UNDERGROUND CABLING ROUTE

SUTTON HOO, WOODBRIDGE

SUFFOLK

GEOPHYSICAL SURVEY AND

ARCHAEOLOGICAL MONITORING

EVENT NO.: SUT 220

Essex County Council

FIELD ARCHAEOLOGY UNIT

March 2013

UNDERGROUND CABLING ROUTE

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ARCHAEOLOGICAL MONITORING AND

GEOPHYSICAL SURVEY

EVENT NO.: SUT 220

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UNDERGROUND CABLING ROUTE, SUTTON HOO, WOODBRIDGE, SUFFOLK ARCHAEOLOGICAL MONITORING

Client: National Trust and Suffolk Coast and Heaths AONB
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SUMMARY

Geophysical survey and archaeological monitoring preceded and accompanied the laying of an underground electricity cable at Sutton Hoo, running from Sutton Hoo Farm to the B1083, a distance of c.1.5km. The general vicinity of Sutton Hoo has established archaeological potential and includes the remains of Early Bronze Age and Iron Age enclosures and ditches and two nationally important Early Saxon burial grounds, one of which is a Scheduled Monument (SF28). The archaeological works were necessitated by the undergrounding of an overhead electricity cable, removed for aesthetic reasons - the location being within a designated Area of Outstanding Natural Beauty.

Geophysical survey undertaken in advance of the cable undergrounding works targeted that part of the route between the two Early Saxon cemeteries. Other than two possible linear features, no anomalies of likely archaeological significance were recorded. Similarly, no significant remains were identified during the monitoring of the excavation of the c.0.4m wide and 1.2m deep cable trench. The two possible ditches found by the geophysical survey were not located. The only artefacts observed were very small amounts of modern brick, tile, glass and plastic from the spoil heaps.

The results of the monitoring possibly indicate that the groundworks has either passed through no areas of significant archaeological remains, or else the method of digging the cable trench was unfavourable to archaeological detection.

1.0 INTRODUCTION

This report presents the results of geophysical survey and archaeological monitoring of an electricity cable trench at Sutton Hoo, near Woodbridge. The Suffolk County Council Archaeological Service recommended the two pieces of archaeological work, and Pre-Construct Geophysics Ltd and the Essex County Council Field Archaeology Unit carried them out on behalf of The National Trust and Suffolk Coast and Heaths AONB, in accordance with the stipulations of a design brief and a Written Scheme of Investigation (SCCAS 2011; ECCFAU 2011). The geophysical survey was funded by a grant from English Heritage. The new underground cable is a replacement for an existing overhead cable, which will be removed for aesthetic reasons. Sutton Hoo contains the remains of high status Early Saxon burials and is a nationally important site for the understanding of East Anglia and England during the 6th to early 7th centuries.

Copies of this report are supplied to The National Trust, Suffolk Coast and Heaths AONB, and The Suffolk County Council Archaeological Service. A digital copy of the report will form part of the Oasis Access to Index of Archaeological Investigations at *www.oasis.ac.uk* and be accessible via the Archaeological Data Service website: http://archaeologydataservice.ac.uk/. The site archive will be deposited at Colchester and Ipswich Museum.

2.0. BACKGROUND INFORMATION

2.1 Location, topography and geology

Sutton Hoo sits on the crest of the west side of the valley of the River Deben (Fig. 1). It overlooks Woodbridge on the opposite side of the valley and has an arable setting.

The route of the cable trench is 1475m long and runs between Sutton Hoo Farm and the B1083 (Fig. 2). The first part of it (running from west to east) crosses a post-medieval / modern track-side ditch and a probable silted-up former pond / mineral extraction pit. It is overlooked by Tranmer House and climbs the floor of an east-facing valley. The following central part of it cuts through a small copse of conifers, and heads southwards along the crest of the Deben Valley and the east side of a north-south farm track. The final part of the route turns a corner and heads eastwards, where it runs along a narrow verge between a farm track to the immediate north and plantations of conifers to the immediate south.

Sutton Hoo visitors' centre and the Early Saxon barrow cemetery lie *c.*220m north and south of the western part of the route of the cable trench respectively.

The surface geology of Sutton Hoo comprises deposits of sand and gravel, which are part of the Kesgrave Catchment Sub Group laid down by rivers during the Quaternary Period up to two million years ago (www.bgs.ac.uk). The overlying topsoil is *c.*0.4m thick and consists of dark brownish grey loose to friable silt sand with infrequent small to medium-sized gravel stones.

2.2 Previous archaeological discoveries

The majority of the following information is derived from the Suffolk Historic Environment Record (SHER). The locations of the sites and finds' spots which are mentioned in the text below are shown in Fig. 2.

An Early Saxon mixed rite cemetery (SHER BML 018) and the Sutton Hoo Early Saxon barrow cemetery (Scheduled Monument SF28) lie north and south respectively of the western part of the cable route. Bronze Age settlement remains and enclosure ditches underlie both sites and have been conjectured to span the intervening *c.*500m wide gap between them, perhaps forming a single large Bronze Age settlement site/landscape overlooking the valley of the River Deben. The mixed rite cemetery site sits near an undated barrow and the finds' spots of a Bronze Age spear tip and Early Saxon pot sherds (SHER BML 015 and BML 009). The scheduled barrow cemetery is of 7th and early 8th century date and consists of cremations, inhumations and two ship burials. Prehistoric remains beneath it include possible plough marks, a Late Neolithic / Early Bronze Age round-house, field system and Beaker pit cluster, and Iron Age features and finds (SHER SUT 038).

Pieces of prehistoric worked flint and sherds of possible and probable prehistoric, Iron Age, Roman, Early Saxon and medieval pottery have been found by fieldwalking in fields to the north and north-west and south of the mixed rite cemetery and to the south-west and south-east of the scheduled monument (SHER SUT BML 005, BML 010, BML 022, SUT 030, SUT 046, SUT 047, SUT 048 and SUT 058). A possible burial mound and undated ditches lie south and north of Sutton Hoo Farm (SHER SUT 163, SUT 164 and BML 005), while cropmarks of undated and post-medieval ditches and an undated sub-rectangular enclosure sit south of the eastern arm of the cable trench (SHER SUT 057, SUT 058 and SUT 106).

Sutton Hoo Farm near the western end of the cable route is thought to have originated during the 17th century or earlier. A possible east-west hollow way of medieval and / or post-medieval date lies *c.*100 to 200m south of the cable route; it runs between the farm and the B1083 (SHER SUT 170).

World War II remains have been identified both sides of the cable route. They mostly comprise banks and anti-glider ditches (e.g. SHER SUT 057), but include a possible anti-aircraft artillery site near the eastern part of the cable route (SHER SUT 166). The Aerial Mast Station near the Livery Stables at the eastern end of the route is a former World War II site of undetermined function (SUT 155). A watching brief here in 2003 did not identify the presence of archaeological remains (Everett 2003).

3.0 AIMS AND OBJECTIVES

The general aim of the archaeological monitoring was to identify, investigate and record any archaeological remains disturbed by the digging of the cable trench, and thereby ensure their preservation by record.

More specific objectives were:

- To establish if Bronze Age enclosures and settlement remains span the *c.*500m wide gap between the Visitor Centre site to the north and the scheduled Early Saxon barrow cemetery to the south
- To locate and investigate potential archaeological features found by the geophysical survey

4.0 METHOD

A fluxgate gradiometer and targeted resistivity survey preceded the archaeological monitoring and investigated the western part of the route in between the two Early Saxon cemetery sites (Figure 1). A detailed survey methodology is provided in Appendix 3.

The cable trench and nine pits for the connecting of cables (CCP1 to CCP9) were excavated in twelve stints (S1 to S12) by a small tracked excavator equipped with a variety of toothless buckets. Most of the trench stints had vertical sides and measured *c.*0.4m wide and 1.2m deep. The cable pits were c.1.2m deep and of varying dimensions. More precise information about the form and size of the trench and the connecting pits can be found in Appendix 1.

Feature recognition was made difficult by the narrowness of the trench, deposit smearing and dusting in section, and disturbance by numerous tree roots. It was also compromised by loose ground conditions, causing the sides of the trench to often fall inwards. The electricity cable was fed into the trench as the trench was dug and the trench was then usually

backfilled shortly thereafter. The amount of trench open at any one time ranged from 10m to *c*.100m. Spoil heaps were visually inspected and intermittently metal detected for man-made artefacts. The cable connecting pits and all of the trench stints were fully monitored, apart from stint S5, which was unable to be visited due to snowy weather on the day of its excavation and backfilling.

A directional GPS with on-board map-based software was used to locate the cable trench and the cable connecting pits. The error margin of the GPS varied, but was always less than 0.2m. The combined surface area of the trench and cable connecting pits was *c*.800m².

The archaeological work was carried out in accordance with the Institute for Archaeologists' standards, Code of Conduct and by-laws and the ALGAO standards for field archaeology in the east of England (IfA 2008 and 2010; Gurney 2003). The ECC FAU is a registered archaeological organisation with the Institute for Archaeologists. The ECC FAU uses its own recording system to record all archaeological deposits and features.

5.0 FIELDWORK RESULTS

5.1 Geophysical Survey

The gradiometer and resistivity surveys of the western part of the route found nothing of obvious archaeological potential, apart from a modern service trench and several ditch-type anomalies near the east end of the east-west valley. Other anomalies were identified, but were probably geological in origin or patches of disturbed ground relating to animal burrows. The detail of these results is presented as Appendix 3.

5.2 Archaeological Monitoring

The cutting of the cable trench and the examination of its spoil heaps revealed no identifiable archaeological features or finds, apart from pieces of modern glass and plastic within pond deposits in stint S1, and several lumps of modern brick within the topsoil in stint S12, near the B1083 (Fig. 2). The possible linear features, which had been detected by the geophysical survey, were not re-discovered, apart from one – a metal water pipe – which corresponded with the previously identified service trench.

The deposit sequences varied along the length of the route. Silty pond and ditch deposits lay in stint S1, a thick deposit of orange brown sand between topsoil and pale brownish orange sand and gravel in stints S2 to S4, and an undulating deposit of yellowish brown sand between topsoil and brownish orange sand and gravel in stints S5 to S8. Topsoil overlay

brownish orange sand and gravel in stints S9 to S12. Rabbit burrows and tree roots were common along stints S2 to S4 and stints S6 to S12 respectively.

Representative views of the archaeological monitoring work carried out are provided as Plates 1 to 6. More detailed information about the deposit sequences, albeit largely describing overburden and natural deposits, can be found in Appendix 1.

6.0 CONCLUSIONS

The excavation of the cable trench has revealed no archaeological deposits or features, although this is possibly in part due to the local ground conditions and the excavation method of the cable trench being unfavourable to their detection. However, inspection of the excavated spoil also revealed no archaeological finds and it may be the case that the route of the cable trench did indeed contain no significant remains. It would therefore appear that the recorded Bronze Age sites to either of the cable route are possibly not conjoined. Similarly, this work confirms that the two cemeteries are distinct entities, with little in between.

Quaternary Period deposits are probably represented by the natural layers beneath the topsoil in stints S2 to S12. Soft silty deposits are present in stint S1 and these are likely to modern accumulations within a silted-up former pond and/or mineral extraction pit. Although it is possible that the orange brown deposit exposed in stints S2 to S4 is a more recent deposit of hill wash, it has produced no finds to confirm this.

It is concluded that the cable undergrounding scheme has had no significantly adverse impact upon the below ground archaeological resource in this vicinity.

ACKNOWLEDGEMENTS

Essex County Council Field Archaeology Unit thanks Suffolk Coast and Heaths AONB and the National Trust for commissioning the archaeological works, in particular Paula Booth, Martin Atkinson and Angus Wainwright for their help and facilitation. The geophysical survey was carried out by David Bunn of Pre-Construct Geophysics Ltd and was funded by a grant from English Heritage. Mark Dowler, Andy and Trev of Morrison Utility Services are thanked for their co-operation and assistance throughout the monitoring of the cable trench excavation. Sarah Poppy of the Suffolk County Council Archaeological Service monitored the project on behalf of the LPA.

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ECC FAU	2012	*Written Scheme of Investigation for Geophysical Survey and Archaeological Monitoring. Underground Cabling Route, Sutton Hoo, Sutton, Woodbridge, Suffolk*.
Everett, L.	2003	*Aerial Mast Station (Livery Stables), Sutton. An Archaeological Watching Brief*. SCCAS report
Gurney, D.	2003	*Standards for Field Archaeology in the East of England*. E. Anglian Archaeol. Occ. Pap. 14
IfA	2008	*Standard and Guidance for an Archaeological Watching Brief*. Institute for Archaeologists (Revised)
IfA	2010	*Code of Conduct.* Institute for Archaeologists (Revised)
SCCAS	2012	*Brief for Geophysical Survey and Continuous Archaeological Recording at Proposed Underground Cabling Route, Sutton Hoo, Sutton, Woodbridge, Suffolk*.

APPENDIX 1: TRENCH AND CABLE PIT DETAILS

Stint	Distance along cable from west end of trench	Trench profile
S1	0 to 30m	0.3m wide. 1m to 1.2m deep. Vertical sides
S2	30 to 245m	1.2m wide at surface. 0.4m wide at base. Tapered sides to lessen sides falling in. 1.2m deep
S3	245 to 450m	0.4m wide. 1.2m deep. Vertical sides
S4	450 to 500m	0.4m wide. 1.2m deep. Vertical sides
S5	500 to 630m	0.4m wide, 1.2m deep. Vertical sides
S6	630 to 715m	0.4m wide. 1.2m deep. Vertical sides
S7	715 to 805m	1m wide at surface. 0.4m wide at base. Tapered sides to lessen sides falling in. 1.2m deep
S8	805 to 965m	0.4m wide. 1.2m deep. Vertical sides
S9	965 to 1025m	0.4m wide. 1.2m deep. Vertical sides
S10	1025 to 1205m	0.4m wide. 1.2m deep. Vertical sides
S11	1205 to 1350m	0.4m wide. 1.2m deep. Vertical sides
S12	1350 to 1475m	0.4m wide. 1.2m deep. Vertical sides

Table 1: Cable trench details

Pit	Distance along cable from west end of trench	Pit profile
CCP1	245m	4m long. 3m wide. 1.2m deep. Stepped and battened sides
CCP2	490m	1.8m long. 1m wide. 1.2m deep. Vertical sides
CCP3	525m	4m long. 1.4m wide. 1.1m deep. Vertical sides
CCP4	670m	3m long. 1.8m wide. 1.2m deep. Vertical sides
CCP5	715m	4m long. 4m wide. 1.2m deep. Battened sides
CCP6	965m	2m long. 1.2m wide. 1.2m deep. Vertical sides
CCP7	995m	2m long. 1.2m wide. 1.2m deep. Vertical sides
CCP8	1245m	2m long. 1.2m wide. 1.2m deep. Vertical sides
CCP9	1350m	2m long. 1.2m wide. 1.2m deep. Vertical sides

Table 2: Cable-connecting pit details

Stint	Distance along cable from west end of trench	Deposit sequences (Thickness of deposit in brackets)
S1	0 to 30m	**Pond and roadside ditch deposits (*c.* 0.6m+)** Dark brownish grey soft / sticky sandy silt and silty sand with infrequent gravel stones and infrequent modern artefacts
S2 to S4	30 to 500m	**Turf and topsoil (*c.* 0.35m)** Dark brownish grey loose to friable silty sand with infrequent small to medium-sized gravel stones **?Natural (*c.* 0.85m)** Orange brown loose to friable sand with occasional small to medium-sized gravel stones **Natural (*c.* 0.05m+)** Pale brownish orange friable sand with occasional small to large gravel stones
S5 to S8	500 to 965m	**Turf and topsoil (*c.* 0.3m)** Dark brownish grey loose to friable silty sand with infrequent small to medium sized gravel stones **?Natural (*c.* 0.6m)** Yellowish brown friable loose to friable sand with occasional small to medium-sized gravel stones **Natural (*c.* 0.3m+)** Brownish orange loose to friable sand with frequent gravel stones
S9 to S12	965 to 1475m	**Turf and topsoil (*c.* 0.4m)** Dark brownish grey loose to friable silty sand with infrequent small to medium-sized gravel stones **Natural (*c.* 0.8m+)** Brownish orange loose to friable sand with frequent gravel stones

Table 3: Deposit sequences

APPENDIX 2: CONTENTS OF SITE ARCHIVE

Held in one A4 folder:

Client report
Archaeological brief
Written Scheme of Investigation
Geophysical survey report
Two pages of field notes
Three site plans
Photo register
Forty three photographs
Computer disk containing digital copies of all of the above
Miscellaneous scheme drawings

APPENDIX 3: ARCHAEOLOGICAL GEOPHYSICAL SURVEY REPORT

pre-construct geophysics LTD

ARCHAEOLOGICAL GEOPHYSICAL SURVEY

PROPOSED UNDERGROUND CABLING ROUTE SUTTON HOO, SUTTON, WOODBRIDGE, SUFFOLK

NGR: 628620 248990 - 628940 249090

REPORT PREPARED FOR
ESSEX COUNTY COUNCIL ARCHAEOLOGICAL FIELD UNIT
ON BEHALF OF
OF SUFFOLK COAST AND HEATHS AONB
AND THE NATIONAL TRUST

BY DAVID BUNN
JUNE 2012

Essex County Council
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Contents

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Non technical summary

Fluxgate gradiometer and targeted resistivity surveys were undertaken along a section of the proposed route of an underground cabling scheme at Sutton Hoo, Sutton, Woodbridge Suffolk.

The gradiometer survey has recorded only limited evidence of potential archaeological remains, exclusively at the eastern end of the site. At this point a number of linear anomalies might indicate buried ditches. Elsewhere, the bulk of magnetic variation almost certainly relates to natural processes, and possibly including traces of animal burrows. Stronger anomalies probably signify miscellaneous modern ferrous-rich materials, with examples recorded along the alignment of a recently removed boundary. A buried service extends along the eastern boundary of the field and the proposed cable route.

Nothing of obvious archaeological potential was detected by the resistivity survey, including definitive traces of linear features identified by gradiometry. It seems likely that variations of electrical resistance are of natural origin.

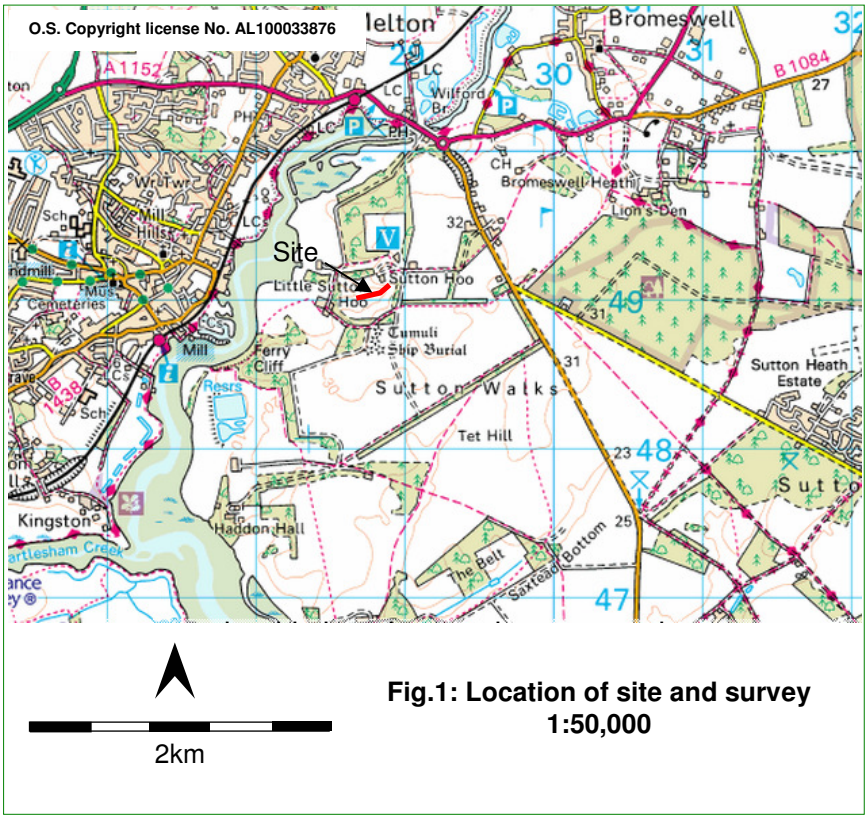

Fig.1: Location of site and survey 1:50,000

1.0 Introduction

Essex County Council Field Archaeology Unit (ECC FAU) commissioned Pre-Construct Geophysics (PCG) to undertake fluxgate gradiometer and resistivity surveys along a section of the proposed route of an underground cabling scheme at Sutton Hoo, Sutton, Woodbridge, Suffolk.

The fieldwork and reporting was carried out in accordance with a written scheme of investigation (WSI) prepared by ECC FAU on behalf of Suffolk Coast and Heaths AONB and The National Trust (ECC FAU, 2012). The WSI responds to a brief issued by the Suffolk County Council Archaeological Service Conservation Team (SCCAS/CT) for a programme of geophysical survey and archaeological monitoring and recording along the planned route.

This report incorporates information and images that have been selectively extracted from the WSI.

2.0 Location & description (Figs.1 & 2)

The proposed cable route extends c.1.5km, east to west, between the B1083 road at Cheavley Links Livery Centre (TM 29754905) and Dairy Farm (TM 28504900).

Geophysical survey was requested along 300m of the route, from a point c.150m to the east of the B1083 (grid reference 628620 248990) to the south of The Sutton Hoo Visitor Centre and Tranmer House (grid reference 628940 249090).

A 30m wide gradiometer survey was undertaken along the entire 300m, whilst a 50m x 20m block of land at the eastern end was targeted for resistivity survey (to the immediate south of Tranmer House).

A number of areas were densely vegetated, with some containing semi hidden burrows. The westernmost end of the survey area was particularly impenetrable. These were considered to be unsuitable for safe and/or effective survey and therefore appear on images as blank spaces. A small additional area was surveyed at the eastern end to compensate for these omissions.

3.0 Archaeological context (Fig. 3)

The cable route extends across an area of high archaeological importance, particularly where it passes to the north of the Sutton Hoo Anglo-Saxon burial ground (scheduled monument SF28) and to the south of another Early Anglo-Saxon cemetery.

The 7th and early 8th century scheduled Anglo-Saxon barrow cemetery comprised two ship burials, cremations and flat grave inhumations (MSF3384-3399). Remains of a prehistoric settlement were found beneath the barrow cemetery. These included possible plough marks, a late Neolithic/Early Bronze Age roundhouse, a field system, a beaker pit cluster (MSF3401) and Iron Age features and finds (MSF3402).

The Early Saxon cemetery was excavated in 2000 at the site of the visitor centre. This work identified inhumation and cremation burials of the 6th to early 7th centuries AD (MSF19231). It is conjectured that a mound immediately to the west of the Visitor Centre might relate to similar activity (MSF16351). Late Bronze Age/Early Iron Age field system remains were also recorded (MSF17313).

4.0 Geology and topography

The solid geology comprises sand (Red Crag Formation), overlain by drift deposits of sand and gravel (Kesgrave Catchment Subgroup) (BGS online viewer).

The response of buried archaeological remains to sand and gravel is variable (English Heritage, 2008).

The westernmost targeted section occupies the base of a valley. The ground level gradually rises from c. 15m AOD to c. 20m AOD at the mid point of the route before climbing more steeply in the eastern regions (c. 30m AOD).

5.0 Survey methodology

The survey methodology is based on guidelines set out in the document *'Geophysical Survey in Archaeological Field Evaluation'* (English Heritage. 2008).

5.2 Principles

Fluxgate Gradiometry is a non-intrusive scientific prospecting tool that is used to determine the presence/absence of some classes of sub-surface archaeological features (e.g. pits, ditches, kilns, and occasionally stone walls). By scanning the soil surface, geophysicists identify areas of varying magnetic susceptibility and can interpret such variation by presenting data in various graphical formats and identifying images that share morphological affinities with diagnostic archaeological remains.

The use of gradiometry should help to establish the presence/absence of buried magnetic anomalies, which may reflect sub-surface archaeological features, and may therefore form a basis for a subsequent scheme of archaeological trenching.

The use of magnetic surveys to locate sub-surface ceramic materials and areas of burning, as well as magnetically weaker features, is well established, particularly on large green field sites. The detection of anomalies requires the use of highly sensitive instruments; in this instance the Bartington 601 Dual Fluxgate Gradiometer. This is accurately calibrated to the mean magnetic value of each survey area. Two sensors, mounted vertically and separated by 1m, measure slight, localised distortions of the earth's magnetic field, which are recorded a data logger.

It should be noted that this technique exploits anomalous magnetic responses of buried remains; an absence of such variation would predispose detection by gradiometry **.**

Resistivity survey measures the electrical resistance of the earth's soil moisture content. A twin probe configuration is normally used, which involves the pairing of electrodes (one current and one potential), with one pair remaining in a fixed position (remote probes), whilst the mobile probes measure resistivity variations across the survey grids. Resistance is measured in ohms, and this method of archaeological prospection is generally effective to a depth of 1m. Features such as wall foundations are usually identified as high resistance anomalies, as are rubble spreads, made surfaces (i.e. yards and paths) and metalled roads and trackways. In contrast, low resistance values are normally associated with water-retentive features such as large pits, ditches, and drains.

5.2 Field work and data processing

The gradiometer survey was undertaken using a Bartington Grad-601 Dual Fluxgate Gradiometer on 12th June 2012. The zigzag traverse method of survey was used, with readings taken at 0.25m intervals along 1.0m wide traverses.

The data was processed using *ArcheoSurveyor.* It was clipped to reduce the distorting effects of extremely high or low readings caused by discrete pieces of ferrous metals on the site, and 'destriped' to eliminate striping introduced by zigzag traversing.

The results are plotted as trace, colourscale, greyscale and interpretive images at a scale of 1:1000 (Figs. 4 – 7).

The resistivity survey was undertaken during the same site visit using a TR/CIA Resistance Meter (twin probe array) + data logger set to a sample interval of 1m along 1 m wide traverses within 20m grids. The survey data was processed using *ArcheoSurveyor*. The data was despiked, and filtered to reduce the effects caused by variations in geology and depth of topsoil, resulting in an enhancement of potential archaeological features and a smoother

graphical appearance in the displayed plots.

The results are plotted as trace and greyscale images at a scale of 1:500 (Fig. 8).

Each survey area was recorded by Differential Global Positioning Satellite using a Topcon GRS-1 to an accuracy of +/- 0.2m, and subsequently geo-referenced onto a digital drawing of the site.

5.3 Character, interpretation and presentation of magnetic anomalies (Figs. 5 & 7)

Anomalies in excess of +/-50nT are highlighted as blue Fig. 5 and +/-10nT on the interpretive image (Fig. 7). These are characterised magnetically as (dipolar) 'iron spikes', often displaying strong positive and/or negative responses, which reflect ferrous-rich objects (particularly apparent on stacked trace plots). Examples include those forming/deposited along current or former boundaries (e.g. wire fencing), services and random scatters of horseshoes, ploughshares etc across open areas. Fired (ferro-enhanced) material, such as brick/tile fragments (often where the latter are introduced during manuring or land drain construction) usually induce a similar though predominately weaker response, closer to c+/-5nT (highlighted in pink/blue on interpretive images). Collectively, concentrations of such anomalies indicate probable rubble spreads, such as backfilled ponds/ditches and demolished buildings. On a cautionary note, fired clay associated with early activity (e.g. villas sites and kilns) has the same magnetic characteristics of modern brick/tile rubble. As such, interpretation of such variation considers the context in which it occurs.

Anomalies of potential archaeological significance typically resolve within +/-10nT of natural background levels and are highlighted in red on interpretive images (potential ditches, pits, burnt material etc).

Examples of probable natural features are flagged in green on interpretive images (palaeochannels, tree throws, isolated deposits of silt etc). These almost always display relatively weak variation (with the potential to mimic archaeological remains).

6.0 Results (Figs. 4 - 8)

6.1 Detailed gradiometer survey (Figs. 4 - 7)

The survey recorded relatively few magnetic anomalies that could conceivably signify buried ditches. These comprise linear features that were detected at the eastern end of the survey (Fig. 7: red lines).

Elsewhere, it seems likely that apparently random and weak variation reflects subtle natural inconsistencies within the upper geological and pedological horizons (e.g. highlighted green). Suggested causes include the magnetic response of localised iron pans, soil filled erosion gullies, tree throws and occupied/collapsed animal burrows (numerous burrow holes were visible at the time of survey).

The survey recorded relatively strong anomalies along the course of a known former field boundary, as depicted on historic O.S maps (yellow line). Such anomalies (highlighted blue) typically indicate mundane materials, including relic wire fencing and discarded miscellaneous iron objects or rubble. Similar anomalies were recorded across the site; all are considered to reflect modern ferrous-rich objects and include the strong response of a probable large iron object in the mid western part of the survey corridor (circled).

A buried service extends along the eastern edge of the field (highlighted as blue & pink line).

6.2 Resistivity survey (Fig. 8)

Measured electrical resistance was particularly high at the time of survey (results mean value: 814ohms). The remote probes were sited in various locations prior to commencing the survey; all areas tested registered high readings at c. 2-3m probe spacing.

The survey did not record electrical resistance suggestive of archaeological remains, including the linear features apparent in the gradiometer greyscale. Indeed, there is minimal correspondence to any of the gradiometer results. For example, the latter do not indicate ceramic rubble deposits across zones of highest resistance (darkest on greyscale image). In theory, it is possible that these could relate to stone masonry rubble, although it seems likely that the distinct mottling on greyscale images are natural responses, such as that induced by varying soil density, possibly including looser soil associated with animal burrows or near surface erosion gullies (comparatively lower electrical resistance).

7.0 Conclusions

The gradiometer survey has recorded only limited evidence of potential archaeological remains, exclusively at the eastern end of the site. At this point a number of linear anomalies might indicate buried ditches. Elsewhere, the bulk of magnetic variation almost certainly relates to natural processes, and possibly including traces of animal burrows. Stronger anomalies probably signify miscellaneous modern ferrous-rich materials, with examples recorded along the alignment of a recently removed boundary. A buried service extends along the eastern boundary of the field and the proposed cable route.

Nothing of obvious archaeological potential was detected by the resistivity survey, including definitive traces of linear features identified by gradiometry. It seems likely that variations of electrical resistance are of natural origin.

8.0 Acknowledgements

Pre-Construct Geophysics would like to thank Essex County Council Field Archaeology Unit for this commission.

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ECC FAU 2012 *Written Scheme of Investigation Geophysical Survey & Archaeological Monitoring Underground Cabling Route Sutton Hoo, Sutton, Woodbridge, Suffolk. ECC FAU, unpublished*

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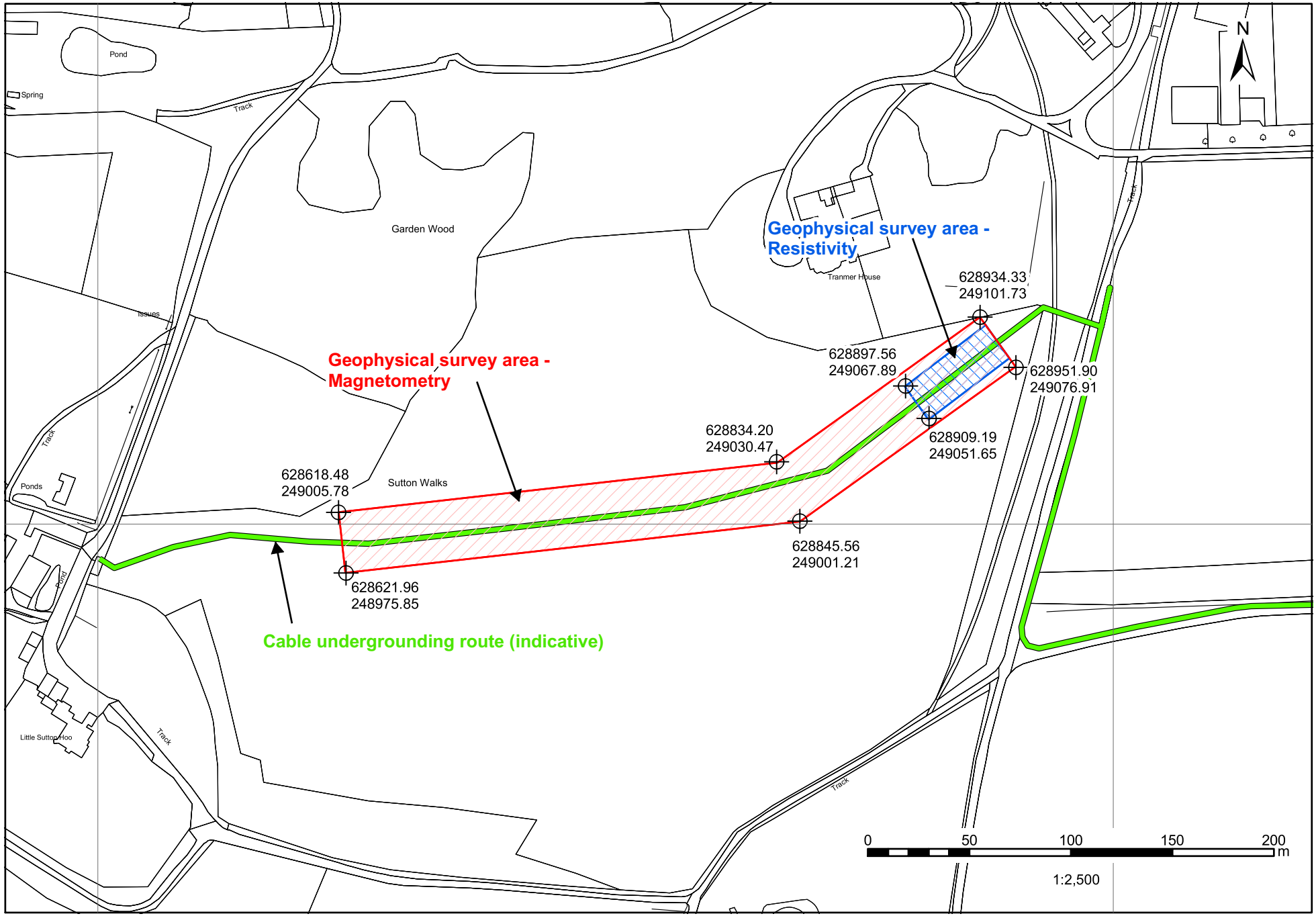

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Fig. 2: Location of site and survey (Extract from WSI)

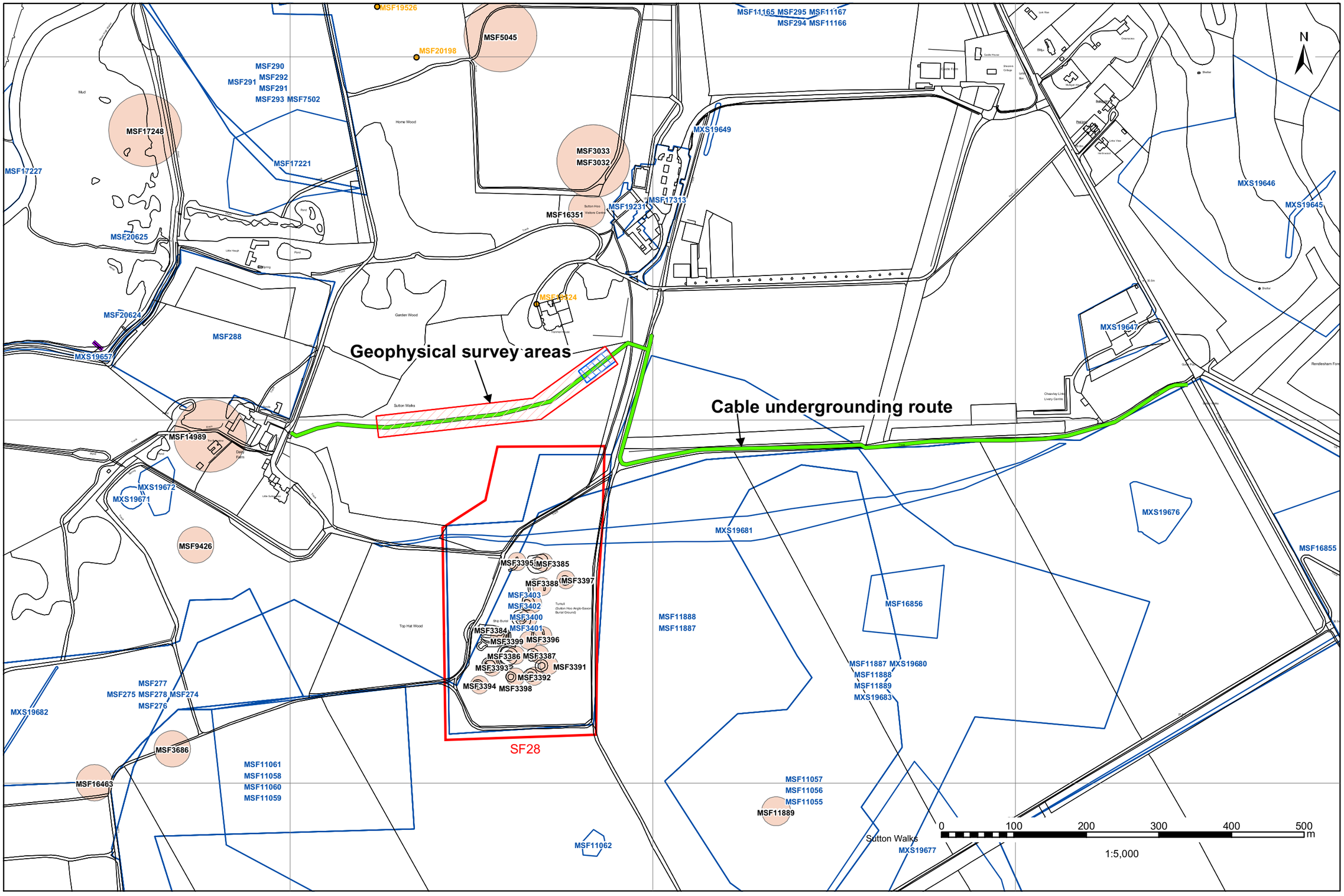

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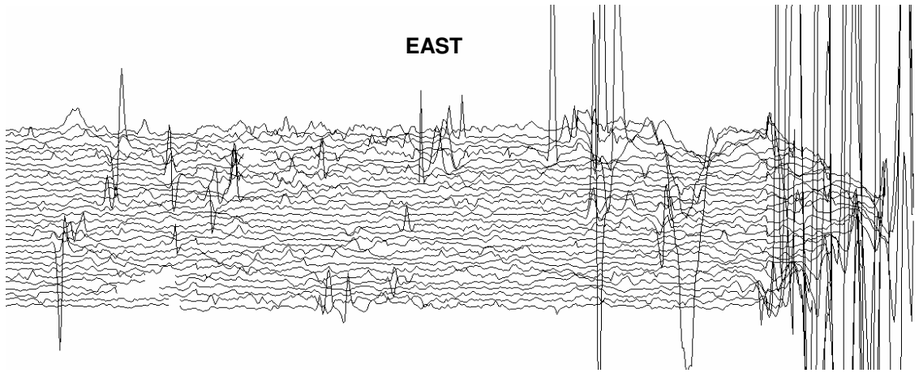
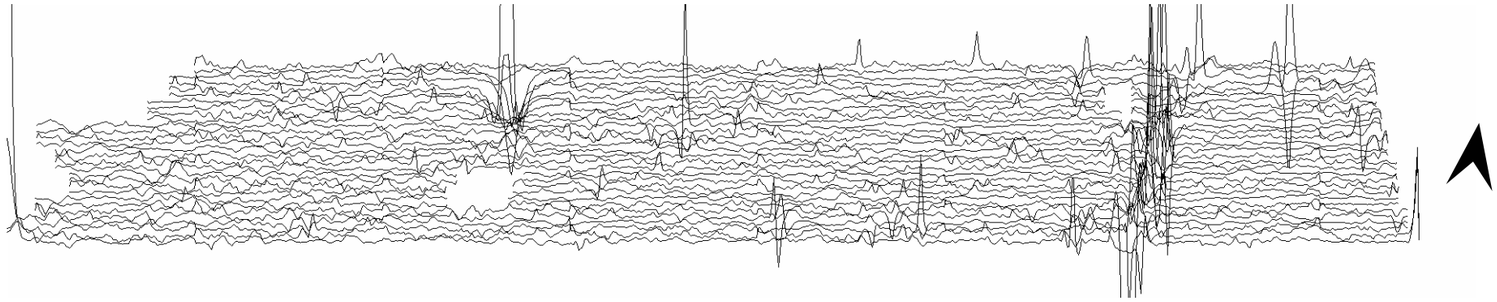
Fig. 3: Archaeological sites (Extract from WSI)

EAST



WEST



30nT

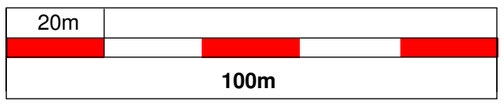


Fig. 4: Gradiometer survey - Trace plots
Data clipped to +/-100nT

Garden Wood

Tranmer House

WATER
BOWSER

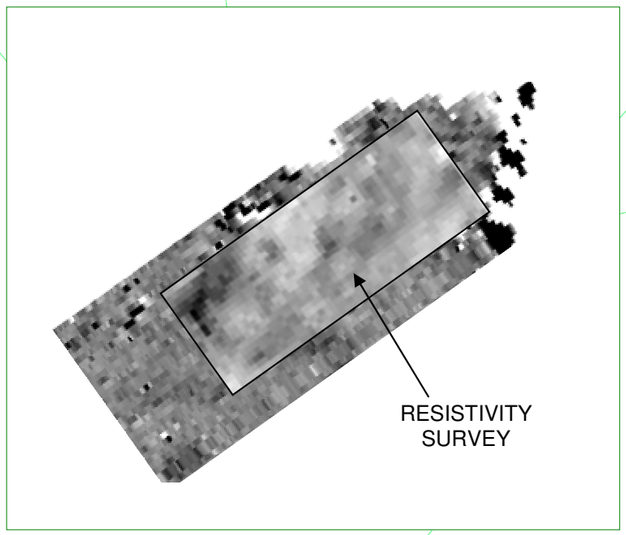
Sutton Walks

- 50 nT 50

20m

100m

Fig.5: Gradiometer survey - Colourscale image
Data clipped to +/-50nT



Tranmer House

WATER
BOWSER

Sutton Walks

- 4 nT 4

20m

100m

Fig.6: Gradiometer survey - Greyscale image
Data clipped to +/-4nT

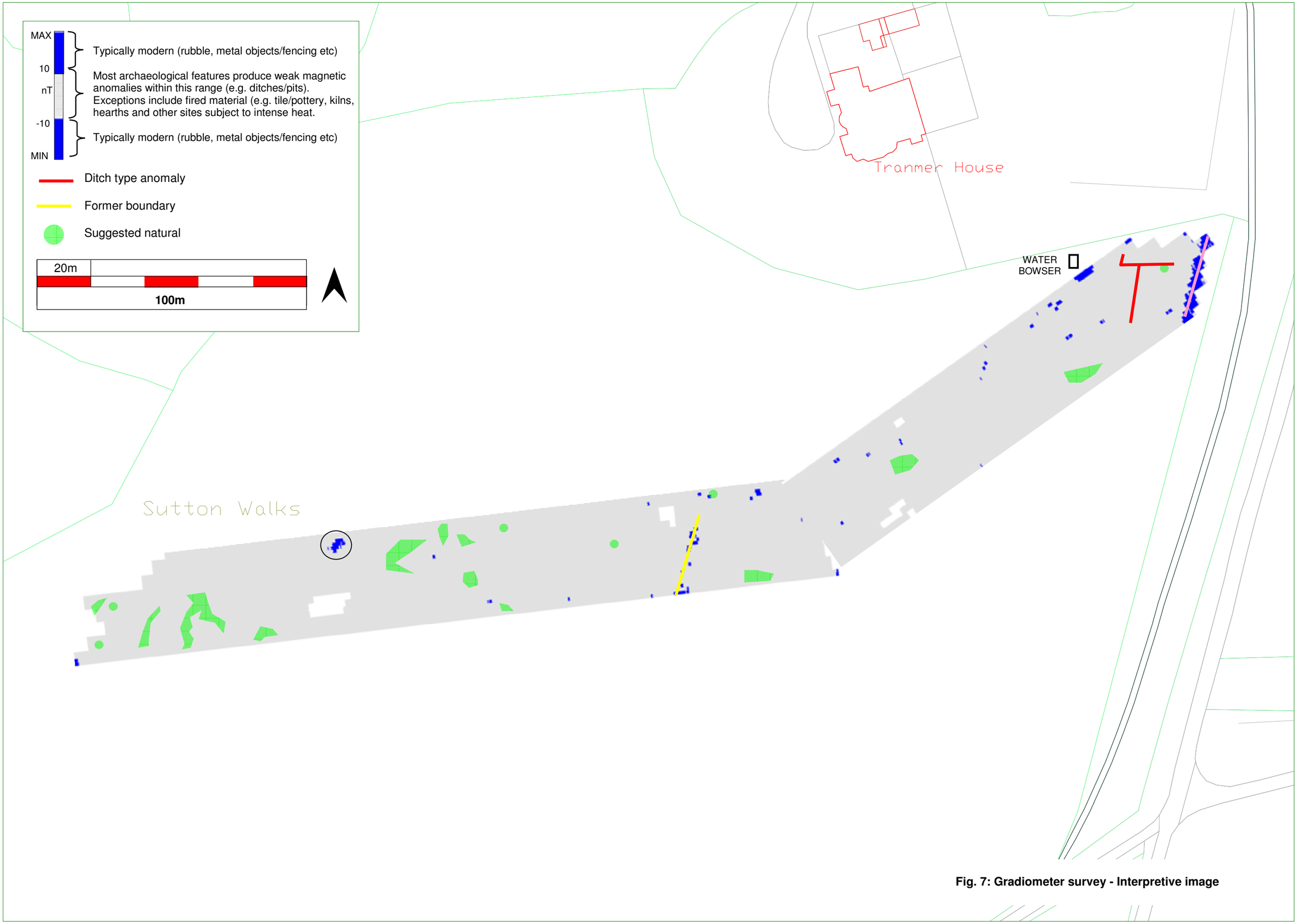
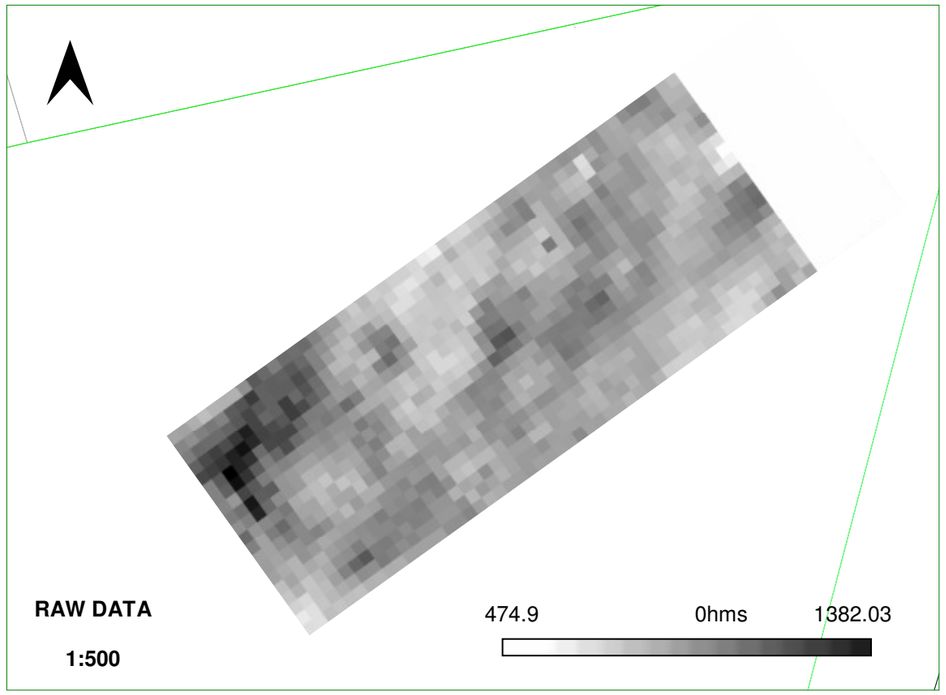
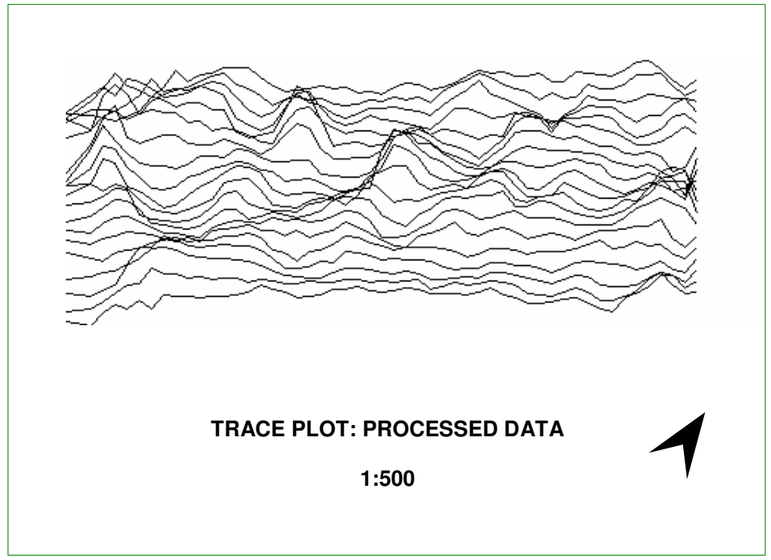
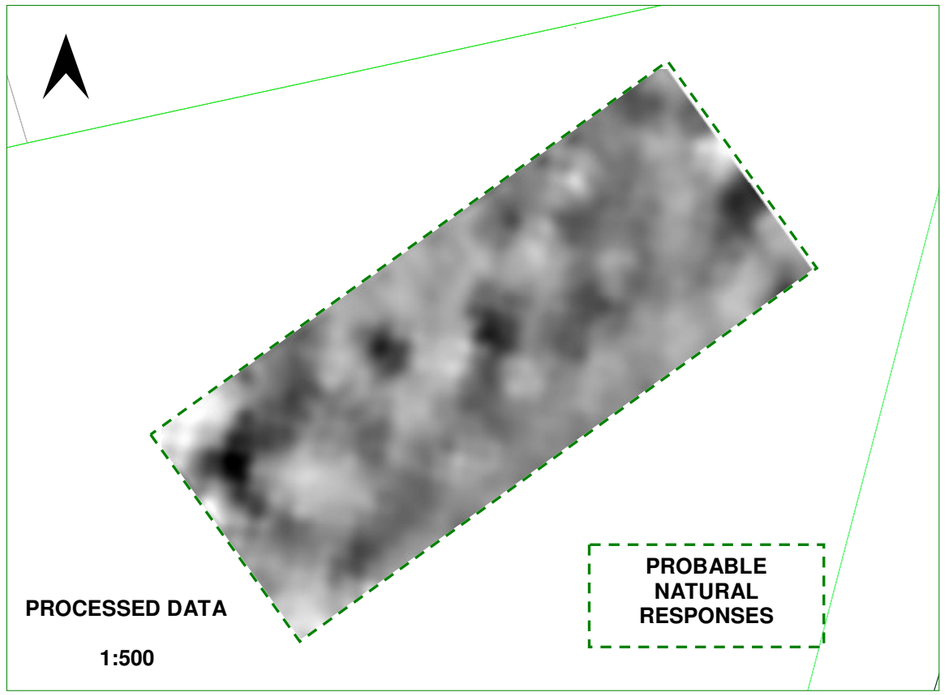
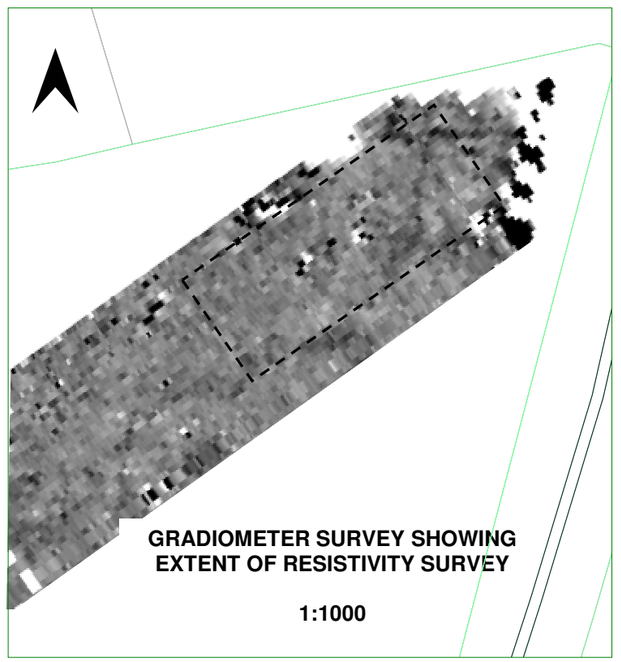


Fig. 7: Gradiometer survey - Interpretive image









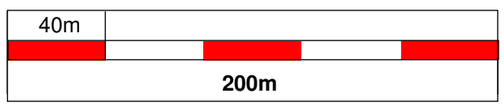


Fig. 8: Resistivity survey

FIGURES AND PLATES

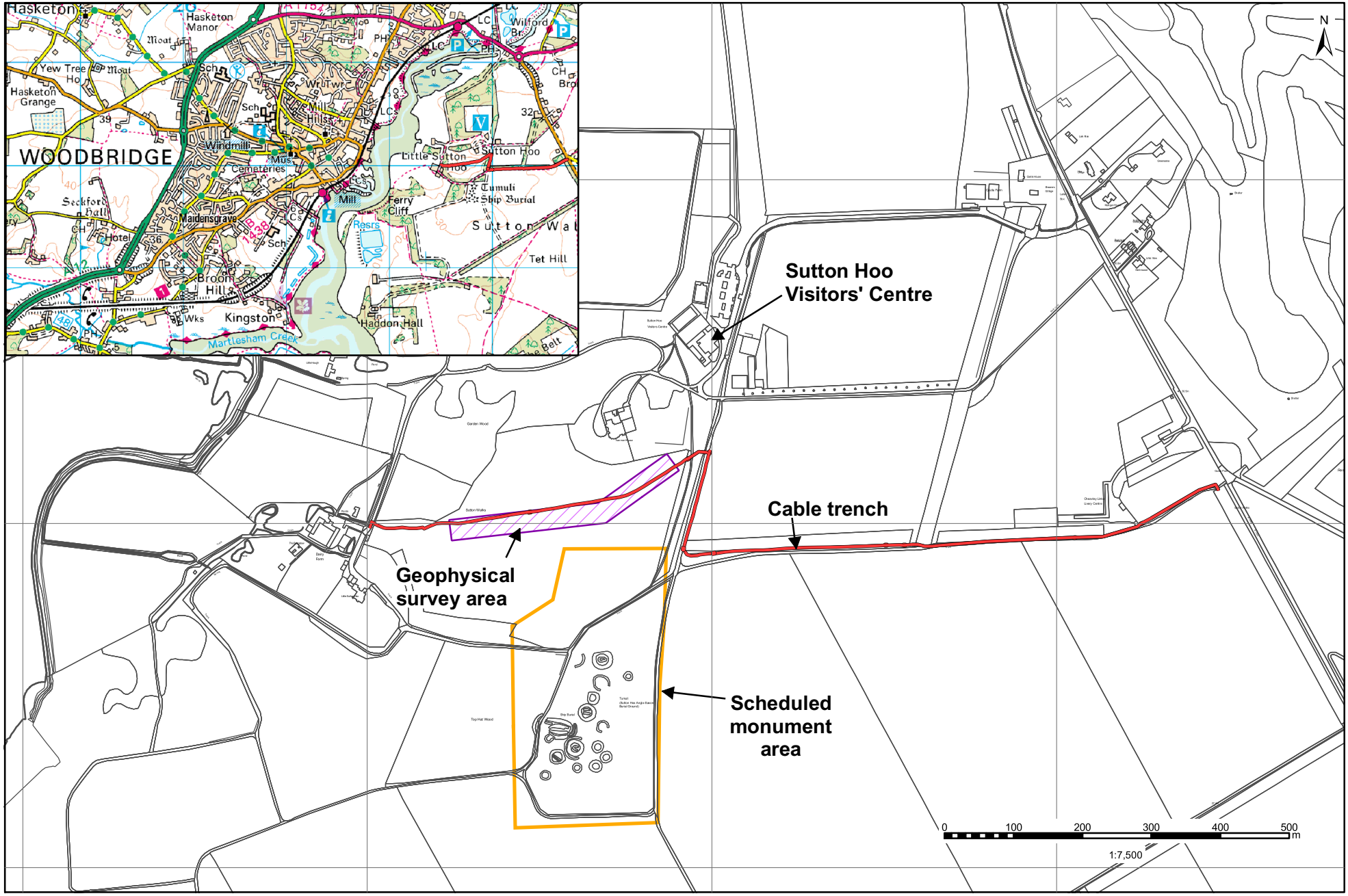


Fig.1. Location of monitored cable route

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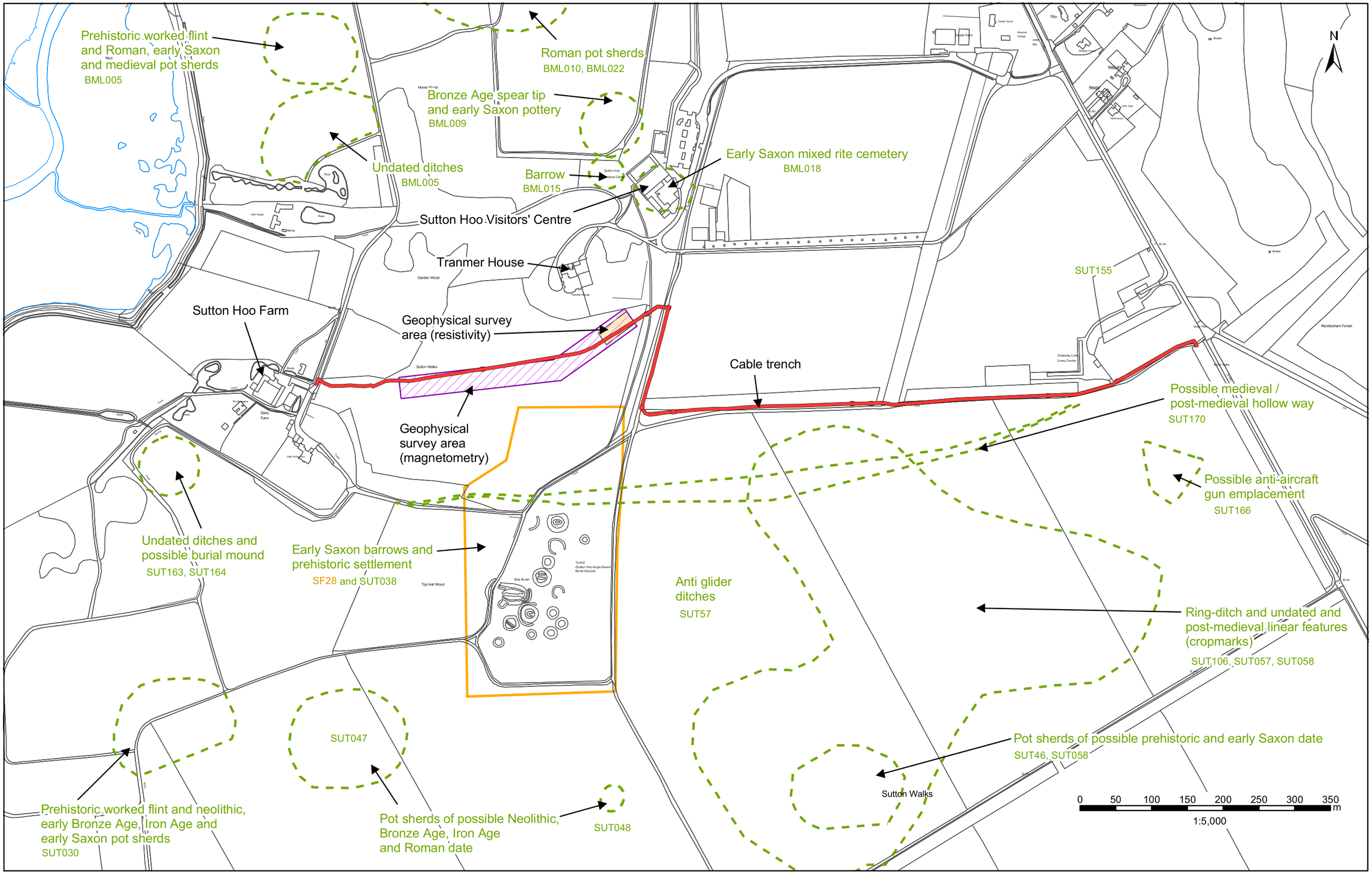
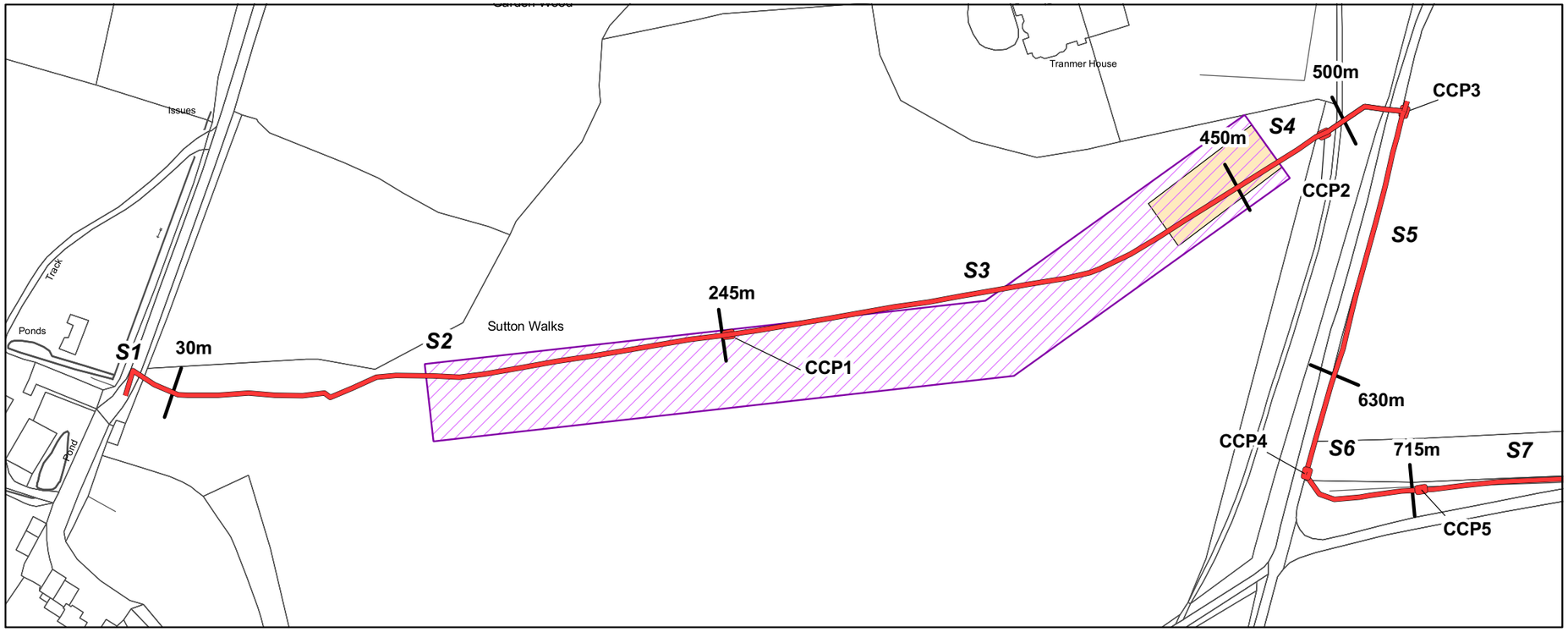
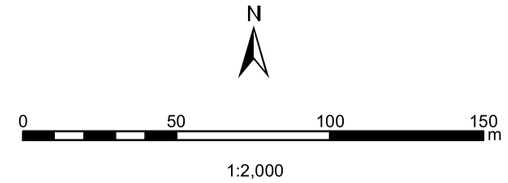


Fig.2. Previous archaeological discoveries





Key

- Cable trench
- magnetometry
- resistivity

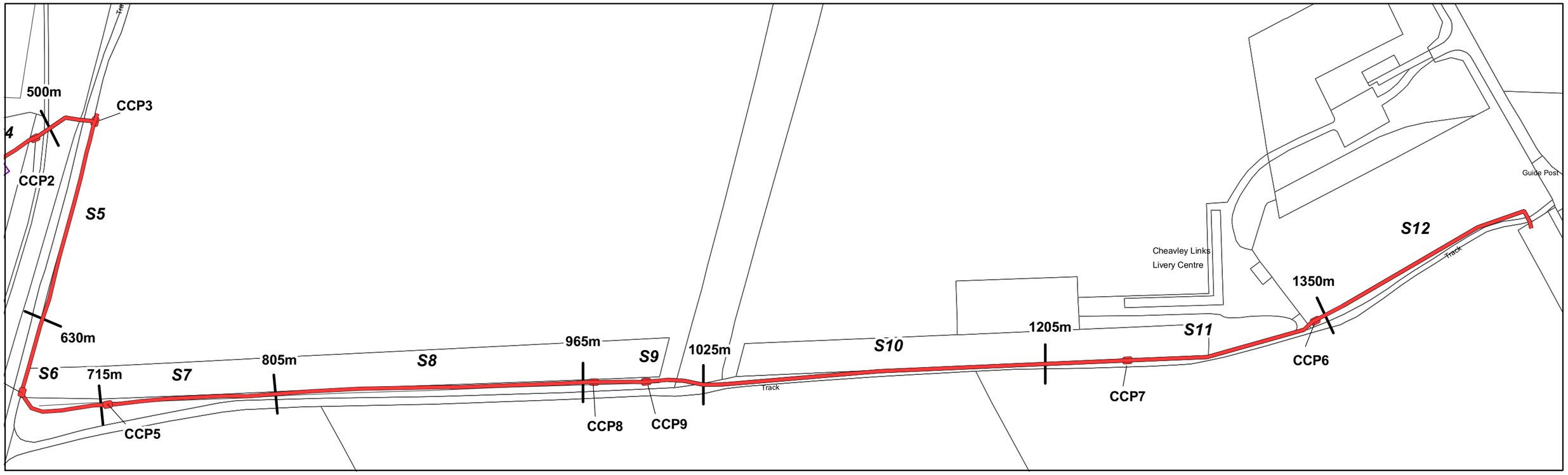


Fig.3. Cable route

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Plate 1: Cable trench 0 to 30m (S1), looking south

Plate 2: Cable trench 450 to 500m (S4), looking west

Plate 3: Cable trench 630 to 715m (S6), looking east

Plate 4: Cable trench 1350 to 1205m (S11), looking west

Plate 5: Cable trench 1350 to 1205m (S11), looking west

Plate 6: Cable connecting pit 7, looking north