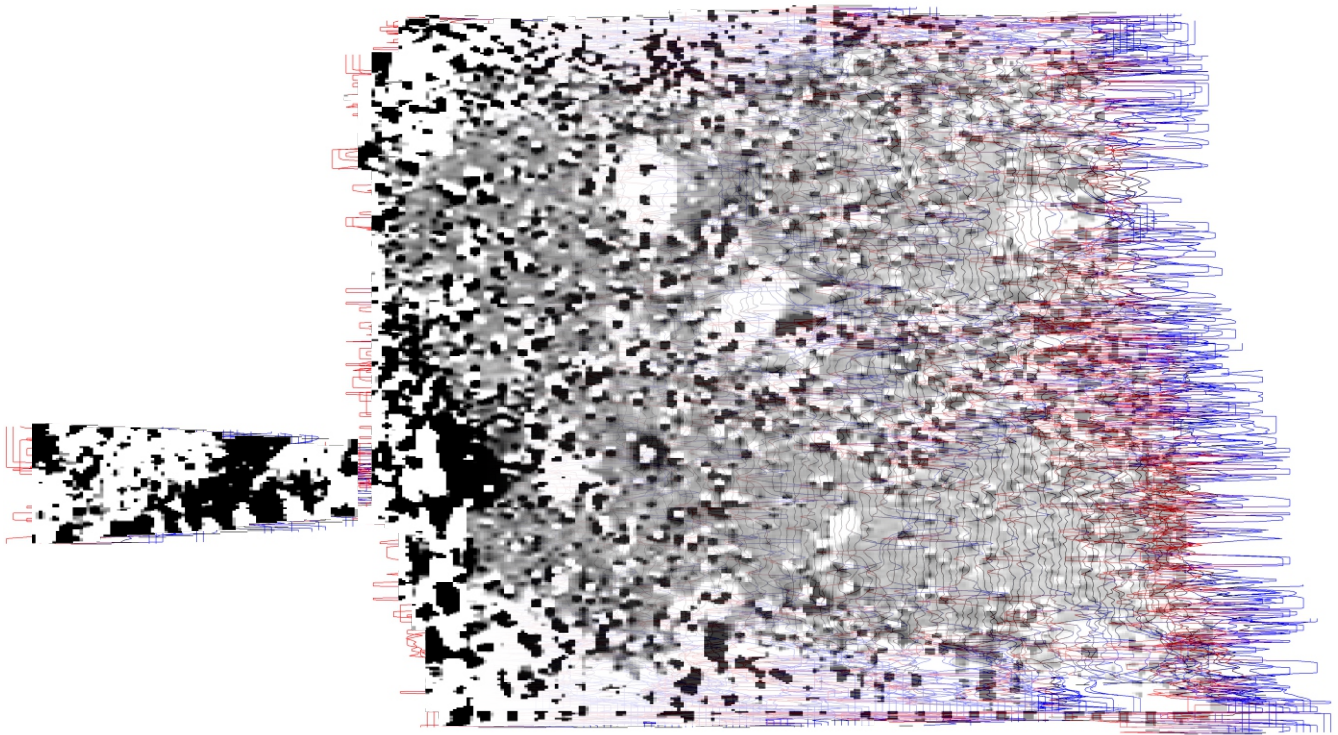




Kingsclere Avenue Havant, Hampshire

Detailed Gradiometer Report



Havant Borough Council Planning Ref.: APP/16/00492
Ref: 113061.04
April 2017



**Kingsclere Avenue, Havant,
Hampshire**

Detailed Gradiometer Survey Report

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File:					
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* I = Internal Draft; E = External Draft; F = Final

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Kingsclere Avenue, Havant, Hampshire

Detailed Gradiometer Survey Report

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Kingsclere Avenue, Havant, Hampshire

Detailed Gradiometer Survey Report

Summary

A detailed gradiometer survey was conducted over land at Kingsclere Avenue, Havant, Hampshire (centred on NGR 471050, 109450). The project was commissioned by Feltham Construction Ltd with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of a planning application by Portsmouth City Council for the development of the site for residential properties.

The site comprises a sub-rectangular parcel along with an adjoining strip of land to the south-west connecting it to Kingsclere Avenue. The site covers an area of 1.37 ha. The geophysical survey was undertaken on Thursday 6th April 2017 by Wessex Archaeology's in house geophysics team. The detailed gradiometer survey did not demonstrate the presence of any anomalies of archaeological origin.

The anomalies identified are primarily ferrous anomalies that are the result of surrounding residential developments and boundaries. Several linear trends have also been identified, one of which may relate to a modern service or drain.



Kingsclere Avenue, Havant, Hampshire

Detailed Gradiometer Survey Report

Acknowledgements

Wessex Archaeology would like to thank Richard Collins of Feltham Construction Ltd for commissioning the geophysical survey. The help and assistance of Leigh Cameron of Feltham Construction Ltd during the course of the project is also gratefully acknowledged. Thanks are also due to Neil Adam, Senior Archaeologist at Hampshire County Council for his advice and for monitoring the archaeological works.

The fieldwork was undertaken by Rok Plesnicar and Becky Hall. Alexander Schmidt processed, interpreted the geophysical data and wrote the report. The geophysical work was quality controlled by Tom Richardson and Ruth Panes. Illustrations were prepared by Nancy Dixon. The project was managed on behalf of Wessex Archaeology by Ruth Panes.



Kingsclere Avenue, Havant, Hampshire

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by Feltham Construction Ltd to carry out a geophysical survey at Kingsclere Avenue, Havant in Hampshire (hereafter “the Site”), centred on NGR 471050, 108450 (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of a planning application (ref. APP/16/00492) for the development of the Site for residential properties.
- 1.1.2 Planning application (ref. APP/16/00492) was submitted to Havant Borough Council on behalf of Portsmouth City Council for the proposed redevelopment of the Site, comprising the construction of 25No. 2 to 2.5 storey 3 bed houses, 5No. 3 storey 4 bed houses and 8No. 2 bed apartments. Permission was granted by Havant Borough Council, the Local Planning Authority (LPA), on 17 February 2017 subject to a number of conditions. Conditions 9, 10 and 11 apply to archaeology:
- 1.1.3 *9. No development hereby permitted shall commence until the applicant has secured the implementation of a programme of archaeological assessment in accordance with a Written Scheme of Investigation that has been submitted to and approved by the Planning Authority. The assessment should initially take the form of a geophysical survey of the site, followed by trial trenches targeted on features identified by the geophysics, with further trenching located within any blank areas. All trenching within the blank areas should be targeted upon the footprints of the proposed new houses, flats, garages and car parks as well as along the route of the new access roads in order to ensure that any archaeological remains encountered are recognised, characterised and recorded.*
- 1.1.4 *Reason: The site is of archaeological significance and it is important that the opportunity should be afforded to excavate the site before development commences and having due regard to policy CS11 of the Havant Borough Local Plan (Core Strategy) 2011 and the National Planning Policy Framework.*
- 1.1.5 *10. No development hereby permitted shall commence until the applicant has secured the implementation of a programme of archaeological mitigation of impact, based on the results of the trial trenching, in accordance with a Written Scheme of Investigation that has been submitted to and approved by the Planning Authority. Reason: To mitigate the effect of the works associated with the development upon any heritage assets and to ensure that information regarding these heritage assets is preserved by record for future generations and having due regard to policy CS11 of the Havant Borough Local Plan (Core Strategy) 2011 and the National Planning Policy Framework.*
- 1.1.6 *11. Following completion of archaeological fieldwork a report shall be produced in accordance with an approved programme including where appropriate post-excavation assessment, specialist analysis and reports, publication and public engagement.*



- 1.1.7 *Reason: To contribute to our knowledge and understanding of our past by ensuring that opportunities are taken to capture evidence from the historic environment and to make this publicly available and having due regard to policy CS11 of the Havant Borough Local Plan (Core Strategy) 2011 and the National Planning Policy Framework.*
- 1.1.8 A Written Scheme of Investigation (WA 2017a) setting out the strategy and methodology to be employed to undertake the geophysical survey was prepared and reviewed by the Senior Archaeologist at Hampshire County Council (HCC), prior to the survey being undertaken.
- 1.1.9 The detailed gradiometer survey was undertaken on 6 April 2017 by Wessex Archaeology with the aim to clarify the presence/absence and extent of any buried archaeological remains and to determine the general nature of the remains present, in accordance with the approved WSI (WA 2017a).
- 1.1.10 Following completion of the geophysical survey, a greyscale plot of the survey results was produced and a Written Scheme of Investigation (WA 2017b) prepared for a targeted trial trench evaluation of the Site. The trial trenches were positioned based on the results of the geophysical survey results and the subsequent trenching was undertaken between the 10th and the 12th April 2017.
- 1.1.11 This report presents a brief description of the methodology followed by the detailed survey results and the archaeological interpretation of the geophysical data.

1.2 The Site

- 1.2.1 The Site is located within the Leigh Park suburb of Havant, Hampshire and currently consists of 1.37 ha of grassland. Modern residential properties border the Site to the north along Brockenhurst Avenue, to the east along Dunsbury Way, and to the west along Kingsclere Avenue. To the south of the Site are the buildings and land associated with Riders Junior School. There is pedestrian access to the north-west, west, and south-east of the Site, with paths running across the area.
- 1.2.2 The Site is situated within a relatively flat area of land at an elevation of approximately 17-19 m above Ordinance Datum (aOD). Local topography falls gently from Gammon's Hill to the north of the Site towards Hermitage Stream which lies to the south.
- 1.2.3 No overhead cables or water courses traverse the site.
- 1.2.4 The solid geology comprises of Palaeogene sedimentary Bognor Sand Member throughout the Site, with no overlying superficial deposits recorded (BGS 2015).
- 1.2.5 The soils underlying the Site are unrecorded due to the urban environment (SSEW SE Sheet 3-1 1983). However, it is likely soils derived from the geological parent material will produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.



2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

- 2.1.1 A Heritage Statement was prepared by Wessex Archaeology (2016) in order to determine the nature, extent and significance of the historic environment resource within the Site and 1 km of the site boundary. This used information provided by the Hampshire Archaeology and Historic Buildings Record (HAHBR), and the National Heritage List for England (NHLE), as well as several other sources. The following background is summarised from the Heritage Statement.
- 2.1.2 There are no Scheduled Monuments, Grade I or II* Listed Buildings, Grade I or II Registered Parks and Gardens, World Heritage Sites, or Registered Battlefields within the Study Area. However, there are two Grade II Listed buildings located at the eastern limit of the Study Area, within the Grade II* listed Leigh Park (List Entry No. 1092129). The Gothick Library (List Entry No. 1339958) was built in 1832 by Vuillamy with an octagonal plan. The Garden wall, Gatepiers and Grotto of Leigh Park (List Entry No. 1000112) comprise an early 19th century brick wall enclosing a former kitchen garden, to the north-west of the former mansion.
- 2.1.3 There is little recorded evidence for the Palaeolithic and Mesolithic period within the Study Area. A single Palaeolithic flint artefact was discovered c.950 m to the east of the Site. Despite this, there have been numerous and important Palaeolithic discoveries within the wider landscape, particularly around the River Lavant to the east and Portsmouth to the south-west. Furthermore, coastal areas and their hinterland are likely to have been extensively utilised during the Mesolithic. It is therefore unclear whether the present absence of evidence is a result of the limited extent of prior archaeological investigation within the Study Area, or if it reflects low levels of activity during these periods.
- 2.1.4 A hoard of Neolithic greenstone axes was found approximately 500 m to the north of the Site in 1976 near Warren Park. A hearth, along with associated flint tools, was also discovered c. 900 m to the north-west in the section of a trench during construction work in 1968.
- 2.1.5 There are no records of any activity for either the Bronze or Iron Age within the Study Area. However, within the wider landscape there are multiple sites that indicate widespread occupation and utilisation of the landscape during these periods. Similarly, there is little recorded within the Study Area from the Romano-British period, with only possible tesserae reported 500 m to the north of the Site.
- 2.1.6 Within the wider landscape there is significant evidence of activity throughout the Romano-British period. A probable Roman road runs to the east of the Study Area. This was probably the route between Rowlands Castle and Havant and connected to the approximate line of the more major route between Chichester and Southampton, approximately 2 km to the south of the Site.
- 2.1.7 There are no known Saxon features or finds in the Study Area. The settlement at Havant is first mentioned in documentary sources in AD 935 and a fragment of a stone font built into St. Faith's church is thought to date from this period. However, very little direct archaeological evidence of Saxon activity has been recovered within the town (Hopkins 2004; Forum Heritage Services & Context 4D 2007).
- 2.1.8 The medieval settlement of Havant remained focussed on the cross roads between North Street, South Street, East Street and West Street, which are believed to correspond

approximately with the Roman roads described above. The Church of St Faith (List Entry no. 1092120), which is of 12th century origin, occupies the south-western corner of the crossroads, and likely formed the nucleus of the medieval settlement.

- 2.1.9 The area around the Site continued to be rural in character throughout the post-medieval period, although the land started to be divided into estates such as Leigh Park. An 1833 map of the area supports this and shows that the parish boundary was just to the east of the Site. Historic mapping of the area dating to 1845 shows that the Site was part of a single field and it is likely that the area of land on which the Site now stands was not part of the parkland, instead remaining in agricultural use. The second edition Ordnance Survey (OS) map shows that the field containing the Site was sub-divided by 1897, with the boundary running east – west straight across the Site.
- 2.1.10 During an excavation at Battins copse, approximately 850 m to the south-east of the Site, a post-medieval kiln was discovered, built of limestone with a brick facade and measured approximately 4 m by 0.75 m.
- 2.1.11 The Site remained relatively unchanged, retaining its rural setting until the Second World War. The only change was another new boundary which ran along the northern edge of the Site. However, in the post war era there was rapid suburban development to replace housing lost during the war. Portsmouth Borough Council purchased the Leigh Park estate with construction starting in 1948 and continuing for several decades. OS maps show that the housing that now surrounds the Site was constructed between 1953 and 1957.

3 METHODOLOGY

3.1 Introduction

- 3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team on Thursday 6th April 2017. Field conditions at the time of the survey were good, being dry with short grass. An overall coverage of 1.26 ha was achieved, with any reduction the result of overgrown boundaries.

3.2 Aims and objectives

- 3.2.1 The aims of the survey comprise the following:

- to conduct a detailed survey covering as much of the specified area as possible, allowing for artificial obstructions;
- to clarify the presence/absence and extent of any buried archaeological remains within the site;
- to determine the general nature of the remains present.

3.3 Fieldwork methodology

- 3.3.1 Individual survey grid nodes were established at 30 m x 30 m intervals using a Leica Viva RTK GNSS instrument, which is precise to approximately 0.02 m and therefore exceeds Historic England recommendations (2008).
- 3.3.2 The detailed gradiometer survey was conducted using a Bartington Grad601-2 fluxgate gradiometer instrument, which has a vertical separation of 1 m between sensors. Data were collected at 0.25 m intervals along transects spaced 1 m apart with an effective sensitivity



of 0.03 nT, in accordance with Historic England guidelines (English Heritage 2008). Data were collected in the zigzag method.

3.4 Data processing (Gradiometer)

3.4.1 Data from the survey was subject to minimal data correction processes. These comprise a zero-mean traverse function (± 5 nT thresholds) applied to correct for any variation between the two Bartington sensors used, and a de-step function to account for variations in traverse position due to varying ground cover and topography. These two steps were applied throughout the survey area, with no interpolation applied.

3.4.2 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.

4 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

4.1 Introduction

4.1.1 The detailed gradiometer survey has identified magnetic anomalies across the Site. The anomalies identified are predominantly ferrous. Results are presented as a series of greyscale plots, XY plots and archaeological interpretations at a scale of 1:1000 (**Figures 2 to 4**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale image and ± 25 nT at 25 nT per cm for the XY trace plots.

4.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (**Figure 4**). Full definitions of the interpretation terms used in this report are provided in Appendix 2.

4.1.3 Numerous ferrous anomalies are visible throughout the dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.

4.1.4 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be present than have been identified through geophysical survey.

4.1.5 Gradiometer survey may not detect all services present on Site. This report and accompanying illustrations should not be used as the sole source for service locations and appropriate equipment (e.g. CAT and Genny) should be used to confirm the location of buried services before any trenches are opened on Site.

4.2 Gradiometer survey results and interpretation

4.2.1 The survey has identified a large amount of high magnitude (± 100 nT) ferrous anomalies around the periphery of the Site. This disturbance encroaches approximately 10 – 15 m into the survey area on all sides, and up to 30 m on the central-eastern portion of the survey area. This response is the result of the surrounding boundaries and gateways as well as the residential properties and roads bordering the Site. Patches of ferrous anomalies identified within the central portion of the survey area are likely the result of metallic borehole covers, as well as a large amount of discarded waste with a highly ferrous content, such as metal dustbins and other metallic objects, that was noted on the surface during survey.

4.2.2 A linear trend can be seen within the ferrous anomalies in the east of the area at **4000**. This runs approximately 50 m on a north-east to south-west alignment and may extend out of



the surveyed area to the east. The large amount of ferrous responses in the area make interpretation difficult, but this may be evidence of a drain or modern service.

- 4.2.3 Other linear trends have been identified across the Site, however these are too weak to provide any accurate interpretation.

5 DISCUSSION

- 5.1.1 The detailed gradiometer survey did not identify any anomalies of archaeological origin. The Site is dominated by ferrous responses, particularly concentrated around the boundaries of the field. Whilst this does have the potential to mask weaker archaeological anomalies, the responses are not thought to be dense enough across the centre of the Site to cause an issue. A small number of linear trends have been identified, including one in the east of the area that may relate to a modern service.

6 REFERENCES

6.1 Bibliography

English Heritage 2008 Geophysical Survey in Archaeological Field Evaluation. Research and Professional Service Guideline No 1. Swindon (2nd Edition)

Wessex Archaeology 2016 Kingsclere Avenue, Havant, Hampshire Heritage Statement. Unpublished client report ref. 113060.01

Wessex Archaeology 2017a Kingsclere Avenue, Havant, Hampshire Written Scheme of Investigation for Archaeological Geophysical Survey ref. T23134.01

Wessex Archaeology 2017b Kingsclere Avenue, Havant, Hampshire Written Scheme of Investigation for Archaeological Evaluation ref. 113061.01

6.2 Cartographic and documentary sources

Ordnance Survey 1983 Soil Survey of England and Wales Sheet 3, Soils of Midland and Western England. Southampton.

6.3 Online resources

British Geological Survey Geology of Britain Viewer (accessed April 2017)
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Hopkins, D. 2004. Extensive Urban Survey - Hampshire and the Isle of Wight. Havant (accessed April 2017)

http://archaeologydataservice.ac.uk/archives/view/hampshire__2003/downloads.cfm



7 APPENDICES

7.1 Appendix 1: Survey Equipment and Data Processing

Survey methods and equipment

The magnetic data for this project was acquired using a Bartington 601-2 dual magnetic gradiometer system. This instrument has two sensor assemblies fixed horizontally 1m apart allowing two traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m separation, and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03nT over a ± 100 nT range, and measurements from each sensor are logged at intervals of 0.25m. All of the data are stored on an integrated data logger for subsequent post-processing and analysis.

Wessex Archaeology undertakes two types of magnetic surveys: scanning and detail. Both types depend upon the establishment of an accurate 20m or 30m site grid, which is achieved using a Leica Viva RTK GNSS instrument and then extended using tapes. The Leica Viva system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02m in real-time and therefore exceed the level of accuracy recommended by Historic England (English Heritage 2008) for geophysical surveys.

Scanning surveys consist of recording data at 0.25m intervals along transects spaced 10m apart, acquiring a minimum of 80 data points per transect. Due to the relatively coarse transect interval, scanning surveys should only be expected to detect extended regions of archaeological anomalies, when there is a greater likelihood of distinguishing such responses from the background magnetic field.

The detailed surveys consist of 20m x 20m or 30m x 30m grids, and data are collected at 0.25m intervals along traverses spaced 1m apart. These strategies give 1600 or 3600 measurements per 20m or 30m grid respectively, and are the recommended methodologies for archaeological surveys of this type (English Heritage 2008).

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125m intervals along traverses spaced up to 0.25m apart, resulting in a maximum of 28800 readings per 30m grid, exceeding that recommended by Historic England (English Heritage 2008) for characterisation surveys.

Post-processing

The magnetic data collected during the detail survey are downloaded from the Bartington system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

As the scanning data are not as closely distributed as with detailed survey, they are georeferenced using the GPS information and interpolated to highlight similar anomalies in adjacent transects. Directional trends may be removed before interpolation to produce more easily understood images.

Typical data and image processing steps may include:



- Destripe – Applying a zero mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;
- Destagger – Shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Despike – Filtering isolated data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings (generally only used for earth resistance data)

Typical displays of the data used during processing and analysis:

- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies.
- Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.



7.2 Appendix 2: Geophysical Interpretation

The interpretation methodology used by Wessex Archaeology separates the anomalies into four main categories: archaeological, modern, agricultural and uncertain origin/geological.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Possible archaeology – used for features which give a response but which form no discernible pattern or trend.

The modern category is used for anomalies that are presumed to be relatively modern in date:

- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

The uncertain origin/geological category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative or broad bipolar (positive and negative) anomalies.



7.3 Appendix 3: OASIS form

Project Details:

Project name		Kingsclere Avenue, Havant, Hampshire			
Type of project		Detailed gradiometer survey (Field evaluation)			
Project description		<p>A detailed gradiometer survey was conducted over land at Kingsclere Avenue, Havant, Hampshire. The project was commissioned by Feltham Construction Ltd with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of a planning application for the development of the site for residential properties.</p> <p>The site comprises a sub-rectangular parcel along with an adjoining strip of land to the south-west connecting it to Kingsclere Avenue. The site covers an area of 1.37 ha. The geophysical survey was undertaken on Thursday 6th April 2017 by Wessex Archaeology's in house geophysics team. The detailed gradiometer survey has not demonstrated the presence of any anomalies of definite archaeological interest.</p> <p>The anomalies identified are primarily ferrous anomalies that are the result of surrounding residential developments and boundaries as well as several linear trend anomalies that are likely to pertain to footpaths across the survey area.</p>			
Project dates		Start: 06-04-2017		End: 06-04-2017	
Previous work		Heritage Statement			
Future work		Targeted trial trench evaluation			
Project Code:	113061	HER event no.	N/A	OASIS form ID:	wessexar1-281945
		NMR no.	N/A		
		SM no.	N/A		
Planning Application Ref.		APP/16/00492			
Site Status		N/A			
Land use		Amenity grassed area			
Monument type			Period		

Project Location:

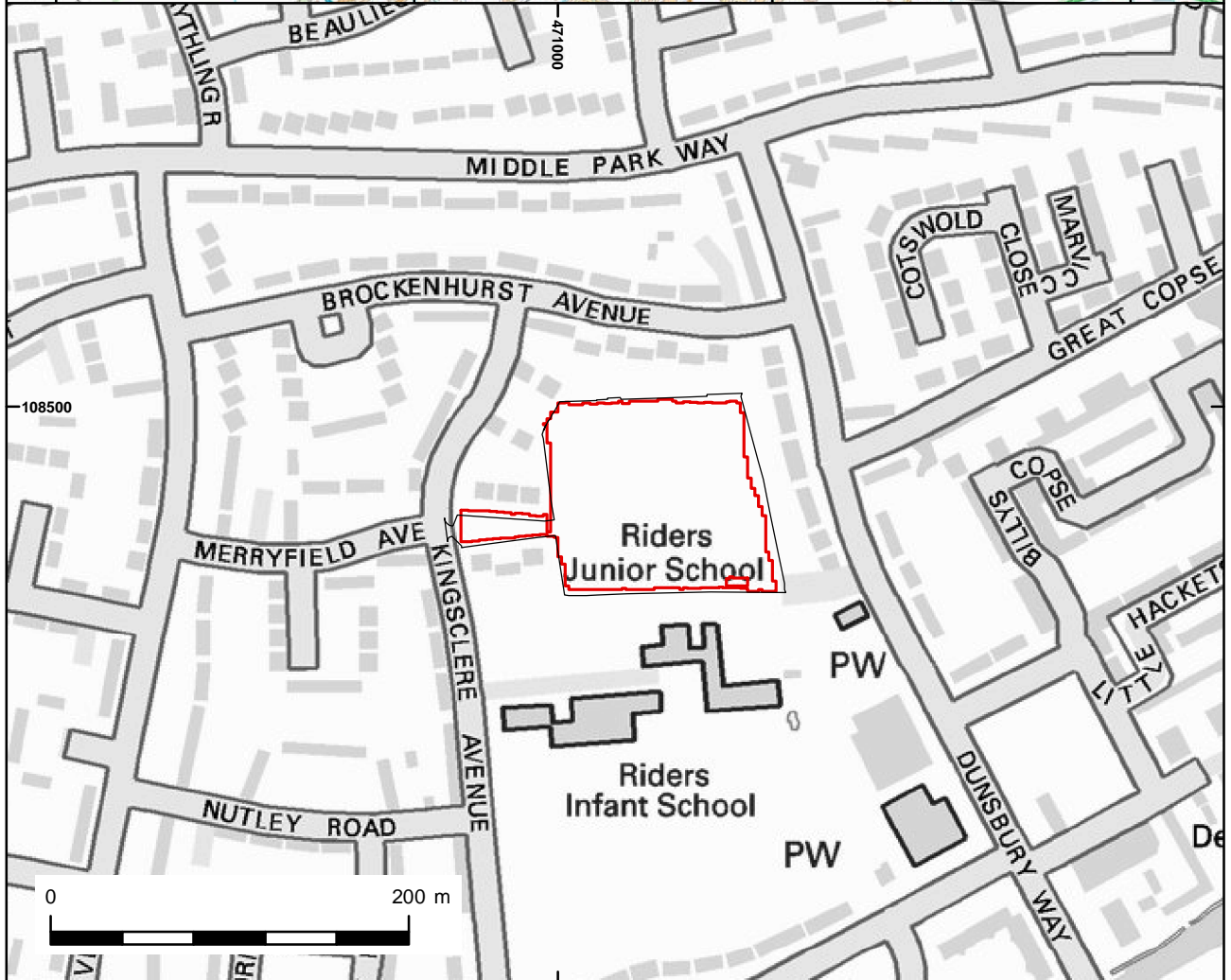
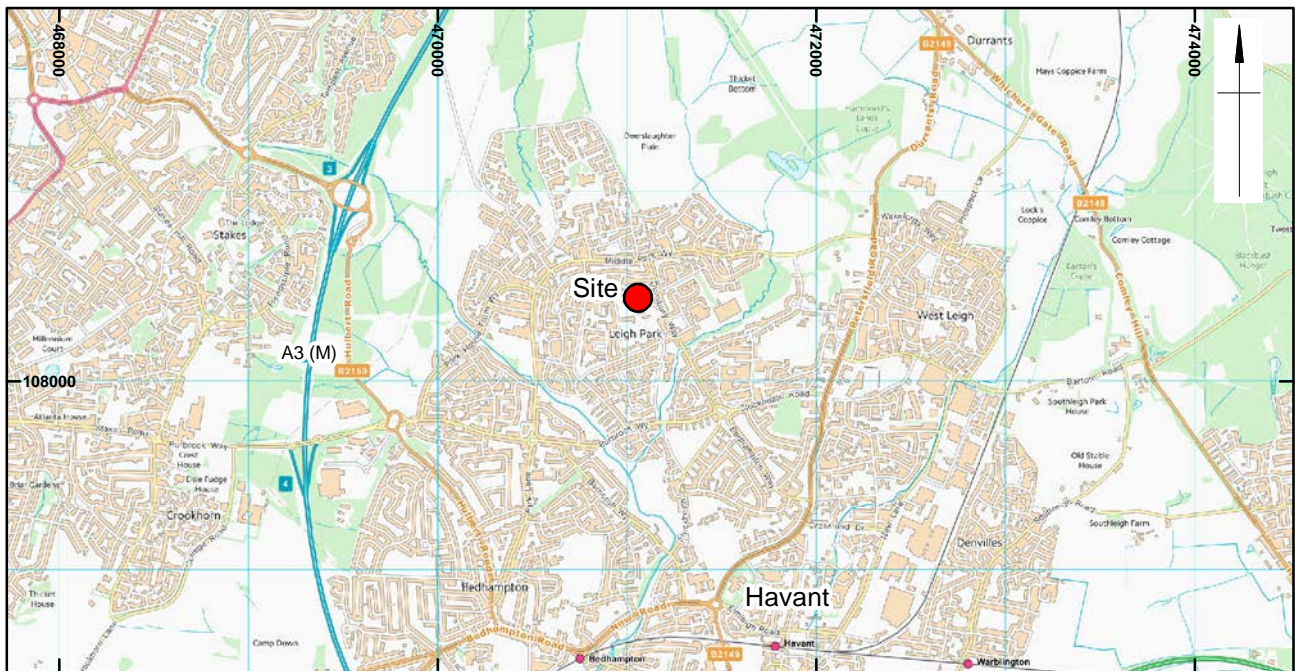
Site Address	Kingsclere Avenue, Havant, Hampshire			Postcode	PO9 4RZ
County	Hampshire	District	Havant	Parish	Havant
Study Area	1.4 ha	Height OD	17 – 19 m aOD	NGR	471050, 109450

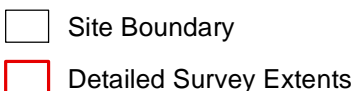
Project Creators:

Name of Organisation		Wessex Archaeology			
Project brief originator		Feltham Construction Ltd.	Project design originator		Wessex
Project Manager		Ruth Panes	Project Supervisor		Rok Plesnicar
Sponsor or funding body		Portsmouth City Council	Type of Sponsor		

Project Archive and Bibliography:

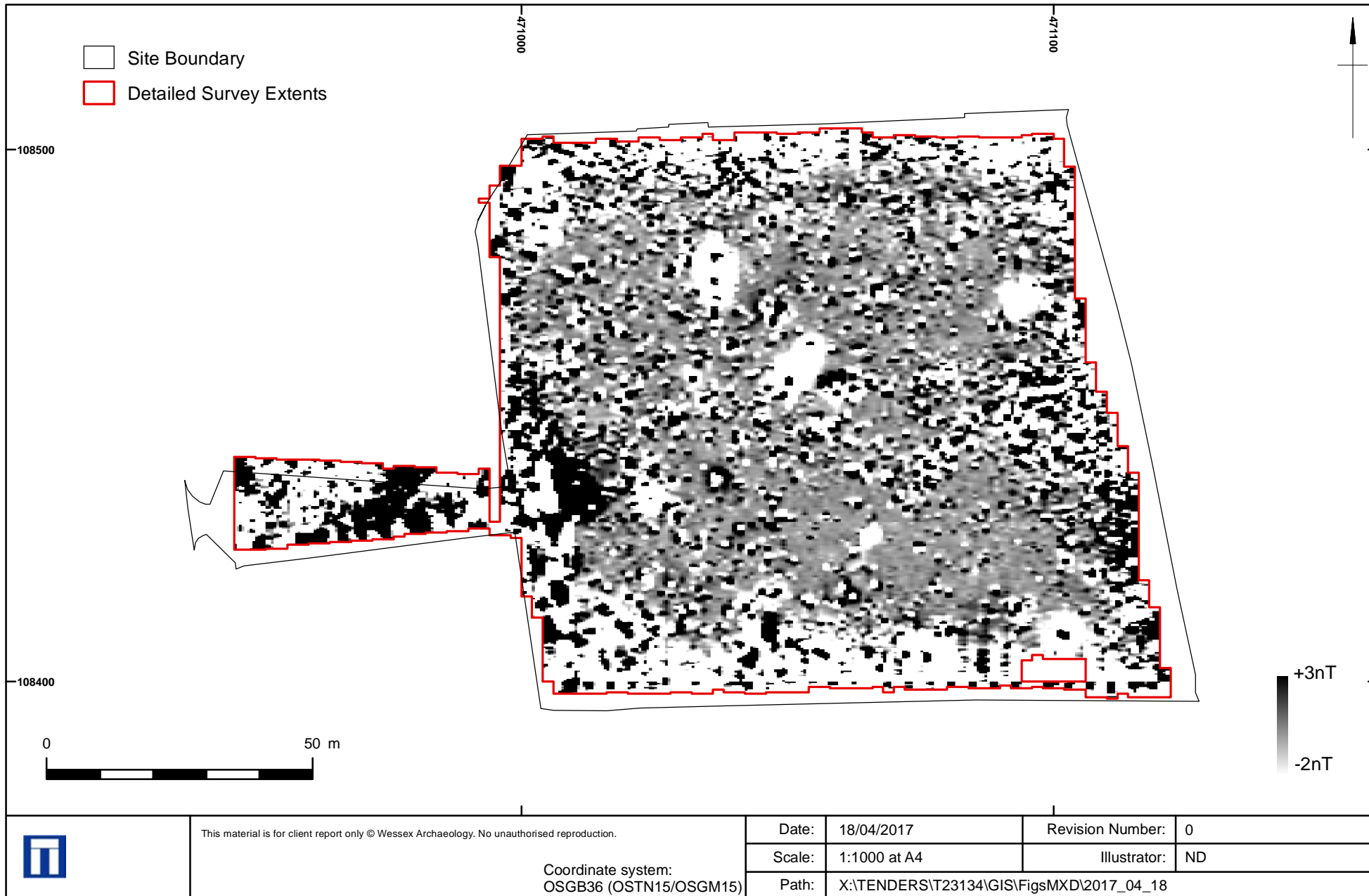
Physical archive	N/A	Digital Archive	Geophysics, survey and report	Paper Archive	N/A
Report title	Kingsclere Avenue, Havant, Hampshire			Date	2017
Author	Wessex Archaeology	Description	Unpublished report	Report ref.	113061.04



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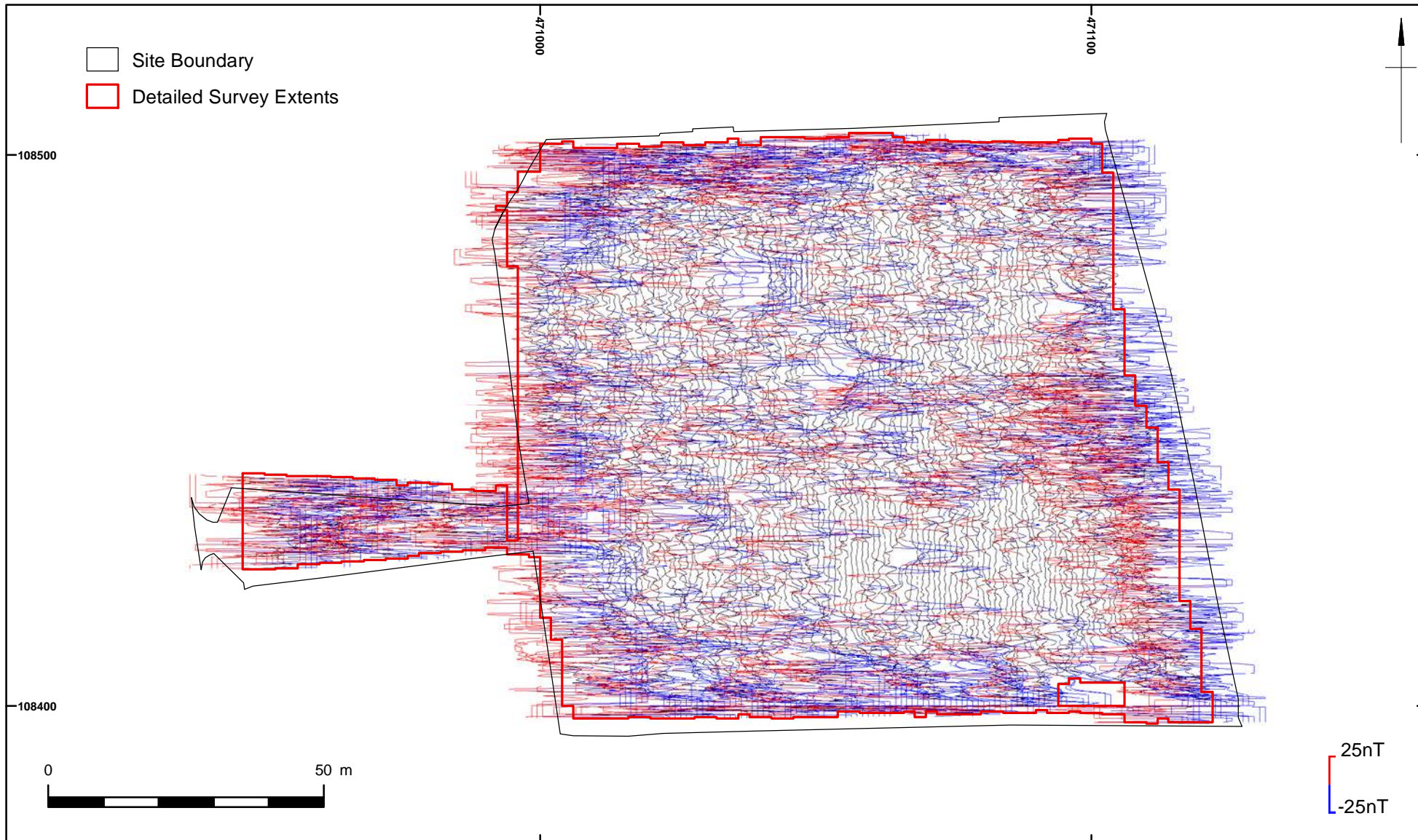
Site location


Figure 1




Greyscale plot

Figure 2



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