STRATASCAN

Geophysical Survey Report

Openview Sports Ground, Earlsfield

for

Compass Archaeology Ltd.

September 2006

J2213

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REGISTERED IFA ORGANISATION

Document Title: **Geophysical Survey Report**
Openview Sports Ground, Earlsfield

Client: **Compass Archaeology Ltd.**

Stratascan Job No: **J2213**

Techniques: **Detailed magnetic survey (gradiometry)**

National Grid Ref: **TQ 265 731**

Field Team: **Luke Brown, Richard Elliot BA (Hons)**

Project Manager: **Simon Stowe BSc. (Hons)**

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Checked by: **Peter Barker C.Eng MICE MCIWEM MIFA**

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LIST OF FIGURES

1 SUMMARY OF RESULTS

A geophysical survey undertaken over approximately 3.5ha of land currently used as a sports field has located a number of anomalies of possible archaeological origin. Two positive curvilinear anomalies may represent the ditches of prehistoric round barrows in the northern and central areas of the site. Discrete positive anomalies indicate the presence of possible pits. A number of positive linear anomalies of uncertain origin have been located in the eastern limits of the survey area. Modern services are evident running across the survey area.

2 INTRODUCTION

2.1 Background synopsis

Stratascan were commissioned by Compass Archaeology Ltd to undertake a geophysical survey of a sports field due to undergo further development.

2.2 Site location

The site is located at Openview Sports Ground, Earlsfield near Wandsworth at OS ref. TQ 265 732.

2.3 Description of site

The survey area consists of approximately 3.5ha of land currently used as a sports field. The presence of a metallic perimeter fence has resulted in a degree of disturbance around the outer edged of the gradiometry data.

2.4 Geology and soils

The underlying geology is London Clay (British Geological Survey South Sheet, Fourth Edition Solid, 2001). The overlying soils have not been surveyed (Soil Survey of England and Wales, Sheet 6 South East England).

2.5 Site history and archaeological potential

The archaeological assessment produced by Compass Archaeology indicates that a number of prehistoric, medieval and post-medieval artefacts have been located in the Wandsworth and Earlsfield area. No artefacts came from within the survey area, however a Neolithic chipped axe was found in the Davies Estate which is in close proximity to the site.

2.6 Survey objectives

The objective of the survey was to locate any features of possible archaeological significance in order that they may be assessed prior to development.

2.7 Survey methods

Detailed magnetic survey (gradiometry) was used as an efficient and effective method of locating archaeological anomalies. More information regarding this technique is included in the Methodology section below.

3 METHODOLOGY

3.1 Date of fieldwork

The fieldwork was carried out over three days from 4th September 2006. Weather conditions during the survey were dry and overcast.

3.2 Grid locations

The location of survey grids was based upon and has a similar orientation to the Ordnance Survey National Grid, see Figure 2. The referencing and alignment of grids was achieved using a Sokia Set 5E Total Station to perform a resection based on two known reference points derived from digital base mapping.

3.3 Survey equipment

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each sensor has a 1m separation between the sensing elements increasing the sensitivity to small changes in the Earths magnetic field.

3.4 Sampling interval, depth of scan, resolution and data capture

3.4.1 Sampling interval

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid.

3.4.2 Depth of scan and resolution

The Grad601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution.

3.4.3 Data capture

The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each job, data is transferred to the office for processing and presentation.

3.5 Processing, presentation of results and interpretation

3.5.1 Processing

Processing is performed using specialist software known as *Geoplot 3*. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves 'flattening' the background levels with respect to adjacent traverses and adjacent grids. 'Despiking' is also performed to remove the anomalies resulting from small iron objects often found on agricultural land. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following schedule shows the basic processing carried out on all processed gradiometer data used in this report:

1. *Despike* (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)

   Geoplot parameters:
   X radius = 1, y radius = 1, threshold = 3 std. dev.
   Spike replacement = mean

2. *Zero mean grid* (sets the background mean of each grid to zero and is useful for removing grid edge discontinuities)

   Geoplot parameters:
   Threshold = 0.25 std. dev.

3. *Zero mean traverse* (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects)

Geoplot parameters:
Least mean square fit = off

In addition to the above the following processing was carried out on the gradiometer data:

4. *Destagger* (used to correct displacement of anomalies caused by alternate zigzag traverses)

Geoplot parameters:
Traverse shift = -6
Grid Number = 11, 12, 18
Line pattern= --34--78 Dual DS

3.5.2 Presentation of results and interpretation

The presentation of the data for each site involves a print-out of the raw data both as greyscale (Figure 3) and trace plots (Figure 4 and 5), together with a greyscale plot of the processed data (Figure 6). Magnetic anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing for the site (Figure 7).

4 RESULTS

The geophysical survey undertaken at the Openview Sports Ground has located a number of anomalies that may be of archaeological origin. Positive curvilinear anomalies can be seen in the northern limits and central area of the site. These anomalies indicate the presence of cut features, such as a ditch.

A number of positive linear anomalies indicating the presence of cut features can be noted within the eastern limits of the survey area. These are likely to be related to former agricultural activity. Other positive linear anomalies are evident within the northern limits of the survey area. The origin of these anomalies is uncertain. Their bipolar characteristics seem to suggest that they are related to modern services; however they have a relatively low magnitude. Therefore, the possibility that these anomalies represent cut features of an archaeological origin cannot be ruled out.

Two discrete positive anomalies have been identified in the southern limits of the survey area. These anomalies have been interpreted as possible pits and may be of archaeological origin.

Modern activity on site is represented by pipes crossing the survey area and the presence of manholes. The metallic perimeter fences have caused an amount of disturbance which may have masked any subtle archaeological features close to the fence.

Bipolar anomalies are present across the survey area. These anomalies indicate the presence of buried ferrous objects. In some cases these anomalies represent the metal sockets for football or rugby goal posts.

5 CONCLUSION

Two positive curvilinear anomalies located within the gradiometry data provide possible evidence for the presence of archaeological features. The curvilinear character of these anomalies may suggest that they relate to the circular ditches of round barrows or other prehistoric features.

Two discrete positive anomalies have been identified in the southern limits of the survey area. These anomalies have been interpreted as possible pits of archaeological origin. Further investigation would be necessary in order to ascertain whether or not they are contemporary with the curvilinear features in the north of the site.

A number of positive linear anomalies of uncertain origin can be noted in the northern limits of the survey area. The bipolar characteristics of these features may suggest that they are related to modern services; however their relatively low magnitude may suggest a different origin. Further investigation would be required in order to ascertain the nature of these anomalies.

The close proximity of metal fences has caused a degree of disturbance within the gradiometer data. This disturbance may mask any subtle features of an archaeological origin close to the fencelines.

A follow up resistance survey may highlight other areas of interest. This survey technique has the advantage of not being affected by metallic objects such as the wire perimeter fence.

APPENDIX A – Basic principles of magnetic survey

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremnant* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

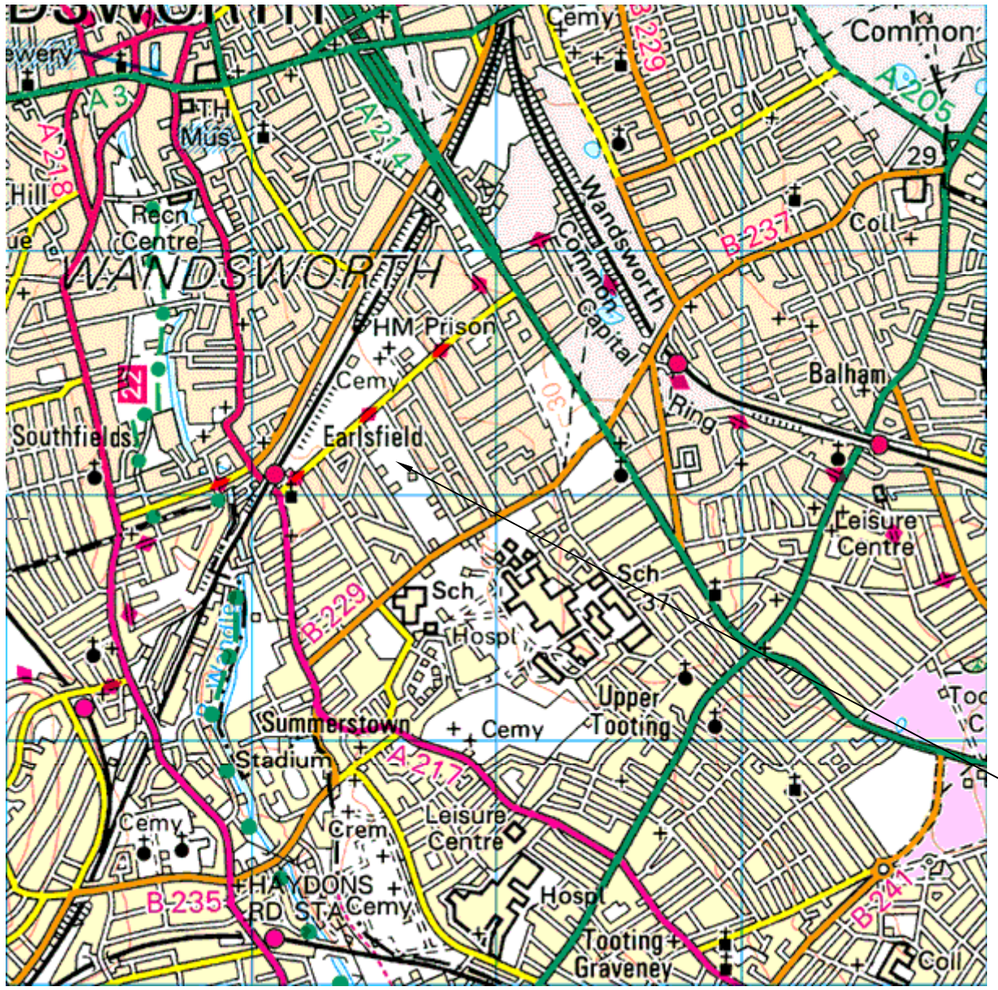
Thermoremnance is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremnant archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically either 0.5 or 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.

OS 100km square = TQ



75
74
73
72
71

25 26 27 28 29

TRUE N

Amendments

Issue No.	Date	Description
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		-

Site centred on NGR TQ 265 732

Client
COMPASS ARCHAEOLOGY LTD

Project Title Job No. 2213
GEOPHYSICAL SURVEY -
OPENVIEW SPORTS GROUND, EARLSFIELD

Subject
LOCATION PLAN OF SURVEY AREA

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Survey date	Drawn by	Figure No.
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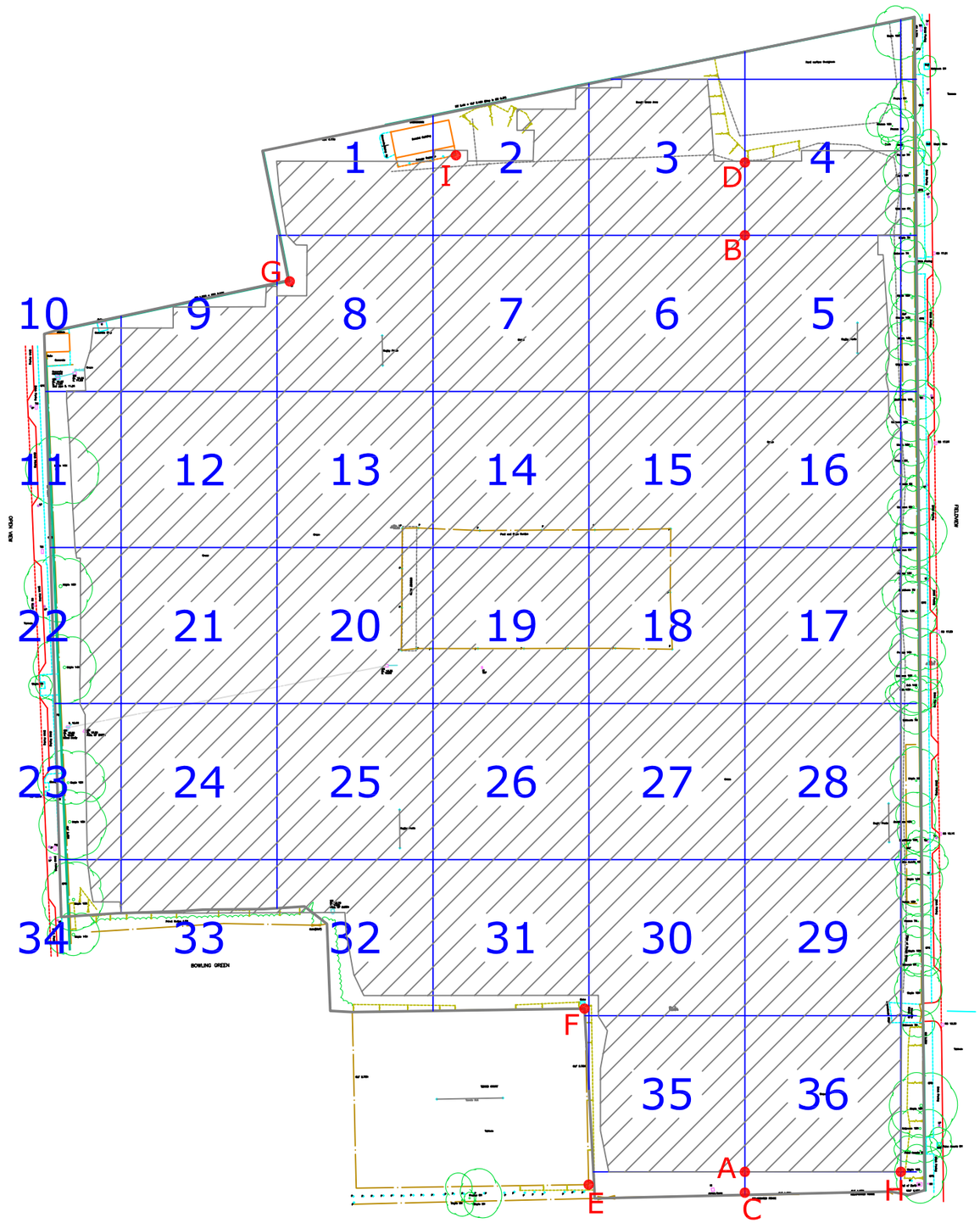

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REFERENCING INFORMATION

A-B	180m	A-C	4m	A-E	30.15m
A-F	44m	A-I	203.14m	B-F	151.8m
B-D	14m	B-G	88.01m	B-I	57.67m

A-B	Base line
C&D	Referencing pegs- left in situ
E-I	Referencing points
2	Grid number
	Area surveyed within grid

Client

COMPASS ARCHAEOLOGY LTD

Project Title — Job No. 2213

GEOPHYSICAL SURVEY -OPENVIEW SPORTS GROUND, EARLSFIELD

Subject

SITE PLAN SHOWING LOCATION OF SURVEY GRIDS AND REFERENCING

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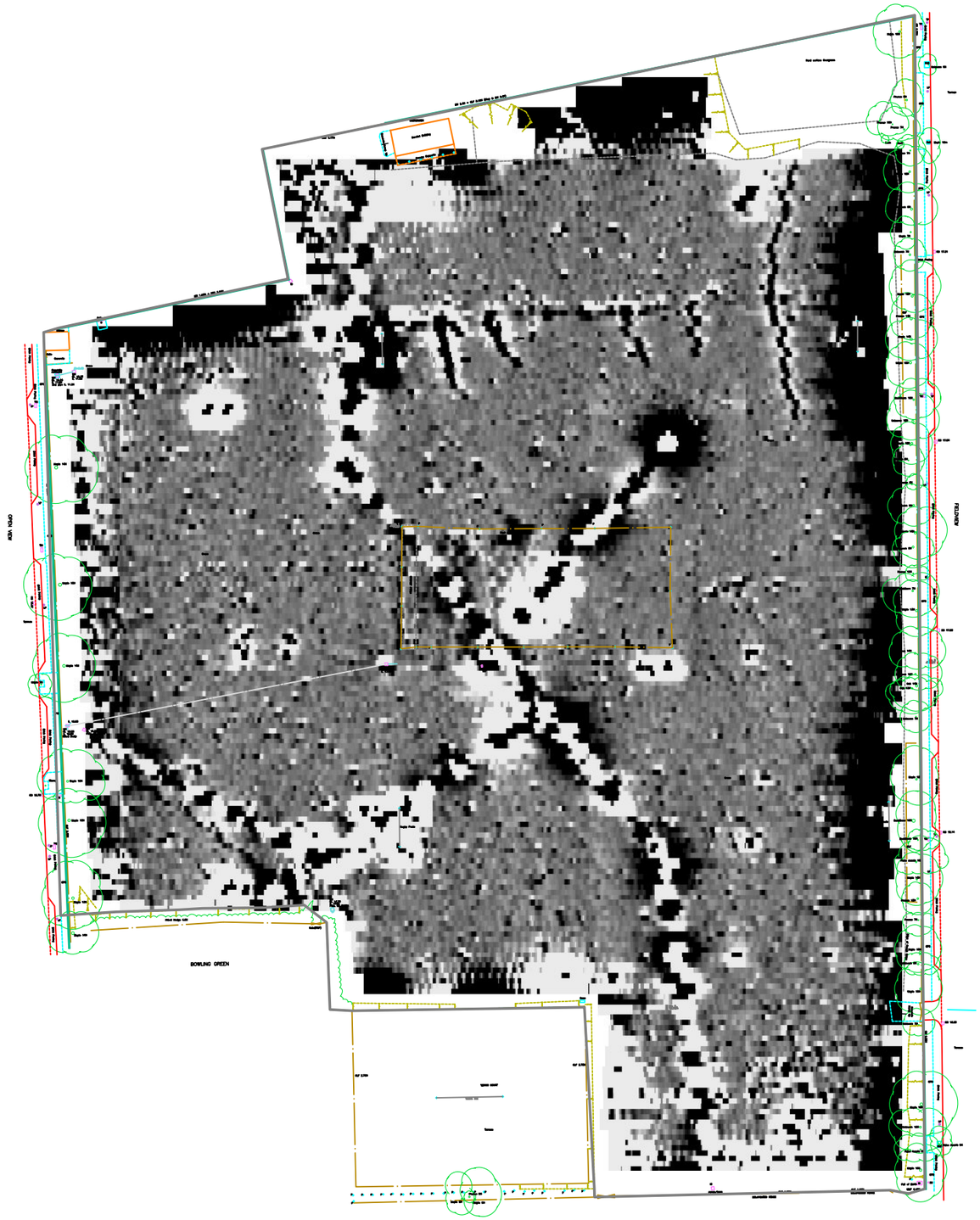

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Plotting parameters

Maximum +5nT (black)
Minimum -5nT (white)

-3SD +3SD

+5nT

-5nT

Client

COMPASS ARCHAEOLOGY LTD

Project Title — Job No. 2213

GEOPHYSICAL SURVEY -OPENVIEW SPORTSFIELD, EARLSFIELD

Subject

PLOT OF RAW GRADIOMETER DATA

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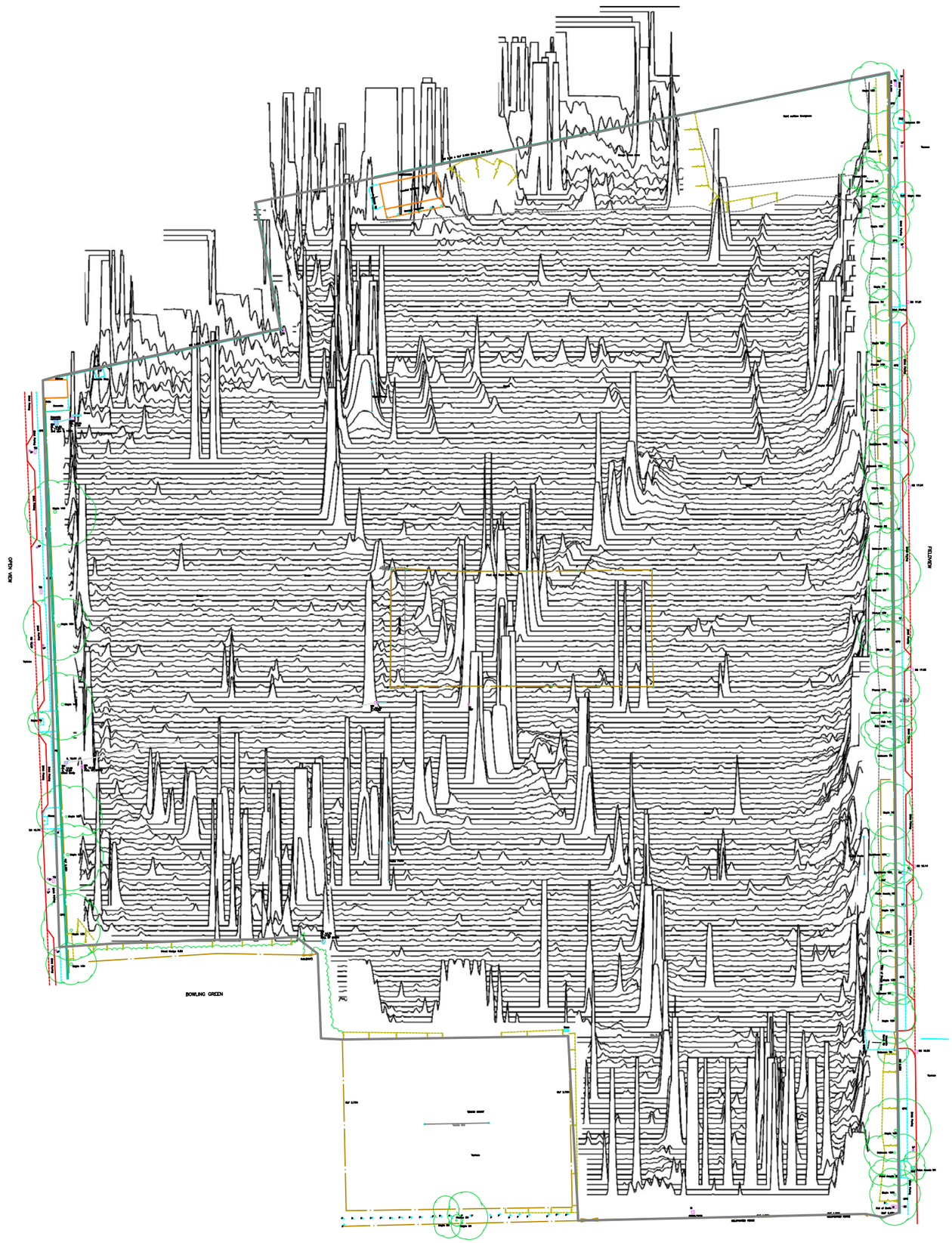

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(*Positive values displace above the trace line. Hidden values have not been plotted*)

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-320nT
-240nT
-160nT
-80nT
0nT

Client

COMPASS ARCHAEOLOGY LTD

Project Title — Job No. 2213

GEOPHYSICAL SURVEY -OPENVIEW SPORTS GROUND, EARLSFIELD

Subject

TRACE PLOT OF GRADIOMETER DATA SHOWING POSITIVE VALUES

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Survey date	Drawn by	Figure No.
SEPT 06	RAJS	04

N

Amendments		
Issue No.	Date	Description
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Plotting parameters

-80nT

(*Negative values displace above the trace line. Hidden values have not been plotted*)

-400nT
-320nT
-240nT
-160nT
-80nT
0nT

Client

COMPASS ARCHAEOLOGY LTD

Project Title — Job No. 2213

GEOPHYSICAL SURVEY -OPENVIEW SPORTS GROUND, EARLSFIELD

Subject

TRACE PLOT OF GRADIOMETER DATA SHOWING NEGATIVE VALUES

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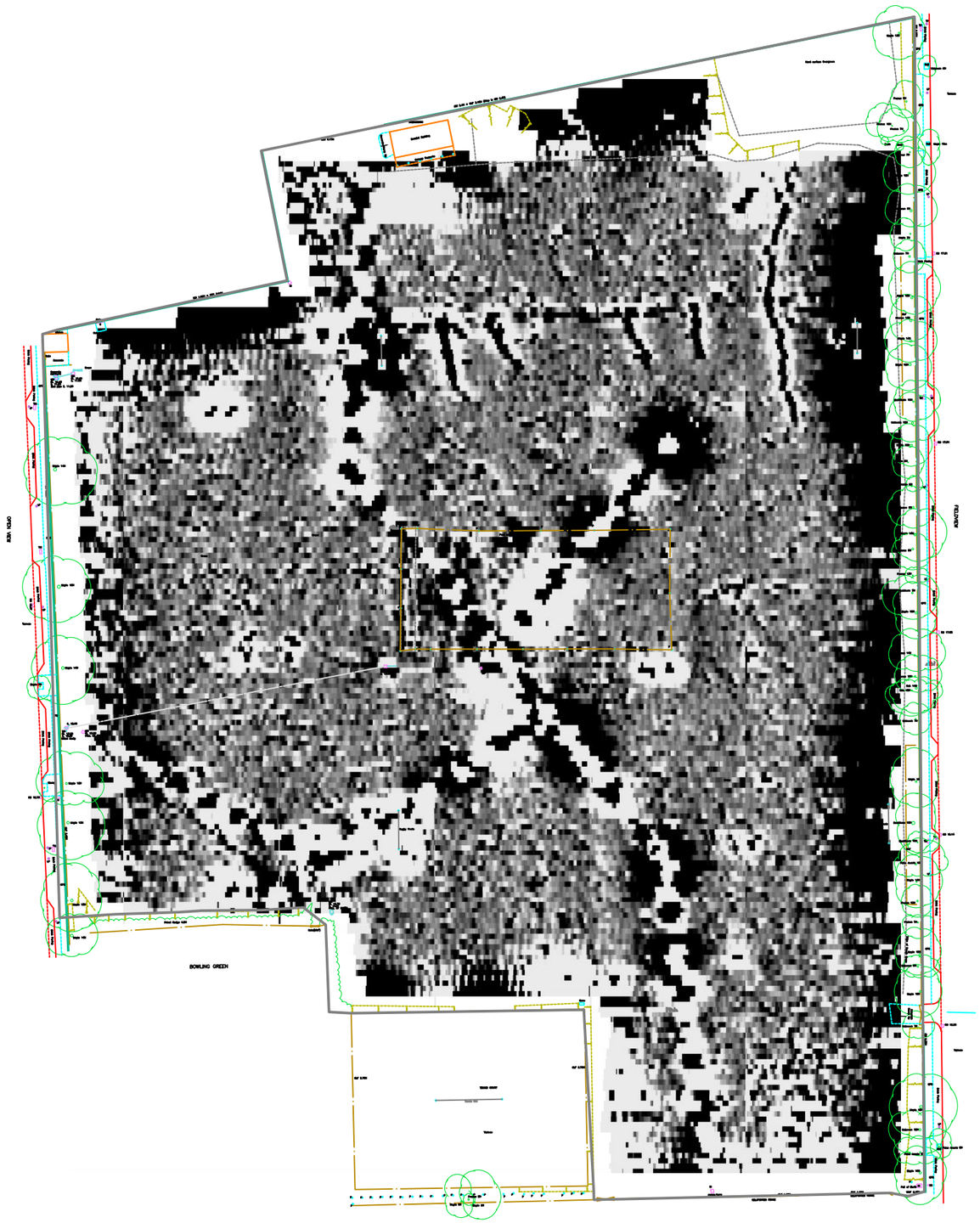

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Plotting parameters

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Minimum -2nT (white)

-3SD +3SD

+2nT

-2nT

Client

COMPASS ARCHAEOLOGY LTD

Project Title — Job No. 2213

GEOPHYSICAL SURVEY -OPENVIEW SPORTS GROUND, EARLSFIELD

Subject

PLOT OF PROCESSED GRADIOMETER DATA

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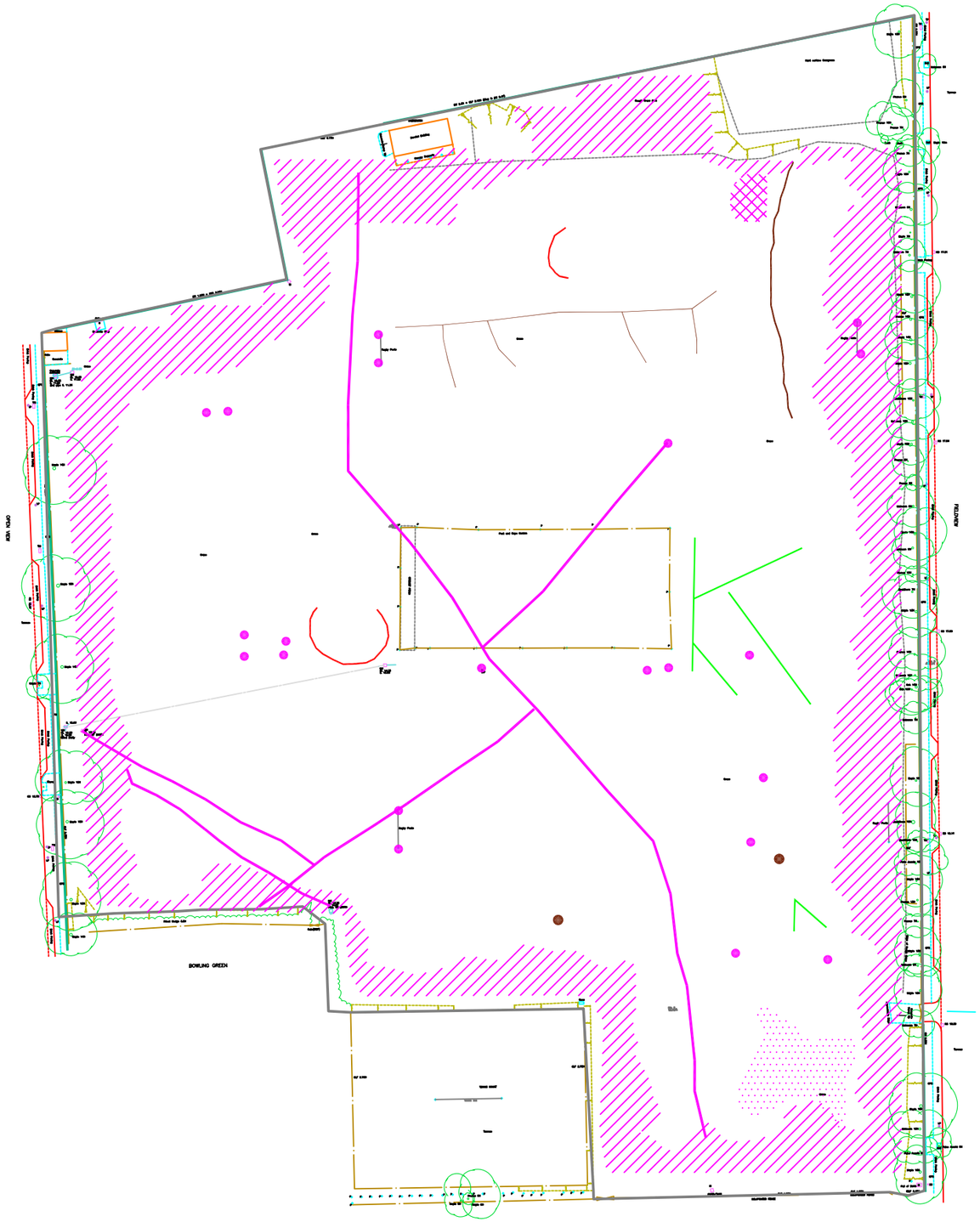

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Amendments

Issue No.	Date	Description
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KEY

	Discrete positive anomaly- possible pit
	Positive anomaly with associated negative response - ferrous object
	Magnetic disturbance - associated with pipe/cable
	Positive linear anomaly - cut feature of possible archaeological origin
	Positive linear anomaly - uncertain origin
	Linear anomaly - agricultural mark
	Area of magnetic debris - Associated with metal fencing around the perimeter of the site
	Area of magnetic debris - evidence of general ground disturbance
	Large bipolar anomaly- possibly related to ground disturbance

Client

COMPASS ARCHAEOLOGY LTD

Project Title — Job No. 2213

GEOPHYSICAL SURVEY -OPENVIEW SPORTS GROUND, EARLSFIELD

Subject

ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES

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