

Detailed Magnetometer Survey
Land at Tenterden Southern Extension
Tenterden, Kent

NGR: 588630 132910
(TQ 88630 32910)

ASE Project No: 7561
ASE Report No. 2015192
Oasis: archaol6-213713



By John Cook BSc (Hons) ACiFA

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Date of Issue:	June 11 th 2015		
Revision:			

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Abstract

A magnetometer survey was carried out by Archaeology south-East on a site totalling approximately 4 hectares at Tenterden Southern Extension, Tenterden, Kent.

Archaeology South-East was commissioned by CgMs Consulting Ltd to conduct a magnetometer survey on a site totalling approximately 4 hectares of land at Tenterden Southern Extension, Tenterden, Kent.

Limited evidence for possible archaeological features was represented by linear and discrete positive anomalies. While these may be representative of cut features such as pits and ditches, they may also be in-filled natural features or modern agricultural activity, or a combination of the above. Linear anomalies noted in the east of the area may pertain to field drainage. Areas of magnetic debris probably correspond to former buildings.

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.

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1.0 INTRODUCTION

1.1 Site background

- 1.1.1 Archaeology South-East was commissioned by CgMs Consulting Ltd to conduct a magnetometer survey on a site totalling approximately 4 hectares of land at Tenterden Southern Extension, Tenterden, Kent, henceforth referred to as 'the site' (NGR. 588630 132910; Figure 1).

1.2 Geology and topography

- 1.2.1 According to the British Geological Survey (BGS 2015a) the bedrock geology of the site predominately comprises Tunbridge Wells sand formation – sandstone and siltstone and Wadhurst clay formation - mudstone. No superficial deposits are recorded at the site. No boreholes are recorded on the BGS Borehole Viewer (BGS 2015b) on or in the immediate vicinity of the site.
- 1.2.2 The site consists of pasture land, with evidence for former arable use. The site is mainly level with some small undulations and bounded by wire fences and mature trees.

1.3 Aims of geophysical investigation

- 1.3.1 The purpose of the geophysical survey was to detect any buried archaeological anomalies that might provide a measurable magnetic response.

1.4 Scope of report

- 1.4.1 The scope of this report is to report on the findings of the survey. The project was conducted by John Cook with the assistance of Catherine Douglas and Odile Rouard. The project was managed by Paul Mason (fieldwork) and Jim Stevenson (post fieldwork).

2.0 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

- 2.2.1 The following information is paraphrased from the Desk-Based Assessment (CgMs 2014). For a more detailed historical background please refer to this document.
- 2.2.2 Overt evidence of prehistoric or Roman activity within 1km of the site is scarce, but this may be a product of very limited modern archaeological fieldwork that has taken place in the vicinity. It is likely that the site was marginal land or wooded until at least the early medieval period although the presence of small dispersed farmsteads dating from the Iron Age to early medieval period cannot be ruled out.
- 2.2.3 The medieval settlement of Tenterden was the meeting point of two old trackways from Woodchurch to Rolvenden and from Biddenden and developed as a small roadside town with the church in its center. The High Street and St Mildred's Church north of the site would have formed the focus for early urbanization and it is suggested that an informal market was operational by the late 13th century.
- 2.2.4 Tenterden was recorded as a medieval borough and one of the Cinque Ports by the mid-15th century. Evidence of medieval 'backland' activity may exist within the northern end of the site but the remainder is thought more likely to have been used for agriculture or as woodland.
- 2.2.5 Urban expansion along the principal axis of the High Street continued into the post-medieval period. Cartographic sources suggest that the site remained as a number of open fields with the exception of the extreme northern end which was sub-divided into three small plots to the rear of properties fronting or accessed by High Street

3.0 SURVEY METHODOLOGY

3.1 Geophysical survey

- 3.1.1 A fluxgate gradiometer (magnetometry) survey was undertaken across approximately 4 hectares spread across five enclosures, as depicted on Figure 2. The work was undertaken between 28th and 29th May 2015 during warm, dry weather, and strong winds.

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 A 30m x 30m grid was set out using digital GPS survey equipment (see below). Each grid was surveyed in 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 was processed using TerraSurveyor software 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 data, processed data, an interpolated data greyscale plot, and a red greyscale blue plot.

4.0 GEOPHYSICAL SURVEY RESULTS

4.1 Description of site

4.1.1 The survey area consisted of approximately 4 hectares of pasture land, bounded by hedges, wire fences and woodland.

4.1.2 The site consists of pasture land, with evidence for former use as orchards, with small areas of woodland.

4.2 Survey limitations

4.2.1 Physical obstructions encountered on site included fences, trees and construction waste (Figures 7e and 7d). Obstructions for each area are noted in the results.

4.2.2 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.

4.2.3 Areas where physical obstructions form a barrier to survey, or a health and safety issue, have been omitted. The site lies over mudstone geology. An average response to magnetometer is possible, although results may be variable (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 (Figures 3-7). 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** (Figure 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 are numbered (A1, A2 etc.) in the figures and text but not all anomalies are numbered.
- 4.4.2 The site consists of an area of approximately 4 hectares spread across a series of five enclosures that slope away to agricultural land in the south.
- 4.4.3 Evidence of possible archaeological activity was, in general, sparse and included the following described anomalies.
- 4.4.4 The most obvious possible archaeological anomalies are moderate positive anomalies, the most prominent example of which is noted as A1, and may be due to cut features such as a gullies. However, these anomalies may relate to natural infilled features.
- 4.4.5 Discrete positive anomalies occur across the site, with a concentration of these anomalies at labelled as A2 and may represent cut features such as pits. However, these anomalies may also relate to in filled natural features.
- 4.4.6 Areas of magnetic debris may relate to a scattering of near surface ferrous material, ground disturbance or made ground. In particular the anomalies noted at A3 appear to correspond to a former barn or agricultural buildings observed on historic mapping and at A4 small building or shed observed on past aerial photography.

- 4.4.7 Dipolar anomalies are observed across the area. These anomalies may relate to thermoremanent material such as that pertaining to kilns and furnaces or, more likely, near surface ferrous objects. Dipolar anomalies in the north of the area (A5) appear to correspond with a field boundary.
- 4.4.8 Positive linear anomalies associated with a pattern of land drains are observed in the north and east of the site (A6).
- 4.4.9 Probable services are noted across the site (A7) along with associated magnetic disturbance (A8).
- 4.4.10 Magnetic disturbance is also observed near the edges of the enclosures relating to interference from nearby ferrous objects such as fences and waste material (Figure 7e)

5.0 CONCLUSIONS

- 5.1 Limited evidence for possible archaeological features was represented by linear and discrete positive anomalies.
- 5.2 While these may be representative of cut features such as pits and ditches, they may also be in-filled natural features or modern agricultural activity, or a combination of the above.
- 5.3 Linear anomalies noted in the east of the area (A6) may pertain to field drainage. Areas of magnetic debris (A3 and A4) probably correspond to former buildings.

Bibliography

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Acknowledgements

Archaeology South-East would like to thank CgMs Consulting Ltd for commissioning the survey.

HER Summary

Identification Name and Address	Detailed Magnetometer Survey Land at Tenterden Southern Extension, Tenterden					
County, District &/or Borough	Kent					
OS Grid Refs.	588630 132910					
Geology	Tunbridge Wells sand formation – sandstone and siltstone and Wadhurst clay formation - mudstone					
Arch. South-East Project Number	7561					
Type of Fieldwork	Eval.	Excav.	Watching Brief	Standing Structure	Survey	Other
Type of Site	Green Field	Shallow Urban	Deep Urban	Other		
Dates of Fieldwork	Eval.	Excav.	WB.	13 th – 15 th May 2015		
Sponsor/Client	CgMs Consulting Ltd					
Project Manager	Paul Mason					
Project Supervisor	John Cook					
Period Summary	Palaeo.	Meso.	Neo.	BA	IA	RB
	AS	MED	PM	Other Modern		
<p>Summary</p> <p><i>Archaeology South-East was commissioned by CgMs Consulting Ltd to conduct a magnetometer survey on a site totalling approximately 4 hectares of land at Tenterden Southern Extension, Tenterden, Kent.</i></p> <p><i>Limited evidence for possible archaeological features was represented by linear and discrete positive anomalies. While these may be representative of cut features such as pits and ditches, they may also be in-filled natural features or modern agricultural activity, or a combination of the above. Linear anomalies noted in the east of the area may pertain to field drainage. Areas of magnetic debris probably correspond to former buildings.</i></p>						

Oasis Form

OASIS ID: archaeol6-213713

Project details

Project name	Detailed Magnetometer Survey Land at Tenterden Southern Extension
Short description of the project	Archaeology South-East was commissioned by CgMs Consulting Ltd to conduct a magnetometer survey on a site totalling approximately 4 hectares of land at Tenterden Southern Extension, Tenterden, Kent. Limited evidence for possible archaeological features was represented by linear and discrete positive anomalies. While these may be representative of cut features such as pits and ditches, they may also be in-filled natural features or modern agricultural activity, or a combination of the above. Linear anomalies noted in the east of the area (A7) may pertain to field drainage. Areas of magnetic debris (A3 and A4) probably correspond to former buildings.
Project dates	Start: 28-05-2015 End: 29-05-2015
Any associated project reference codes	7561 - Contracting Unit No.
Type of project	Field evaluation
Site status	None
Current Land use	Grassland Heathland 5 - Character undetermined
Monument type	NONE None
Significant Finds	NONE None
Methods & techniques	"Geophysical Survey"
Development type	Housing estate
Prompt	Planning condition
Position in the planning process	Not known / Not recorded
Solid geology (other)	Tunbridge Wells sand formation
Drift geology	Unknown
Techniques	Magnetometry

Project location

Country	England
Site location	KENT ASHFORD TENTERDEN Tenterden Southern Extension
Postcode	TN30 6EX
Study area	4.00 Hectares
Site coordinates	TQ 88630 32910 51.0638926733 0.692370852611 51 03 50 N 000 41 32 E Point

Project creators

Name of Organisation	Archaeology South East
Project brief originator	Archaeology South East
Project design originator	ASE/CgMs
Project director/manager	Paul Mason
Project supervisor	John Cook
Type of sponsor/funding body	CgMs Consulting
Name of sponsor/funding body	CgMs Consulting Ltd

Project archives

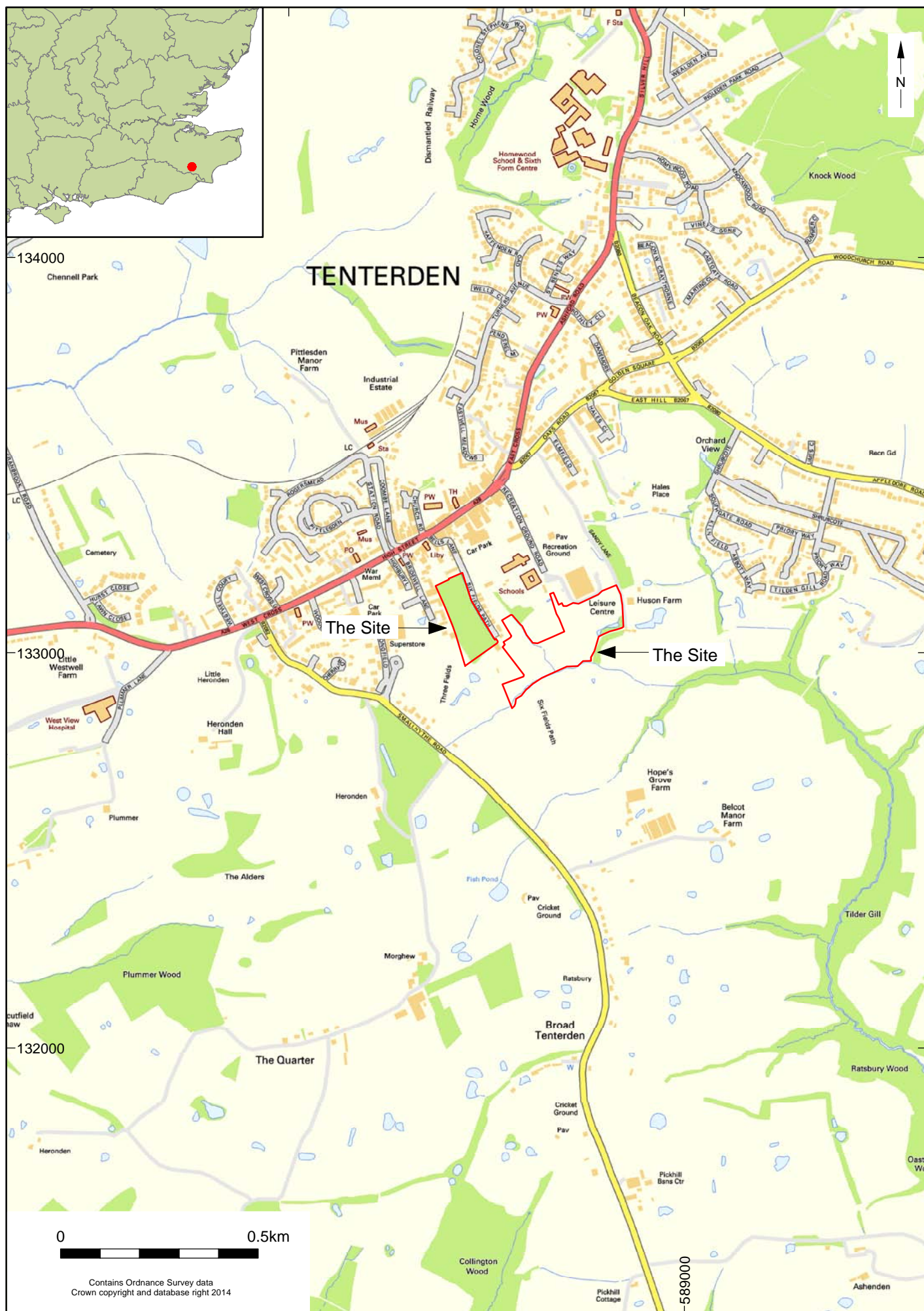
Digital Archive recipient	Kent HER
Digital Contents	"Survey"
Digital Media available	"Geophysics", "Images raster / digital photography"

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Detailed Magnetometer Survey Land at Tenterden Southern Extension, Kent

Author(s)/Editor(s)	Cook, J.
Other bibliographic details	report number 2015192
Date	2015
Issuer or publisher	ASE
Place of issue or publication	Portslade

Entered by	John Cook (john.cook@ucl.ac.uk)
Entered on	11 June 2015



© Archaeology South-East		Land South of Tenterden, Kent	Fig. 1
Project Ref: 7561	June 2015	Site location	
Report Ref: 2015192	Drawn by: JC		



© Archaeology South-East		Tenterden Southern Extension, Tenterden, Kent	Fig. 3
Project Ref: 7561	June 2015	Raw data	
Report Ref: 2015192	Drawn by: JC		



© Archaeology South-East		Tenterden Southern Extension, Tenterden, Kent	Fig. 4
Project Ref: 7561	June 2015	Processed data	
Report Ref: 2015192	Drawn by: JC		



© Archaeology South-East		Tenterden Southern Extension, Tenterden, Kent	Fig. 5
Project Ref: 7561	June 2015	Interpolated data	
Report Ref: 2015192	Drawn by: JC		

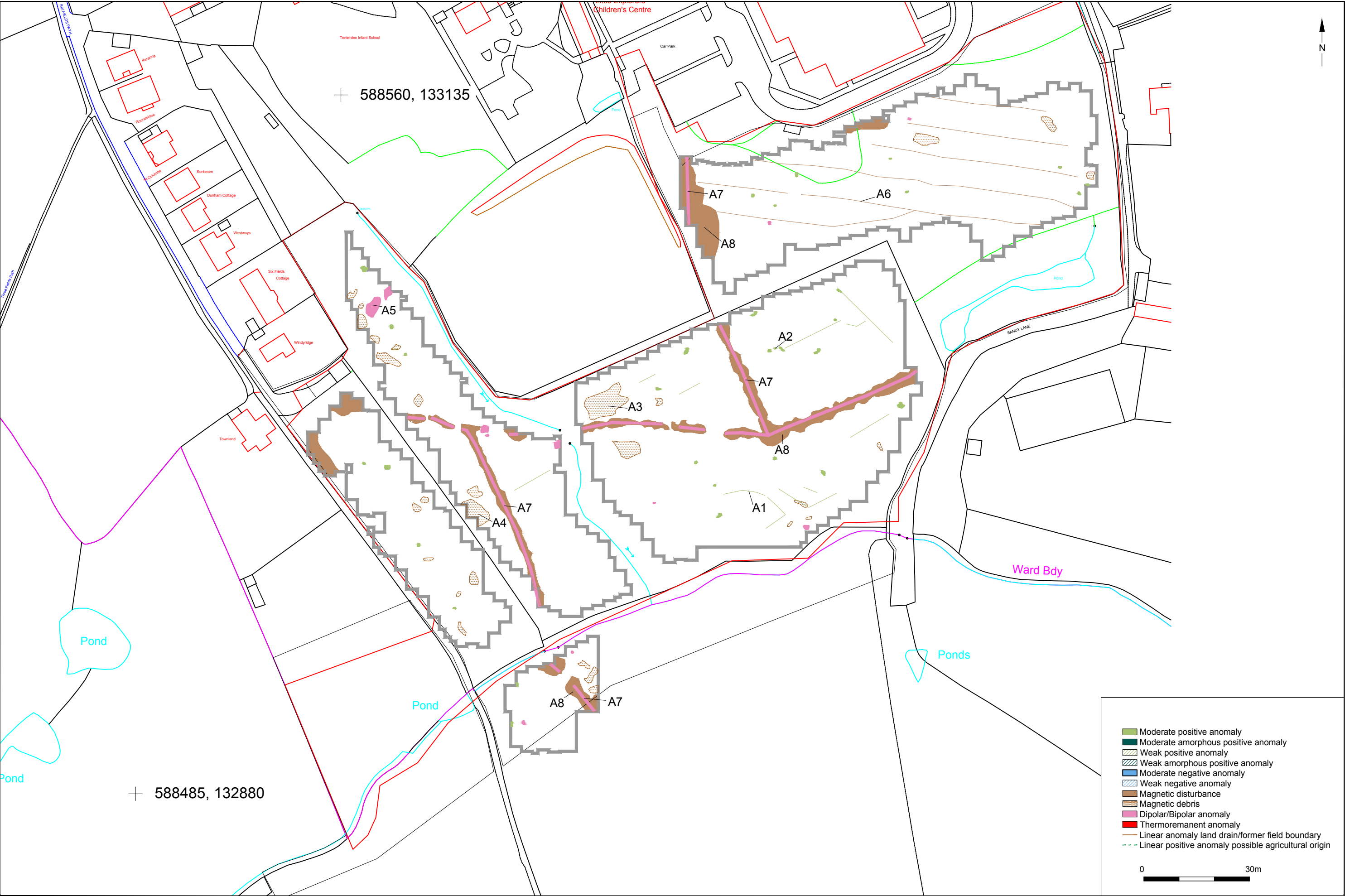




Fig. 7a garden area looking north, showing trees and undergrowth



Fig. 7b western enclosure looking south



Fig. 7c central enclosure looking north



Fig. 7d south eastern enclosure looking east



Fig. 7e obstructions in north east of site



Fig. 7d large area of dumped construction material in north east of site

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