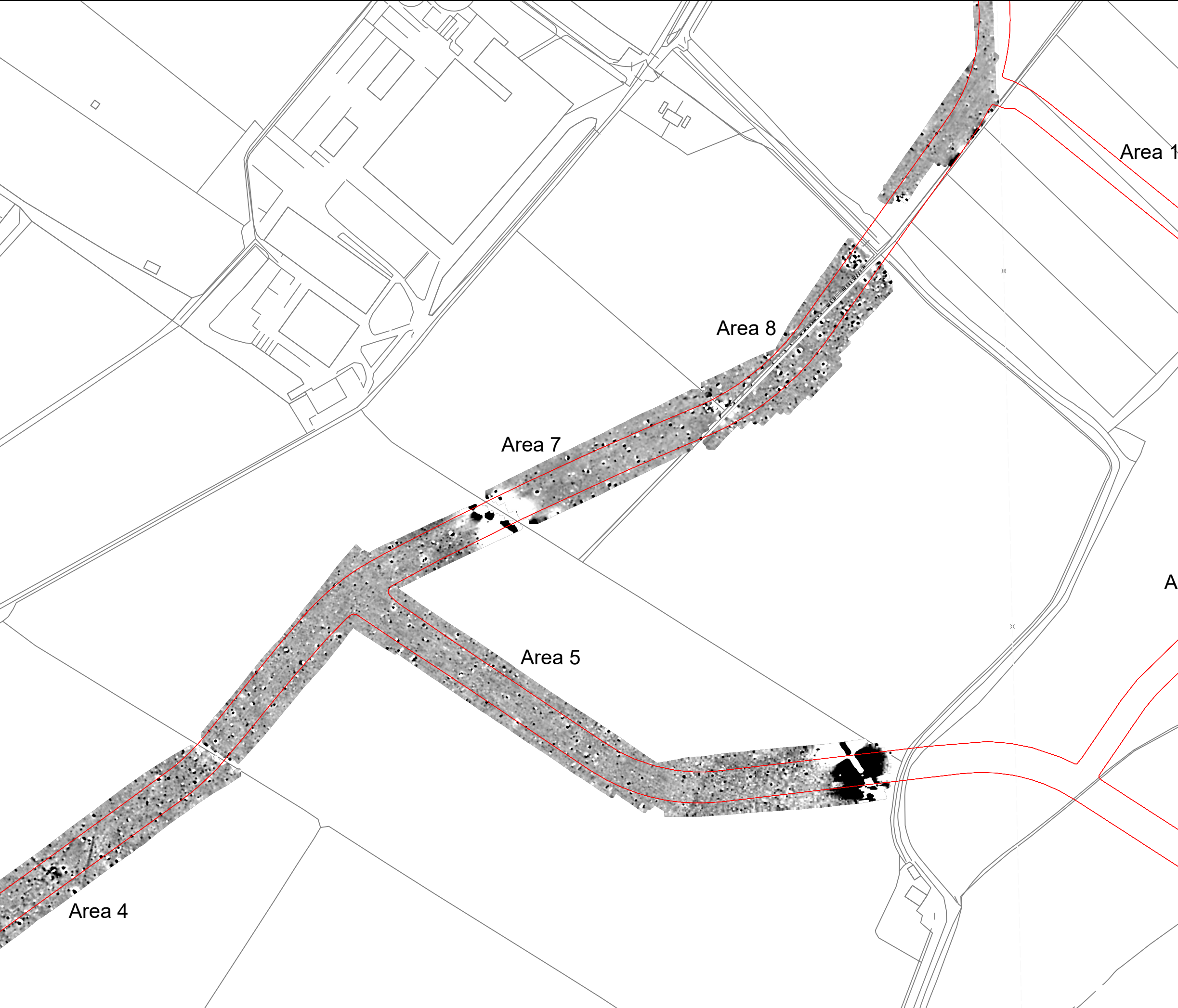


KEY

	Possible archaeology (discrete anomaly / trend)
	Uncertain Origin (discrete anomaly / trend)
	Natural (e.g. geological / pedological)
	Ferrous



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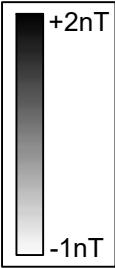
Area 1

Area 8

Area 7

Area 5

Area 4



Title: Magnetometer Survey - Greyscale Plots - Areas 5, 7 and 8

Client: RPS

Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire

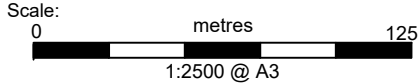
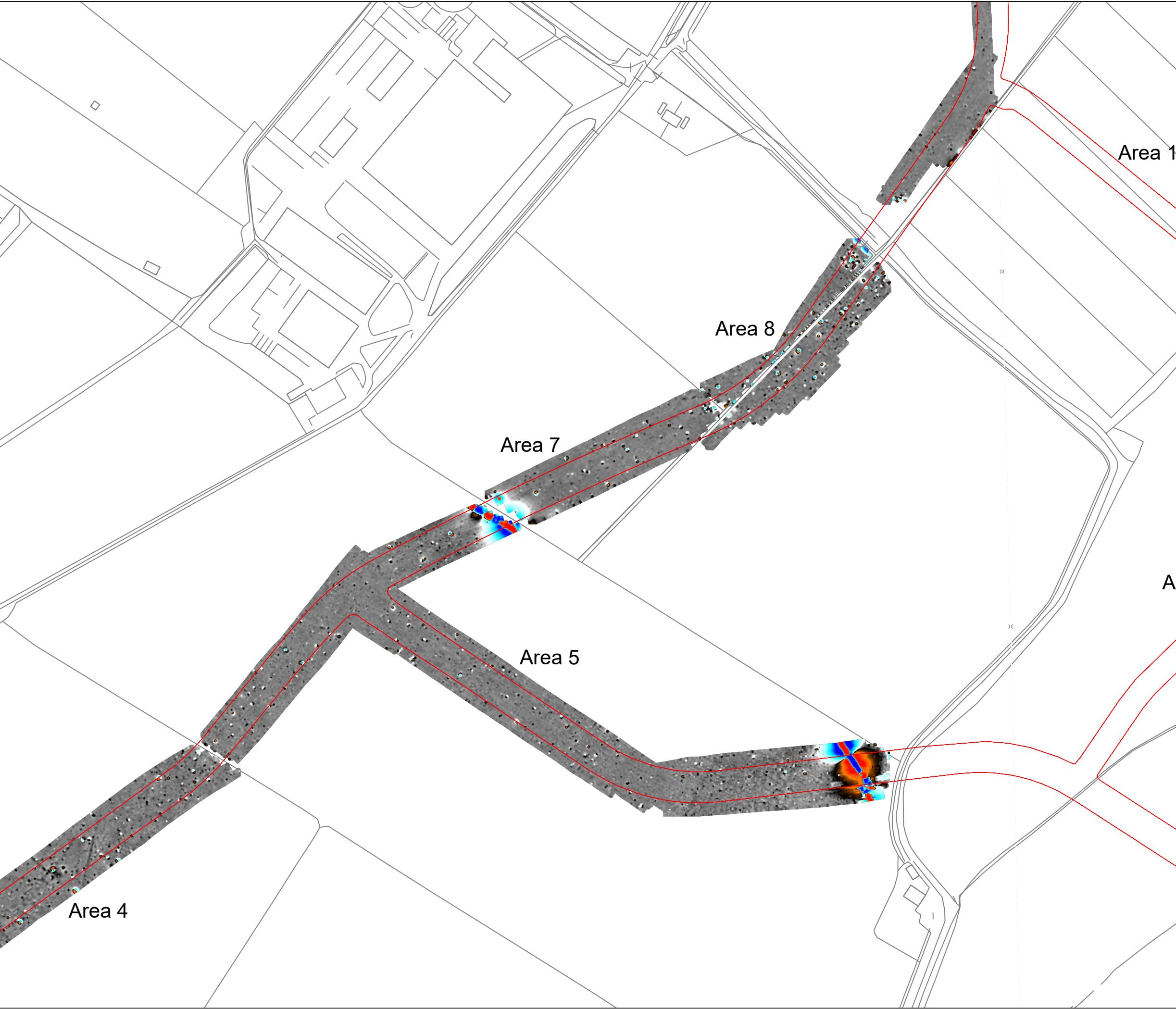


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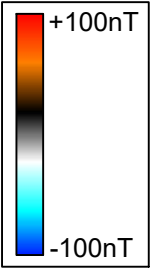
Area 1

Area 8

Area 7

Area 5

Area 4



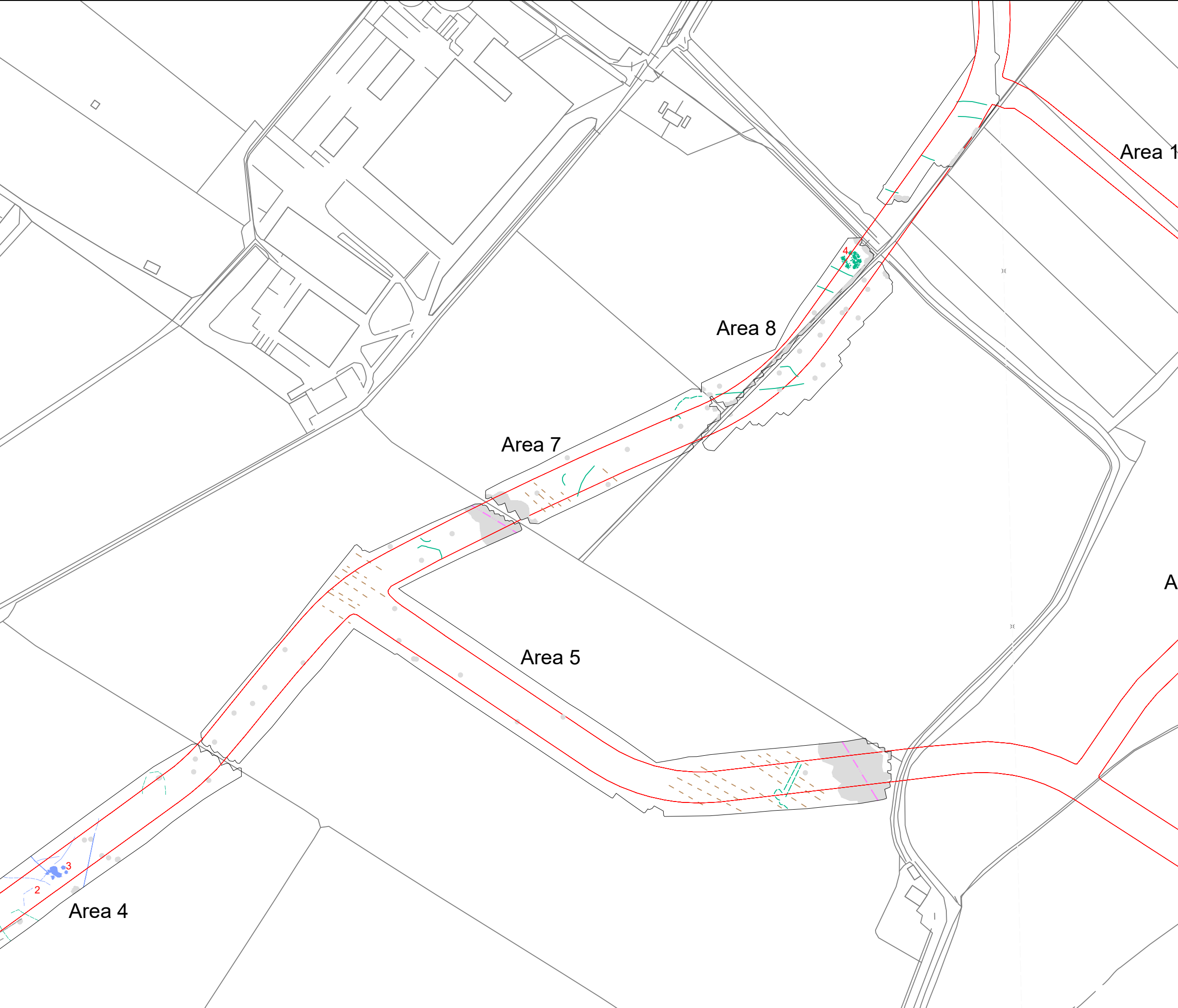
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Client: RPS

Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire



Fig No: 10



Area 1

Area 8

Area 7

Area 5

Area 4

KEY



Possible archaeology (discrete anomaly / trend)



Uncertain Origin (discrete anomaly / trend)



Agriculture (plough)



Service



Ferrous

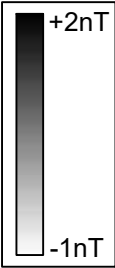
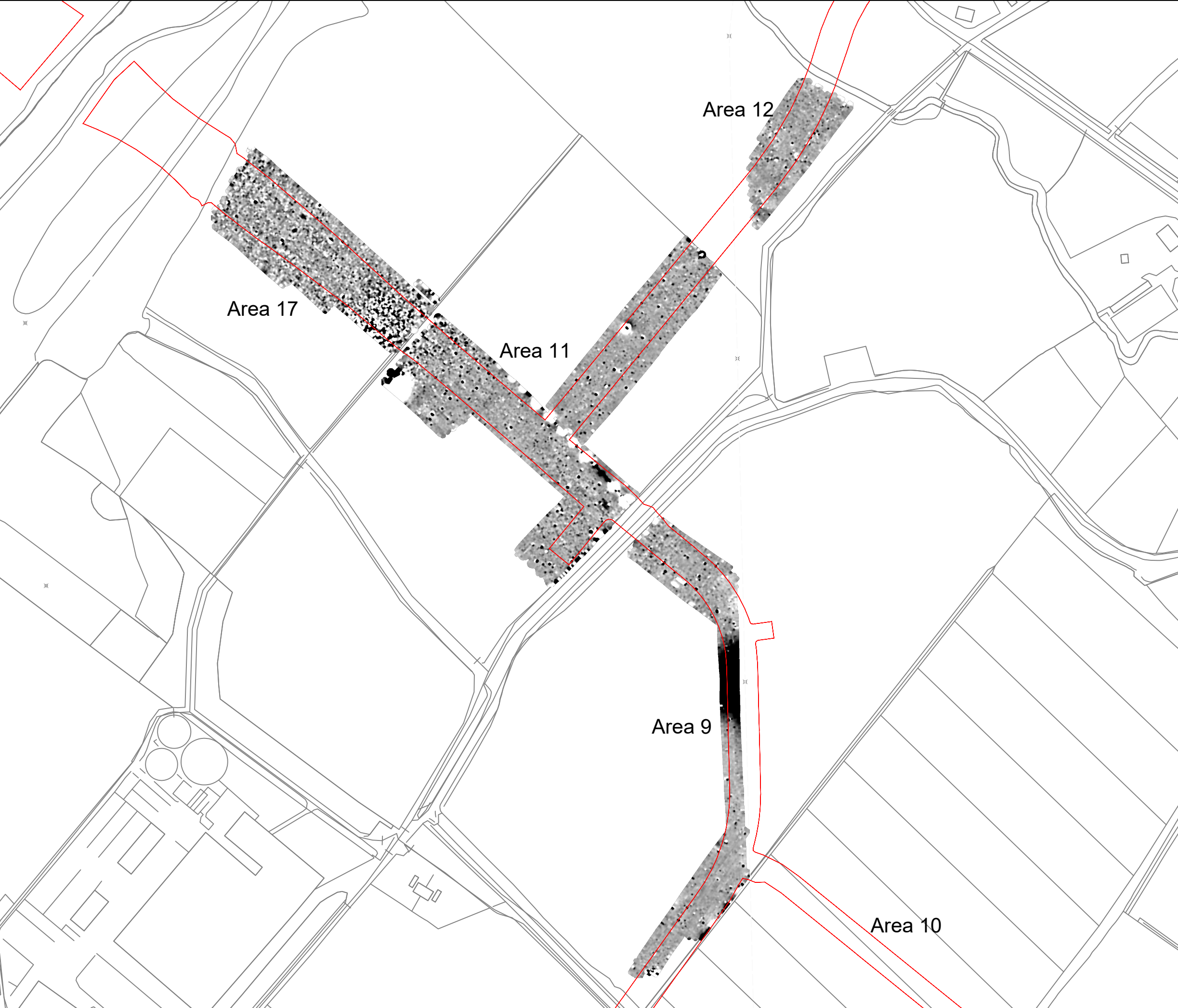


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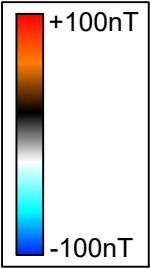
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Scale: 0 metres 125 1:2500 @ A3 Fig No: 11



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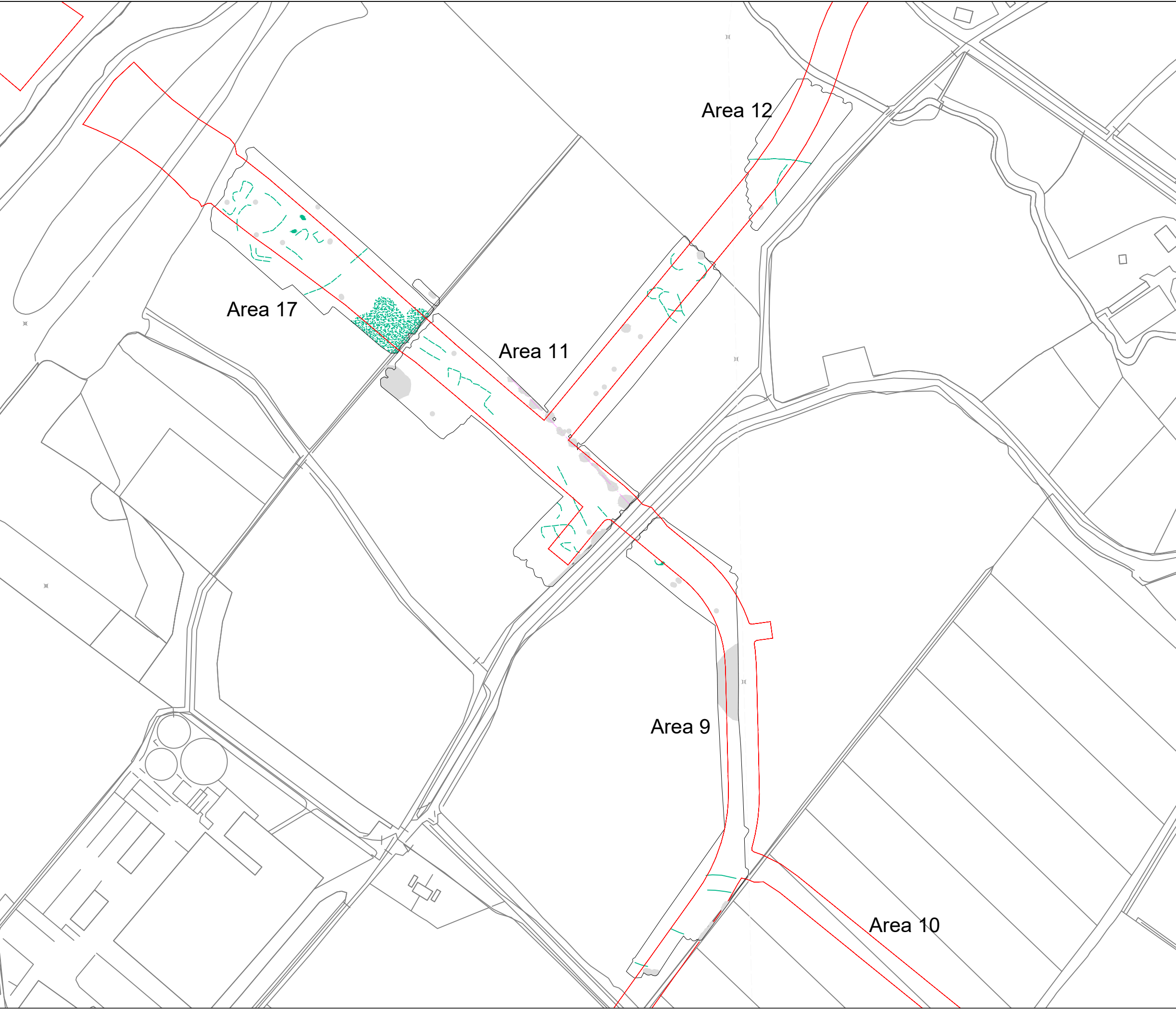
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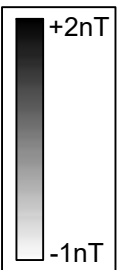
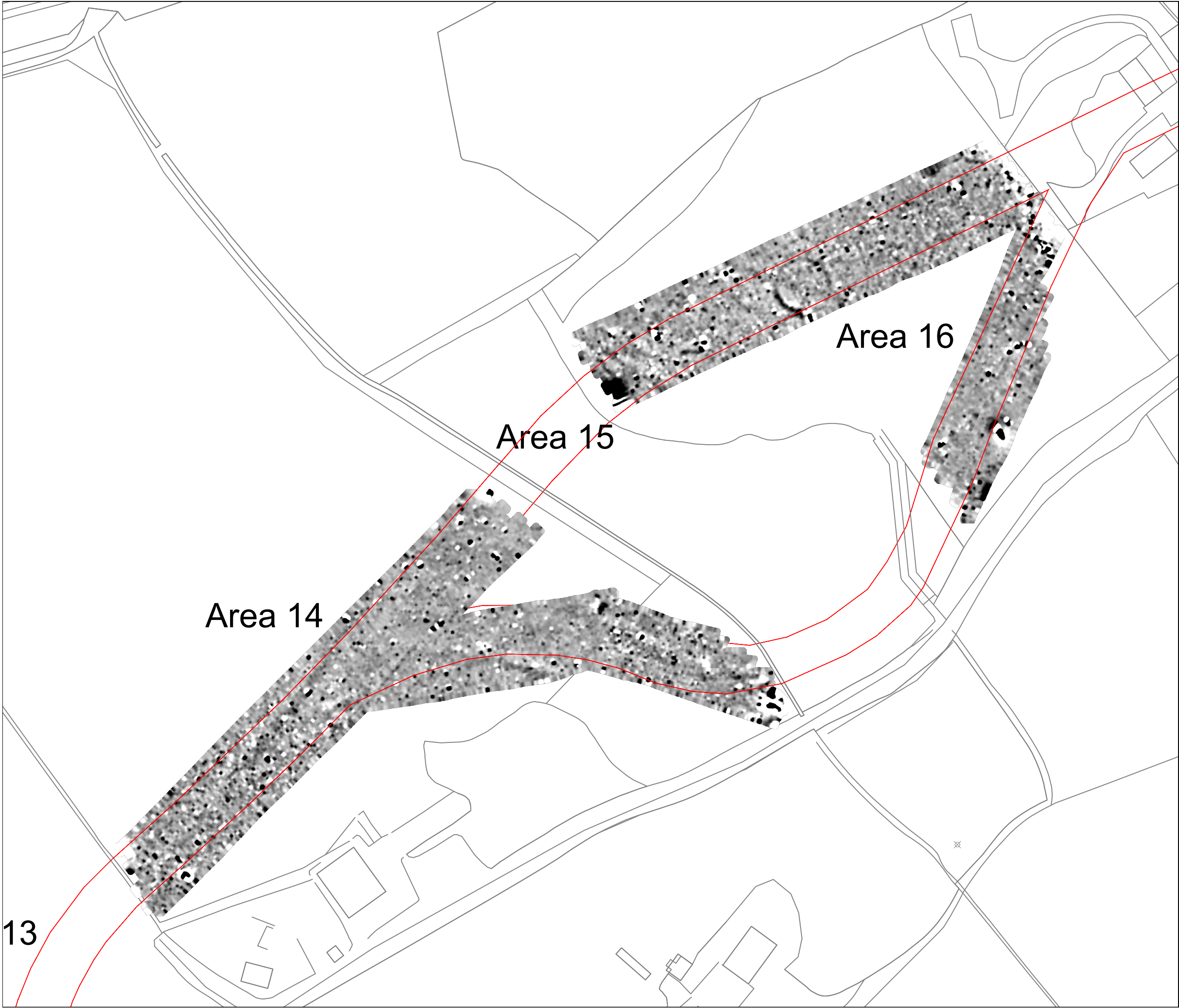


KEY

	Uncertain Origin (discrete anomaly / trend / increased response)
	Service
	Ferrous



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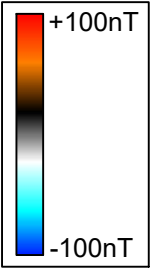
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Magnetometer Survey - Greyscale Plots -
Areas 14 and 16

Client:
RPS

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SUMO-22424: Loddon Garden Village,
Arborfield, Berkshire

Scale:
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Fig No:
15



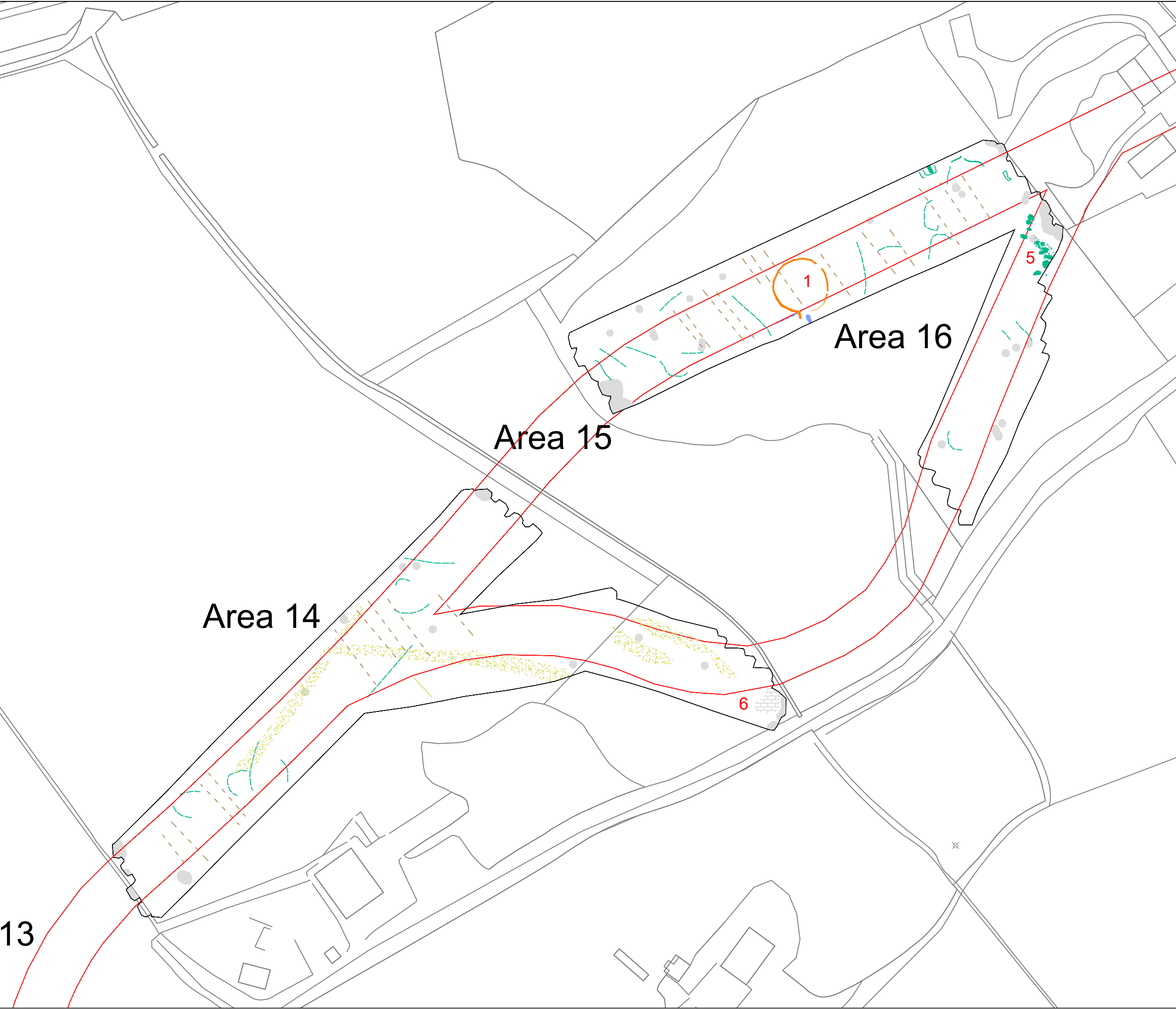
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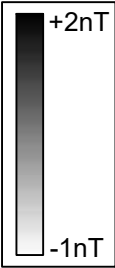
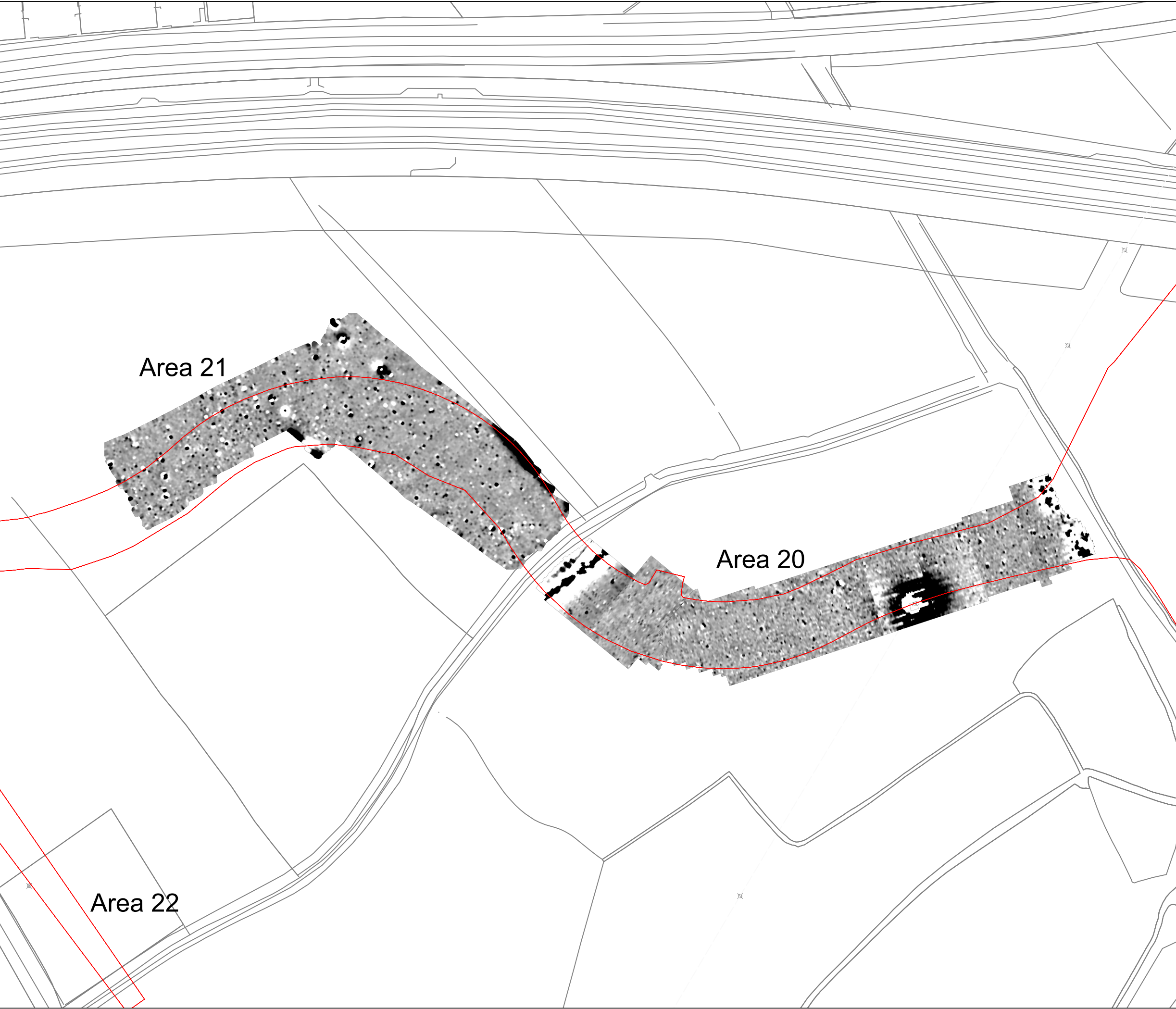


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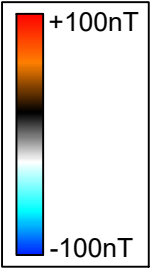
	Known (corroborated) archaeology (discrete anomaly)
	Possible archaeology (trend)
	Uncertain Origin (discrete anomaly / trend / increased response)
	Agriculture (plough)
	Natural (e.g. geological / pedological)
	Former pond (corroborated)
	Ferrous



Title: Magnetometer Survey - Interpretation - Areas 14 and 16	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 metres 75 1:1500 @ A3	Fig No: 17



Title: Magnetometer Survey - Greyscale Plots - Areas 20 and 21	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 metres 100 1:2000 @ A3	Fig No: 18



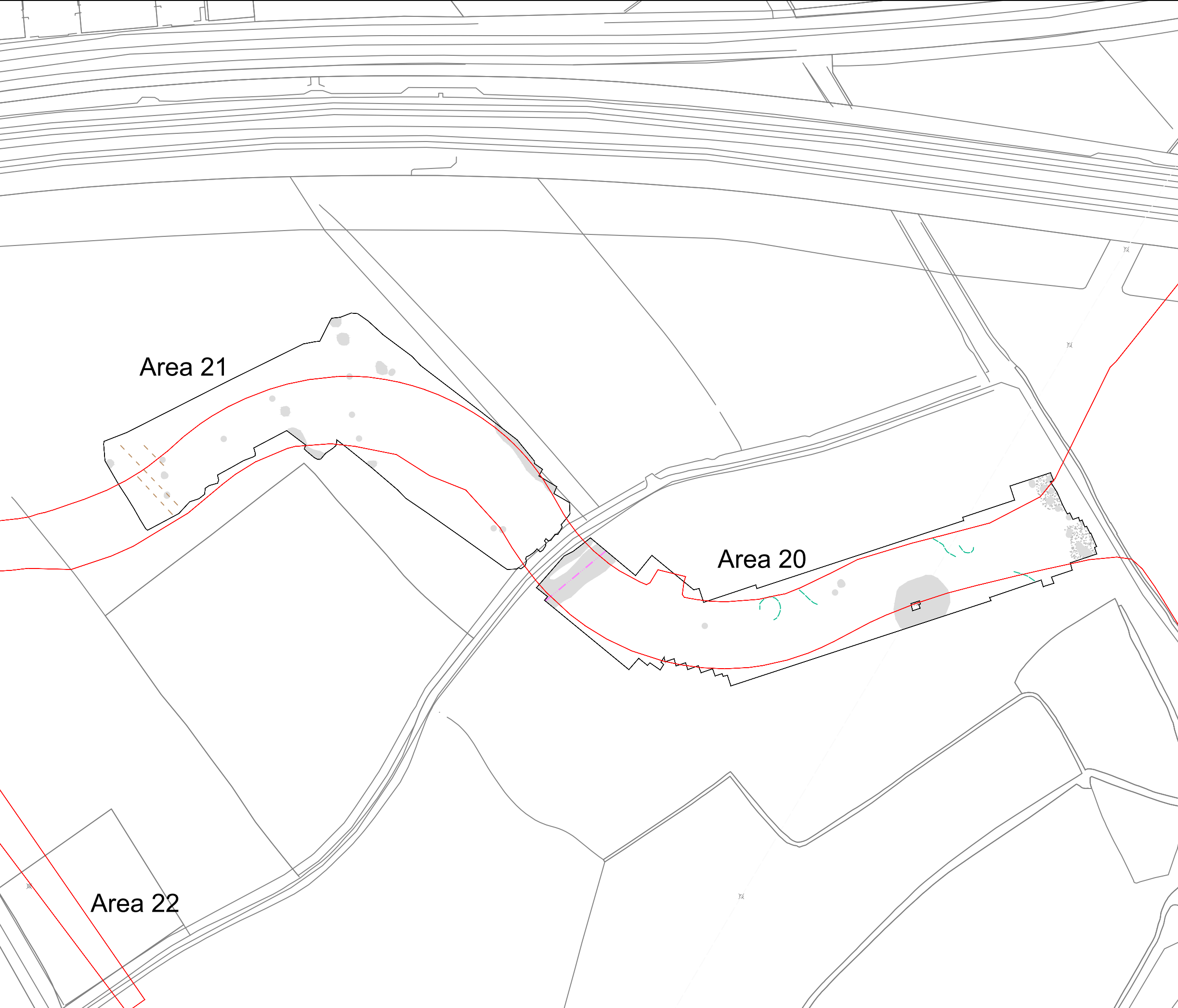
Title: Magnetometer Survey - Colour Plots - Areas 20 and 21

Client: RPS

Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire

Scale: 0 metres 100
1:2000 @ A3

Fig No: 19

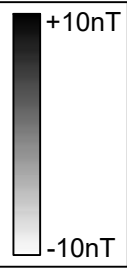
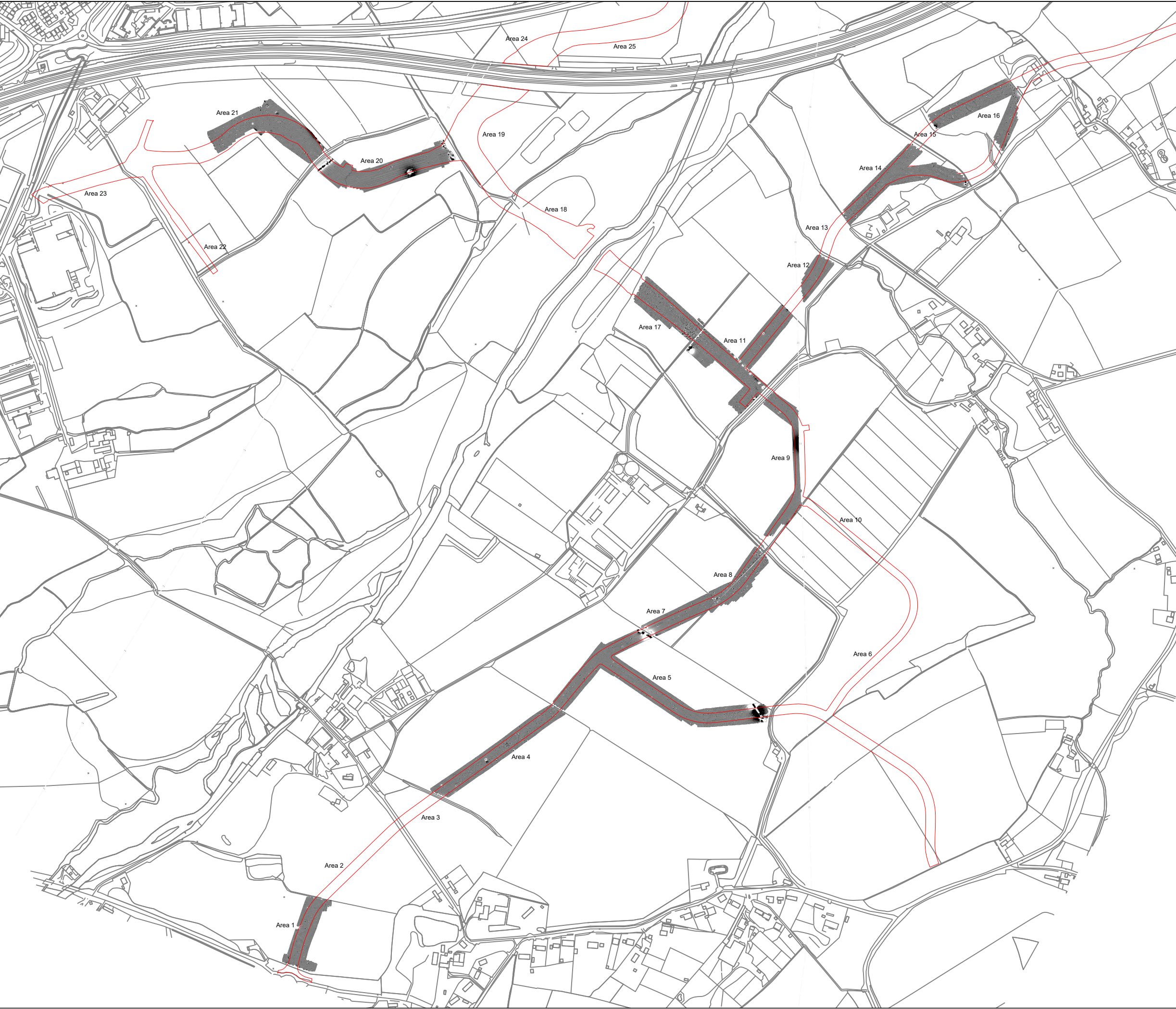


KEY

	Uncertain Origin (discrete anomaly / trend)
	Agriculture (plough)
	Magnetic disturbance
	Service
	Ferrous



Title: Magnetometer Survey - Interpretation - Areas 20 and 21	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 metres 100 1:2000 @ A3	Fig No: 20



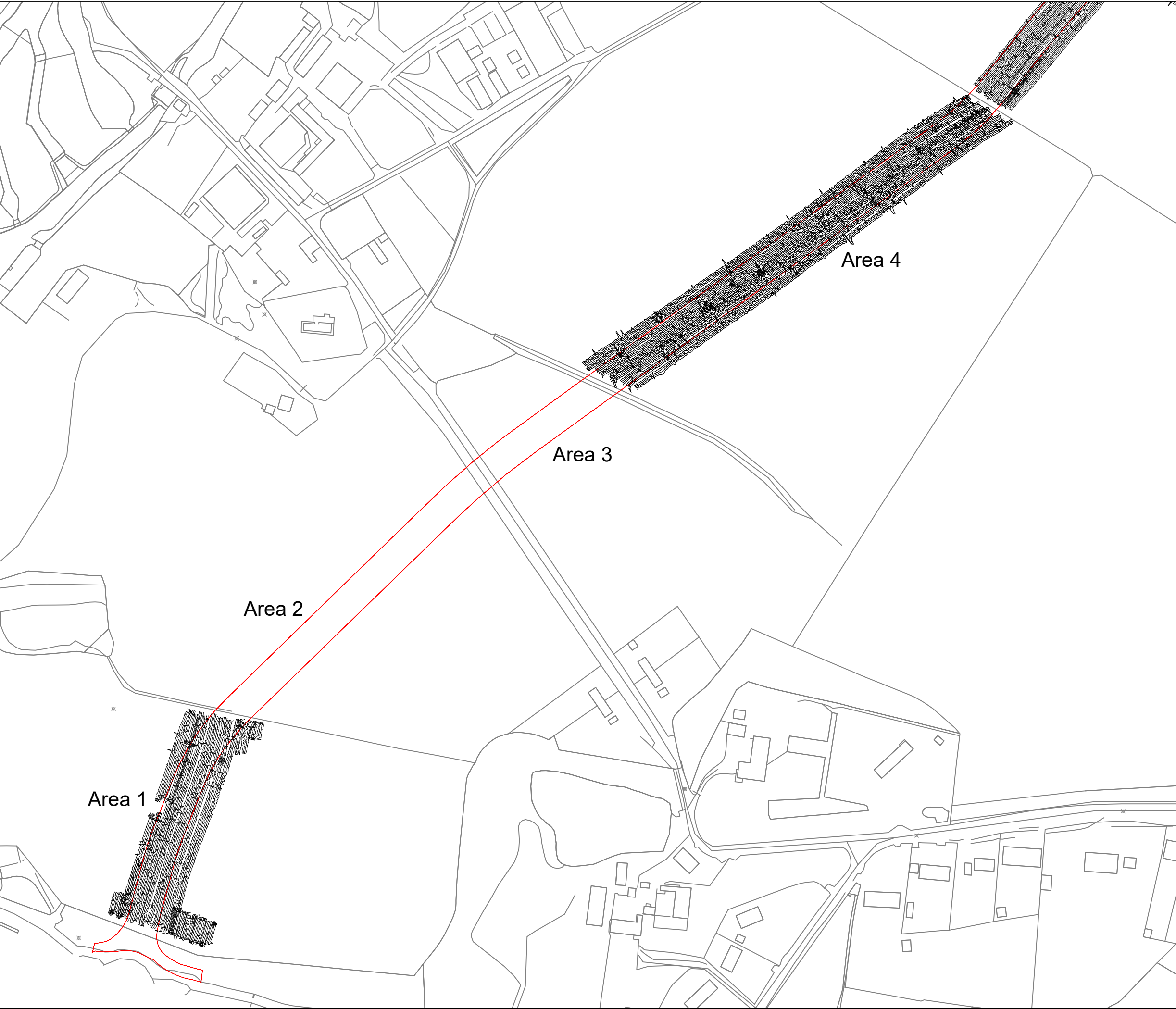
Title:
Minimally Processed Data - Greyscale Plots

Client:
RPS

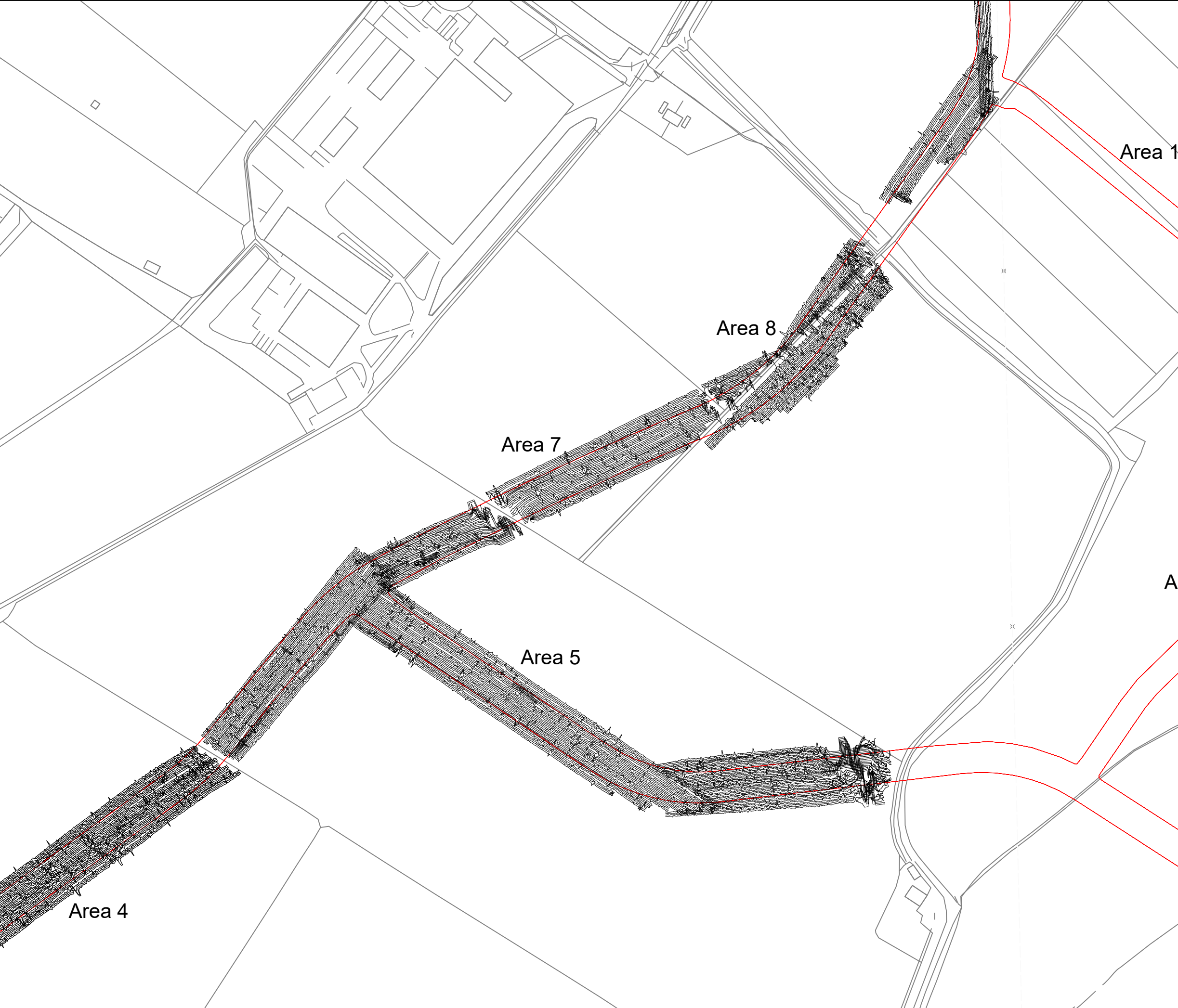
Project:
SUMO-22424: Loddon Garden Village,
Arborfield, Berkshire

Scale:
0 metres 400
1:8000 @ A3

Fig No:
22



Title: XY Trace Plots (clipped at +/-15nT) - Areas 1 and 4		
Client: RPS		
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire		
Scale: 0 1:2500 @ A3	metres 125	Fig No: 23



Area 1

Area 8

Area 7

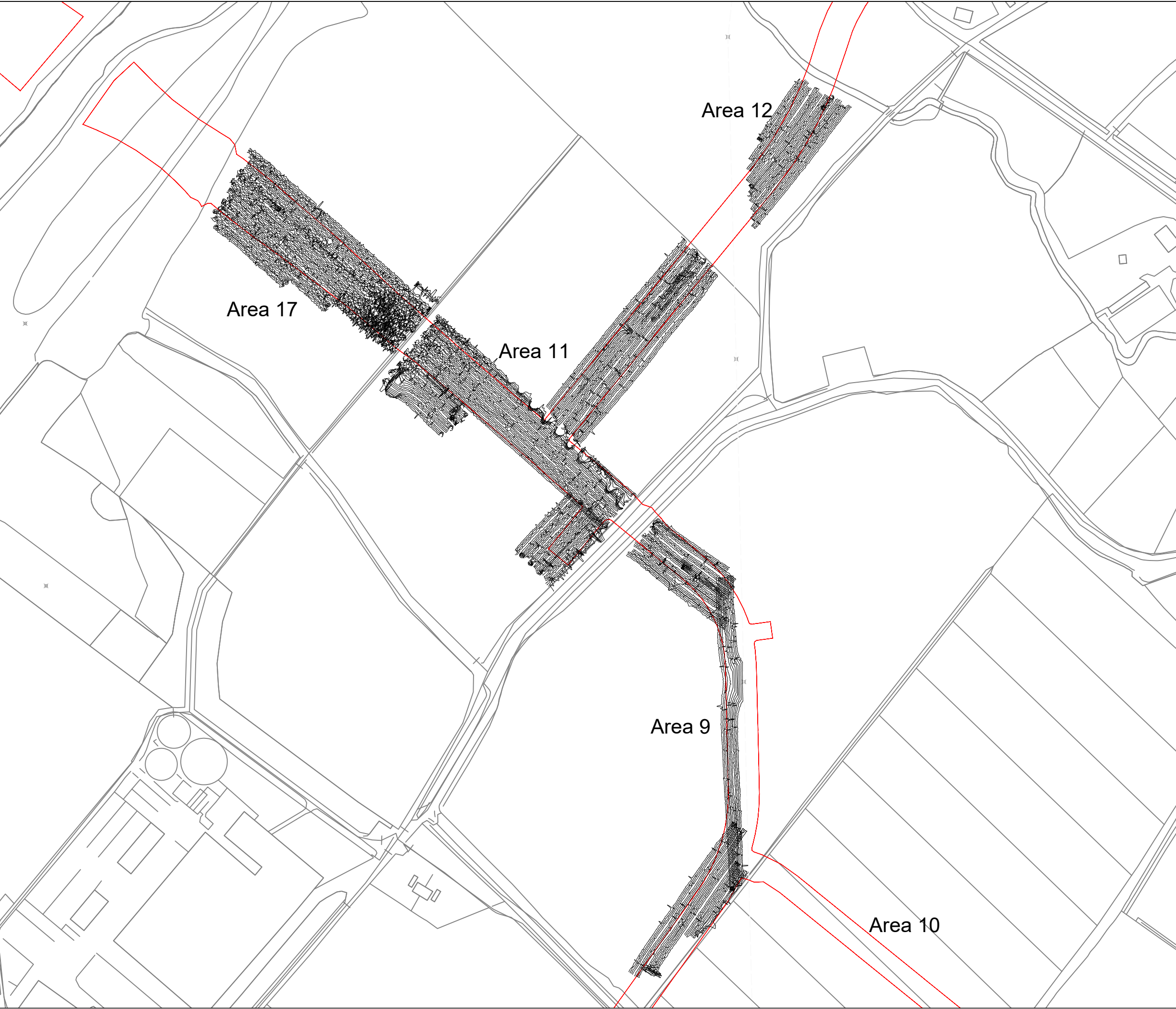
Area 5

Area 4

A



Title: XY Trace Plots (clipped at +/-15nT) - Areas 5, 7 and 8	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 125 metres 1:2500 @ A3	Fig No: 24



Title: XY Trace Plots (clipped at +/-15nT) - Areas 9, 11, 12 and 17	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 125 metres 1:2500 @ A3	Fig No: 25



Title: XY Trace Plots (clipped at +/-15nT) - Areas 14 and 16	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 metres 75 1:1500 @ A3	Fig No: 26



Title: XY Trace Plots (clipped at +/-15nT) - Areas 20 and 21	
Client: RPS	
Project: SUMO-22424: Loddon Garden Village, Arborfield, Berkshire	
Scale: 0 metres 100 1:2000 @ A3	Fig No: 27

Appendix A - Technical Information: Magnetometer Survey Method

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m
Magnetometer	Bartington Cart System	1.0m	0.125m

Instrumentation:

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted horizontally, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths.

Bartington Grad 601-2

Hand-Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines

Bartington Cart System

Data will be collected using a cart carrying four paired Bartington magnetic sensors. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

Data Processing

Zero Mean	This process sets the background mean of each traverse within each grid to zero.
Traverse	The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

Display

Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.
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Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall, etc.*) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Archaeology / Probable Archaeology</i>	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable & possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge & Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
<i>Service</i>	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.
<i>Uncertain Origin</i>	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of <i>Possible Archaeology / Natural</i> or (in the case of linear responses) <i>Possible Archaeology / Agriculture</i> ; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns; material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried feature. The difference between the two sensors will relate to the strength of a magnetic field created by this feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity and disturbance from modern services.

Appendix C - OASIS Summary Sheet

OASIS Summary for sumogeop1-533757

OASIS ID (UID)	sumogeop1-533757
Project Name	Geophysical Survey, Magnetometry Survey at Loddon Garden Village, Arborfield, Berkshire
Sitename	Loddon Garden Village, Arborfield, Berkshire
Sitecode	22424
Project Identifier(s)	22424
Activity type	Geophysical Survey, Magnetometry Survey, MAGNETOMETRY SURVEY
Planning Id	
Reason For Investigation	Planning: Pre application
Organisation Responsible for work	SUMO Geophysics Ltd.
Project Dates	02-Jun-2025 - 09-Jun-2025
Location	Loddon Garden Village, Arborfield, Berkshire NGR : SU 75788 68596 LL : 51.41133046658693, -0.91167397480421 12 Fig : 475788,168596
Administrative Areas	Country : England County/Local Authority : Wokingham Local Authority District : Wokingham Parish : Arborfield and Newland
Project Methodology	Data was collected using a cart carrying four paired Bartington magnetic sensors. Four sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings were taken at 0.125m centres along traverses 1.0m apart. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
Project Results	A detailed magnetometer survey was conducted over approximately 14 hectares of land covering a linear road scheme at Arborfield, Berkshire. It has identified one feature of definite archaeological interest; a ring ditch which can be corroborated with a known cropmark feature (MWK1127). Additional ditch-like anomalies, linear trends and discrete anomalies of possible archaeological interest have also been detected. Several other linear, curvilinear and discrete anomalies have an uncertain origin; they could be archaeological, given the proximity of cropmark features recorded in the area or be a result of agricultural and natural processes. Modern ploughing effects, land drains and a former pond have been mapped in the results, along with underground services, areas of natural magnetic variation and modern ferrous disturbance
Keywords	Ring Ditch - BRONZE AGE - FISH Thesaurus of Monument Types
Funder	Private or public corporation RPS
HER	Berkshire Archaeology HER - unRev - STANDARD
Person Responsible for work	Rebecca Fradgley
HER Identifiers	
Archives	

Appendix D – Data Management Plan & Archive Selection Strategy

Data Management Plan

Project ID / OASIS Ref.

SUMO-22424 / sumogeop1-533757

Project Name

Loddon Garden Village, Arborfield, Berkshire

Project Description

Detailed magnetic survey over approximately 14 hectares at Arborfield, Berkshire.

Client

RPS

Project Manager

Rebecca Fradgley

Field Leader

Craig Wakefield

Date DMP created

13/04.2025

Date DMP last updated

18/06/2025

Version

1

Technique - data

Detailed magnetic survey.

Manual – cart - other

Hand cart system

Documentation and metadata

All documentation and data produced are stored on SUMO servers in a specific job file.

Data storage, access and back-up

- SUMO Secure server during the project life set up in a RAID configuration (a RAID configuration incorporates a level of data redundancy meaning if a single hard drive in fails data can still be restored).
- Snap shots of the data will be made at several intervals during the day to allow data to be restored for up to 30 days if changed / deleted.
- Once the final report has been completed data will be moved onto NAS drive set up in a RAID configuration.
- All data is backed up to an off-site location (Cloud storage).

Archive Selection Strategy

Digital Data

Selection

It is proposed that only the final version of all born digital documents (reports, images and CAD files) will be selected for inclusion in the Preserved Archive. All raw and processed survey data will be included in the preserved archive. Below is what will constitute the selected archive:

- Raw data in XYZ format .csv and .png plus .pgw world file
- Processed data as .png plus .pgw world file
- Final survey report .pdf
- CAD and Vector graphics (interpretations) in .dwg format

De-selected digital data

The de-selected material will be retained on the SUMO Secure server and Cloud storage.

Documents

Not applicable – no archive

Materials

Not applicable – no archive



- Archaeological Geophysics
- Engineering Geophysics
- Measured Building Services
- Utility and Topographic Services
- Aerial Surveys
- Rail Surveys

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.
SUMO Services Ltd, incorporated under the laws of England and Wales,
Company Registration No.4275993.
Registered Office Unit 8 Hayward Business Centre, New Lane, Havant, Hampshire, PO9 2NL