Brookpit Lane, Climping, West Sussex

Detailed Gradiometer Survey Report

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wessexarchaeology

Portway House
Old Sarum Park
Salisbury
SP4 6EB

www.wessexarch.co.uk

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Document compiled by	Lydia Jones
Contributions from	Jo Instone-Brewer & Pamela Warne
Graphics by	Lydia Jones

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1	29/09/2023	Lydia Jones (LJ)	 TR

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Summary

A detailed gradiometer survey was conducted over land at Brookpit Lane, Climping, West Sussex (centred on NGR 500632 101532). The project was commissioned by The Baird Farming Partnership 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.

The site comprises an arable field located 630 m south of Climping in West Sussex, covering an area of 11.4 ha. The geophysical survey was undertaken on 22 – 23 August 2023.

The gradiometer survey has identified archaeological activity in the centre and south of the survey area which pertains to a settlement bounded by a ditched, and at points, double-ditched enclosure. A trackway runs through the centre, and further trackways are seen outside of the settlement. In the north the settlement is characterised by densely spaced ditched rectilinear features internally sub-divided into smaller areas, likely habitation features. The south of the settlement consists of a large enclosure with internal subdivisions and an area of possible industrial activity. Both areas contain possible hearths or areas of burning, as well as pit features likely used for rubbish disposal or as post-holes.

More enclosures, likely used for animal management are seen to the south-west, south, and north-east of the settlement. Pit features, either used for rubbish disposal or small-scale extraction have been identified outside the settlement.

Given the regular mainly rectilinear morphology of the settlement and the Romano-British settlement discovered in a field to the north it is likely that this is an enclosed multi-phase settlement and associated field systems possibly of Romano-British date. However, given the surrounding medieval history of the area continued use into the medieval period may have occurred. Further investigation would be needed to accurately date the settlement and associated features.

North-east of the settlement enclosing ditch is a ring ditch. This is likely to be a round house gully or enclosure dating from the Bronze Age to Romano-British period. Further investigation would however be needed to confirm this interpretation.

The remaining anomalies detected were natural variations in the underlying deposits, modern cultivation, and magnetic enhancement of a likely modern origin on the edges of the field.

Acknowledgements

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The fieldwork was undertaken by Pamela Warne and Andrew Marke. Lydia Jones processed and interpreted the geophysical data and prepared the illustrations. Lydia Jones wrote the report with wrote the report with the assistance of Jo Instone-Brewer. The geophysical work was quality controlled by Brett Howard. The project was managed on behalf of Wessex Archaeology by Tom Richardson.

Brookpit Lane, Climping, West Sussex

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by The Baird Farming Partnership to carry out a geophysical survey at Brookpit Lanes, Climping, West Sussex (centred on NGR 500632 101532) (**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.

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 at the southern side of the village of Climping 2.3 km to the west of Littlehampton, and 3.3 km to the south-east of Yapton. It is 500 m north of the southern coastline and the meandering course of the River Arun flows 1 km to the north-east and east of the site.

1.3.2 The survey comprises 11.5 ha of agricultural land, currently utilised for crop. The site is bounded by the further agricultural fields, a school and farm buildings to the north, agricultural fields to the west and residential house to the east with further agricultural land to the south, leading to the coastline.

1.3.3 The site is relatively flat at 3 – 6 m above Ordnance Datum (aOD), though the eastern part of the site is slightly lower-lying.

1.3.4 The solid geology comprises undifferentiated Chalk of the Lewes Nodular, Seaford, Newhaven, Culver, and Portsdown Chalk Formations. This is overlain by superficial deposits comprising Raised Beach Deposits of Sand and Gravel (BGS 2023).

1.3.5 The soils underlying the site are likely to consist of argillic brown earths of the 571s (Efford 1) association (SSEW SE Sheet 6 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 Archaeological backgrounds were prepared by Wessex Archaeology (2021a, 2021b) ahead of work on an area to the north of the site. These archaeological backgrounds were based on the findings of an archaeological desk-based assessment (DBA) prepared by Archaeology South-East (2016). The following background is not exhaustive but is

summarised from aspects of the archaeological backgrounds and DBA that are considered relevant to the interpretation of the geophysical survey data.

2.2 Summary of the archaeological resource

Listed buildings

2.2.1 St Mary's Church (NHLE 1027640), a Grade I listed building in the centre of Climping 1 km north of the site was established by the 1080s, but the earliest parts of its fabric date to the late 12th century. Remains associated with the deserted (or shrunken) medieval village of Climping (NHLE 1005828) lie immediately to the south and east of the church. These include well-preserved earthworks relating to house platforms, depressions, banks, and a metalled trackway. Climping also contains three Grade II listed buildings, all within the study area: the vicarage (NHLE 1027641); a barn (NHLE 1027642); and a building called Church Farmhouse, now split into two properties (NHLE 1027643).

2.2.2 Adjacent to the site on the north-eastern edge lies Kent's Farm containing three listed buildings, the farmhouse (NHLE 1027674), dairy cottages (NHLE 1233446), and barn (NHLE 1233447), all of 18th century build. It is likely they are associated with the 18th century Brookspits Cottage (NHLE 1276603) and the late 16th century Brookspits Manor (NHLE 1353858) just 200 m to the north-east of the farm, all Grade II listed.

2.2.3 A Grade II windmill built in 1799 lies 950 m to the south-east, now transformed into a house (NHLE 1027639).

2.2.4 800 m to the south-west, six structures are Grade II listed and three Grade II* listed owned collectively by Bailiffscourt Hotel and Country Club (NHLE 1027676), a 20th century reconstruction in late medieval Cotswold style. The site was built in the grounds of a medieval Benedictine Grange (MTN 392811), of which the only remains are the moat and the 13th century chapel (NHLE 1233450). All the other buildings have been transplanted from other areas of England and reconstructed here in the 18th century. From north-east to south-west: a dovecote (NHLE 1353880), stables (NHLE 135379), gatehouse (NHLE 1027637), two outbuildings (NHLE 1027638; 1027677), cottage (NHLE 1276596) and guest house (NHLE 1274459), with the hotel at the southern-most point.

2.2.5 500 m to the west Climping Street runs north-west to south-east and hosts four Grade II listed 18th century buildings: three cottages on the northern stretch (NHLE 1353859 1233449; 1027675) and the public house The Black Horse in the centre of Atherington (NHLE1353860).

Archaeological and historical context

Palaeolithic

2.2.6 Pleistocene river terrace gravels and raised beach deposits of West Sussex are of substantial importance in terms of Palaeolithic and Quaternary studies. In particular, the Raised Beach deposits, which lie in excess of 30 m aOD on the Upper Coastal Plain, to the north, are well-known for the internationally important in situ Lower Palaeolithic site at Boxgrove. By contrast, the deposits of the Lower Coastal Plain are less archaeologically prolific. Although undifferentiated by the BGS, the raised beach deposits beneath the development area perhaps belong to the late Wolstonian Brighton-Norton Raised Beach, which occurs between Brighton and Portsmouth at 5 – 9 m aOD (Timpany 2009, 18). Very little archaeological material has been retrieved from the Norton Raised Beach deposits, although occasional re-worked artefacts have been reported (ibid.). A possible Palaeolithic worked flint flake was found to the north-east of the site in the late 1990s, although its precise provenance is unclear.

Prehistoric

2.2.7 Evidence of Mesolithic activity in the vicinity of the site is insubstantial, consisting primarily of assemblages of diagnostic worked flint found north of the development area at the former Ford Airfield, and to the north of the site during the installation of the Bognor Regis and Littlehampton Transfer Pipelines. Small amounts of Neolithic flintwork were found residually during these investigations. Small amounts of Neolithic flint were also found in excavations in a field 250 m to the north of the site (WA 2021b).

2.2.8 Excavations at Bailiffscourt Hotel in 2003 revealed a ditch, gully, and burnt and unburnt flints of indetermined prehistoric date, 800 m south-west of the site (Griffin 2003).

2.2.9 Fragments of two Late Bronze Age vessels and small amounts of Bronze Age flintwork have been discovered during excavation (WA 2021b) in a field 250 m to the north of the site. A potential Late Bronze Age hoard was also discovered on the beach 1 km south of the site consisting of a socketed axe, gouge, ring, and some slag (MTN 392893), and probably Bronze Age features were recorded in the grounds of Bailiffscourt Hotel in 2002. Cremation urns, associated finds, pits, postholes, and enclosure ditches were found in the wider area at the former Ford Airfield 2 km north of the site (MWS9678).

2.2.10 Small numbers of potentially later Bronze Age features, predominantly ditches, have been recorded during investigations to the north at the former Cropthorne nursery site, and to the north at Waterford Gardens, Horsemere Green Lane (Archaeology South-East 2000a; 2001). Other inconclusively dated, but probable prehistoric finds and features, including a 'V-shaped' ditch, have been found during archaeological work also north of the site at the former Cresswood Mushroom Farm (Archaeology South-East 2000b) and the Waterford Gardens sites on Horsemere Green Lane.

Iron Age – Romano-British

2.2.11 Extensive settlement activity dating from the Iron Age to Romano-British period was discovered 250 m to the north of the site in the form of a ladder-type settlement, field systems, double ditched enclosure, trackways and associated ditches, numerous pits and postholes (WA 2021a, 2021b). Previously Iron Age activity only consisted of a copper alloy harness fitting found 1 km north of the site (MWS7704), and Roman activity had been findspots of pottery on the beach (MWS3459) and ditches containing roman material, including a jar found at Bailiffscourt Hotel (Griffin 2003). However, a Roman silver coin hoard was discovered 900 m south-west of the site in the field adjacent to Bailiffscourt Hotel (MWS7072) consisting of 88 denarii dating from the 1st and 2nd centuries, buried around 141 AD.

Early medieval – medieval

2.2.12 There is sparse evidence of Saxon activity in the wider area, comprising just a few sherds of pottery and a possible ditch (MWS 6777; 7003). However, the Domesday Survey of 1086 contains entries referring to two estates associated with the name Climping.

2.2.13 The site of the deserted medieval village (DMV) Islesham (MTN 392880) and its church (MWS3100) are most likely located near the junction of Brookpit Lane and Ferry Road just north-east of the site.

2.2.14 Atherington to the south-west extended further south than it does currently, shown on a 1616 map reaching into what is now the English Channel. Building remains and sometimes graves can be seen at low tide 1 km south of the site (MTN 392896).

2.2.15 Another DMV lost to the sea was known as Cudlow (MTN 392881), which, although outside of the study area, may have a lasting effect on the surrounding landscape due to its nature as a port with potential for channels and water ways in the south of the survey area.

2.2.16 In a field 250 m to the north of the survey area a single piece of medieval roof tile, two pottery sherds and a clay pipe stem were discovered. Many of these were discovered in the topsoil indicating that the area was agricultural through the medieval period. A belt mount was also found, the type typically dated to the late Romano-British to early medieval periods (WA 2021b).

Post-medieval - modern

2.2.17 Eight World War II monuments still remains on the beach 1 km south of the site, including tank traps (MTN 1419356), walls and trenching (MTN 1422456) and heavy anti-aircraft battery (Littlehampton L2).

2.2.18 In the 1879 Six Inch OS map (LXIII) the field is split into four smaller fields, with a right of way crossing the site from the south – north, and centre of the site to the west. The east – west stretch of the public right of way is visible on satellite imagery (Google Earth 2023) as presently running across the centre of the site north-east to south-west from Lower Dairy Barn on Kent's Farm to join up with a track on the adjacent field to the west. The position and shape of the footpath looks to have shifted slightly over time. The track formerly split off in the centre of the field towards the south, though by 1913 this appears to have been abandoned. By the 1899 Six Inch OS map (Sussex LXXV.NW) the field boundaries have been removed and the field is in its current form.

2.3 Recent investigations in the immediate area

Geophysical survey

2.3.1 A detailed gradiometer survey and a subsequent excavation were undertaken by Wessex Archaeology, 250 m to the north of the site. The detailed gradiometer survey identified an extensive range of archaeological features that likely cover multiple periods of activity. This is predominantly associated with a palimpsest of conjoined or overlapping ditched enclosures. In the eastern part of the site, this is thought to be associated with a ladder or ribbon settlement, most likely attributable to the Iron Age or Romano-British period. In the western part of the site, two further concentrations of enclosures have been defined, which are also thought to relate to settlement activity dating to these periods. These enclosures are seemingly interconnected by a branching, parallel-ditched trackway, or road system, which traverses the site (Wessex Archaeology 2021a).

Excavation

2.3.2 Following the detailed gradiometer survey in 2020, Wessex Archaeology undertook an excavation at the same site in 2021. Extensive settlement activity dating from the Iron Age to Romano-British period was discovered in the form of a ladder-type settlement, field systems, double ditched enclosure, trackways and associated ditches, numerous pits, and postholes. Some medieval artefacts were found however they are limited and mainly found in the topsoil (Wessex Archaeology 2021b).

3 METHODOLOGY

3.1 Introduction

3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 22 – 23 August 2023. Field conditions at the time of the survey were dry throughout the period of survey. An overall coverage of 10.5 ha was achieved, with reductions due to a trackway to the west of the site and ground conditions in the north-west corner.

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 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 hand-pushed cart. Data were collected at a rate of 20 Hz and interpolated to 0.1 m intervals along transects spaced 1 m apart, in accordance with European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015).

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. Results are presented as a series of greyscale plots, and archaeological interpretations at a scale of 1:2000 (**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 The geophysical survey has identified a number of features that are likely to be associated with archaeological remains. These linear and curvilinear ditch features and smaller pit features are predominantly located in the centre and south of the site. They are associated with a complex settlement and surrounding embankment. Other anomalies of geological and modern origin have also been detected.

4.2.2 A weak positive curvilinear anomaly has been detected in the centre of the site at **4000**. It runs for 120 m south-west to north-east, it then turns towards the east for 64 m where it curves giving the northern side a slightly pointed shape. It then turns to the south for 38 m. It may continue southwards for a further 35 m at **4001** however the anomaly here is much weaker and harder to define. **4000** measures between 1.7 m and 8.1 m wide. At the north-western and north-eastern corners of **4000** two other anomalies have been detected at **a** and **b**. They are weak positive anomalies and are 110 m and 73 m long respectively. They are between 0.6 m and 3 m wide. They run parallel to **4000**, to the south and north, following its shape, likely forming a second ditch line. **4000** encloses an area measuring 230 m x 160 m within which a multitude of other archaeological anomalies indicative of a settlement are contained. **4000** is an enclosing ditch, potentially at one point having been double-ditched (**a** and **b**). There is no enclosing ditch evident to the south and west, this may be due to poor preservation, however it is also possible it is outside of the area of survey, and potentially where the current field boundaries are.

4.2.3 To the south, and so within the enclosing ditch, of **4000** are two positive linear parallel anomalies at **4002**. They are discontinuous at various points however look to cross the centre of **4000** on a south-east to north-west orientation. They cross an area of 175 m in length and are spaced 2.5 m – 3 m apart. They are for the majority between 0.5 m and 1.5 m wide however at the western end the southern anomaly is larger where it extends to

5 m. They are typical of ditched features and at points appear to form the edges of enclosures and settlement features immediately to their north and south. The central section of **4002** is less clear due to the density of the surrounding enclosures. The eastern end terminates at the edge of the survey area beyond the bounds of the enclosing ditch of **4000** and may continue beyond the survey extent. The western end looks to respect **4000**, however a single ditched feature 85 m long and 1.5 m wide seen at **4003** may be a continuation of it. It is considered likely that this is a double-ditched trackway used to cross the area contained within **4000**. The edges of this track look to have formed the edges or boundaries of the enclosures and settlement features to the north and south. The south-eastern half of **4002** follows the same route as a field boundary marked on the 1879 Six Inch OS mapping (Sussex LXXVI), whilst it is possible that this is a field boundary of a later date than the settlement, it may also be that the ditches and/or route were later repurposed to create a boundary.

4.2.4 The trackway at **4002** appears to delineate the area enclosed within **4000** in to two areas, to the north and south. To the north is an area covering 136 m x 814 m (**4004**). **4004** contains a dense concentration of positive mainly linear anomalies that sub-divide it into smaller rectilinear areas. The anomalies are 10 m – 74 m long by 0.5 m – 2 m wide and are oriented north-north-east to south-south-west and north-west to south-east. They are typical of ditched features and form at least six rectilinear areas that cover areas between 21 m x 31 m and 67 m x 54 m.

4.2.5 Within these rectilinear features are numerous smaller linear and curvilinear positive anomalies which may relate to further ditched sub-divisions and internal features, as well as discrete anomalies possibly used as pits for rubbish disposal or post holes. A clear example of this is at **c** in the south-east corner of **4004**. Linear anomalies form a rectilinear area covering 20 m x 69 m. The trackway at **4002** appears to either form the southern boundary to **c** or may cross through it. Numerous discrete pit-like anomalies 0.9 m – 1.7 m in diameter have been detected which may be post-holes or pits for rubbish disposal. A larger positive anomaly covering an area of 5.7 m x 5.5 m is located in the north of **c** which may relate to a larger pit or ground disturbance. Several linear anomalies cross the area on various orientations either forming further sub-divisions or internal features.

4.2.6 Within **4004** are numerous strong positive and negative discrete anomalies. The clearest example is at **d**. Their magnetic properties are typical of areas of burning. Whilst they may relate to more modern activities, it is also possible they are areas of hearths or small scale industrial activity.

4.2.7 Given the morphology of the internal rectilinear features of **4004** and the dense concentration of anomalies it is considered likely that these are settlement features of Romano-British date. Whilst further investigation would be needed to accurately date this, the excavation of a late prehistoric to Romano-British settlement 250 m to the north supports this theory.

4.2.8 To the south of **4002** is a positive rectilinear anomaly typical of a ditched feature (**4005**). It is 0.5 m – 5.7 m wide and oriented north-north-east to south south-west and north-west to south-east, similar to **4004**. It forms a square enclosure covering an area of 100 m x 112 m with its northern boundary formed by the trackway at **4002**. There is a gap of 42 m at its north-western extent, and one of 5 m to its north. These may be due to poor preservation or may have been an entrance ways. Within this enclosure are numerous linear, curvilinear, and discrete features, however these are noticeably less numerous than in **4004**. Two sets of parallel linear anomalies measuring between 21 m – 30 m long and 1 m wide have been detected at **e** and **f**. Each set runs parallel to each other spaced 5 m apart and are oriented north-west to south-east. Whilst **e** and **f** are currently separated by a 28 m gap they may at one point have formed one trackway across the enclosure.

4.2.9 Further linear anomalies appear to form subdivisions within **4005**. A clear example of this is at **g** where a curvilinear anomaly measuring 55 m long by 2 m – 7 m wide encloses the south-west corner. This curvilinear morphology is different to the other linear anomalies in form, which may suggest a different phase or purpose to the enclosed area.

4.2.10 Numerous discrete pit-like anomalies 0.5 m – 2.5 m in diameter have been detected within **4005**. Some clear examples of these are at **h** and **i** which may be post-holes or rubbish disposal, however a geological origin such as natural pitting is also possible. Two magnetically strong anomalies at **j** and **k** have been detected which are typical of thermoremanent responses and are likely to have been areas of burning such as hearths.

4.2.11 The enclosure and interior features at **4005** are likely Romano-British in date based on morphology and layout however the anomalies are noticeably less dense than **4004** and it is not clear if the usage was for settlement or other associated activity such as animal management.

4.2.12 An area of high magnetic response has been detected in the south-west corner of **4005** at **l**. It covers an area of 20 m x 55 m and its strong signal obscures some of the ditch features surrounding it. Given its strength it may be modern in origin such as a damaged buried pipe or agricultural waste, however an archaeological origin, specifically industrial activity using high temperatures is also possible.

4.2.13 Further positive linear anomalies forming rectilinear and partial rectilinear ditched features have been detected in the south at **4006** and **4007**. They are on the same north-north-east to south-south-west and north-west to south-east alignment as **4004** and **4005**. Their full size is not discernible as they appear to continue past the edge of the survey extent, however they are 1 m – 2.5 m wide. They are likely further ditched enclosures for settlement or agricultural purposes. At **4006** the ditched feature crosses into **4005** and it is not immediately clear whether this is a different phase of overlapping enclosure or if it forms a further internal subdivision of **4005**.

4.2.14 Immediately to the south-east of **4005** several positive linear anomalies have been detected at **4008**. They are between 22 m – 157 m long by 0.5 m – 4 m wide. They are typical of ditched features. They extend from **4005** on a north-west to south-east orientation with at least one linear running north-north-east to south-south-west forming several rectilinear features covering an area of 121 m x 156 m. Within this area there are various positive linear and curvilinear anomalies, clear examples of these being at **m** and **n**, which may have at one point formed internal sub-divisions. It is considered likely that anomalies at **4008** are ditched enclosures, associated with **4005** and potentially used for animal management.

4.2.15 Numerous discrete pit-like anomalies 1 m – 3.5 m in diameter have been detected within **4008,** with a concentration of them in the south at **o.** They may be pits used for rubbish disposal or, given their location outside of the centre of the settlement, small scale extraction, however a geological origin such as natural pitting is also possible.

4.2.16 Several strong possible thermoremanent anomalies have been detected within **4008** at **p** and **q**. These are areas of high heat such as a hearth or kiln however an exact origin cannot be determined from the geophysical data alone.

4.2.17 In the south of the site at **4009** two parallel positive anomalies have been detected. They are 26 m and 15 m long, 1 m wide, and are spaced 2 m apart. They are oriented south-east to north-west. They are possibly the remnants of a double-ditched trackway or ditched boundary feature.

4.2.18 To the north of **4000** two parallel positive anomalies have been detected at **4010**. They are 92 m and 60 m long, 1 m wide, and are spaced 5 m apart. They are oriented north – east

to south - west. They are possibly the remnants of another double – ditched trackway leading to the settlement, or another ditched boundary feature.

4.2.19 Immediately to the east of **4010** and north of **4000** are several linear positive anomalies on various orientations at **4011**. They are between 11 m and 53 m long by 1 m and 2 m wide. At points they intersect and form a sub-rectangular feature in the east. Given their morphology and position it is considered likely they are ditched enclosures, potentially for animal management.

4.2.20 A positive penannular anomaly has been detected 16 m from the north-east of **4000** at **4012**. The anomaly is 0.9 m wide and encloses an area 10.5 m in diameter. There is a break in the anomaly on the eastern side for 6 m. Within **4012** are three positive discrete anomalies with a diameter of 1.2 m to 1.4 m. It is considered likely this is a ring ditch, potentially the gully of a round house or circular enclosure. The smaller anomalies within it are either pits for rubbish disposal, post-holes, or other internal features. Whilst it is not possible to date accurately without further investigation it is proposed that **4012** has an origin from the Bronze Age to late Iron Age, or possibly Romano-British period.

4.2.21 Various positive and negative linear and curvilinear anomalies have been detected within and outside the settlement. They have weaker magnetic properties than other anomalies, and many are not on the same orientation as the anomalies more confidently interpreted. It is therefore harder to determine if they are archaeological or more modern in origin. Whilst they are likely related to the archaeological activity within **4000**, they may have a more modern agricultural origin.

4.2.22 Weak positive amorphous anomalies have been detected across the site. The clearest examples are at **4013** and **4014**. They cover areas between 4 m x 2 m and 15 m x 19 m. These may be areas of small-scale extraction or just enhancement of the soil via habitation effect. They are however similar in magnetic properties to the anomalies in the north of the site which are variations in the superficial deposits. They may therefore also be natural in origin.

4.2.23 Numerous discrete pit-like anomalies with a diameter between 1 m – 4 m have been detected across the site. They may be pits used for rubbish disposal, post holes, or small scale extraction, however a geological origin such as natural pitting is also possible.

4.2.24 In the north of the site various positive sinuous and amorphous anomalies have been detected. They are typical of variations in the underlying superficial deposits of the site.

4.2.25 Weakly positive narrowly spaced linear anomalies have been detected across the site. They are on a north – south orientation. They are the result of modern cultivation.

5 DISCUSSION

5.1.1 The gradiometer survey has identified archaeological activity in the centre and south of the survey area which pertains to a settlement covering an area of 230 m x 160 m enclosed by a ditched and at times double-ditched enclosure on its northern, north-eastern, and north-western extents. In the north the settlement is characterised by densely spaced ditched rectilinear features internally sub-divided into smaller areas, likely associated with habitation. The south of the settlement consists of a large enclosure with internal subdivisions and an area of possible industrial activity. Both areas contain possible hearths or areas of burning and pit features likely used for rubbish disposal or as post-holes.

5.1.2 A trackway crosses the settlement north-west to south-east and forms the boundaries of some of the settlement features. The south-eastern half of this trackway follows the same route as a field boundary marked in the 1879 Six Inch OS mapping (Sussex LXXVI), whilst it is possible that this is a field boundary of a later date rather than a trackway contemporaneous with the settlement. It is likely that the ditches and/or route of the trackway were later repurposed to create the field boundary. Further possible trackways have been detected outside the settlement to the north and south.

5.1.3 More enclosures, likely used for animal management are seen to the south-west, south, and north-east of the settlement, the latter being outside of the settlement enclosure. Pit features, either used for rubbish disposal or small-scale extraction have been identified outside the settlement. Given the regular mainly rectilinear morphology of the settlement and the Romano-British settlement discovered in a field 250 m to the north (WA 2021a, 2021b) it is considered likely that this is an enclosed multi-phase settlement and associated field system possibly of Romano-British date. However, given the surrounding medieval history of the area, including the DMVs of Climping and Islesham, continued use into the medieval period may have occurred. Further investigation would be needed to accurately date the settlement and associated features.

5.1.4 Just north-east of the settlement enclosing ditch is a ring ditch. This is likely to be a round house gully or enclosure dating from the Bronze Age to Romano-British period. Further investigation would however be needed to confirm this interpretation and provide dating evidence.

5.1.5 The remaining anomalies detected were natural variations in the underlying deposits, modern cultivation, and magnetic enhancement of a likely modern origin on the edges of the field.

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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 will be 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 Carlson BRX-7 RTK system. This receives corrections from a network of reference stations operated by the Ordnance Survey, allowing positions to be determined with a precision of 0.02 m in real-time and therefore exceed the level of accuracy recommended by European Archaeologiae Consilium (Schmidt *et al.* 2015).

Post-processing

The magnetic data collected during the detail survey are downloaded from the Sensys 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.

The cart-based system generally requires a lesser amount of post-processing than the handheld instrument. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error, caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

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:

- 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 Summary for wessexar1-519495

OASIS ID (UID)	wessexar1-519495
Project Name	Geophysical Survey at Brookpit Lane
Sitename	Brookpit Lane
Sitecode	280570
Project Identifier(s)	280570
Activity type	Geophysical Survey, MAGNETOMETRY SURVEY
Planning Id	
Reason For Investigation	Planning: Pre application
Organisation Responsible for work	Wessex Archaeology
Project Dates	22-Aug-2023 - 23-Aug-2023
Location	Brookpit Lane NGR : TQ 00362 01532 LL : 50.804662827910505, -0.57707428058557 12 Fig : 500362,101532
Administrative Areas	Country : England County : West Sussex District : Arun Parish : Climping
Project Methodology	The cart-based gradiometer system used a Carlson 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 hand-pushed cart. Data were collected at a rate of 20 Hz and interpolated to 0.1 m intervals along transects spaced 1 m apart, in accordance with European Archaeologiae Consilium recommendations (Schmidt et al. 2015).

Project Results	The gradiometer survey has identified archaeological activity in the centre and south of the survey area which pertains to a settlement bounded by a ditched, and at points, double-ditched enclosure. A trackway runs through the centre, and further trackways are seen outside of the settlement. In the north the settlement is characterised by densely spaced ditched rectilinear features internally sub-divided into smaller areas, likely habitation features. The south of the settlement consists of a large enclosure with internal subdivisions and an area of possible industrial activity. Both areas contain possible hearths or areas of burning, as well as pit features likely used for rubbish disposal or as post-holes. More enclosures, likely used for animal management are seen to the south-west, south, and north-east of the settlement. Pit features, either used for rubbish disposal or small-scale extraction have been identified outside the settlement. Given the regular mainly rectilinear morphology of the settlement and the Romano-British settlement discovered in a field to the north it is likely that this is an enclosed multi-phase settlement and associated field systems possibly of Romano-British date. However, given the surrounding medieval history of the area continued use into the medieval period may have occurred. Further investigation would be needed to accurately date the settlement and associated features. North-east of the settlement enclosing ditch is a ring ditch. This is likely to be a round house gully or enclosure dating from the Bronze Age to Romano-British period. Further investigation would however be needed to confirm this interpretation. The remaining anomalies detected were natural variations in the underlying deposits, modern cultivation, and magnetic enhancement of a likely modern origin on the edges of the field.
Keywords	
Funder	Private individual
HER	West Sussex HER - unRev - STANDARD
Person Responsible for work	T Richardson
HER Identifiers	
Archives	

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Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk

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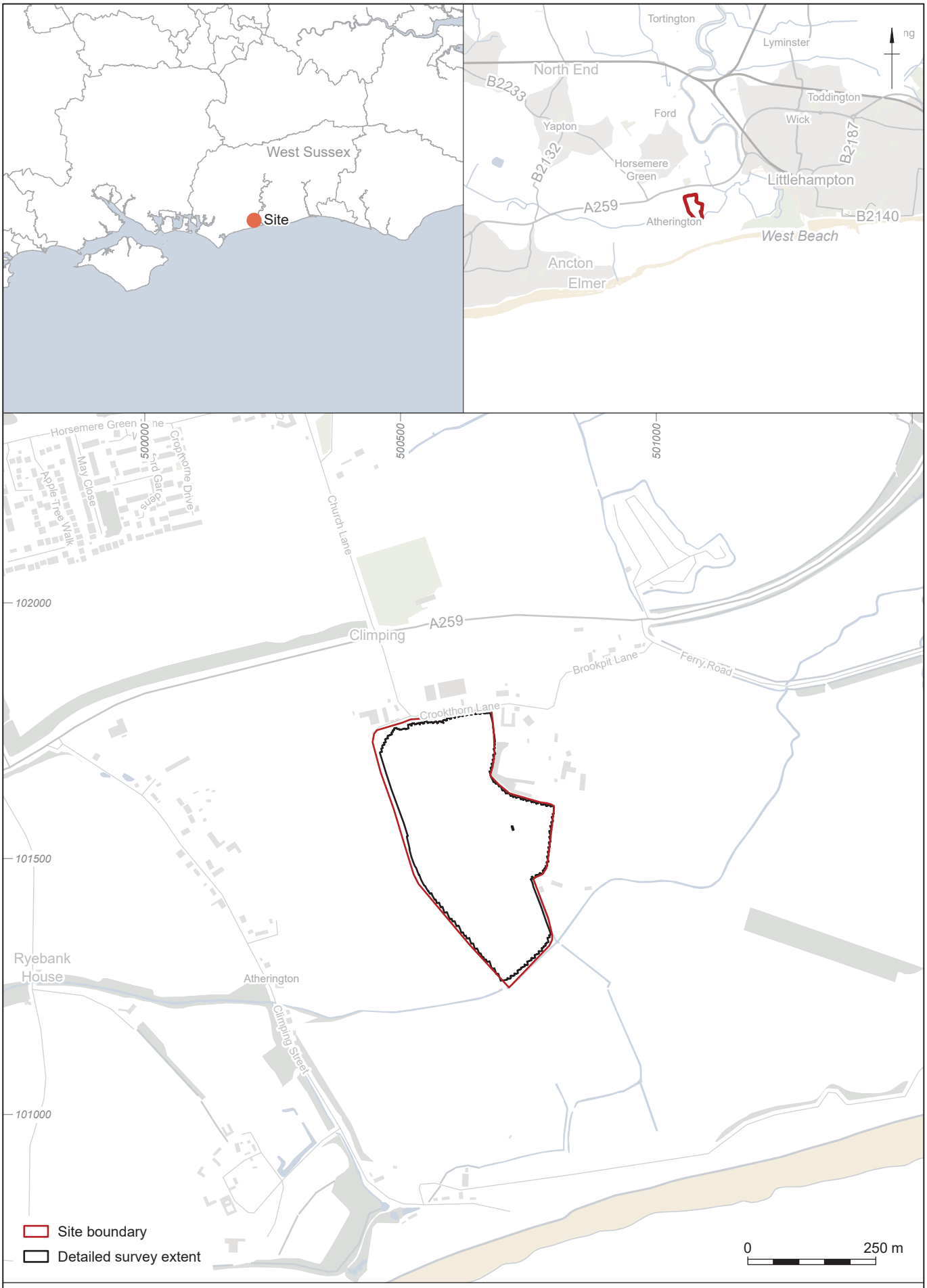

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Figure 1: Site location and boundary

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500400

500600

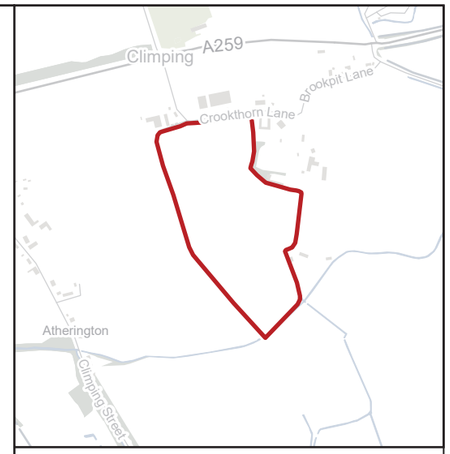
500800

Bread Lane

Crookth Lane

101600

101400



Site boundary

Detailed survey extent

-2 nT

3 nT

0

100 m

Date: 14/09/2023 | Created by: LJ

Scale: 1:2000 | Revision: 0

Figure 2 : Magnetic gradiometer data: greyscale plot

X:\Projects\280570\GIS_ArcPro\280570\280570.aprx

500400 500600 500800

Bread Lane

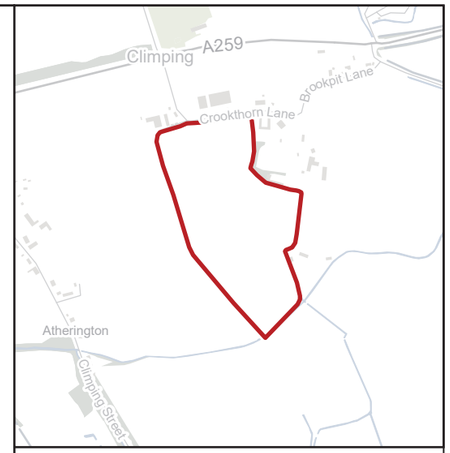
Crookth Lane

101600

101400

4014
4010
4011
4012
4000
4004
4003
4001
4002
4005
4006
4007
4008
4013
4009

a b c d e f g h i j k l m n o p q



Site boundary
Detailed survey extent
Archaeology
Possible archaeology
Former field boundary
Historic landscape feature
Geology
Geomorphology
Historic cultivation
Agricultural feature
Trend
Drain
Increased response
Ferrous
Modern service

0 100 m

Date: 14/09/2023 | Created by: LJ

Scale: 1:2000 | Revision: 0

Figure 3: Magnetic gradiometer data: interpretation