Land off Longleaze Lane, Melksham, Wiltshire

Detailed Gradiometer Survey Report

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Document Information

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Document subtitle	Detailed Gradiometer Survey Report
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Commissioned by	Aspire LPP Ltd
Address	Castle Court 41 London Road Reigate Surrey RH2 9RJ
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County	Wiltshire
National grid reference	391370 163100 (ST 91370 63100)
WA project name	Land off Longleaze Lane, Melksham
WA project code	282201
Date of fieldwork	26/06/2023
Fieldwork directed by	Jake Bishop
Project management by	Tom Richardson
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Quality Assurance

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Summary

A detailed gradiometer survey was conducted over land at Land off Longleaze Lane, Melksham (centred on NGR 391390, 163102). The project was commissioned by Aspire LPP 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 as a care home for the elderly.

The site comprises grassland located off of Longleaze Lane, covering an area of 0.7 ha. The geophysical survey was undertaken on 27/06/2023.

The gradiometer survey has not identified any anomalies that can confidently be interpreted as archaeology. A possible former field boundary identified in the southern portion of the site could indicate a past field arrangement that predates available maps. However, it could equally relate to a service.

The remaining anomalies relate to a former footpath, a former field boundary, and a modern service.

Acknowledgements

Wessex Archaeology would like to thank Aspire LPP Ltd for commissioning the geophysical survey. The assistance of Ryan Nicholls is gratefully acknowledged in this regard.

The fieldwork was undertaken by Jake Bishop and Callum Jervis. Rok Plesnicar processed, and Pamela Warne interpreted the geophysical data. Pamela Warne wrote the report with contributions from Rok Plesnicar. The geophysical work was quality controlled by Lydia Jones. Illustrations were prepared by Rok Plesnicar. The project was managed on behalf of Wessex Archaeology by Patricia Edwards.

Land off Longleaze Lane, Melksham, Wiltshire

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Aspire LPP Ltd to carry out a geophysical survey at land off of Longleaze Lane, Melksham, Wiltshire (centred on NGR 391370 163100) (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of a planning application for the development of the site as a care home for the elderly.

1.2 Scope of document

1.2.1 This report presents a brief description of the methodology followed by the detailed survey results and the archaeological interpretation of the geophysical data.

1.3 The site

1.3.1 The site is located in the town of Melksham, 15 km east of Bath, in the county of Wiltshire.

1.3.2 The survey comprises 0.7 ha of grassland, currently utilised as a playing field. The site is bounded by residential houses to the north and west of the site, with further agricultural land to the east and south.

1.3.3 The site is situated in a flat landscape, 41 m above Ordnance Datum (aOD).

1.3.4 The solid geology comprises Mudstone of the Oxford Clay Formation with no overlaying deposits recorded (BGS 2023).

1.3.5 The soils underlying the site are likely to consist of stagnogley soils of the 711f (Wickham 3) association (SSEW SE Sheet 5 1983). Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 The following historical and archaeological background has been compiled using publicly available online resources, combined with the results of Wessex Archaeology's previous investigations in the area, and in-house resources. The background covers the survey area and a 500 m area around it, examining the potential for the survival of buried archaeological remains.

2.2 Summary of the archaeological resource

2.2.1 There are seven Grade II Listed buildings within 500 m of the survey area. These include Bowerhill Lodge Farmhouse (NHLE 1021767) and the associated Gatepiers (NHLE 1021768).

2.2.2 Iron Age four-post structures were found during excavation 410 m south-west of the site and are thought to date from 800 BC to 42 AD. Several pits dating to the same period were found on the same site.

2.2.3 A possible Late Iron Age to Romano-British enclosure is located 850 m to the south-east of the site.

2.2.4 A Romano-British settlement was identified 90 m to the east of the site by a geophysical survey. Further evaluation suggests that the site was occupied in the 2nd and 3rd centuries.

2.2.5 A number of ditches and pits found during the excavation 410 m south-west of the site were identified as Romano-British in origin.

2.2.6 The evidence of a medieval ridge and furrow field system is visible as a series of earthworks on air photographs and lidar 500 m south-east of the site. Additionally, further evidence of Medieval ridge and furrow is noted across the wider landscape in the HER data.

2.2.7 A demolished 19th century outfarm of loose courtyard plan was located 20 m to the east of the site.

2.2.8 The site of a demolished Outfarm is located 50 m to the east of the site.

2.2.9 A Second World War RAF camp is located 600 m to the south of the site.

2.2.10 A geophysical survey 475 m south-west of the site identified a number of undated pits and ditches. Additionally, a collection of undated pits and ditches were identified by a geophysical survey 180 m to the south of the survey area.

3 METHODOLOGY

3.1 Introduction

3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team on 26 June 2023. Field conditions at the time of the survey were dry throughout the period of the survey. An overall coverage of 0.56 ha was achieved. The reductions represent areas with obstructions such as vegetation and buildings on site.

3.1.2 The methods and standards employed throughout the geophysical survey conform to current best practice, and guidance outlined by the Chartered Institute for Archaeologists' (CIfA 2014) and European Archaeologiae Consilium (Schmidt *et al.* 2015).

3.2 Aims and objectives

3.2.1 The aims of the survey comprise the following:

- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource within a specified area using appropriate methods and practices; and

- To inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

3.2.2 In order to achieve the above aims, the objectives of the geophysical survey are:

- To conduct a geophysical survey covering as much of the specified area as possible, allowing for on-site obstructions;

- To clarify the presence/absence of anomalies of archaeological potential; and

- Where possible, to determine the general nature of any anomalies of archaeological potential.

3.3 Fieldwork methodology

3.3.1 The cart-based gradiometer system used a Carlson BRX-7 RTK GNSS instrument, which receives corrections from a network of reference stations operated by the Ordnance Survey (OS). Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds European Archaeologiae Consilium recommendations (Schmidt et al. 2015).

3.3.2 The detailed gradiometer survey was undertaken using four Sensys FGM650/3 magnetic gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of ±8 µT over ±1000 nT range at a rate of 100 Hz, producing intervals of 0.02 m along transects spaced 4 m apart.

3.4 Data processing

3.4.1 Data from the survey were subjected to minimal correction processes. These comprise a 'Destripe' function (±5 nT thresholds), applied to correct for any variation between the sensors, and an interpolation used to grid the data and discard overlaps where transects have been collected too close together.

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, along with modern service, a former field boundary and increased magnetic response. Results are presented as a series of greyscale plots and archaeological interpretations at a scale of 1:500 (**Figures 2** to **3**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale image.

4.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous responses, burnt or fired objects, and magnetic trends (**Figure 3**). 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 A strong positive linear anomaly has been identified in the southern portion of the survey area at **4000** (**Figure 3**). It is 2 m wide and traverses the site on a south-west to north-east orientation. It appears to be truncated after 40 m for 1.5 m, from where it continues for 25 m to the survey extent. This could indicate a ditch-like feature, likely a former field boundary that predates the available mapping, however, it could just as well be a result of modern services and as such archaeologically irrelevant.

4.2.2 A negative linear anomaly at **4001** is located in the northern part of the survey area (**Figure 3**). It is 1.5 m wide and up to 31 m long, and indicates a bank feature or compacted material of lower magnetic values. This feature is likely to be associated with a former public footpath which ran across the site.

4.2.3 A strong positive linear anomaly at **4002** has been detected traversing the site on an east – west orientation (**Figure 3**). It is up to 3 m wide and indicates an old field boundary which was identified on an 1886 Ordnance survey map.

4.2.4 An area of increased magnetic response at **4003** has been identified along the northern edge of the survey area (**Figure 3**). It indicates man-made ground.

4.2.5 A strong positive linear anomaly at **4004** has been identified traversing the northern part of the survey area (**Figure 3**). It relates to a modern sewage service on utility plans.

4.2.6 The remaining anomalies indicate weak positive linear trends that are too weak for a confident interpretation.

5 DISCUSSION

5.1.1 The gradiometer survey has not identified any anomalies that can confidently be interpreted as archaeology. A possible former field boundary identified in the southern portion of the site could indicate a past field arrangement that predates available maps. However, it could equally relate to a service.

5.1.2 The remaining anomalies relate to a former footpath, a former field boundary, and a modern service.

REFERENCES

British Geological Survey 2023. *Geology of Britain Viewer* http://mapapps.bgs.ac.uk/geologyofbritain/home.html (accessed June 2023).

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Online resources

Archaeology Data Service (accessed June 2023) Archaeology Data Service

British Geological Survey Geology of Britain Viewer (accessed June 2023) http://mapapps.bgs.ac.uk/geologyofbritain/home.html

Heritage Gateway (accessed June 2023) Heritage Gateway - Search

Know your Place (accessed June 2023) Know Your Place (kypwest.org.uk)

National Library of Scotland (accessed June 2023) Georeferenced Maps - Map images - National Library of Scotland (nls.uk)

APPENDICES

Appendix 1 Survey equipment and data processing

Survey methods and equipment

The magnetic data for this project were acquired using a non-magnetic cart fitted with four SenSys FGM650/3 magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 0.6 m 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 ±8 µT over ±1000 nT range. All of the data are then relayed to a CS35 tablet, running the MONMX program, which is used to record the survey data from the array of FMG650/3 probes at a rate of 100 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Leica Captivate system with rover and base station. This 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 European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015) for geophysical surveys.

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 0.01 m intervals along traverses spaced up to 0.25m apart.

Post-processing

The magnetic data collected during the detailed survey is downloaded from Bartington and Sensys systems for processing and analysis using 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:

- GPS DeStripe – Determines the median of each transect and then subtracts that value from each datapoint in the transect. May be used to remove the striping effect seen within a survey caused by directional effects, drift, etc.

- GPS Base Interpolation – Sets the X & Y interval of the interpolated data and the track radius (area around each datapoint that is included in the interpolated result).

- Discard Overlaps - Intended to eliminate a track(s) that have been collected too close to one another. Without this, the results of the interpolation process can be distorted as it tries to accommodate very close points with potentially differing values.

Typical displays of the data used during processing and analysis:

- 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.

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.
-

Appendix 3 OASIS Form

OASIS ID (UID)	wessexar1-517563
Project Name	Geophysical Survey at Land off Longleaze Lane, Melksham, Wiltshire
Sitename	Land off Longleaze Lane, Melksham, Wiltshire
Sitecode	282201
Project Identifier(s)	282201, Document titleLand off Longleaze Lane, Melksham, Wiltshire
Activity type	Geophysical Survey, MAGNETOMETRY SURVEY
Planning Id	
Reason For Investigation	Planning: Pre application
Organisation Responsible for work	Wessex Archaeology
Project Dates	26-Jun-2023 - 26-Jun-2023
Location	Land off Longleaze Lane, Melksham, Wiltshire NGR : ST 91372 63113 LL : 51.36700857379239, -2.125326940456523 12 Fig : 391372,163113
Administrative Areas	Country : England County : Wiltshire District : Wiltshire Parish : Melksham Without Parish : Melksham
Project Methodology	The cart-based gradiometer system used a Carlson BRX-7 RTK GNSS instrument, which receives corrections from a network of reference stations operated by the Ordnance Survey (OS). Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds European Archaeologiae Consilium recommendations (Schmidt et al. 2015). The detailed gradiometer survey was undertaken using four Sensys FGM650/3 magnetic gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of ±8 µT over ±1000 nT range at a rate of 100 Hz, producing intervals of 0.02 m along transects spaced 4 m apart.

Project Results	The gradiometer survey has not identified any anomalies that can confidently be interpreted as archaeology. A possible former field boundary identified in the southern portion of the site could indicate a past field arrangement that predates available maps. However, it could equally relate to a service. The remaining anomalies relate to a former footpath, a former field boundary, and a modern service.
Keywords	
Funder	Private or public corporation Aspire LPP Ltd
HER	Wiltshire and Swindon HER - unRev - STANDARD
Person Responsible for work	Patricia Edwards
HER Identifiers	
Archives	

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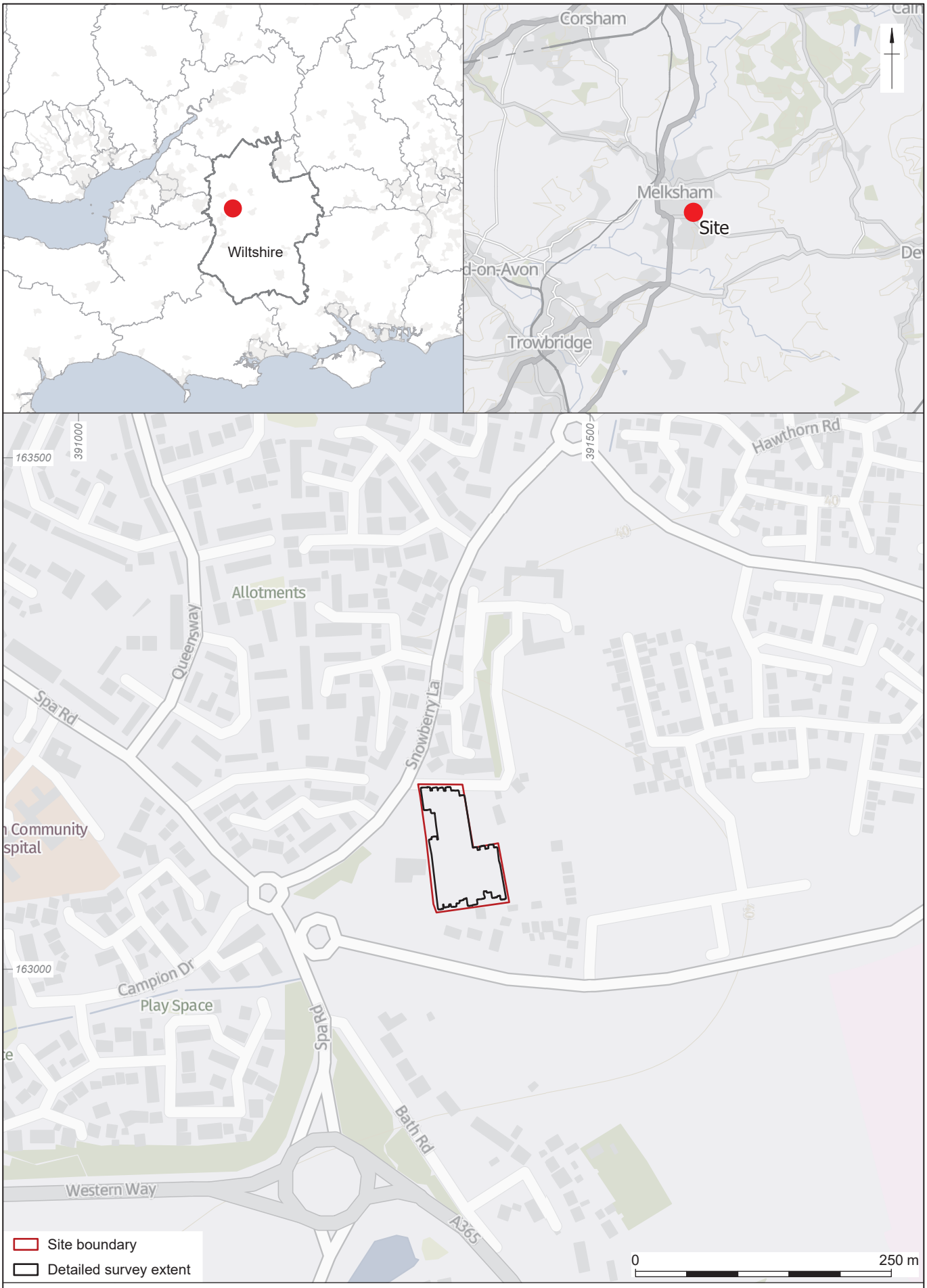

Coordinate system: OSGB 1936 British National Grid

Date: 14/07/2023	Created by: RP	Revision: 0	Scale: 1:5,000 at A4

Figure 1: Site location and survey extents

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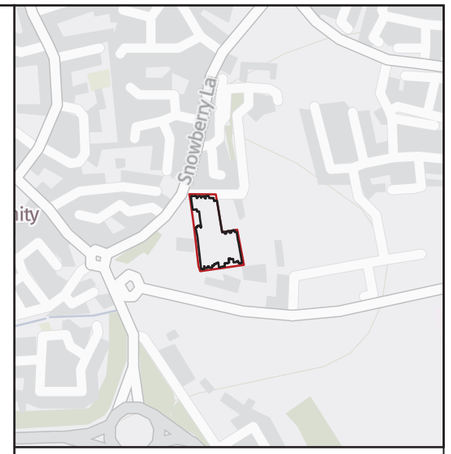
391350
391400
391450
163150
163100
163050



Site boundary
Detailed survey extent

-2 nT
3 nT

0
25 m

Date: 03/07/2023	Created by: RP	
Scale: 1:500	Revision: 0	

Figure 2: Preliminary detailed gradiometer survey results: overall greyscale plots (-2nT to 3nT)

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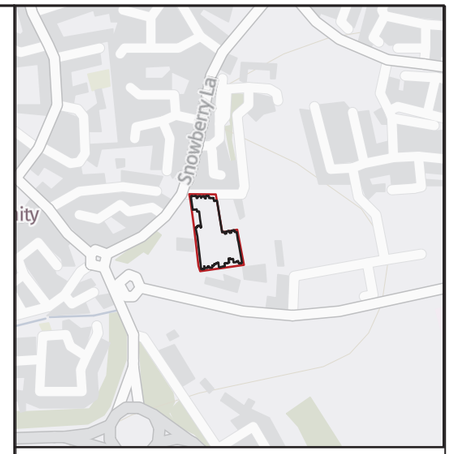
4004
4002
4000



Site boundary
Detailed survey extent
Possible archaeology
Historic landscape feature
Former field boundary
Trend
Increased response
Ferrous
Modern service

0
25 m

Date: 04/07/2023 | Created by: RP

Scale: 1:500 | Revision: 0

Figure 3: Detailed gradiometer survey results: interpretation

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