Archaeology South-East

ASE

Detailed Magnetometer Survey
Land at Cockering Road, Thanington, Kent

NGR: 613387 156839
(TR 13387 56839)

Site Code: CTK17
OASIS ID: archaeol6-292797

ASE Project No: 170569
ASE Report No: 2017357

By John Cook

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Prepared by:	John Cook	Senior Geophysicist	J. Cook
Reviewed and approved by:	Andy Margetts	Project Manager	
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Archaeology South-East
Units 1 & 2
2 Chapel Place
Portslade
East Sussex
BN41 1DR

Tel: 01273 426830
Fax: 01273 420866
Email: fau@ucl.ac.uk
www.archaeologyse.co.uk

Abstract

Archaeology South-East was commissioned by Southern Water to undertake a geophysical survey on land at Cockering Road, Thanington, Kent, NGR 613387, 156839. The work was undertaken on the 4th August 2017.

Evidence for possible archaeological features was represented by moderate positive anomalies. A linear positive anomaly is observed that may indicate a ditch. However, when overlain on Google Earth imagery the anomaly appears to correspond to grass marks that indicate a pattern of field drainage. A complex area of anomalies in the north of the survey corresponds to a former boundary and piggery noted on the 1972 Ordnance Survey National Grid 1:2500 map (National Grid tile TR1356). Linear anomalies indicative of services are noted crossing the site.

Statement of Indemnity

Geophysical survey is the collection of data that relate to subtle variations in the form and nature of soil and which relies on there being a measurable difference between buried archaeological features and the natural geology. Geophysical techniques do not specifically target archaeological features and anomalies noted in the interpretation do not necessarily relate to buried archaeological features. As a result, magnetic and earth resistance detail survey may not always detect sub-surface archaeological features. This is particularly true when considering earlier periods of human activity, for example those periods that are not characterised by sedentary social activity.

CONTENTS

1.0 INTRODUCTION

1.1 Site background

1.1.1 Archaeology South-East (ASE), the contracting division of The Centre for Applied Archaeology at the Institute of Archaeology, University College London (UCL), were commissioned by Southern Water to undertake archaeological investigations, encompassing geophysical survey, trial trench evaluation and geoarchaeological investigations, on land at Cockering Road, Thanington, Kent, hereafter 'the site' (centred on NGR 613387, 156839; Figure 1).

1.1.2 Southern Water are proposing to install a new sewer along the A2 slip road (while developer is carrying out roadworks in this area, along Thanington Road and into Thanington Resource Centre (Figures 2 and 3). All work in Thanington Road will be constructed using trenchless construction methods. The sewer will then be laid through the field near to the resource centre before connecting to the existing sewer. The existing sewer will then be upsized to 525mm diameter. The outfall to the Great Stour will then also be upsized to 525mm diameter. The total length of the proposed sewer installation is c.550m including c.230m of open cut trenching through the field.

1.2 Geology and topography

1.2.1 According to the online British Geological Survey 1:50,000 mapping, the bedrock geology of the site consists of Seaford Chalk Formation (Chalk) with superficial geology comprising Alluvium (Clay, Silt, Sand and Gravel) along the northern end of the site, along the southern bank of the Great Stour, River Terrace Deposits (Sand and Gravel) at the eastern end, where the A2 and Thanington Road intersect, and Head Deposits (Clay and Silt) present within the remainder. BGS borehole logs from the south of the field area record c. 0.30m of topsoil overlying Clay over chalk with flints, while logs from the north of the field area record c.0.30m of topsoil over sandy, silty clay, over soft dark clayey peat, over gravels, over chalk (BGS 2017).

1.2.2 The survey area was approximately 1.15 hectares of recreational land. It is bounded by the A2 to the northeast and the A28 to the south. The centre of Canterbury lies some 1km to the northeast (Figure 2).

1.3 Aims of geophysical investigation

1.3.1 The general aim of the programme of geophysical survey was to obtain a better understanding of the archaeological potential of the site. This work will allow informed decisions to be made as to the need, nature and scope of any further intrusive investigations and/or mitigation measures that may be required.

1.3.2 The geophysical survey comprised a detailed magnetometer survey within all accessible areas shown on Figure 2. The survey aimed to detect any anomalies of archaeological origin that are within the boundaries of the survey area. The features detected were naturally limited to those features that produce a measurable response to the instrumentation used

1.4 Scope of report

1.4.1 The scope of this report is to detail the findings of the survey. The project was conducted by John Cook with the assistance of Sophie Morrish. The project was managed by Neil Griffin (fieldwork) and Andy Margetts (post-fieldwork).

2.0 ARCHAEOLOGICAL BACKGROUND

2.1 Desk-Based Assessment

2.1.1 The following information is extracted from the Written Scheme of Investigation (WSI) (ASE 2017).

2.1.2 The works area lies c. 1km from Canterbury, and as such there is a significant amount of Historic Environment Record data for the area from all periods. This includes the discovery of Palaeolithic hand axes from Head deposits (Brickearth) from within 500m of the works area, Roman and Anglo-Saxon burials from within 500m, as well as a Roman tile cist found during road widening which contained an urn, a dish, a flagon and a beaker. Roman coins have also been found in relative close proximity to the works area.

2.1.3 Nearby conservation areas are marked on Figure 1.

2.2 The Archive

2.2.1 The digital and paper archive derived from this project will be housed at Archaeology South-East's Sussex offices and will be combined with any further archive generated in the event of further fieldwork being required.

3.0 SURVEY METHODOLOGY

3.1 Geophysical survey

3.1.1 A fluxgate gradiometer (magnetometry) survey was undertaken across a single parcel of land, as depicted on Figure 2 (NGR 613387 156839). The work was undertaken on Friday 4th August 2017 during dry, clear and breezy weather.

3.2 Applied geophysical instrumentation

3.2.1 The Fluxgate Gradiometer employed was the Bartington Instrumentation Grad 601-2. The Grad 601-2 has an internal memory and a data logger that store the survey data. This data is downloaded into a PC and is then processed in a suitable software package.

3.2.2 30m x 30m grids were set out using a GPS (see below). Each grid was surveyed with 1m traverses; samples were taken every 0.25m.

3.2.3 Data was collected along north-south traverses in a zigzag pattern beginning in the south west corner of each grid, following the contours of the site.

3.3 Instrumentation used for setting out the survey grid

3.3.1 The survey grid for the site was geo-referenced using a Leica Viva SmartRover. The GPS receiver collects satellite data to determine its position and uses the mobile phone networks to receive corrections, transmitting them to the RTK Rover via Bluetooth to provide a sub centimetre Ordnance Survey position and height. Each surveyed grid point has an Ordnance Survey position; therefore the geophysical survey can be directly referenced to the Ordnance Survey National Grid.

3.4 Data processing

3.4.1 All of the geophysical data processing was carried out using TerraSurveyor published by DW Consulting. Minimally processed data was produced using the following schedule of processing. Due to the very high positive readings of some of the magnetic disturbance, the values were replaced with a dummy value so as to avoid detrimentally affecting the dataset when further processed. The first process carried out upon the data was to apply a DESPIKE to the data set which removes the random ‘iron spikes’ that occur within fluxgate gradiometer survey data. A ZERO MEDIAN TRAVERSE was then applied to survey data. This removes stripe effects within grids and ensures that the survey grid edges match.

3.5 Data presentation

3.5.1 Data is presented using images exported from TerraSurveyor into AutoCAD software and inserted into the geo-referenced site grid. Data is presented as raw and processed data greyscale plots.

4.0 GEOPHYSICAL SURVEY RESULTS

4.1 Description of site

4.1.1 The survey area was approximately 1.15 hectares of recreational land. It is bounded by the A2 to the north east and the A28 to the south. The centre of Canterbury lies some 1km to the north east (Figure 2).

4.2 Survey limitations

4.2.1 Physical obstructions encountered on site included trees, an area of overgrown vegetation with hidden dips, wire fences and post and rail fences (Figures 2, 6 and 7). Obstructions for each area are noted in the results. In addition, the effectiveness of magnetometer surveys depends on a contrast between the absolute magnetic susceptibility of the topsoil to the underlying subsoil (Clark 1996). Features may also be difficult to detect where there has been significant primary silting and development of significant overburden. Areas where physical obstructions form a barrier to survey, or a health and safety issue, have been omitted. One small area in the south east of the site was omitted from the survey due to physical obstructions and nearby magnetic objects (Figure 2). The site lies over Seaford Chalk and Head deposits. There is a high degree of local variation in response to magnetometer survey although response is good over the parent solid geology of chalk (English Heritage 2008).

4.3 Introduction to results

4.3.1 The results should be read in conjunction with the figures at the end of this report. The types of features likely to be identified are discussed below.

4.3.2 *Positive Magnetic Anomalies*
Positive anomalies generally represent cut features that have been in-filled with magnetically enhanced material.

4.3.3 *Negative Magnetic anomalies*
Negative anomalies generally represent buried features such as banks or compacted ground that have a lower magnetic signature in comparison to the background geology.

4.3.4 *Magnetic Disturbance*
Magnetic disturbance is generally associated with interference caused by modern ferrous features such as fences and service pipes or cables.

4.3.5 *Magnetic Debris*
Low amplitude magnetic debris consists of a number of dipolar responses spread over an area and is indicative of ground disturbance.

4.3.6 *Dipolar Anomalies*
Dipolar anomalies are positive anomalies with an associated negative response. These anomalies are usually associated with discreet ferrous objects or may represent buried kilns or ovens.

4.3.7 *Bipolar Anomalies*
Bipolar anomalies consist of alternating responses of positive and negative

magnetic signatures. Interpretation will depend on the strength of these responses; modern pipelines and cables typically produce strong bipolar responses.

4.3.8 *Thermoremanence*
Thermoremanence is most commonly encountered through the magnetizing of clay through the firing process although stones and soils can also acquire thermoremanence.

4.3.9 Magnetism from ferromagnetic materials (iron) and from thermoremanence are forms of permanent magnetism and in most cases a magnetometer will not enable the separation of anomalies into the two categories. The interpretation of these anomalies into either category relies on field strength within an area. Magnetic anomalies due to iron normally rise and fall rapidly, forming a 'spike' in the data.

4.4 Interpretation of fluxgate gradiometer results (Figures 3-6)

4.4.1 The interpretation of fluxgate gradiometer results should be read in conjunction with the figures at the end of the report. Specific examples of anomaly types may be numbered in the figures and text but not all anomalies are numbered.

4.4.2 Evidence of possible archaeological activity included the following described anomalies (Figure 5). The most obvious possible archaeological anomalies are the linear and discrete moderate positive anomalies and likely to be due to cut features such as pits and ditches (coloured light green).

4.4.3 Areas of magnetic debris may relate to a scattering of near surface ferrous material, demolished buildings, former field boundaries, ground disturbance or made ground (dotted brown).

4.4.4 A scatter of dipolar anomalies (pink dots) relate to near surface ferrous (iron) objects.

4.4.5 A number of linear anomalies run across the site and are probably the result of services (pink lines).

4.4.6 Magnetic disturbance relating to the nearby services, boundaries, field gates and feeding troughs may mask underlying features (coloured brown).

5.0 CONCLUSIONS

5.1 Discussion

5.1.1 Evidence for possible archaeological features was represented by moderate positive anomalies (coloured light green on Figure 5). Though they could have an archaeological origin, they may equally be the result of the natural geology. A linear positive anomaly (A1) is observed that may indicate a ditch. However, when overlain on Google Earth imagery (Figure 6) the anomaly appears to correspond to grass marks that indicate a pattern of field drainage. A complex area of anomalies in the north of the survey corresponds to a former boundary (A2) and piggery (A3) noted on the 1972 Ordnance Survey National Grid 1:2500 map (National Grid tile TR1356).

5.1.2 Dipolar anomalies indicate near surface ferrous (iron) objects (A4). A number of these correspond to goal post locations (A5).

5.1.3 Linear anomalies indicative of services are noted crossing the site. One of these (A6) corresponds with a surface water pipe route noted on the service plan. However, this anomaly deviates from the marked line on the plan as it heads northwest. A stronger linear anomaly (A7) is also likely to be a service.

5.1.4 An area of magnetic debris and disturbance (A8) is caused by nearby buildings and metallic objects.

5.1.5 In conclusion a number of possible archaeological features were encountered across the site. However, these features may also relate to variations in the natural geology or modern features associated with the recreation ground and former piggery.

Bibliography

ASE 2017. *Land at Cockering Road, Thanington, Kent: Written Scheme of Investigation*

BGS 2017. *Geology of Britain Viewer*
http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html?src=topNav
Accessed 8th August 2017

Clark, A. 1996. *Seeing Beneath the Soil.* (2nd edition). London: Routledge.

English Heritage 2008 *Geophysical Survey in Archaeological Field Evaluation 2nd Edition* Swindon: English Heritage

Acknowledgements

Archaeology South-East would like to thank Southern Water for commissioning the survey.

HER Summary

HER enquiry number	N/A					
Site code	CTK17					
Project code	170569					
Planning reference	Permitted development					
Site address	Cockering Road, Thanington, Kent					
District/Borough	Kent					
NGR (12 figures)	613387 156839					
Geology	Seaford Chalk, Alluvium, Head deposits					
Fieldwork type					**Survey**	
Date of fieldwork	4th August 2017					
Sponsor/client	Southern Water					
Project manager	Neil Griffin					
Project supervisor	John Cook					
Period summary						
Project summary	*Archaeology South-East was commissioned by Southern Water to undertake a geophysical survey on land at Cockering Road, Thanington, Kent, NGR 613387, 156839. The work was undertaken on the 4th August 2017. Evidence for possible archaeological features was represented by moderate positive anomalies. A linear positive anomaly is observed that may indicate a ditch. However, when overlain on Google Earth imagery the anomaly appears to correspond to grass marks that indicate a pattern of field drainage. A complex area of anomalies in the north of the survey corresponds to a former boundary and piggery noted on the 1972 Ordnance Survey National Grid 1:2500 map (National Grid tile TR1356). Linear anomalies indicative of services are noted crossing the site.*					
Museum/Accession No.	N/A					

OASIS FORM

OASIS ID: archaeol6-292797

Project details

Project name Land at Cockering Road, Thanington, Kent

Short description of the project Archaeology South-East was commissioned by Southern Water to undertake a geophysical survey on land at Cockering Road, Thanington, Kent, NGR 613387, 156839. The work was undertaken on the 4th August 2017. Evidence for possible archaeological features was represented by moderate positive anomalies. A linear positive anomaly is observed that may indicate a ditch. However, when overlain on Google Earth imagery the anomaly appears to correspond to grass marks that indicate a pattern of field drainage. A complex area of anomalies in the north of the survey corresponds to a former boundary and piggery noted on the 1972 Ordnance Survey National Grid 1:2500 map (National Grid tile TR1356). Linear anomalies indicative of services are noted crossing the site.

Project dates Start: 04-08-2017 End: 04-08-2017

Previous/future work Not known / Yes

Any associated project reference codes 170569 - Contracting Unit No.

Any associated project reference codes CTK17 - Sitecode

Type of project Field evaluation

Site status None

Current Land use Other 14 - Recreational usage

Monument type NONE None

Significant Finds NONE None

Methods & techniques ''Geophysical Survey''

Development type Service infrastructure (e.g. sewage works, reservoir, pumping station, etc.)

Solid geology CHALK (INCLUDING RED CHALK)

Drift geology (other) Head - clay and silt

Techniques Magnetometry

Project location

Country England

Site location KENT CANTERBURY THANINGTON WITHOUT Land at Cockering Road, Thanington

Postcode CT7 3XE

Study area 1.1 Hectares

Site coordinatesTR 13387 56839 51.27007196912 1.059427165952 51 16 12 N 001 03 33 E Point

Project creators

Name of Organisation Archaeology South East

Project brief originator Southern Water

Project design originatorASE

Project director/manager Paul Mason/Jim Stevenson

Project supervisor John Cook

Type of sponsor/funding body Southern Water

Project archives

Digital Archive recipient ASE

Digital Media available ''Geophysics''

Paper Media available ''Report''

Project bibliography 1

Publication type Grey literature (unpublished document/manuscript)

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Other bibliographic details Report number 2017357

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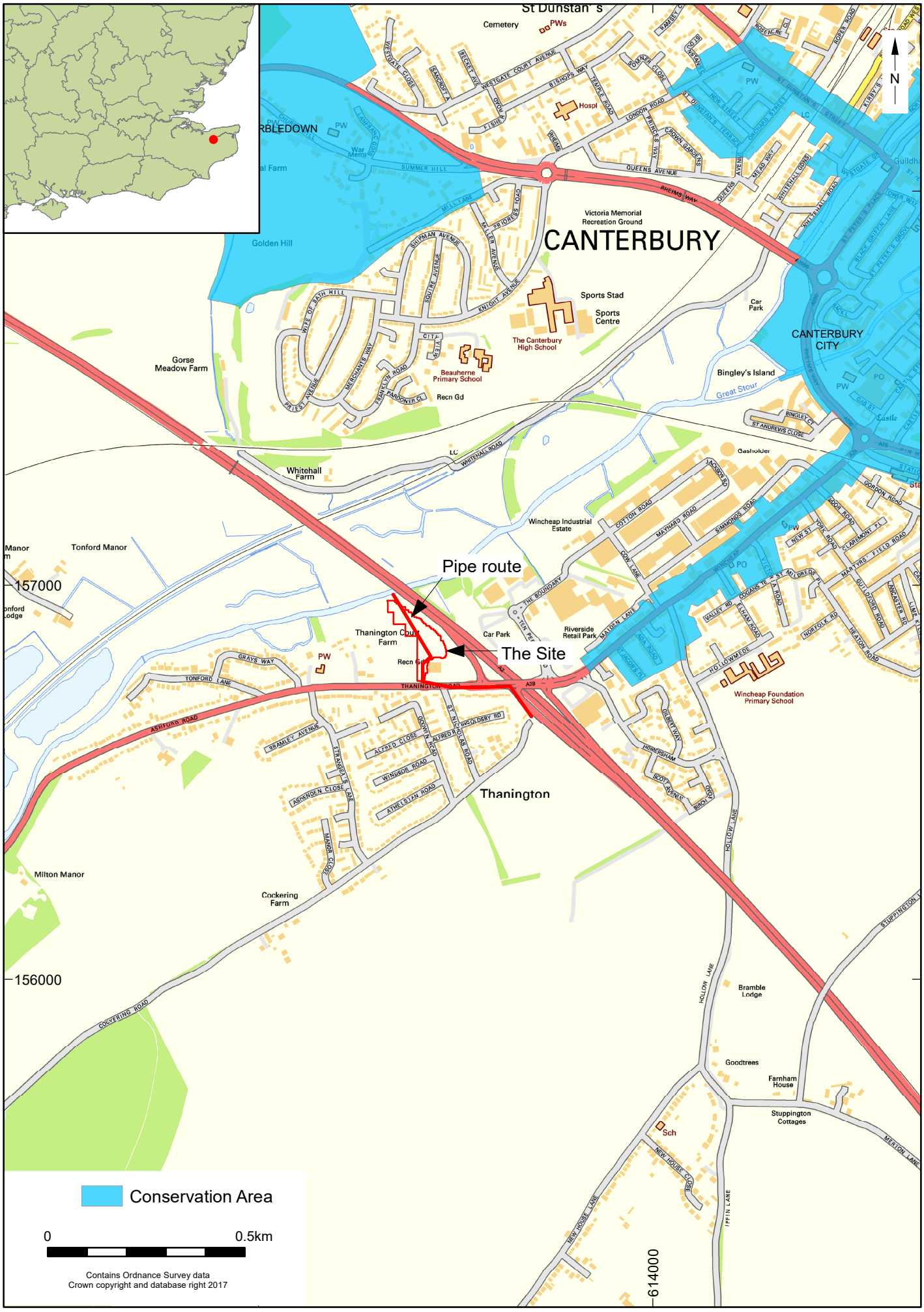
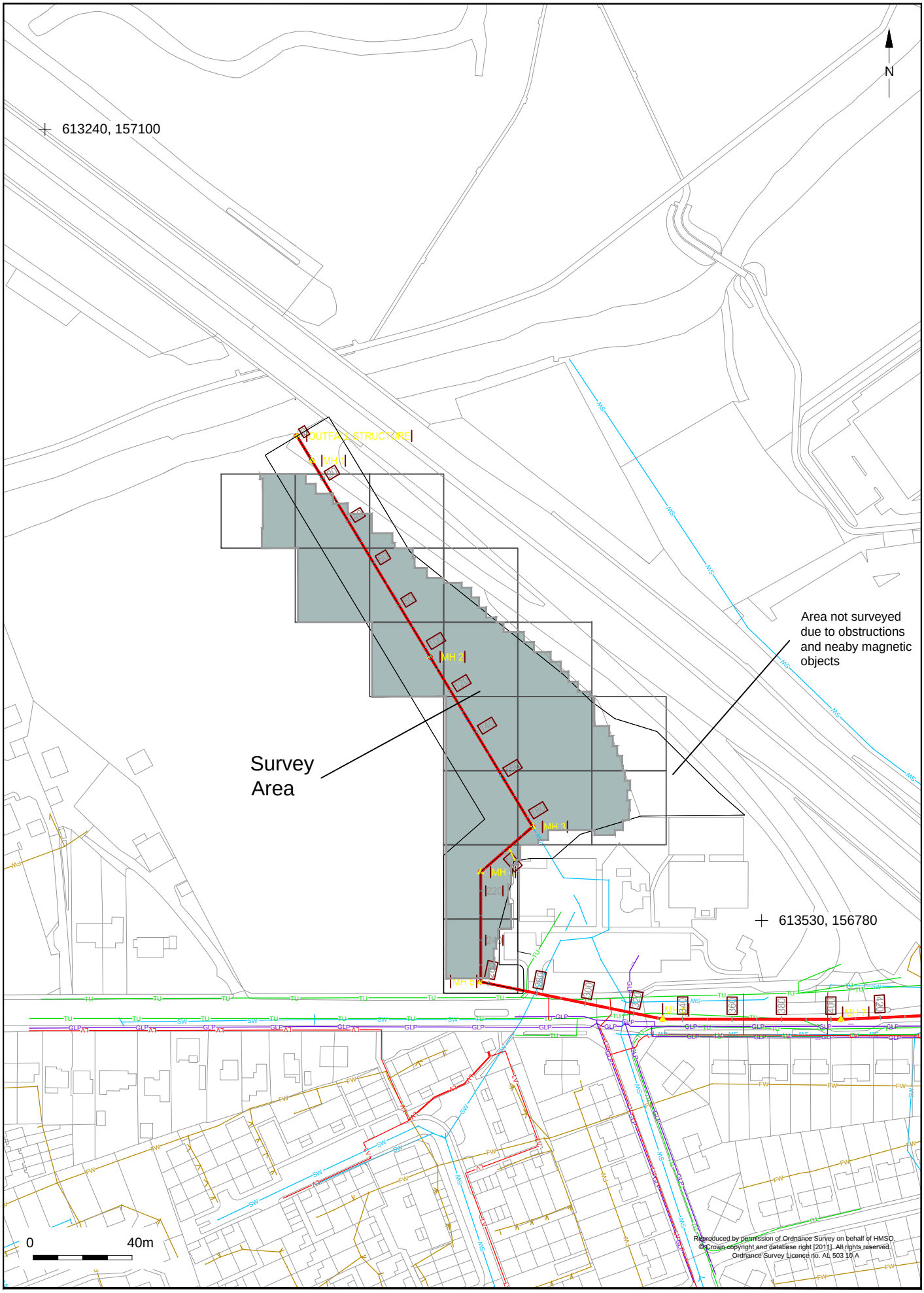
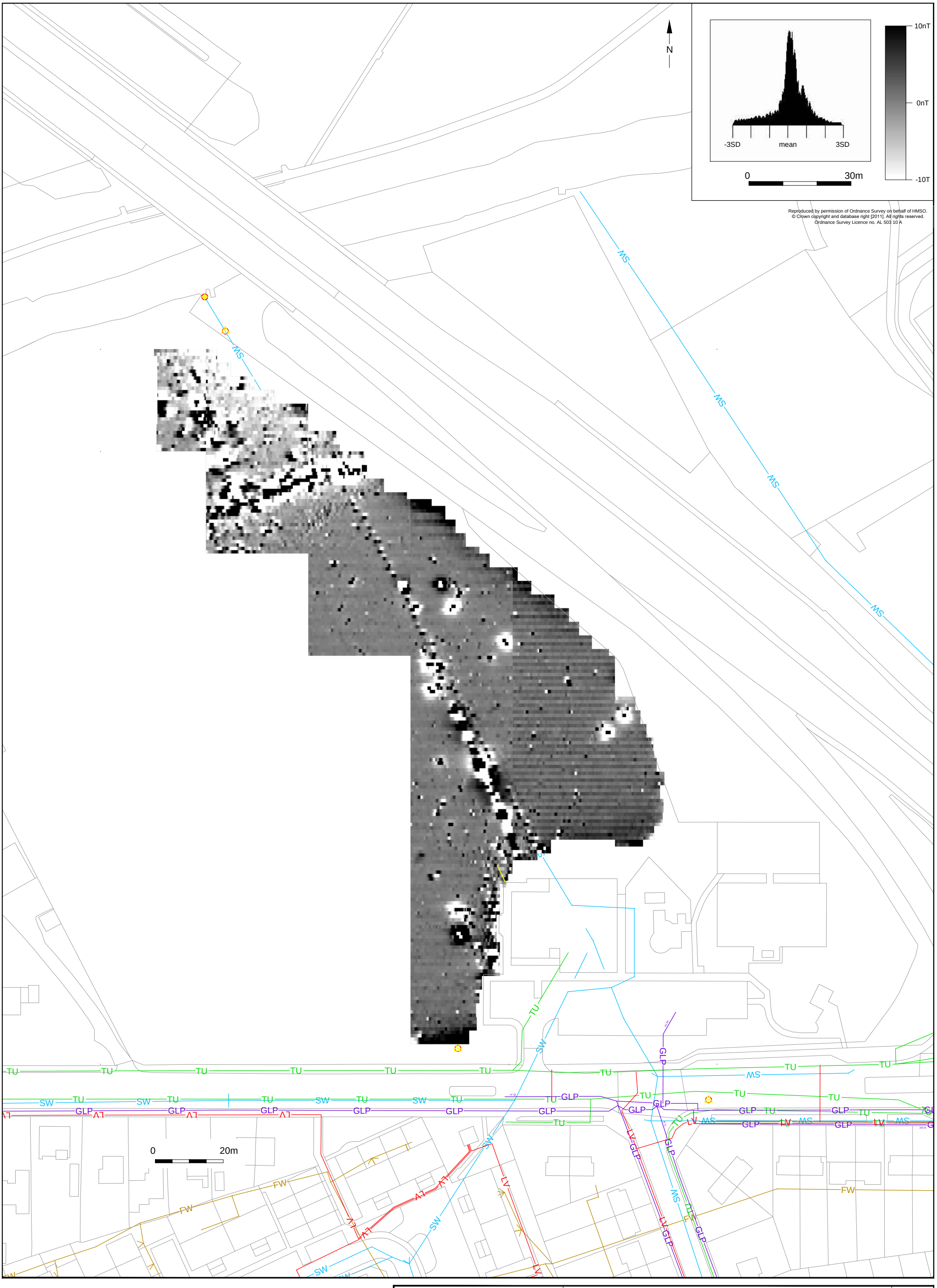


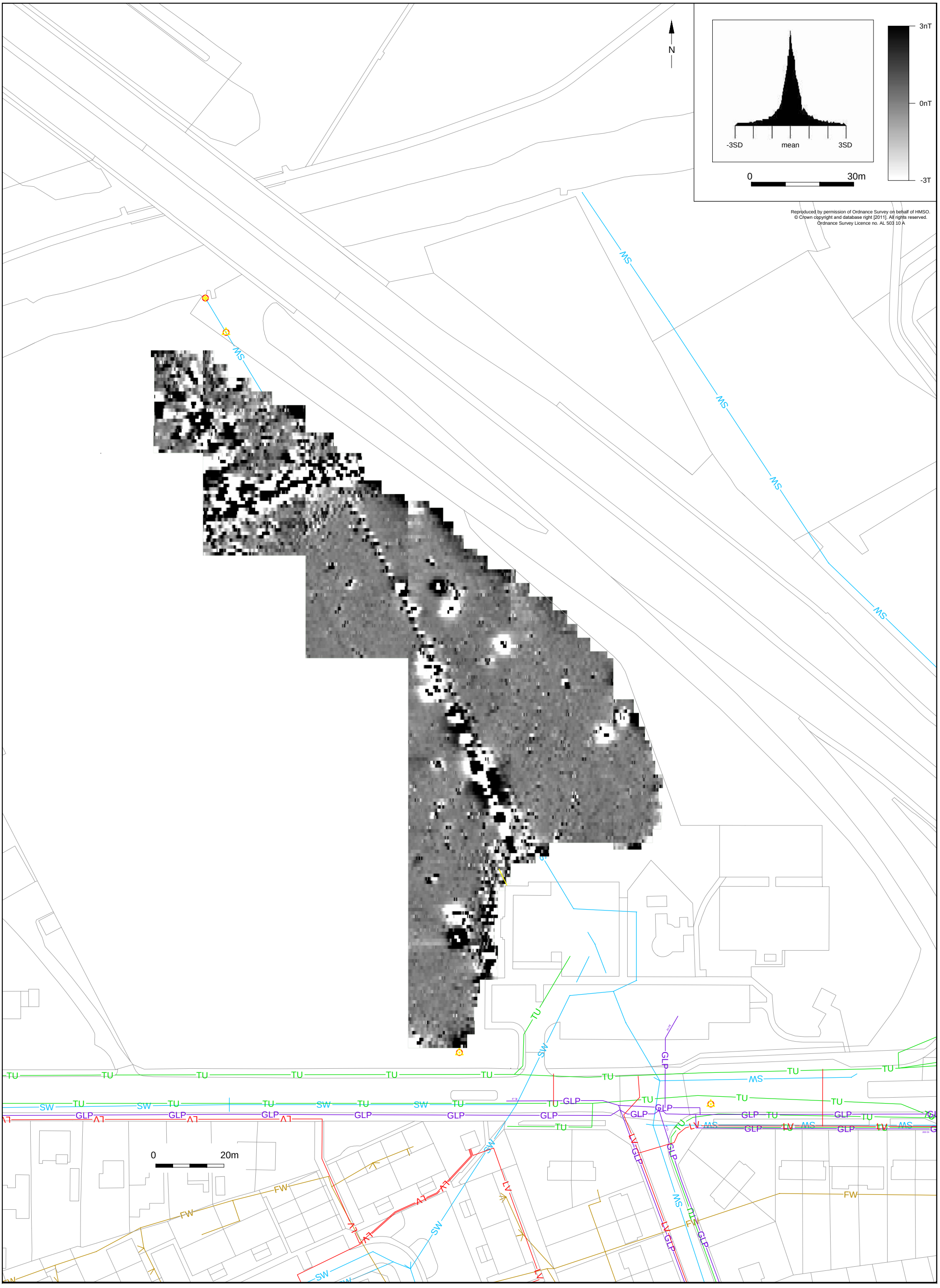
© Archaeology South-East		Cockering Road, Thanington	Fig. 1
Project Ref: 170569	August 2017	Site location	
Report Ref: 2017357	Drawn by: JC		



© Archaeology South-East		Land at Cockering Road, Thanington, Kent	Fig. 2
Project Ref: 170569	August 2017	Site plan	
Report Ref: 2017357	Drawn by: JC		



© **Archaeology South-East**		Land at Cockering Road, Thanington, Kent	Fig. 3
Project Ref: 170569	August 2017	Raw data	
Report Ref: 2017357	Drawn by: JC		



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Project Ref: 170569	August 2017	Processed data	
Report Ref: 2017357	Drawn by: JC		

Strong positive anomaly(Possible archaeology)
Moderate positive anomaly (Possible archaeology)
Weak positive anomaly (Possible archaeology)
Moderate negative anomaly
Weak negative anomaly
Magnetic disturbance
Magnetic debris
Dipolar anomaly (Possible archaeology/Modern)
Possible thermoremanent anomaly
Linear anomaly former field boundary or land drain
Linear anomaly agricultural activity
Possible service

0 45m

N

A1
A2
A3
A4
A5
Goalpost
locations
A6
A7
A8

0 20m

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Project Ref: 170569	August 2017	Interpretation	
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Fig. 6a Oblique Google Earth imagery

Fig. 6b Oblique Google Earth 3D imagery with geophysical survey data overlain

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Project Ref: 170569	August 2017	Google Earth images	
Report Ref: 2017357	Drawn by: JC		

Fig. 7a

Fig. 7b

Fig. 7c

Fig. 7d

Sussex Office
Units 1 & 2
2 Chapel Place
Portslade
East Sussex BN41 1DR
tel: +44(0)1273 426830
email: fau@ucl.ac.uk
www.archaeologyse.co.uk

Essex Office
27 Eastways
Witham
Essex
CM8 3YQ
tel: +44(0)1376 331470
email: fau@ucl.ac.uk
www.archaeologyse.co.uk

London Office
Centre for Applied Archaeology
UCL Institute of Archaeology
31-34 Gordon Square
London WC1H 0PY
tel: +44(0)20 7679 4778
email: fau@ucl.ac.uk
www.ucl.ac.uk/caa