Light Valley Solar

Environmental Statement Volume 3

Appendix 8.3: Geophysical Survey Results Part A

Document Reference: EN0110012/APP/LVS/06.03.08.03

February 2026

Planning Inspectorate Reference: EN0110012
APFP Regulation: 5(2)(a)

Light Valley
Solar

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009
(as amended)

Light Valley Solar

Development Consent Order 2025

Appendix 8.3: Geophysical Survey Results

Regulation Reference	APFP Regulation 5(2)(a)
Planning Inspectorate Case Reference	EN0110012
Application Document Reference	EN0110012/APP/LVS/06.03.08.03
Author	Light Valley Solar Limited

Version	Date	Status of Version
1.0	February 2026	DCO Submission

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1 Introduction

1.1.1 This document has been prepared by Lanpro Services Ltd on behalf of Light Valley Solar Limited ('the Applicant'). It provides the results of the archaeological geophysical (magnetometer) surveys undertaken for the Proposed Development in support of the application for a Development Consent Order (DCO).

1.1.2 The Proposed Development comprises a solar photovoltaic (PV) electricity generating station of over 100 megawatts (MW) and 'associated development' comprising a Battery Energy Storage System (BESS), grid connection infrastructure and other infrastructure integral to the construction, operation and maintenance, and decommissioning phases.

1.1.3 The main element of the Proposed Development comprises seven Solar Development Sites (Solar Development Sites 1-4 and 6-8) that will accommodate the Solar PV Panels. A BESS Compound will be located within Solar Development Site 2.

1.1.4 The Cable Route Corridor is the area within which the export connection cables (hereafter referred to as the 'Grid Connection Cables') would be located to connect the Solar PV Sites to the National Grid at the existing Monk Fryston Substation (hereafter referred to as the 'Existing National Grid Monk Fryston Substation') and the area within which cables connecting the Solar Development Sites would be located (hereafter referred to as 'Interconnecting Cables') (refer to Figure 2.1: Illustrative Site Layout Plan (ES Volume 2) [**EN0110012/APP/LVS/06.02.02.01**].

1.1.5 Further details of the Proposed Development are presented in Chapter 2: The Proposed Development (ES Volume 1) [**EN0110012/APP/LVS/06.01.02**] and the design envelope for the Proposed Development is set out in the Design Parameters and Commitments Document [**EN0110012/APP/LVS/05.06**] and the limits of deviation shown on the Works Plans [**EN0110012/APP/LVS/02.03**].

1.1.6 The geophysical surveys were undertaken in line with nationally recognised standards by SUMO Services, Archaeological Services WYAS and AOC Archaeology, all of which are Registered Organisations with the Charted Institute for Archaeologists (CIfA).

1.1.7 The geophysical survey covered all surveyable areas within the seven Solar Development Sites and were undertaken by SUMO Services between April 2024 and September 2025. The survey on the Cable Route Corridor covered all accessible areas within the Cable Route Corridor and was undertaken between April 2025 and December 2025 by ASWYAS and AOC Archaeology. The interpretation of data sets was informed by the results of an archaeological desk-based assessment (Appendix 8.1: Cultural Heritage Baseline (ES Volume 3) [**EN0110012/APP/LVS/06.03.08.01**]).

1.1.8 Clear concentrations of magnetic anomalies have been identified within the Order Limits that are indicative of possible prehistoric, Roman and medieval activity.

Evidence of agricultural activity, including ridge and furrow, former field boundaries, land drains and ploughing, as well as anomalies of a modern and geological origin, have also been mapped (Annex A to Annex I).

1.1.9 The data is considered to be of a suitable quality, providing a reliable source of information for identifying the presence, absence and extent of buried archaeological features. The results of the geophysical survey, along with desk-based research, were used to inform a programme of evaluation trial trenching undertaken between June 2025 and October 2025, as agreed in advance with the North Yorkshire County Council.

1.1.10 The nature of geophysical anomalies were confirmed by trial trench evaluation, which provided further information regarding the character and depth of features (Ref 1 to Ref 6). Consequently, it is considered that there is limited potential for buried archaeological remains to be present outside of areas where geophysical survey has been completed and has identified a potential for archaeological remains to be present, which could be impacted upon by the Proposed Development.

2 Survey Areas

2.1.1 The geophysical survey was undertaken within the identified locations within Annex A - Annex I. The following annexes are included within this report:

1) Annex A: Solar Development Site 1;
2) Annex B: Solar Development Site 2;
3) Annex C: Solar Development Site 3; (Part B) [**EN0110012/APP/LVS/06.03.08.03.01**]
4) Annex D: Solar Development Site 4; (Part B) [**EN0110012/APP/LVS/06.03.08.03.01**]
5) Annex E: Solar Development Site 6; (Part B) [**EN0110012/APP/LVS/06.03.08.03.01**]
6) Annex F: Solar Development Site 7; (Part B) [**EN0110012/APP/LVS/06.03.08.03.01**]
7) Annex G: Solar Development Site 8; (Part B) [**EN0110012/APP/LVS/06.03.08.03.01**]
8) Annex H: Cable Route Corridor Part A (ASWYAS) (Part C) [**EN0110012/APP/LVS/06.03.08.03.02**]; and
9) Annex I: Cable Route Corridor Part B (AOC Archaeology) (Part C) [**EN0110012/APP/LVS/06.03.08.03.02**].

3 Assumptions and Limitations

3.1.1 The surveys outlined within Annexes A to I were undertaken on the basis of the Proposed Development as it was understood at that point in time. Design development since that time means that areas may have been surveyed that are no longer within the Order Limits of the Proposed Development as it currently stands. The descriptions of the Proposed Development and naming conventions

may be different to those outlined within Chapter 2: The Proposed Development (ES Volume 1) [**EN0110012/APP/LVS/06.01.02**]. Where terms used are different, they are clearly defined within each Annex.

References

Ref 1 CFA 2025, Light Valley Solar Project: Site 1 Archaeological Evaluation Trial Trenching, Survey Report 4752

Ref 2 CFA 2025, Light Valley Solar Project: Site 2 Archaeological Evaluation Trial Trenching, Survey Report 4758

Ref 3 CFA 2025, Light Valley Solar Project: Site 3 Archaeological Evaluation Trial Trenching, Survey Report 4773

Ref 4 CFA 2025, Light Valley Solar Project: Site 4 Archaeological Evaluation Trial Trenching, Survey Report 4764

Ref 5 CFA 2025, Light Valley Solar Project: Site 6 Archaeological Evaluation Trial Trenching, Survey Report 4755

Ref 6 CFA 2025, Light Valley Solar Project: Sites 7 and 8 Archaeological Evaluation Trial Trenching, Survey Report 4759

Annex A Light Valley Site 1 Geophysical Survey Report

GEOPHYSICAL SURVEY REPORT

Light Valley Solar Project: Site 1

Client

Island Green Power UK Limited

Survey Report

16614-1

OASIS Ref. No.

sumogeop1-523845

Date

23 December 2024

Survey Report 16614-1: Light Valley Solar Project: Site 1

Survey dates	08-24 April 2024 13-24 May 2024 27-30 August 2024 18-27 September 2024
Field co-ordinator	Jelmer Wubs BA MA Robert Knight BA MA Simon Lobel BSc Liam Brice-Bateman BA
Field Team	Morgan Potter Janee Gagnon BSc BA MSc MA Craig Wakefield MSc Daniel Morris MSci William Vernon BA (Hons)
Report Date	23 December 2024
CAD Illustrations	Thomas Cockcroft MSc MCIfA
Report Author	Thomas Cockcroft MSc MCIfA
Project Manager	Thomas Cockcroft MSc MCIfA
Report approved	Dr John Gater BSc DSc(Hon) MCIfA FSA

SUMO GeoSurveys
Suite1
Deer Park Business Centre
Woollas Hill
Eckington
Pershore
Worcestershire
WR10 3DN
T: 01684 592266
[redacted]
geophysics@sumoservices.com

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.

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Appendix B	Technical Information: Magnetic Theory
Appendix C	OASIS Data Collection Sheet
Appendix D	Data Management Plan & Archive Selection Strategy

3 SURVEY TECHNIQUE

3.1 Detailed magnetic survey (magnetometry) was chosen as the most efficient and effective method of locating the type of archaeological anomalies which might be expected at this site. All survey techniques followed the guidance set out by CIfA (2020) and the European Archaeology Council (EAC) (2016).

Bartington Grad 601-2	Traverse Interval 1.0m	Sample Interval 0.25m
Bartington Cart System	Traverse Interval 1.0m	Sample Interval 0.125m
MACS Cart System (Foerster)	Traverse Interval 1.0m	Sample Interval 0.125m

The only processes performed on data are the following unless specifically stated otherwise:

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes instrument striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

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4 EXECUTIVE SUMMARY OF RESULTS

4.1 A magnetometer survey of 420 hectares of land at Site 1 of the Light Valley Solar Project has recorded magnetic responses that have been interpreted as being of archaeological interest. In the north of the site a ditched trackway has been plotted which appears to span the width of the survey area, extending from this track are numerous enclosures and ditches. Some of these enclosures have ring-ditches and pits located within them a possible timber building has been identified. Several clusters of archaeological responses have been recorded in many of the other fields which mark the locations of small farmsteads, enclosures and field systems. In the east of Field 1.4 the foundations of a building and spreads of demolition debris have also been plotted.

4.2 Historic ridge and furrow cultivation has been marked in many of the survey areas. Numerous uncertain responses have been detected throughout the data which is to be expected on a survey of this size. The majority of these have probably been caused by variations in the underlying geology or agricultural processes. However, archaeological origins for some of these responses cannot be entirely discounted. Field boundaries, land drains, ploughing and service pipes have also been recorded in the survey.

5 INTRODUCTION

5.1 **SUMO GeoSurveys** was commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by **Island Green Power UK Limited**.

5.2 This survey is part of the Light Valley Solar Project which is composed of a five separative magnetometer survey reports.

5.3 Site Details

NGR / Postcode	SE 65083 41837 / YO19 6EJ	
Location	The site is located 9km north of Selby and 1km south-east of Escrick. The survey area surrounds Mount Pleasant Farm / Tileshed Farm / Manor Farm and it is bounded to the west / south-east by Skipwith Road and to the north by Wheldrake Lane.	
HER	North Yorkshire HER	
OASIS Ref. No.	sumogeop1-523845	
District	N/A	
Parish	Escrick	
Topography	Generally flat	
Land Use	Arable / Pasture	
Geology (BGS 2024)	Bedrock:	Sherwood Sandstone Group - Sandstone
	Superficial:	Skipwith Sand Member - Sand, clayey, gravelly Escrick Moraine Member - Clay, sandy, gravelly Thorganby Clay Member - Clay, silty
Soils (CU 2024)	Soilscape 8: Slightly acid loamy and clayey soils with impeded drainage Soilscape 15: Naturally wet very acid sandy and loamy soils Soilscape 18: Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils	
Survey Methods	Magnetometer survey (fluxgate gradiometer)	
Study Area	420 ha	

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5.4 *Archaeological Background*

5.4.1 See Below a table of non-designated heritage assets within Site 1.

Field No.	HER Record	Summary
1.4	MNY26351	19th Century to Modern quarry in the south-east of Field 1.4
1.34	MNY24075	Romano-British enclosure site - boundary ditch, sub-rectangular enclosure, metal working site?
1.34	ENY3480	In March 2002, Archaeological Services WYAS carried out a Magnetometry Survey along the route of the Yorkshire Derwent Aqueduct Duplication Main. Anomalies of a likely archaeological origin, closely corresponding to known cropmarks, were identified
1.37	MNY37042	Fragmentary field system south of Mount Pleasant Farm - Early Iron Age to Roman
1.40 / 1.41	ENY3479	In March 2002, Archaeological Services WYAS carried out a Magnetometry Survey along the route of the Yorkshire Derwent Aqueduct Duplication Main. No archaeological anomalies were identified
1.42	MNY37043	Extensive field system south-west of Whinchat Hall which extends westwards beyond Field 1.42. - Early Iron Age to Roman
1.45	MNY17727	Possible field system of unknown date
1.45	ENY3478	In March 2002, Archaeological Services WYAS carried out a Magnetometry Survey along the route of the Yorkshire Derwent Aqueduct Duplication Main. No archaeological anomalies were identified.

5.5 *Aims and Objectives*

5.5.1 To locate and characterise any anomalies of possible archaeological interest within the study area.

6 RESULTS

6.1 *The survey has been divided into 40 survey areas (Fields 1.1 to 1.46) and specific anomalies have been given numerical labels [1] [2] which appear in the text below, as well as on the Interpretation Figure(s). At the time of the survey Field 1.20 was a wildflower meadow and Field 1.41 was a coppice which rendered these two areas unsurveyable. Gaps in the data in other parts of the site have been caused by waterlogging, sever rutting or overgrown vegetation.*

6.2 *Probable / Possible Archaeology*

6.2.1 Numerous magnetic responses have been detected throughout the site which have been interpreted as being of archaeological interest. They have been assigned to the categories of *Probable* and *Possible Archaeology* in accordance with their magnetic strengths.

6.2.2 In Field 1.1 (*See Figures 6-8*) a series of linear responses have been detected which appear to form a rectangular enclosure [1] which measures 46m by 35m. A second tentative partial enclosure [2] has also been plotted. A ditch is visible extending northwards of the first

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enclosure, beyond the limits of the survey. These anomalies may be associated with a complex of responses that have been detected in Fields 1.2 and 1.3 (see below: 6.2.3).

6.2.3 In Field 1.2 and 1.3 (*See Figures 9-11*) two parallel linear anomalies [3], aligned east - west, probably mark the location of a trackway. Extending northwards and southward of the trackway are numerous ditches which in places appear to form enclosures. Within one of these enclosures is a well-defined ring-ditch [4] while other pit-like anomalies and weaker ring-shaped responses have also been plotted. Many of these responses extend northward beyond the limits of the survey which has hindered a more confident interpretation. Numerous other square, rectangular and sub-rectangular enclosures [5] are visible in these fields which could indicate smaller nucleated farmsteads, stock enclosures or be part of wider scale land division.

6.2.4 In the north-west of Field 1.5 (*See Figures 9-11*) a rectangular response [6], which measures 20m by 8m, is composed of intermittent pit-like and gulley-like responses; weaker trends tentatively suggest it may have a surrounding ditch. The response could be the remains of a building, possibly of post / timber beam construction.

6.2.5 In the south-east of Field 1.4 (*See Figures 9-11)* magnetically strong linear anomalies and trends have been plotted which are located within a zone of increased response [7]. They have been categorised as being of *Possible Interest*. These anomalies could have been caused by a relatively modern building foundations and spreads of demolition debris; however, no building is visible on available historic mapping. A 19th Century quarry is located due south of the responses (MNY26351), so these anomalies could also be associated with this quarrying activity.

6.2.6 Numerous ditch-like anomalies, trends and pits [8] in Fields 1.8 (*See Figures 12-14*) which mark the locations of several enclosures, a ring-ditches, other ditches and pits. This cluster of anomalies [8] appears to be located on a ditched trackway [9] which is similar in width to the one detected in Fields 1.2 and 1.3 (see 6.2.3; [3] and could be a continuation. The trackway hasn't been detected between these settlement / farmsteads, and this may be due to the absence of magnetically detectable debris in the ditch fills.

6.2.7 In the south-west of Field 1.9 (*See Figures 12-14*) a few trends [10] have been marked and tentatively interpreted as being *Possible Archaeology*. They are magnetically weak and appear to extend westwards beyond the limits of the site which has hindered a more confident interpretation. On balance is it thought these anomalies are anthropogenic in origin.

6.2.8 Magnetically weak linear responses [11] in Fields 1.11 and 1.12 (see *Figures 15-17*) could also be a continuation of the trackway [3] (see 6.2.3) and [9] (see 6.2.6). Numerous other magnetically weak trends are visible in this part of the site which may mark the locations of enclosures and ditches. However, these anomalies have been difficult to interpret with confidence due to the surrounding increased levels of magnetic background 'noise'.

6.2.9 Two circular anomalies [12 & 13] have also been marked in Fields 1.11 and 1.12 (*see Figures 15-17*) which measure 16m and 15m in diameter. There is no apparent break in the response [12], but a break in the second anomaly [13] could indicate a south facing entrance.

6.2.10 In the west of Field 1.15/1.16/1.17 (*see Figures 15-17*) a rectangular enclosure [14] measuring 50m by 50m has been detected; an apparent break in the east of the enclosure likely marks an entrance. Subdividing ditches and pits are apparent within the enclosure. A zone of increased response has been detected surround these anomalies which could be due to spreads of settlement debris. Ditches are visible extending westward and northward beyond the enclosure. In the east of Field 1.15/1.16/1.17 is another cluster of anomalies [15] which marks the location of another small farmstead; three ring-ditches, enclosure, ditches and pits are all visible. Two

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strong responses [16] within a zone of increased response due north of the farmstead could be evidence of small-scale industrial activity i.e. small ovens, kilns or metal working.

6.2.11 In Field 1.13 (*see Figures 18-20*) an enclosure [17] measures 30m by 35m, a break in the south-west of the response could be an entrance. A few weak trends extend beyond the enclosure to the south which are likely to mark other ditches.

6.2.12 A tentative partial enclosure [18] has been detected in Field 1.25 (*see Figures 27-29*). It measures 28m by 34m but the south-western limits of the anomaly are not visible in the data.

6.2.13 In Fields 1.28 and 1.29 (see Figures 33-35) the remains of a partial rectangular enclosure [19] have been plotted straddling the two survey areas; it measures 150m by 60m. Three ring-ditches have been marked within the southern half and a rectangular anomaly is visible in the north-west. 100m to the south-west ring-like anomalies and weak trends [20] have also been detected which could also be of interest. In the east of Field 1.28 a well-defined enclosure [21] is also visible and two clear ring-ditches have been plotted within it. A few weaker anomalies have also been detected outside of the enclosure.

6.2.14 A number of ditch-like response, trends and a zone of increased response [22] have been marked in Field 1.30 (*see Figures 36-38*) which have tentatively been assigned to the category of *Possible Archaeology*; however, they could have been caused by other relatively modern processes.

6.2.15 In Field 1.34 (see Figures 42-44) a series of linear anomalies [23] and pit-like responses [24] have been marked as being of *Possible Interest*. Ordinarily these anomalies might not warrant such a categorised as they are magnetically weak and ill-defined; however, they are located within close proximity of a Romano-British enclosure site, comprised of boundary ditches, sub-rectangular enclosure and possible metal working (MNY24075 & ENY3480). The responses detected in the survey could be a continuation of these excavated features.

6.2.16 Tentative trends and a ditch-like anomaly [25] have been plotted in Field 1.37 (see Figures 48-50). The HER records a Fragmentary field system south of Mount Pleasant Farm of early Iron Age to Roman date in this location (MNY37042) and the magnetic anomalies could be part of this field system.

6.2.17 In the south-west of Field 1.39/1.40 (*see Figure 51-53*) a cluster of archaeological anomalies [25] includes three oval anomalies abutting each other. A pair of ditches extend eastwards from the central ring ditch to form a possible entranceway. Other ditches and pits have been detected, some of them appear to form circular and rectangular patterns. In places these responses have been difficult to interpret due to the present of an adjacent pipe. In the east of Field 1.39/1.40 a few trends [26] have been detected which could also have archaeological origins, they could be an enclosure and associated ditches. They have also been difficult to interpret as land drains plus ridge and furrow cultivation are present in the results.

6.2.18 Weak linear and curvilinear trends plus a few pit-like responses [27] have been detected in Field 1.45 (*see Figures 60-62*) which have been tentatively interpreted as being *Possible Archaeology*. They correspond with the location of a possible field system of unknown date recorded in the HER (MNY17727). however, it should be noted a magnetometry survey along the route of the Yorkshire Derwent Aqueduct Duplication Main, due west of these anomalies, failed to detect any archaeological responses (ENY3478,) suggesting the field system are not strongly magnetically enhanced, hence the weak responses.

6.3 *Ridge and Furrow*

6.3.1 Broad and parallel linear anomalies of varying alignments and magnetic strengths have been detected across the survey areas which have been caused by historic ridge and furrow

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cultivation. In places, it has been difficult to distinguish between the ridge and furrow cultivation and land drains (See 6.6.2).

6.4 *Uncertain*

6.4.1 Numerous trends, discrete anomalies and zones of increased response have been detected throughout the survey which have been assigned to the category of *Uncertain* which is to be expected on a survey of this size. The majority of these responses have probably been caused by underlying natural variations, agricultural processes or spreads of relatively modern debris. However, archaeological origins for some of these anomalies cannot be discounted due to the proximity of archaeological features that have been detected in the magnetic data. Also, Fields 1.42 and 1.45 are on the edge of known field systems MNY37043, and the numerous weak responses could be of interest.

6.5 *Former Field Boundary – Corroborated / Conjectural*

6.5.1 Linear responses throughout the survey area have been recorded which correspond with the routes of former field boundaries that are visible on historic mapping (see Figure 63).

6.5.2 A number of conjectural field boundaries have also been mapped in Fields 1.7, 1.18, 1.25, 1.33, 1.37 and 1.39/1.40. While these responses do not correspond with recorded boundaries on available historic mapping, they have a similar magnetic signature and hence their categorisation.

6.6 *Agricultural – Ploughing / Land Drains / Tramlines*

6.6.1 Weak and ill-defined parallel anomalies are visible in Field 1.43/1.44 which have been caused by relatively modern ploughing.

6.6.2 Evenly spaced parallel responses on multiple alignments, in some cases forming herringbone patterns, have been detected in the magnetic data. They have been caused by land drains. In places, it has been difficult to distinguish between the land drains and historic ridge and furrow cultivation due to the magnetic strengths of the anomalies.

6.6.3 In Fields 1.1 and 1.2 sets of parallel trends mark the routes of agricultural tractor tramlines.

6.7 *Natural / Geological / Pedological*

6.7.1 Sinuous and amorphous bands of increased response are visible in the magnetic data in Fields 1.28, 1.30, 1.33, 1.46 and 1.46; they are interpreted as being natural in origin.

6.8 *Service*

6.8.1 Two strong dipolar ferrous responses have been recorded in Fields 1.34, 1.39/1.40, 1.43/1.44 and 1.45 which mark the routes of two underground aqueducts. Two magnetically weaker responses have also been detected in Field 1.5 which probably mark the locations of small water pipes.

6.9 *Ferrous / Magnetic Disturbance*

6.9.1 Zones of magnetic disturbance have been detected in many of the fields. They have probably been caused by spreads of debris, landscaping or removal of former field boundaries. Most of Field 1.36 is magnetically disturbed which may be associated with the instillation of a drainage system.

6.9.2 Ferrous responses close to boundaries are due to adjacent roads, buildings, fences and gates. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick / tile) in the topsoil; they are commonly

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assigned a modern origin. Only the most prominent of these are highlighted on the interpretation diagram.

7 DATA APPRAISAL & CONFIDENCE ASSESSMENT

7.1 Historic England Table 4 (EH 2008) states that the typical magnetic response on the local soils / geology is variable. The results from this survey indicate the presence of enclosures, trackways, ditches and pits; consequently, the technique is deemed to have worked well.

8 CONCLUSION

8.1 The magnetometer survey has recorded numerous magnetic responses which have been interpreted as being of archaeological interest. In the north of the site a ditched trackway has been plotted which appears to span the width of the survey area; it has been intermittently recorded for a distance of 1.8 km. Extending either side of this track are enclosures and ditches, some of which have ring-ditches and pits within them. In the north-west of Field 1.5 the location of a possible post-pit building has been marked. Several clusters of archaeological responses have also been recorded in Fields 1.13, 1.15/1.16/1.17, 1.28, 1.29, 1.30, 1.37, 1.39/1.40 and 1.45 which represent small farmsteads, enclosures and field systems. In the east of Field 1.4 the foundations of a relatively modern building and spreads of demolition debris have been plotted.

8.2 Historic ridge and furrow cultivation have been marked in many of the survey areas. Numerous responses of uncertain origin have been marked throughout the data which is to be expected on a survey of this size. The majority of these have probably been caused by variations in the underlying geology or agricultural processes. However, archaeological origins for some of these responses cannot be entirely discounted.

8.3 Corroborated and conjectural former field boundaries have been plotted throughout the survey and modern ploughing effects are visible in Field 1.43/1.44. Land drains have also been detected in many of the fields along with agricultural tractor tramlines in Fields 1.2 and 1.3. Amorphous zones of natural response are visible in Fields 1.28, 1.30, 1.33, 1.46 and 1.46. Two strong dipolar ferrous anomalies have been recorded in Fields 1.34, 1.39/1.40, 1.43/1.44 and 1.45 which mark the routes of two underground aqueducts. While two smaller pipes have also been detected in Field 1.5.

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9 REFERENCES

BGS 2024 *Geology of Britain Viewer,* British Geological Survey, website: [redacted]

CIfA 2020 *Standard and Guidance for Archaeological Geophysical Survey.* 2014 amended 2020. CIfA Guidance note. Chartered Institute for Archaeologists, Reading [redacted]

CU 2024 *The Soils Guide*. www.landis.org.uk. Cranfield University, UK. website: [redacted]

EAC 2016 *EAC Guidelines for the Use of Geophysics in Archaeology,* European Archaeological Council, Guidelines 2.

EH 2008 *Geophysical Survey in Archaeological Field Evaluation.* English Heritage, Swindon (now withdrawn, but used for evaluating suitability of soil types)

10 ARCHIVE

10.1 The minimally processed data, data images, XY traces and a copy of this report are stored in **SUMO GeoSurveys'** digital archive, on an internal RAID configured NAS drive in the Midlands Office. These data are also backed up to the Cloud for off-site storage.

10.2 The Grey Literature will be archived with OASIS and the relevant HER within a period of 12 months.

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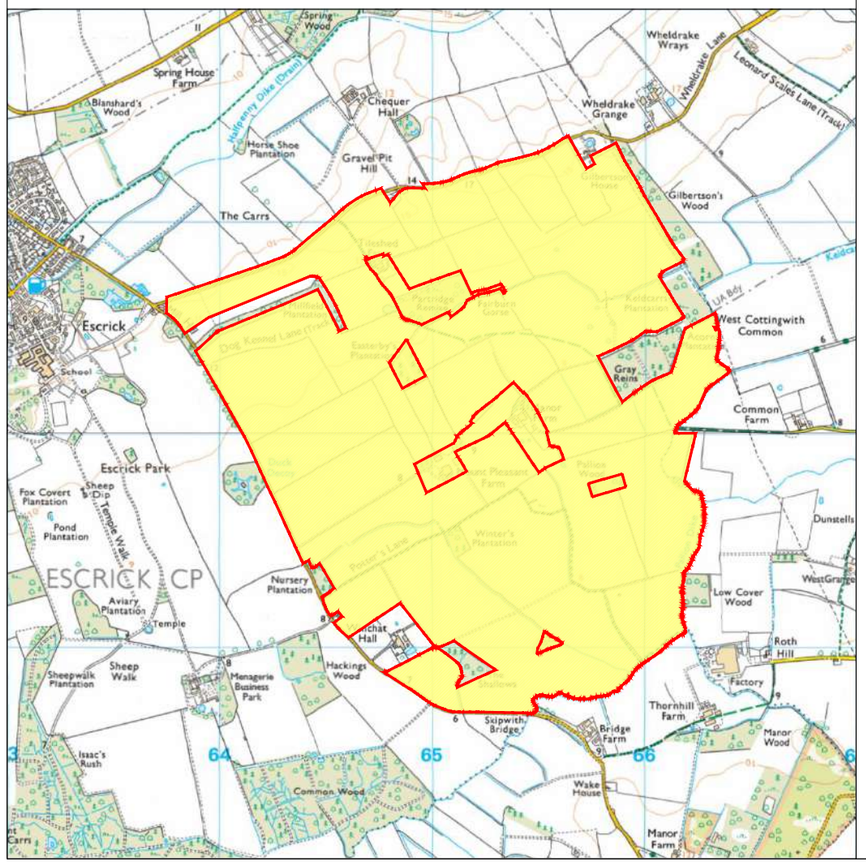

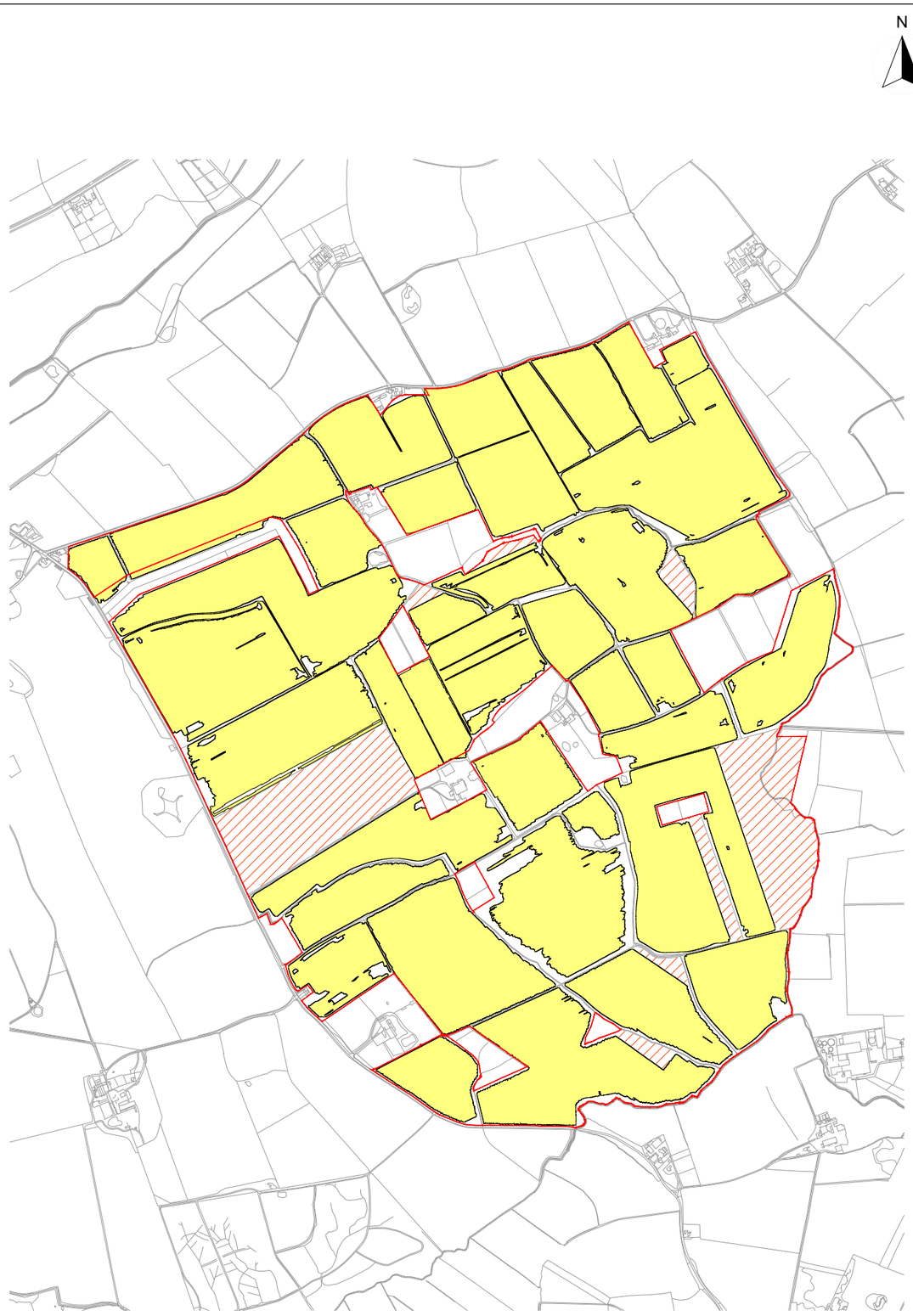

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Survey Areas

Unsurveyable Area

sumo GeoSurveys

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Site Location

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
NOT TO SCALE

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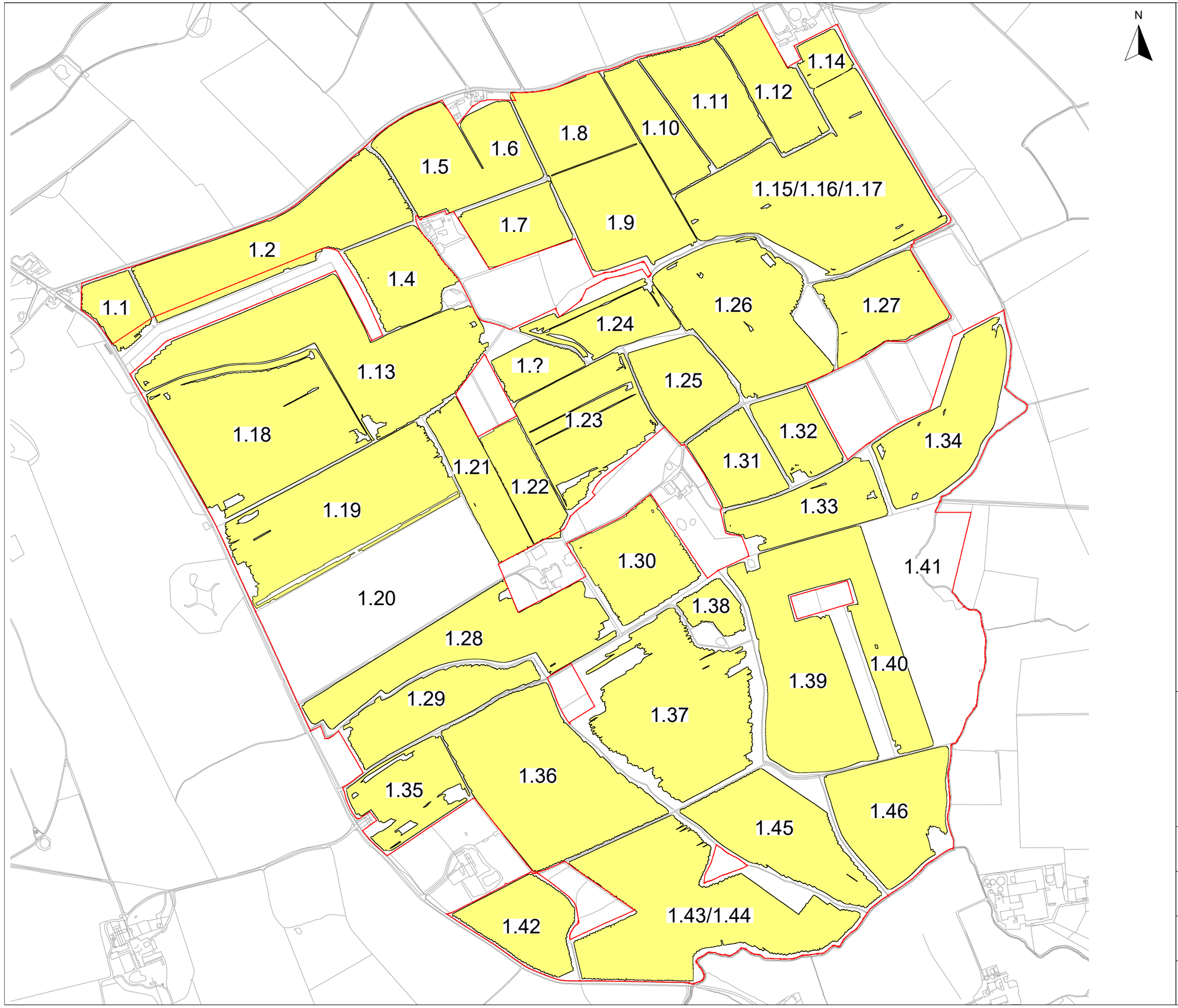

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Magnetometer Survey

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 500
1:10,000 @ A3

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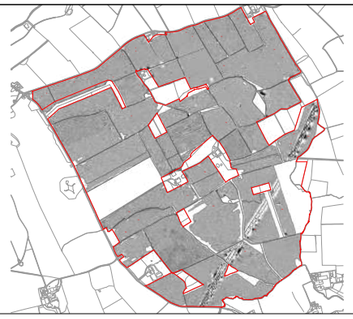

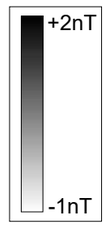

Title:
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Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
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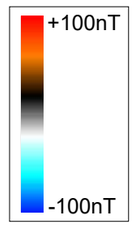

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Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
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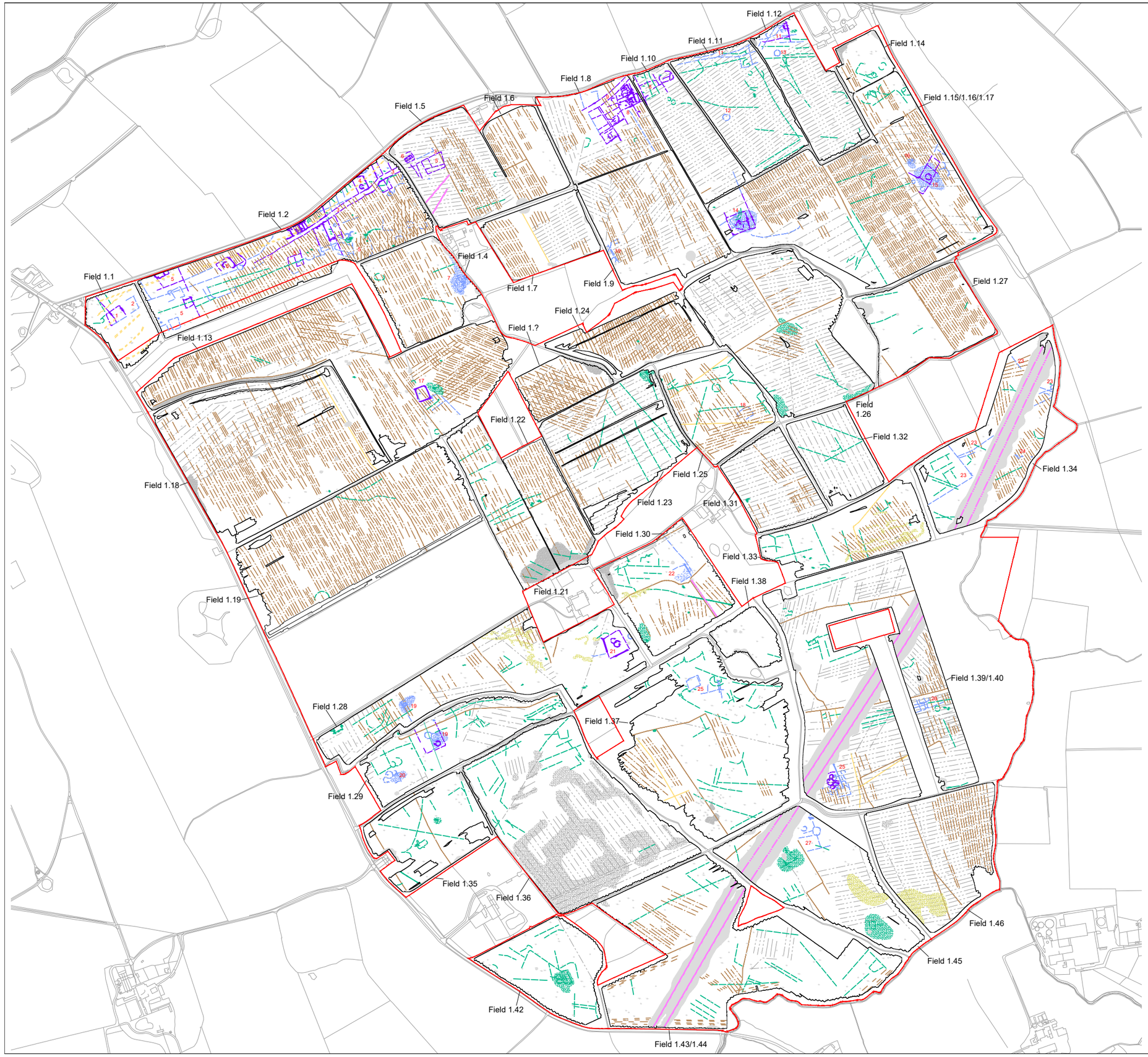

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

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Title:
Magnetometer Survey - Interpretation

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 500
1:10,000 @ A3

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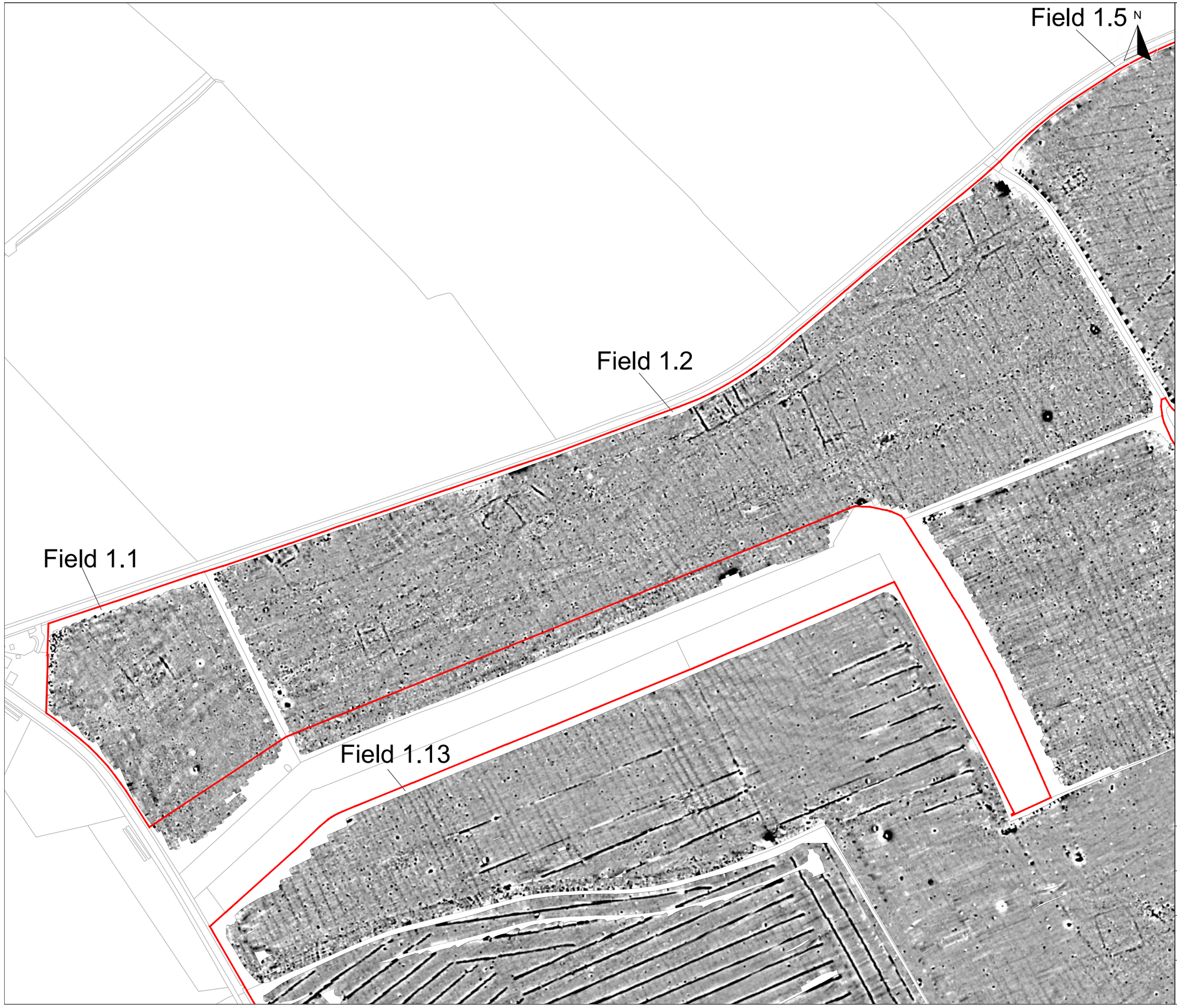

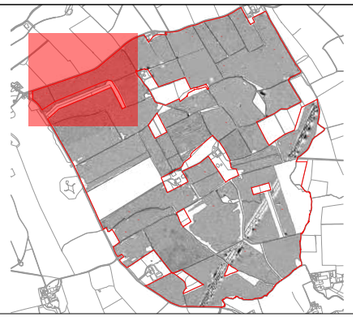

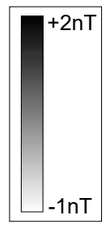

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Magnetometer Survey - Greyscale Plots
(Fields 1.1 & 1.2)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

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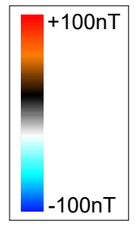

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(Fields 1.1 & 1.2)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

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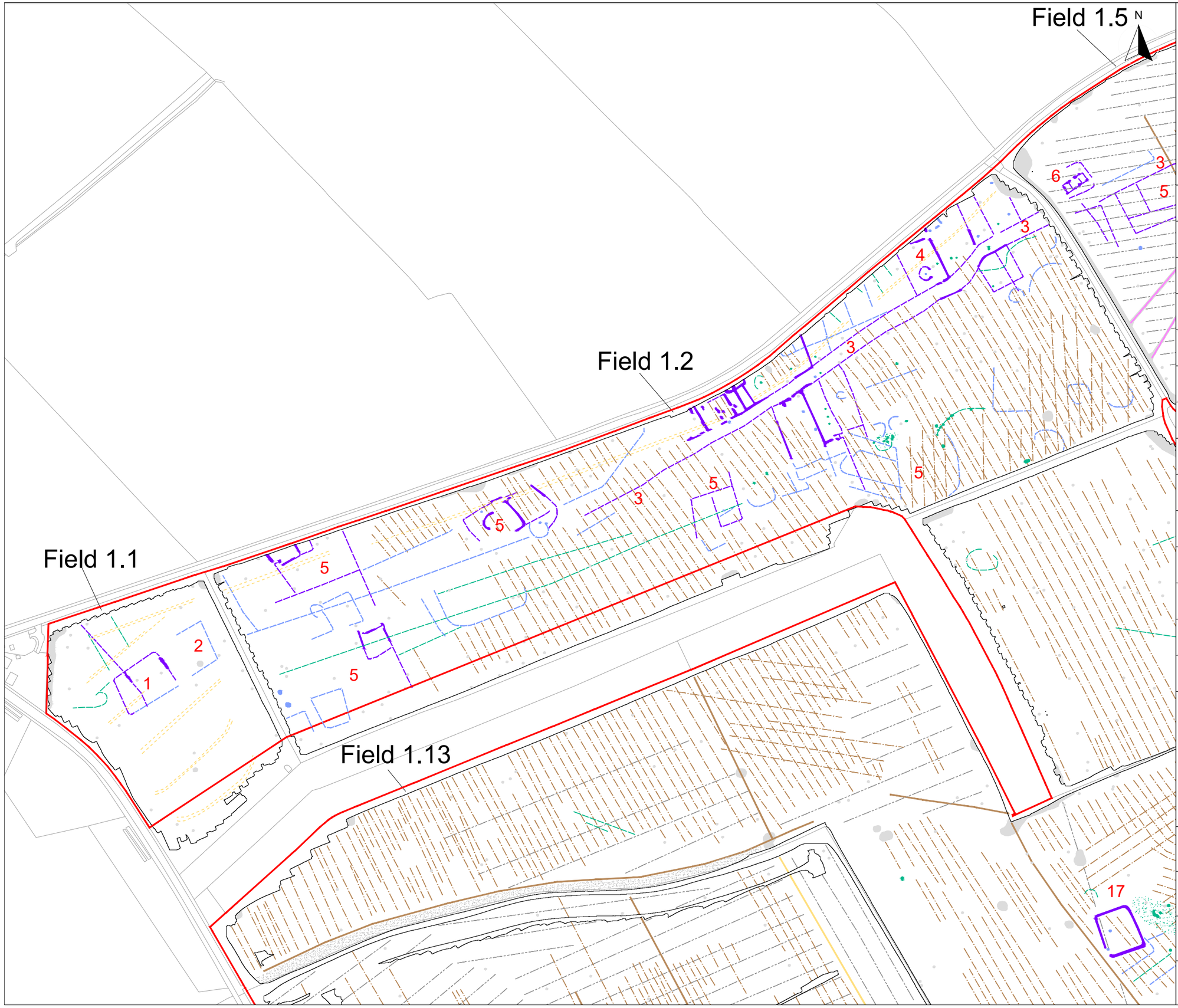

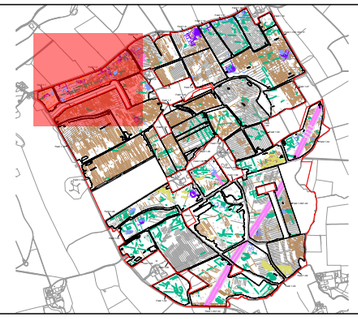

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
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	Uncertain Origin (discrete anomaly / trend / increased response)
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	Former field boundary (conjectural)
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	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

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Title:
Magnetometer Survey - Interpretation
(Fields 1.1 & 1.2)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

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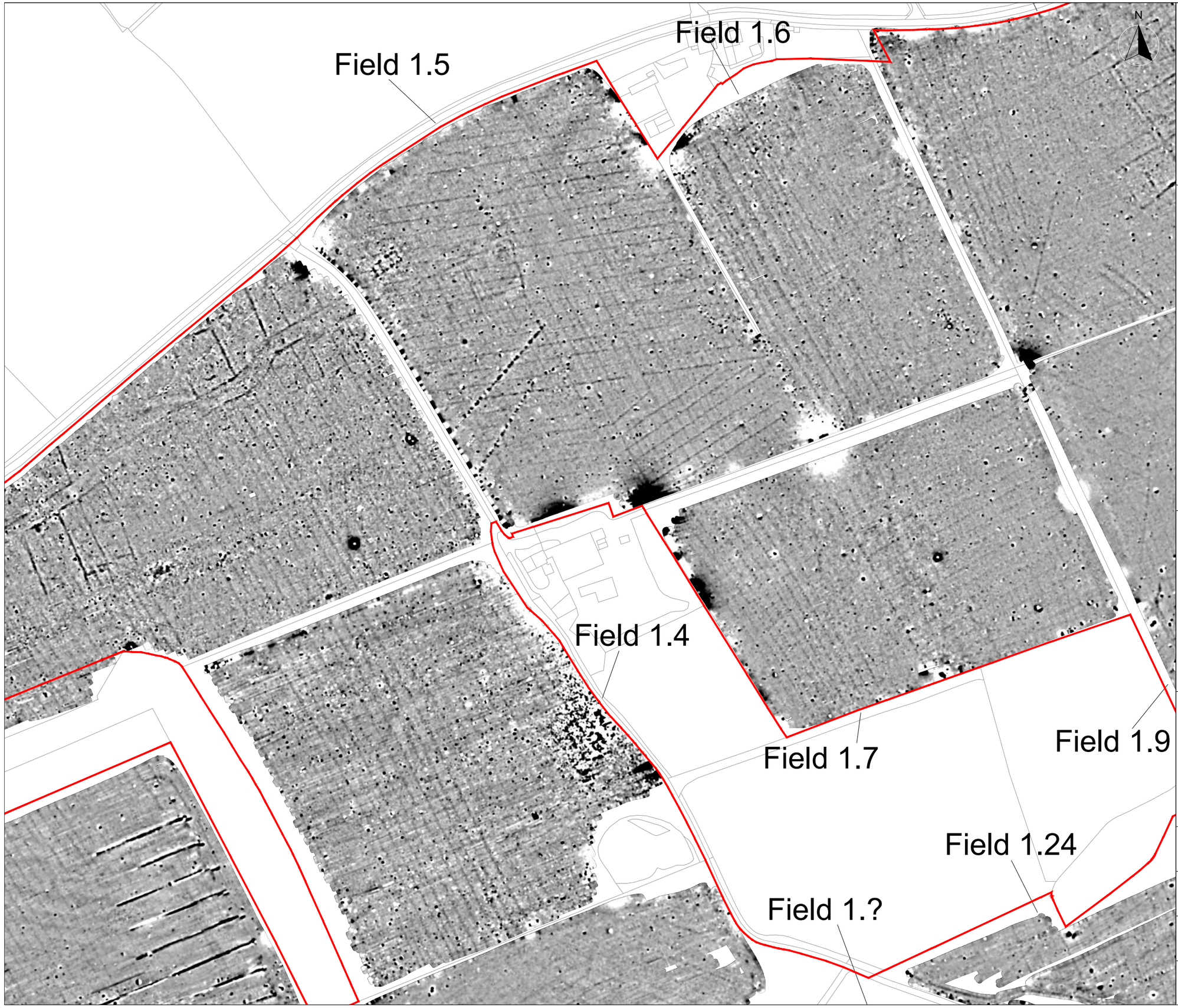

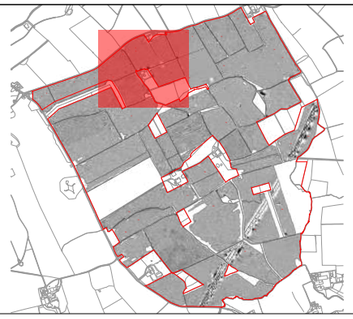

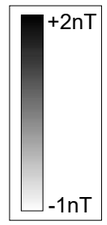

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Magnetometer Survey - Greyscale Plots
(Fields 1.4, 1.5, 1.6 & 1.7)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

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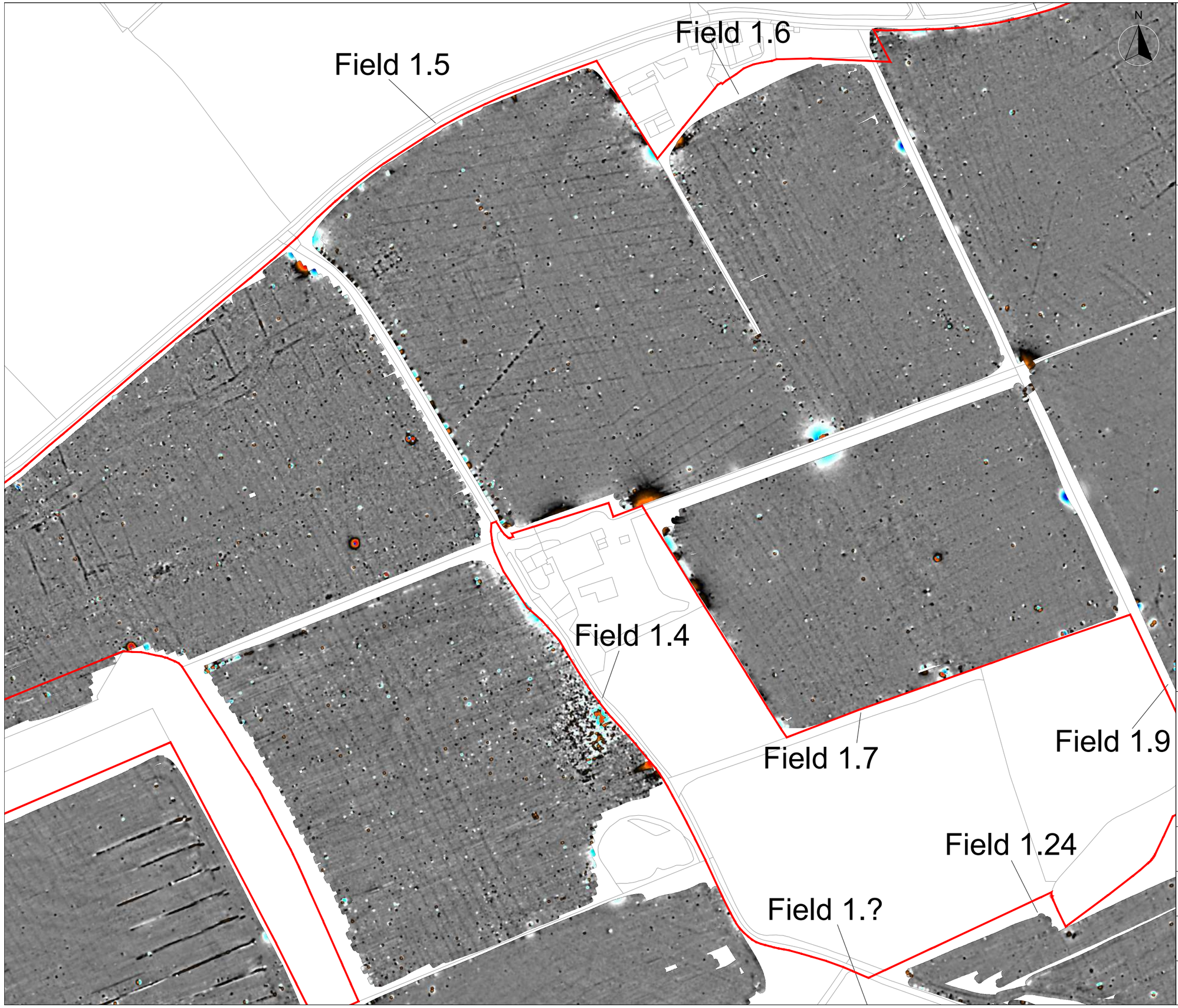

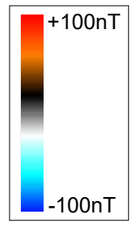

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Magnetometer Survey - Colour Plots
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Client:
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Project:
16614-1 - Light Valley Solar Project: Site 1

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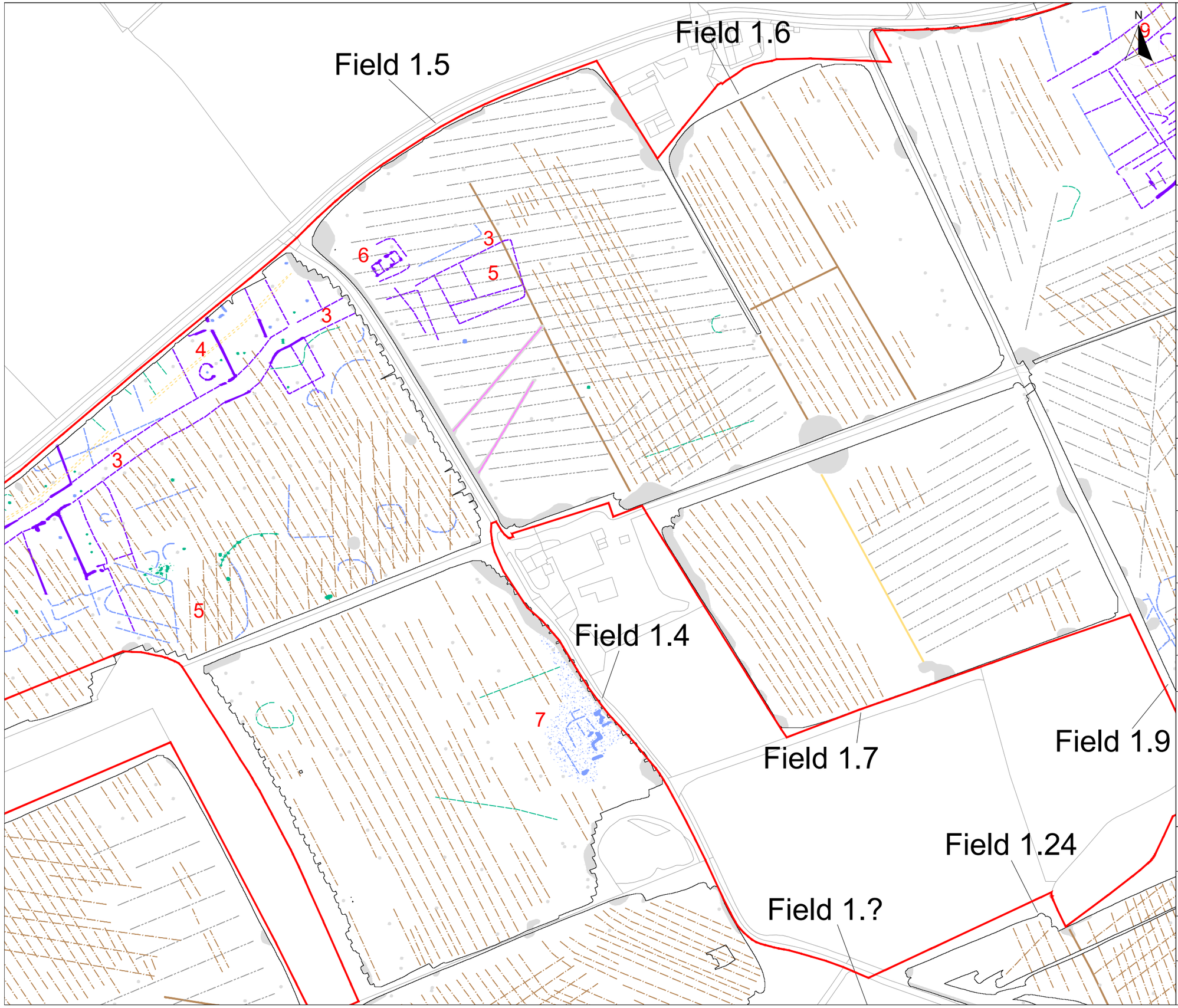

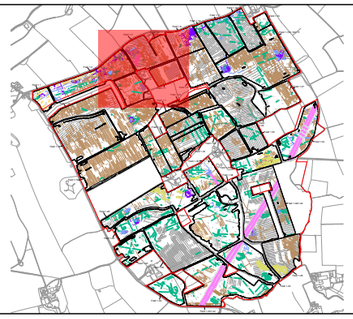

KEY

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	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

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Title: Magnetometer Survey - Interpretation (Fields 1.4, 1.5, 1.6 & 1.7)

Client: Island Green Power UK Limited

Project: 16614-1 - Light Valley Solar Project: Site 1

Scale: 0 metres 125
1:2500 @ A3

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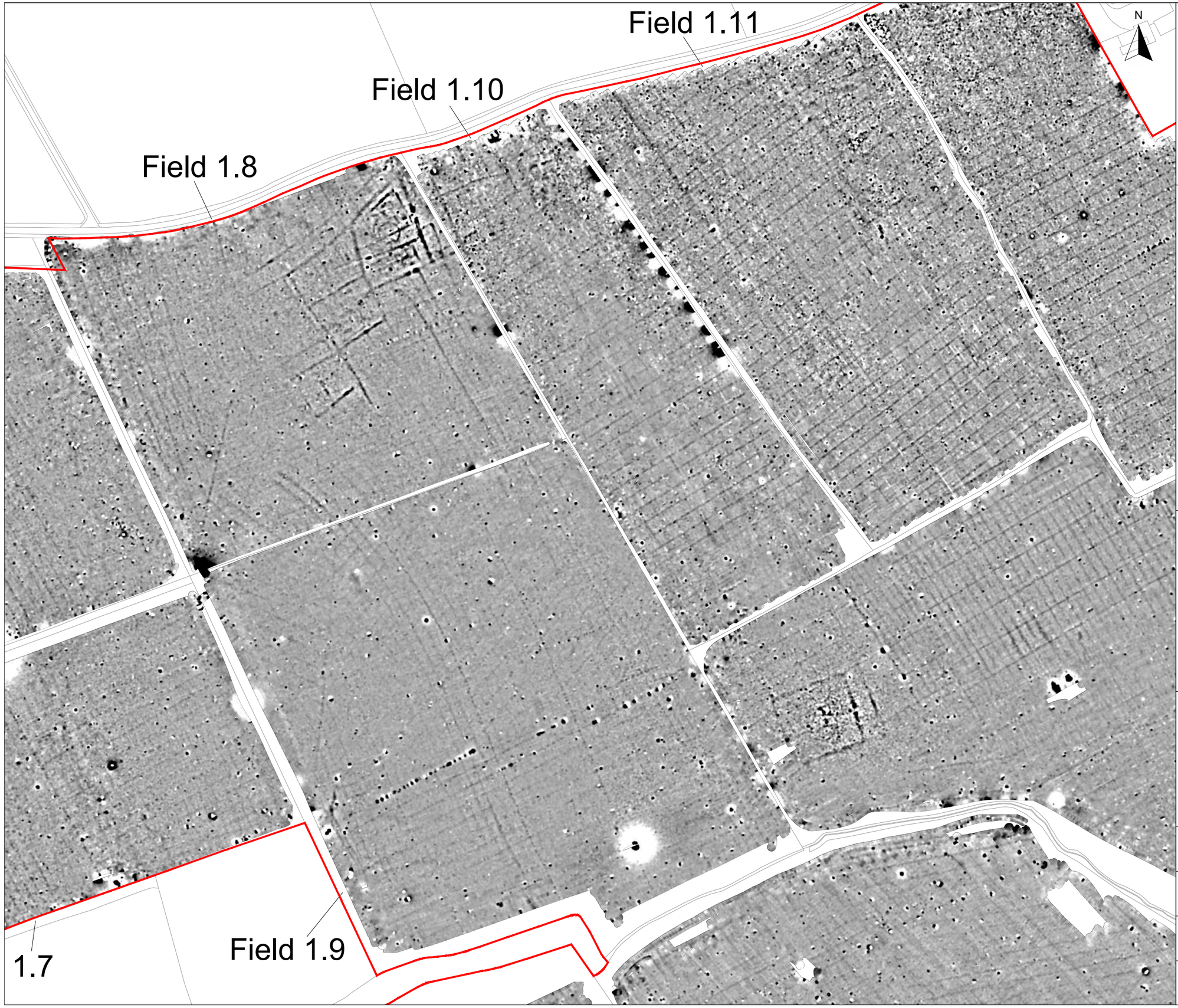

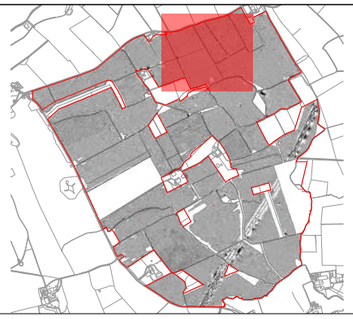

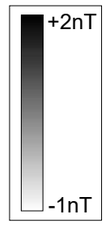

Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.8, 1.9, 1.10 & 1.11)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

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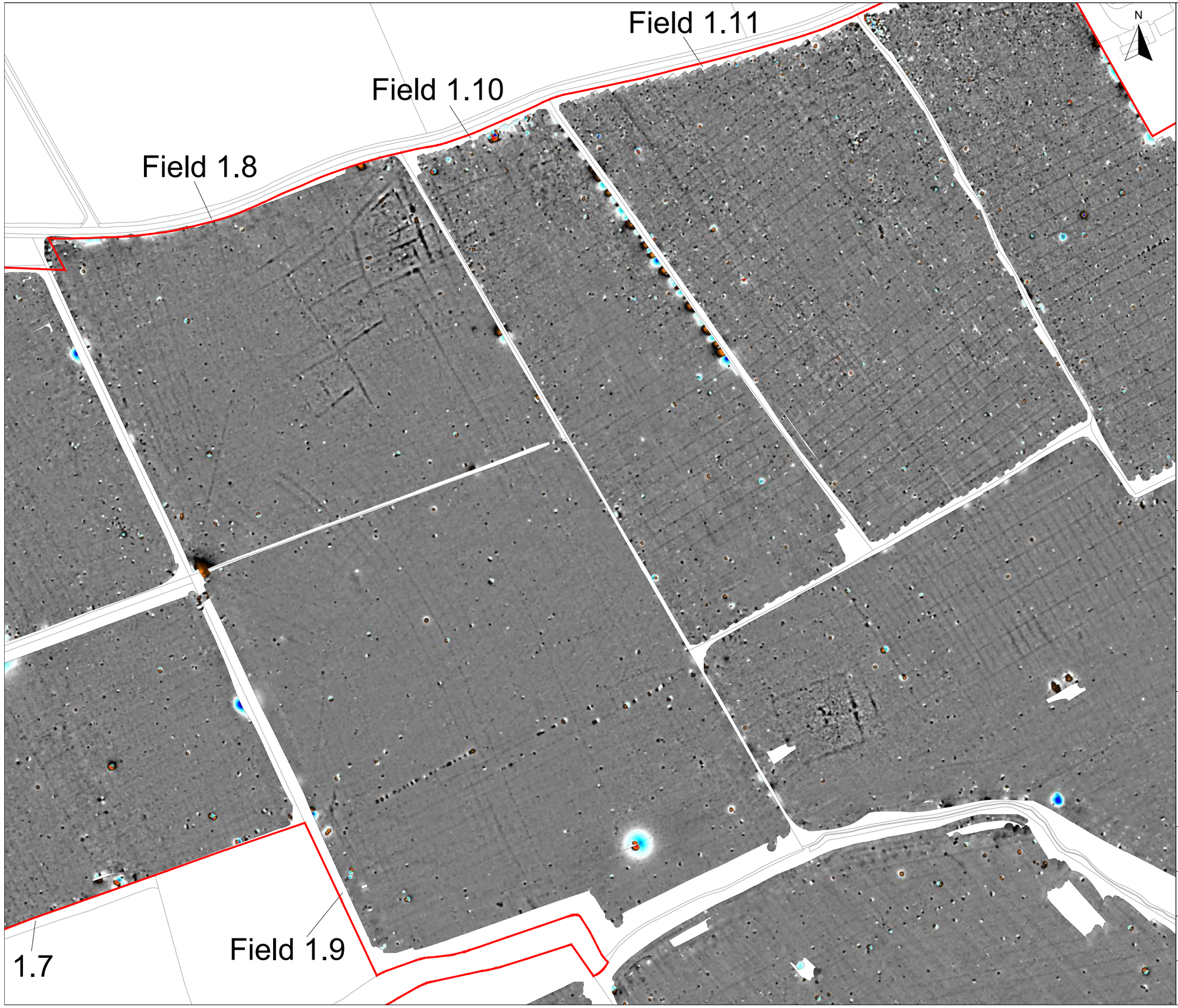

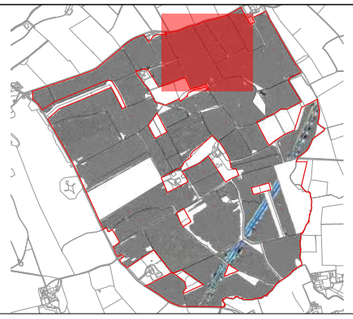

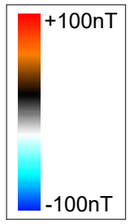

sumo GeoSurveys

Title:
Magnetometer Survey - Colour Plots
(Fields 1.8, 1.9, 1.10 & 1.11)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
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Field 1.11

Field 1.10

Field 1.8

Field 1.9

1.7

8

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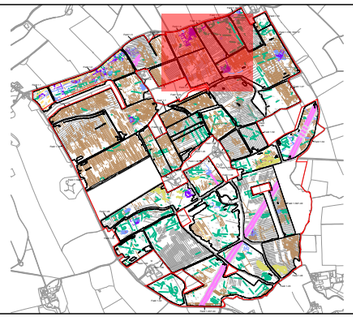

KEY

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	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
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sumo GeoSurveys

Title:
Magnetometer Survey - Interpretation
(Fields 1.8, 1.9, 1.10 & 1.11)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

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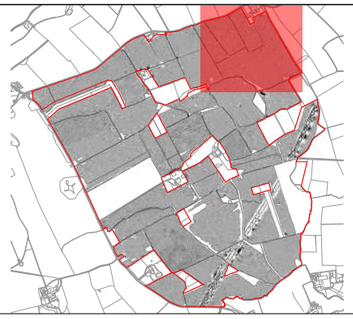
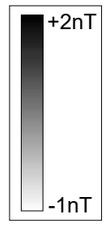




sumo GeoSurveys

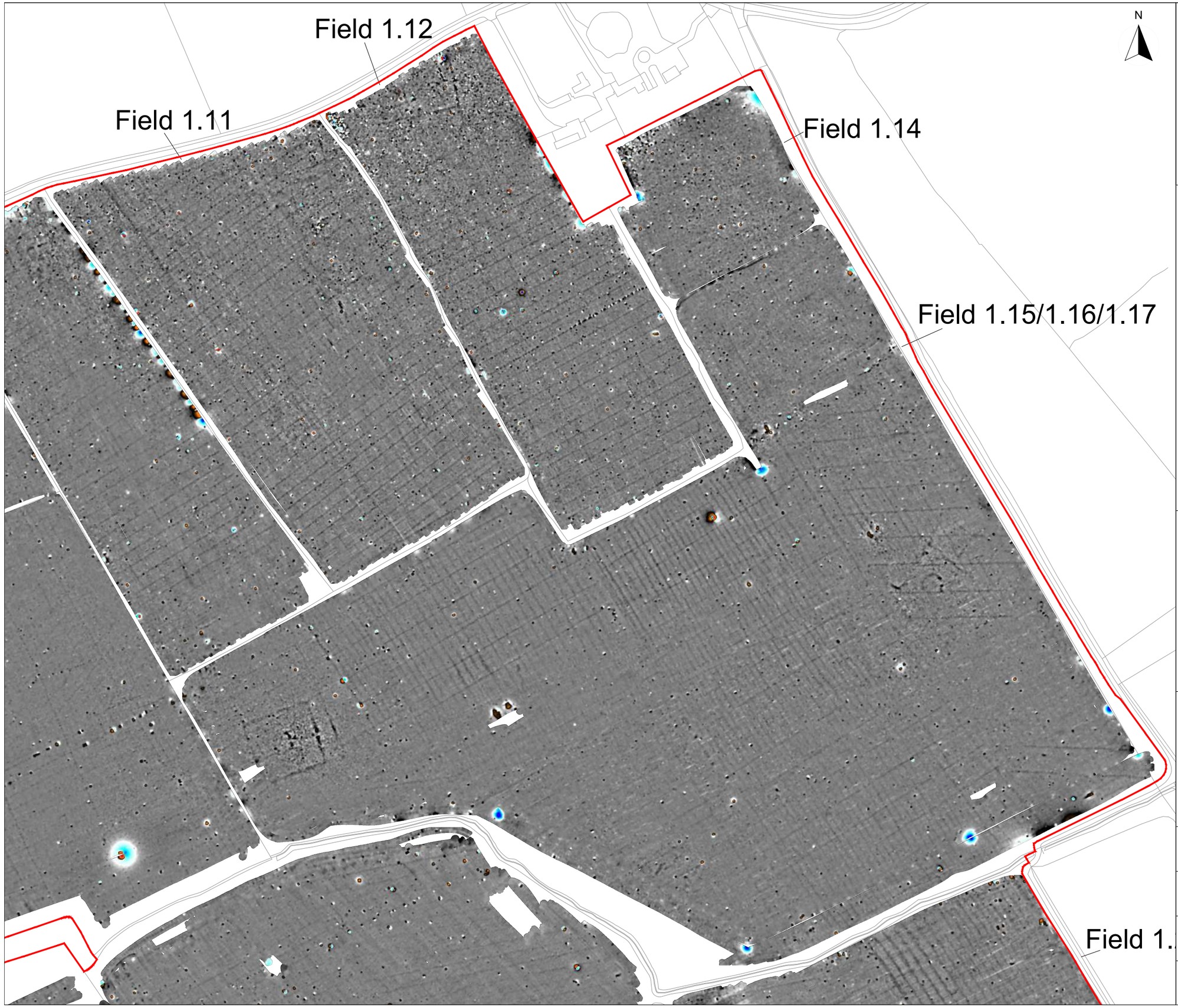
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.11, 1.12, 1.14 & 1.15/1.16/1.17)

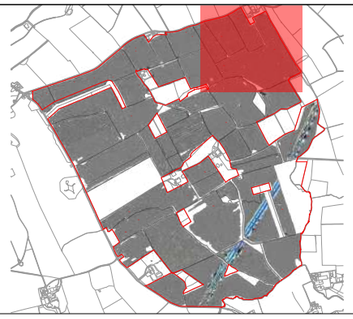
Client:
Island Green Power UK Limited

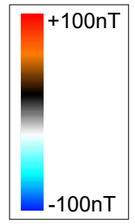
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
15







sumo GeoSurveys

Title:
Magnetometer Survey - Colour Plots
(Fields 1.11, 1.12, 1.14 & 1.15/1.16/1.17)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
16

Field 1.12

Field 1.11

Field 1.14

Field 1.15/1.16/1.17

Field 1.

N

11

11

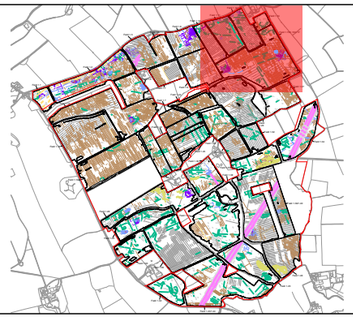
13

12

14

15

16



KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

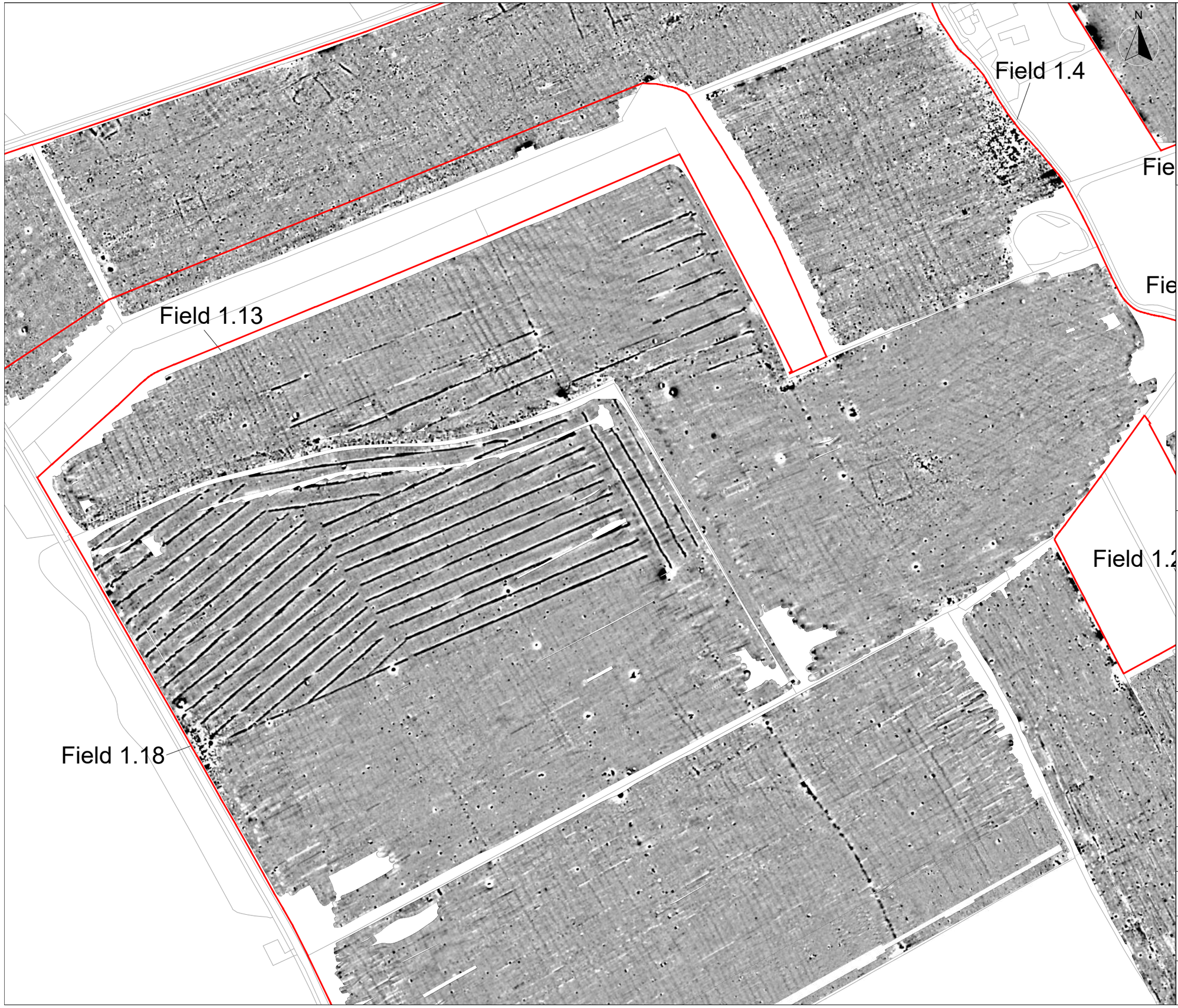
Title:
Magnetometer Survey - Interpretation
(Fields 1.11, 1.12, 1.14 & 1.15/1.16/1.17)

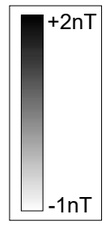
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
17





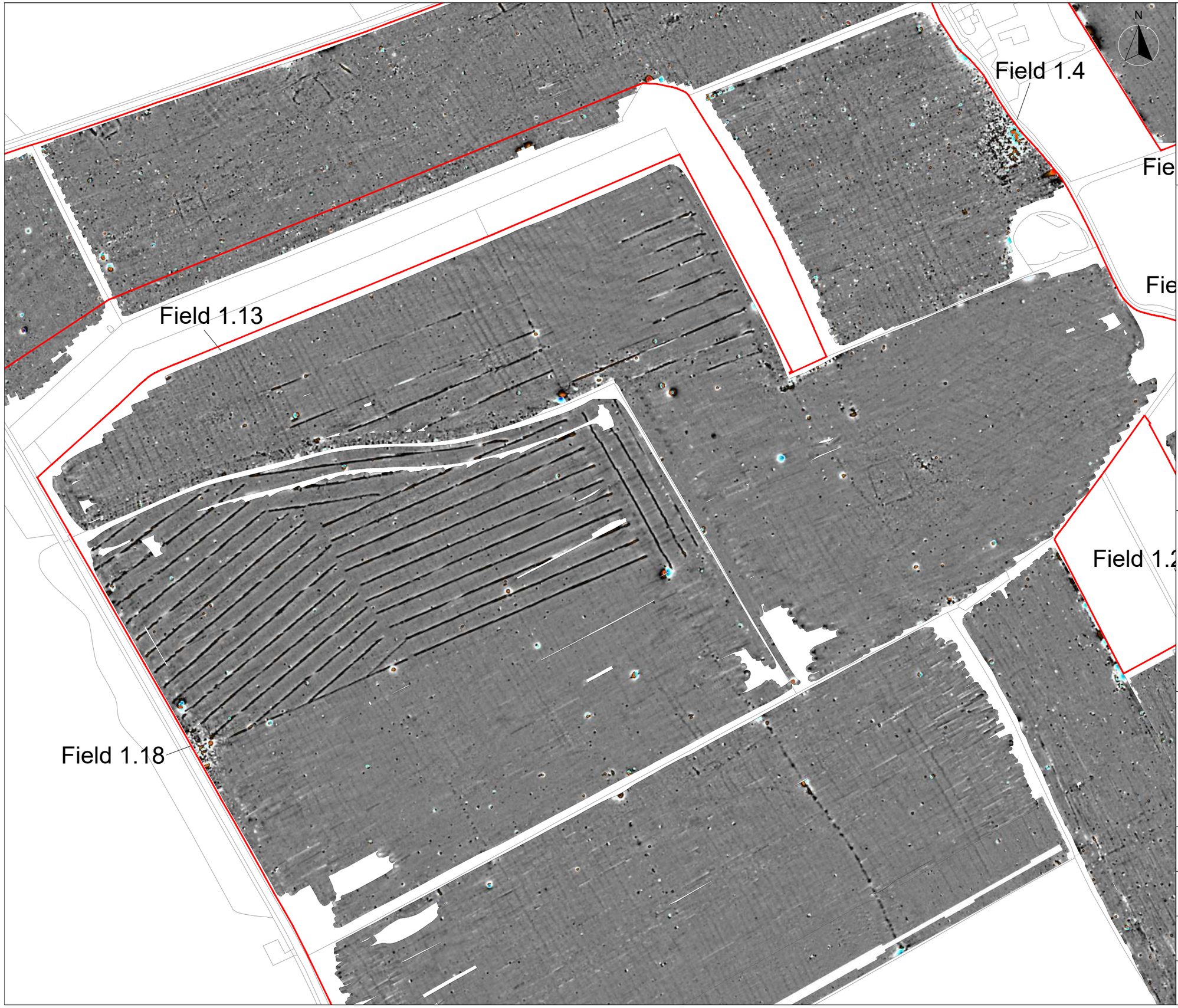
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.13 & 1.18)

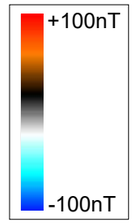
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 160
1:3200 @ A3

Fig No:
18





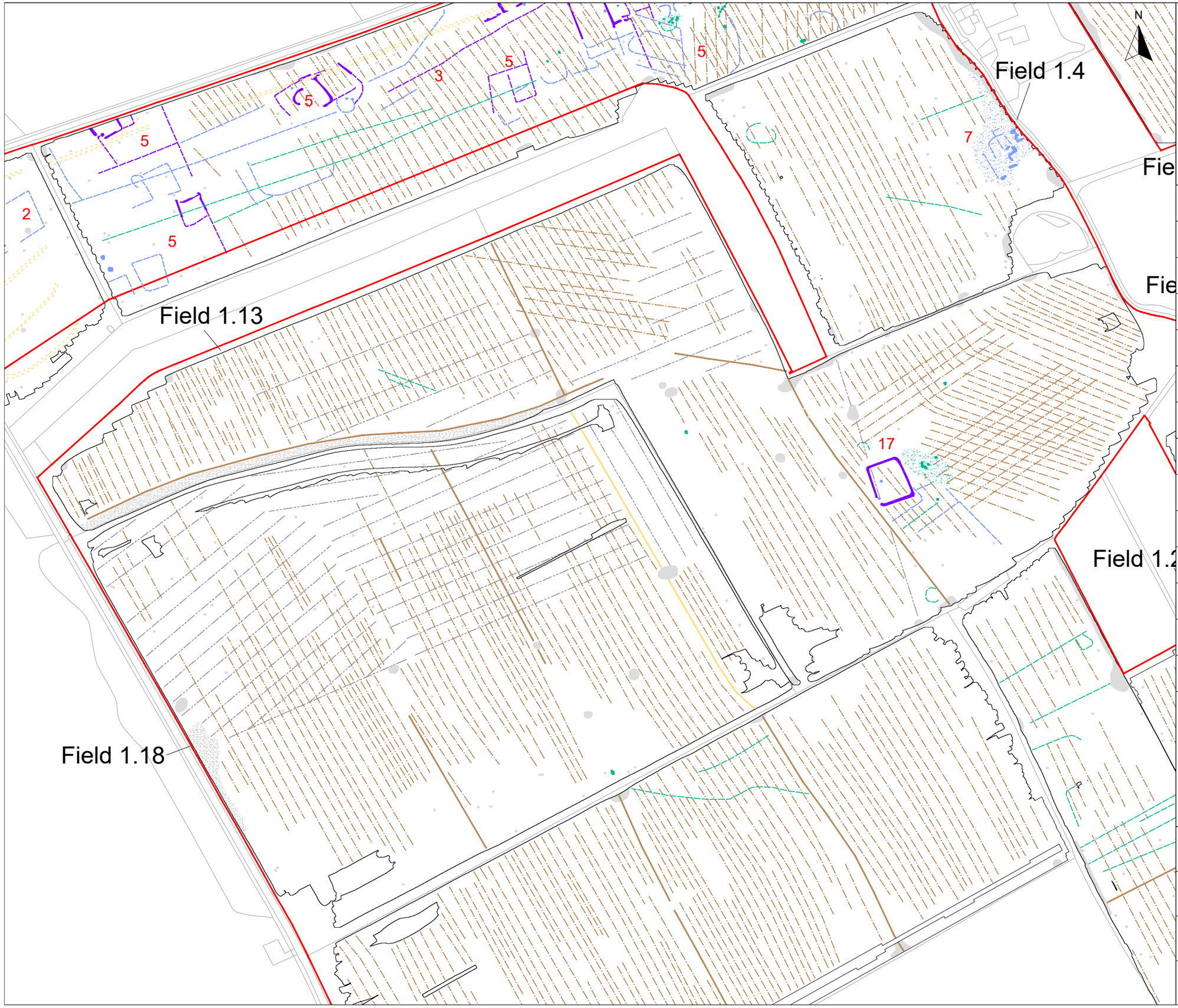
Title:
Magnetometer Survey - Colour Plots
(Fields 1.13 & 1.18)

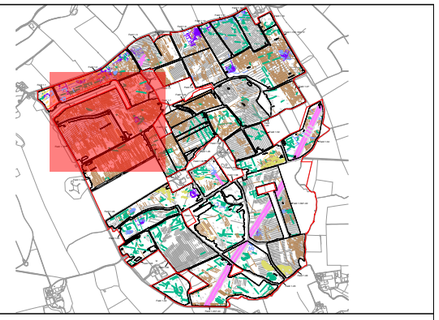
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 160
1:3200 @ A3

Fig No:
19





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

Title:
Magnetometer Survey - Interpretation
(Fields 1.13 & 1.18)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 160
1:3200 @ A3

Fig No:
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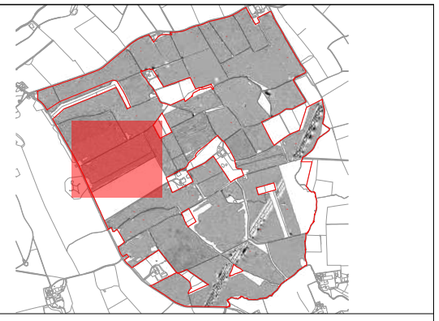
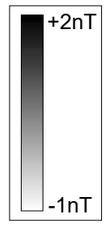




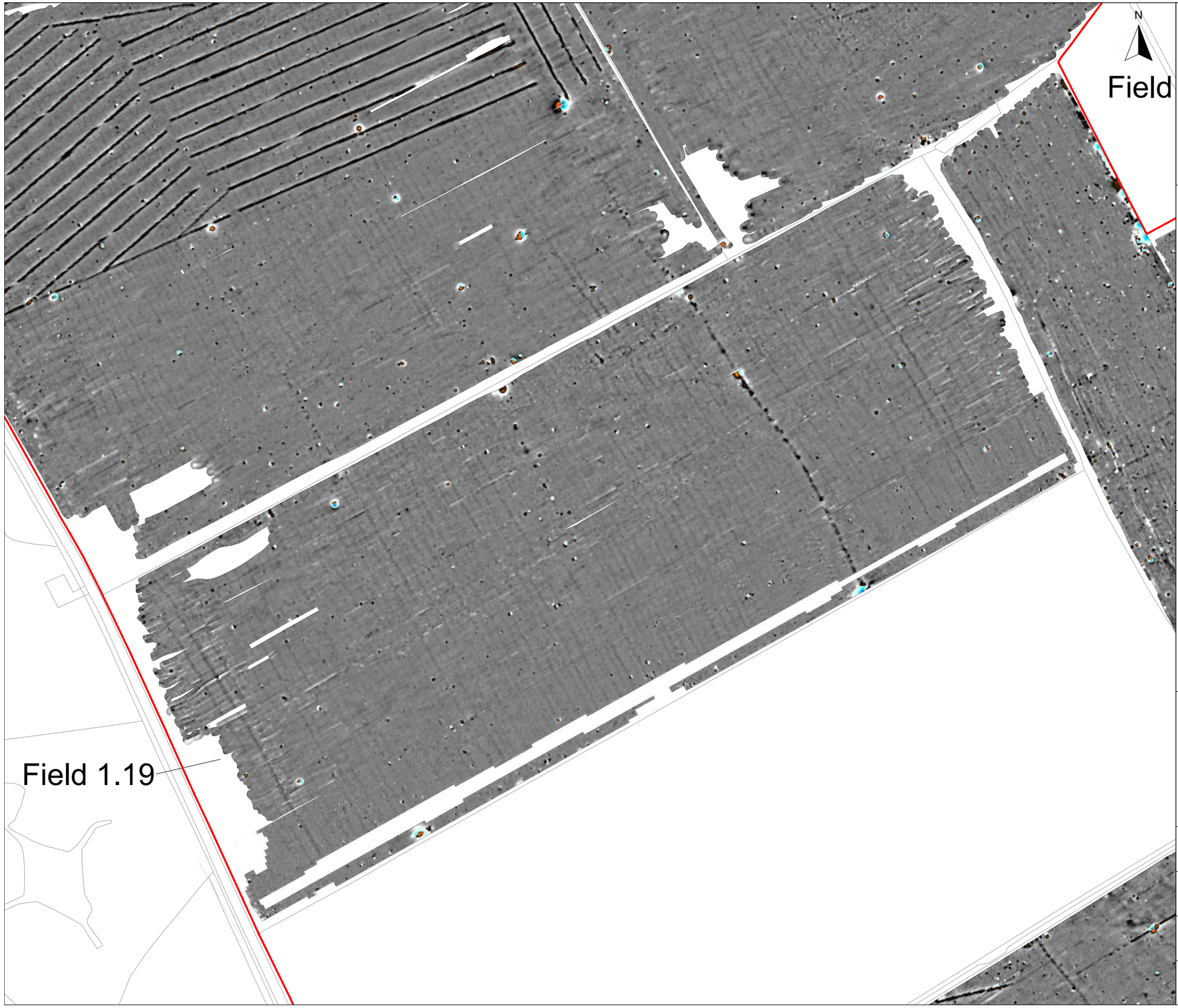
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.19)

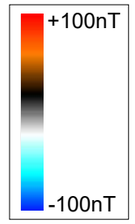
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
21





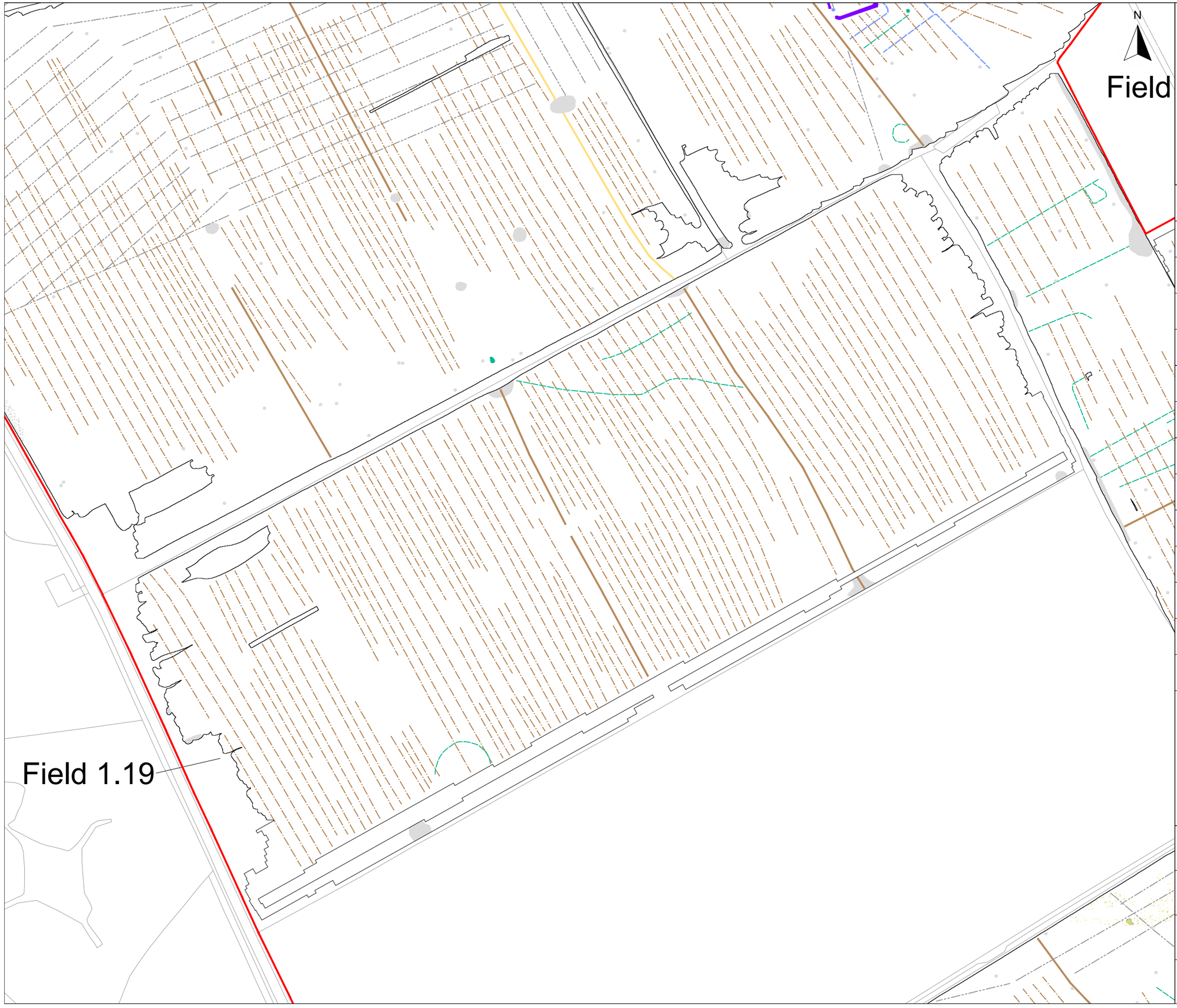
Title:
Magnetometer Survey - Colour Plots
(Field 1.19)

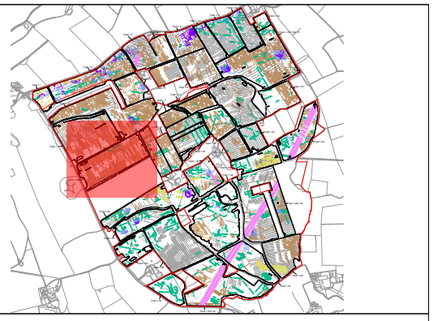
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
22





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

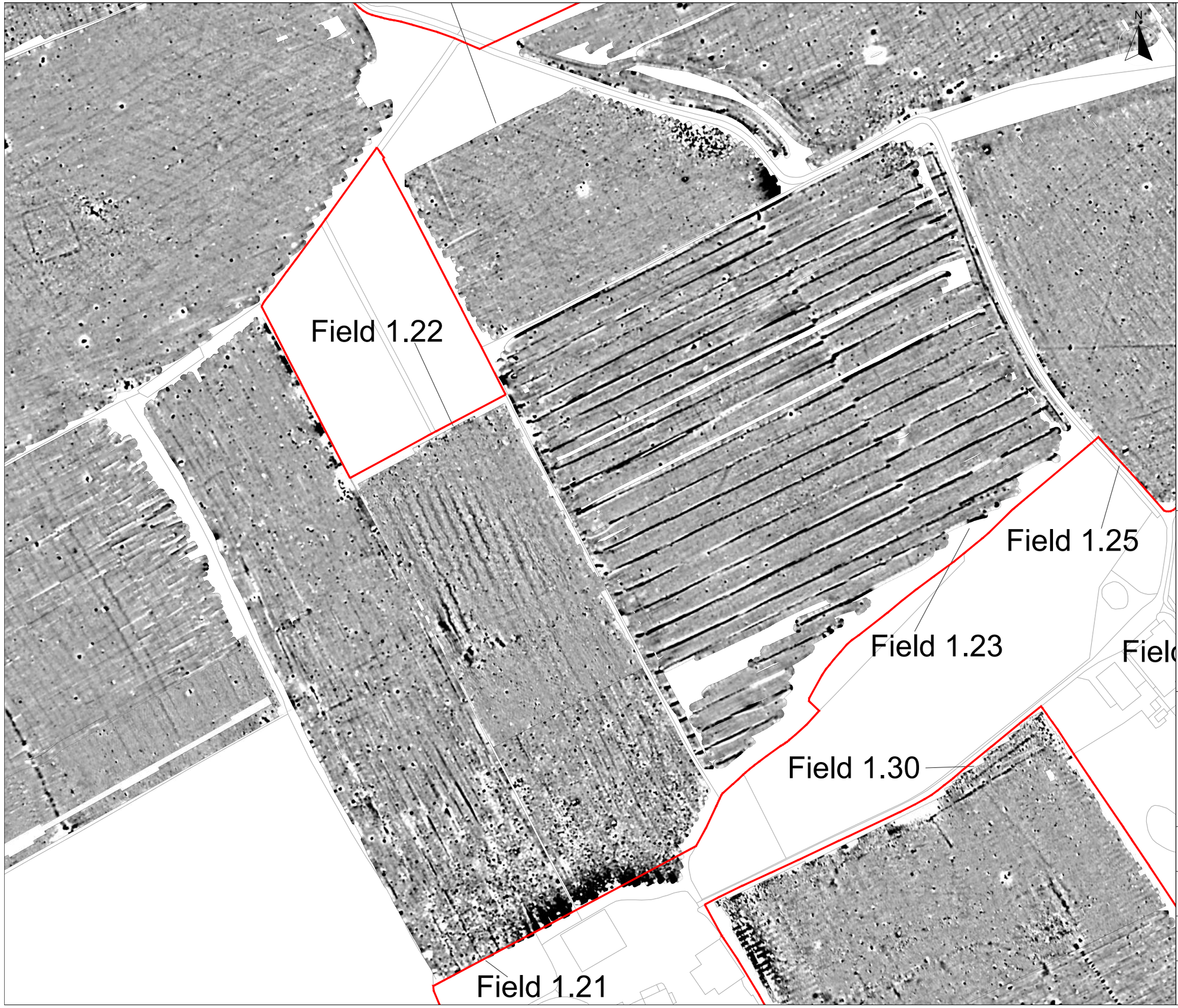
Title:
Magnetometer Survey - Interpretation
(Field 1.19)

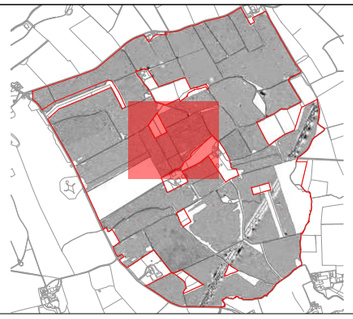
Client:
Island Green Power UK Limited

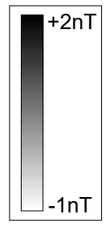
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
23







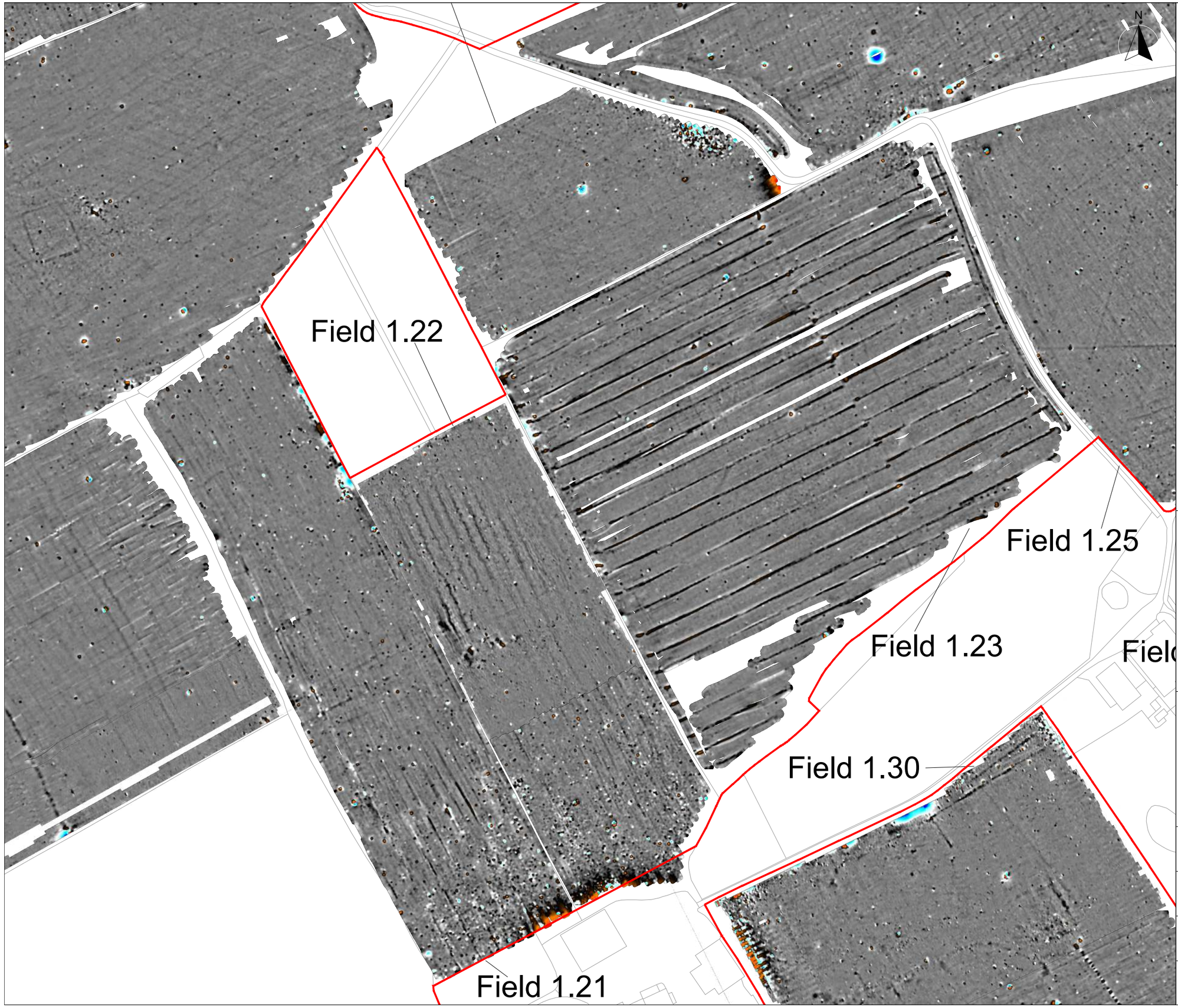
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.21, 1.22 & 1.23)

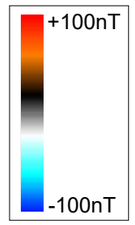
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
24





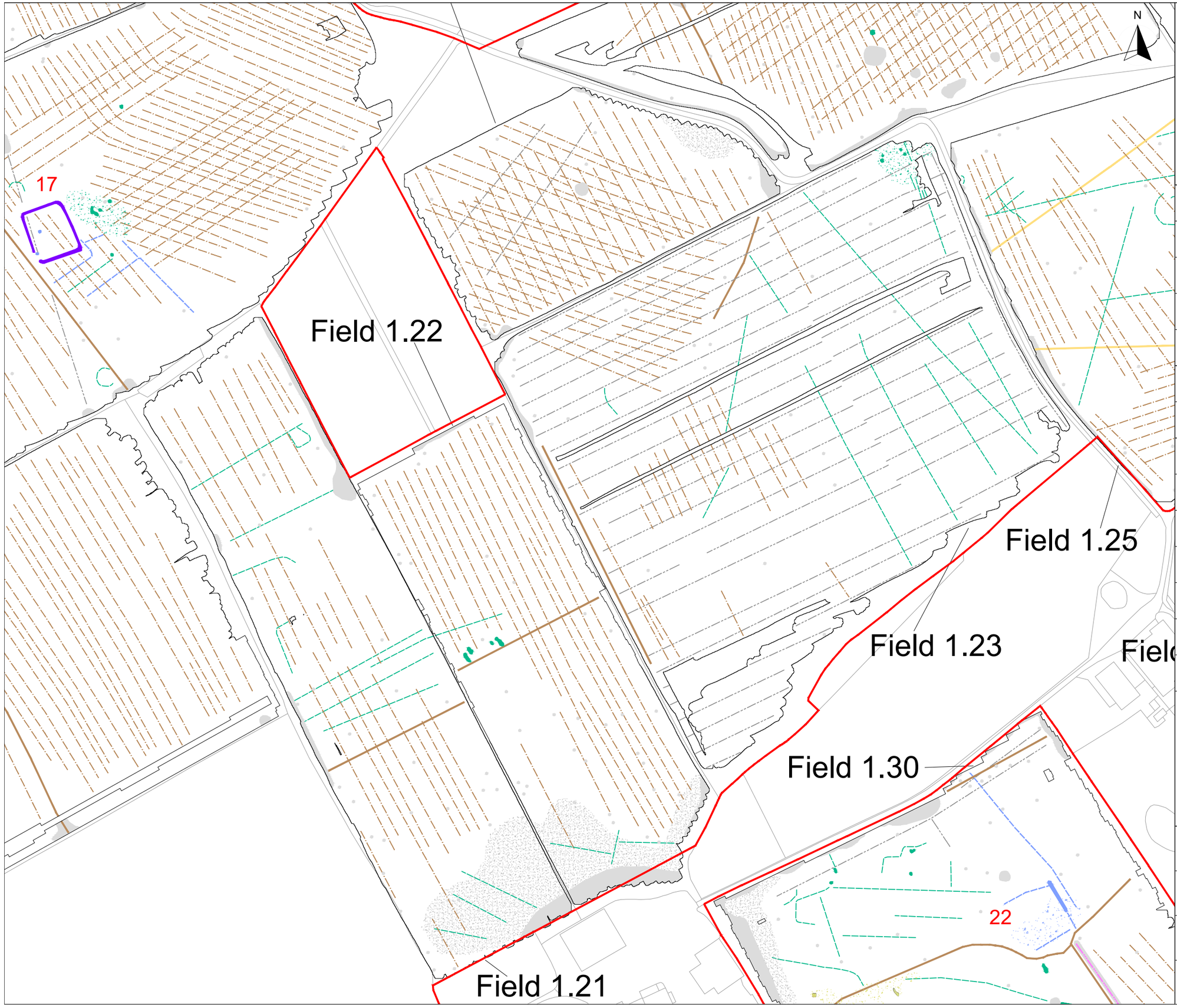
Title:
Magnetometer Survey - Colour Plots
(Fields 1.21, 1.22 & 1.23)

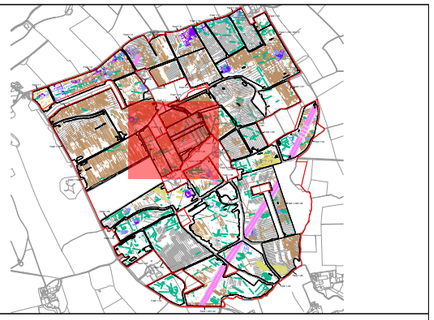
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
25





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

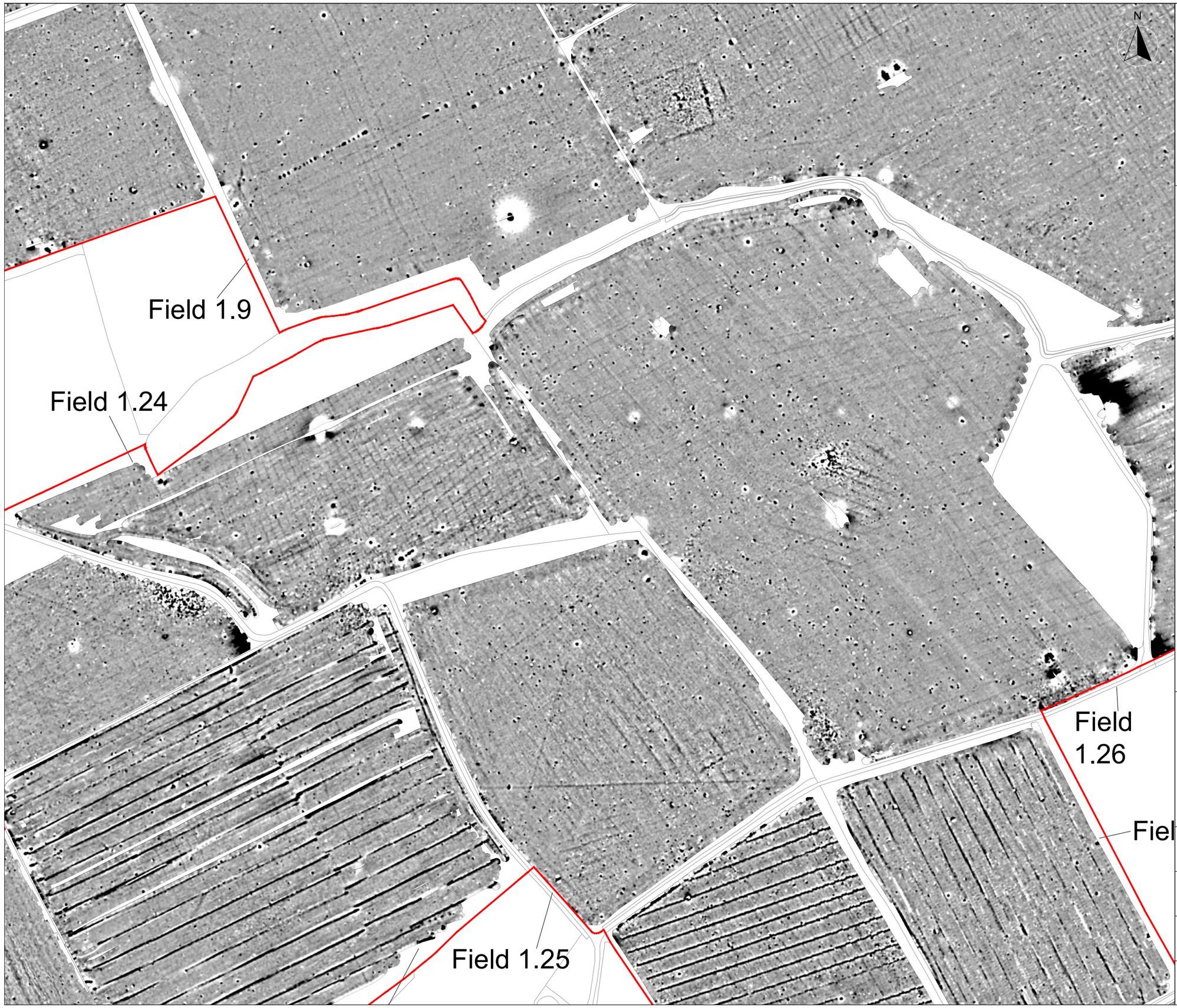
Title:
Magnetometer Survey - Interpretation
(Fields 1.21, 1.22 & 1.23)

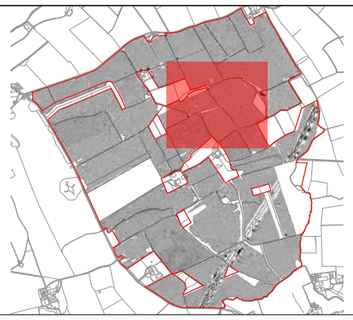
Client:
Island Green Power UK Limited

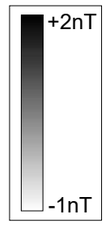
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
26







sumo GeoSurveys

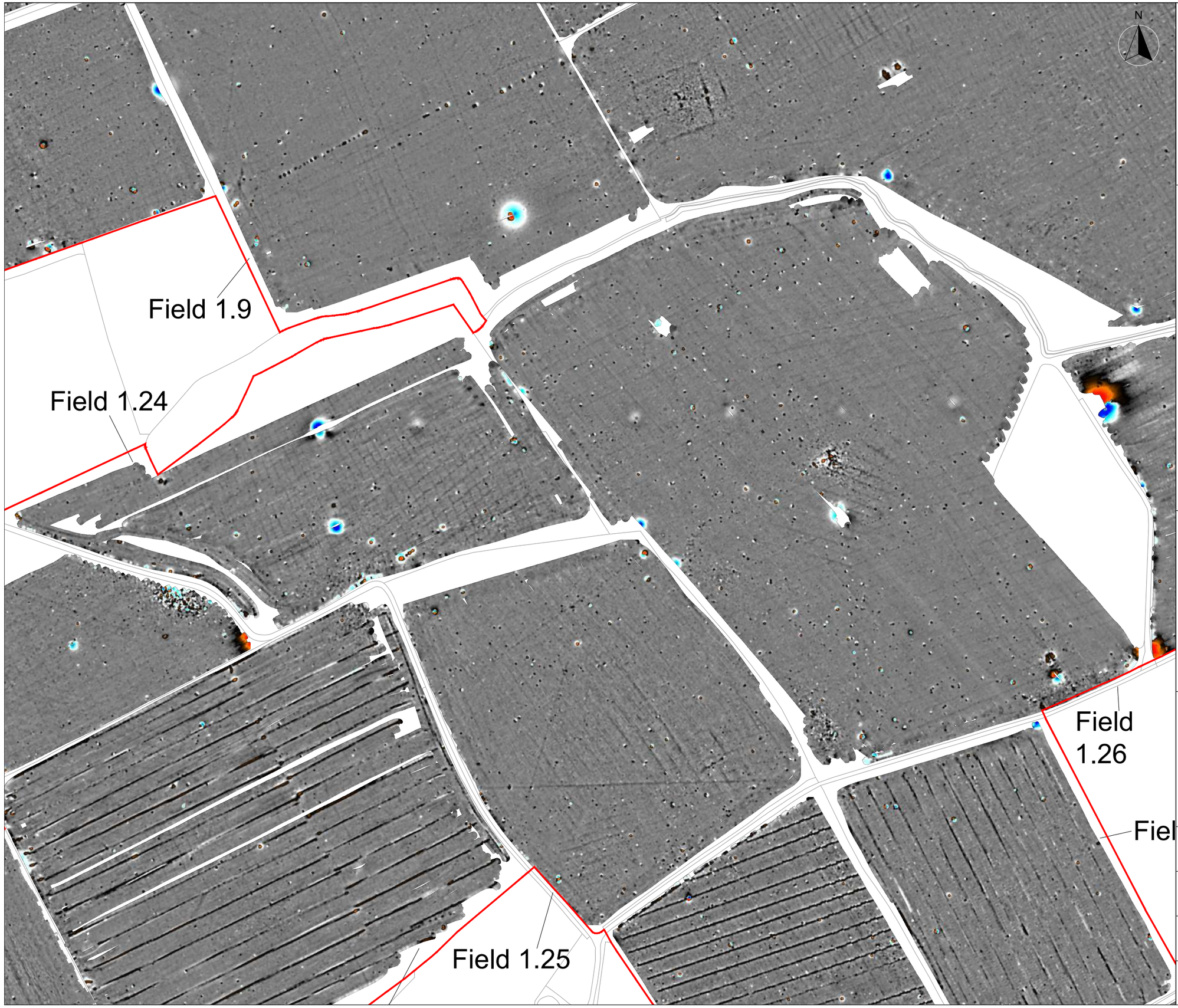
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.24, 1.25 & 1.26)

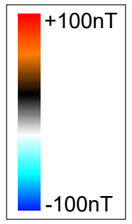
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
27





sumo GeoSurveys

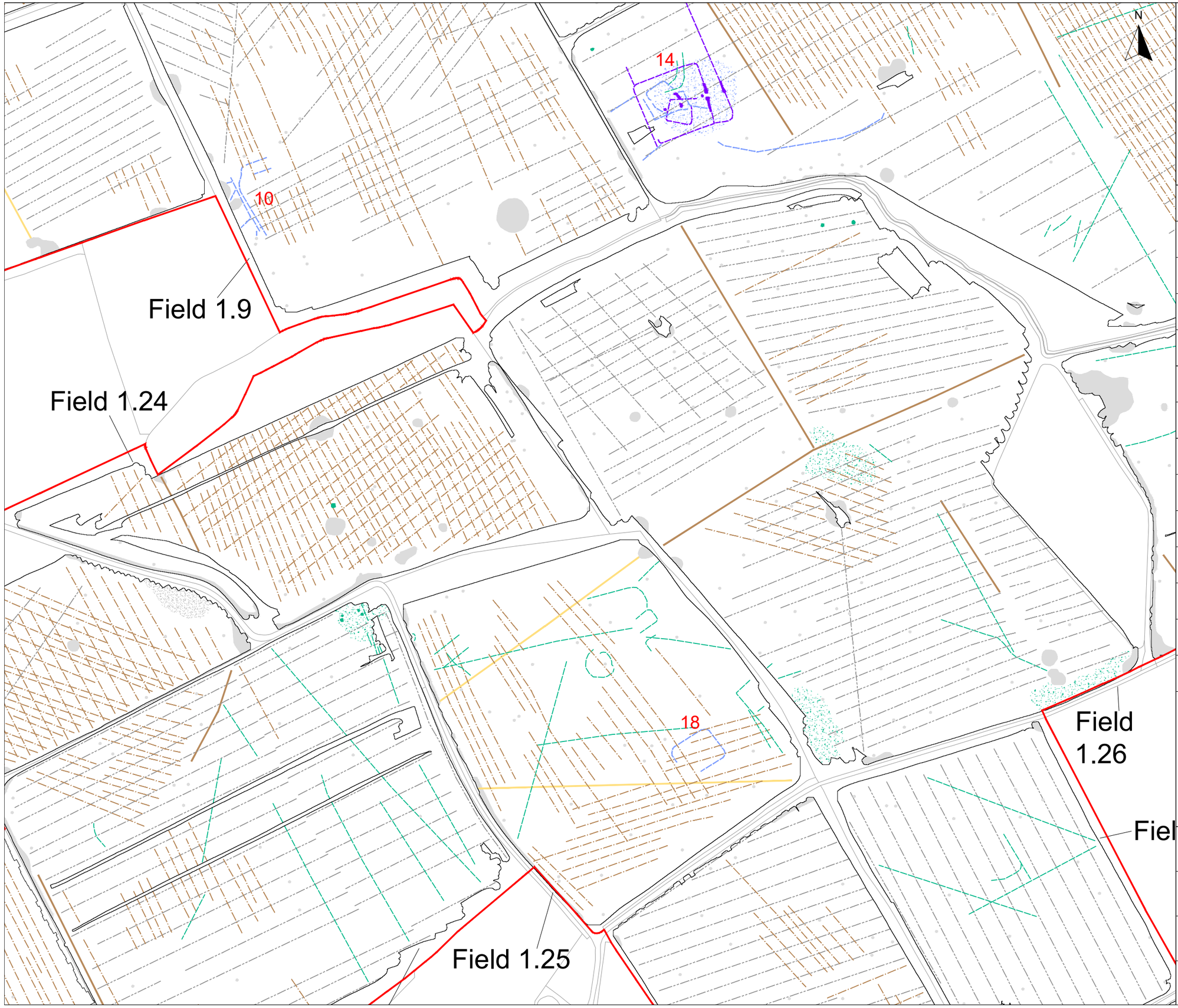
Title:
Magnetometer Survey - Colour Plots
(Fields 1.24, 1.25 & 1.26)

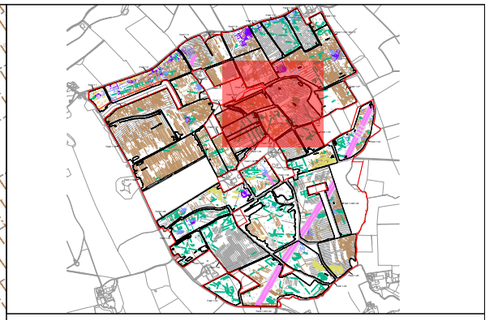
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
28





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
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	Former field boundary (conjectural)
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	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

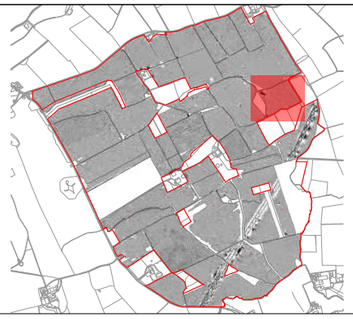
Title: Magnetometer Survey - Interpretation (Fields 1.24, 1.25 & 1.26)

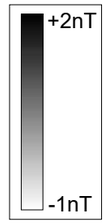
Client: Island Green Power UK Limited

Project: 16614-1 - Light Valley Solar Project: Site 1

Scale: 0 metres 140
1:2800 @ A3

Fig No: 29





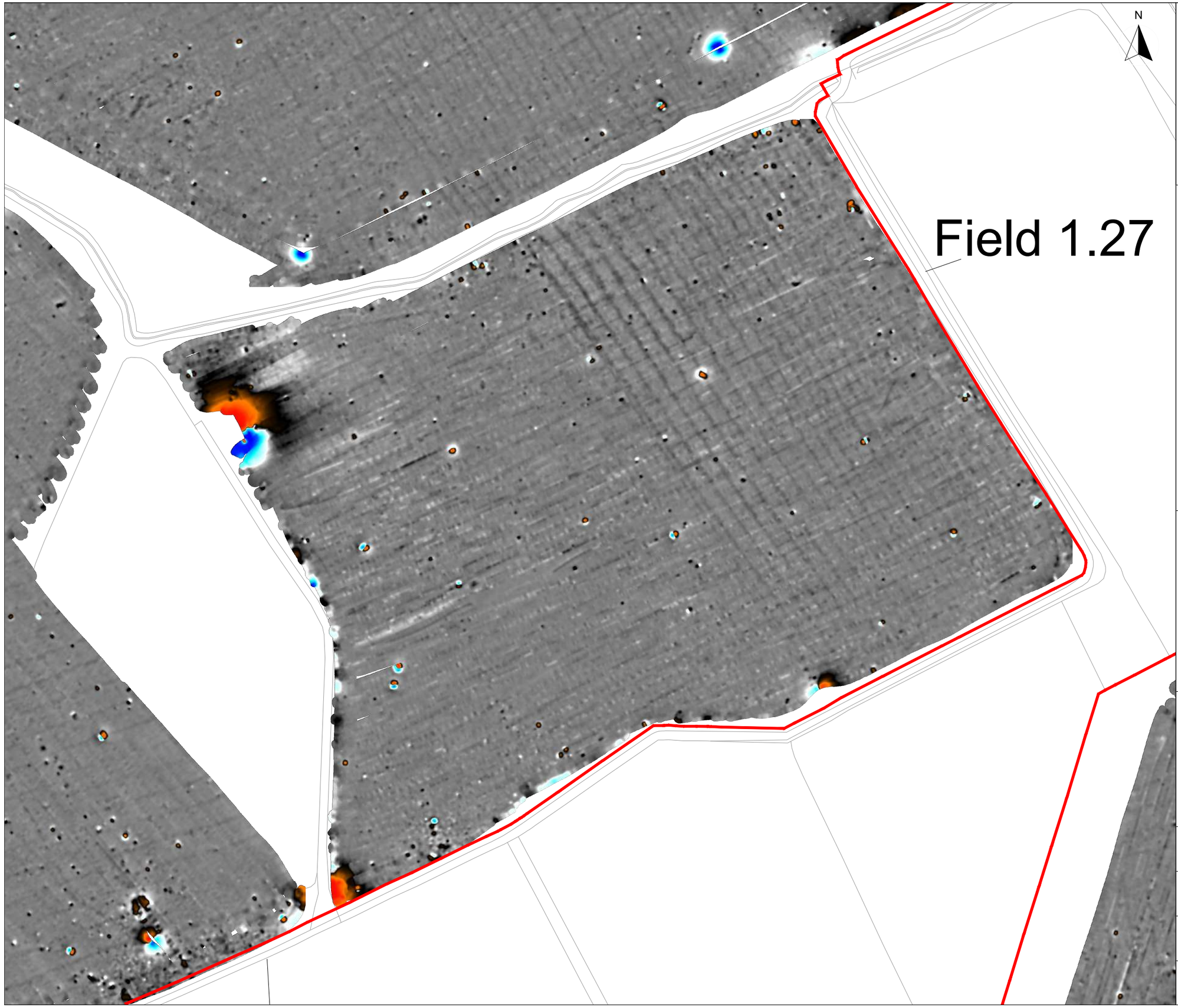
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.27)

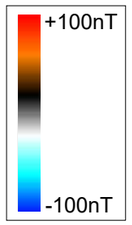
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
30





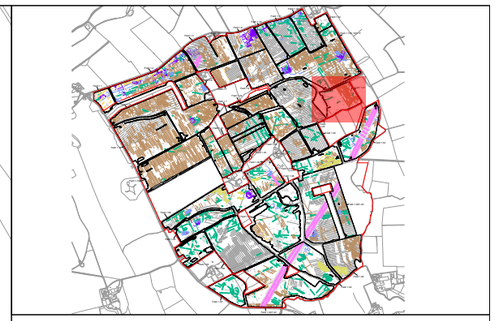
Title:
Magnetometer Survey - Colour Plots
(Field 1.27)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
31



KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

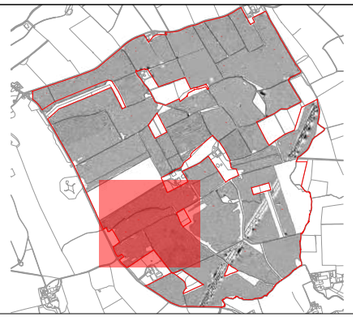
Title:
Magnetometer Survey - Interpretation
(Field 1.27)

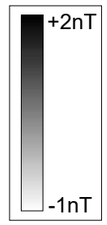
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
32





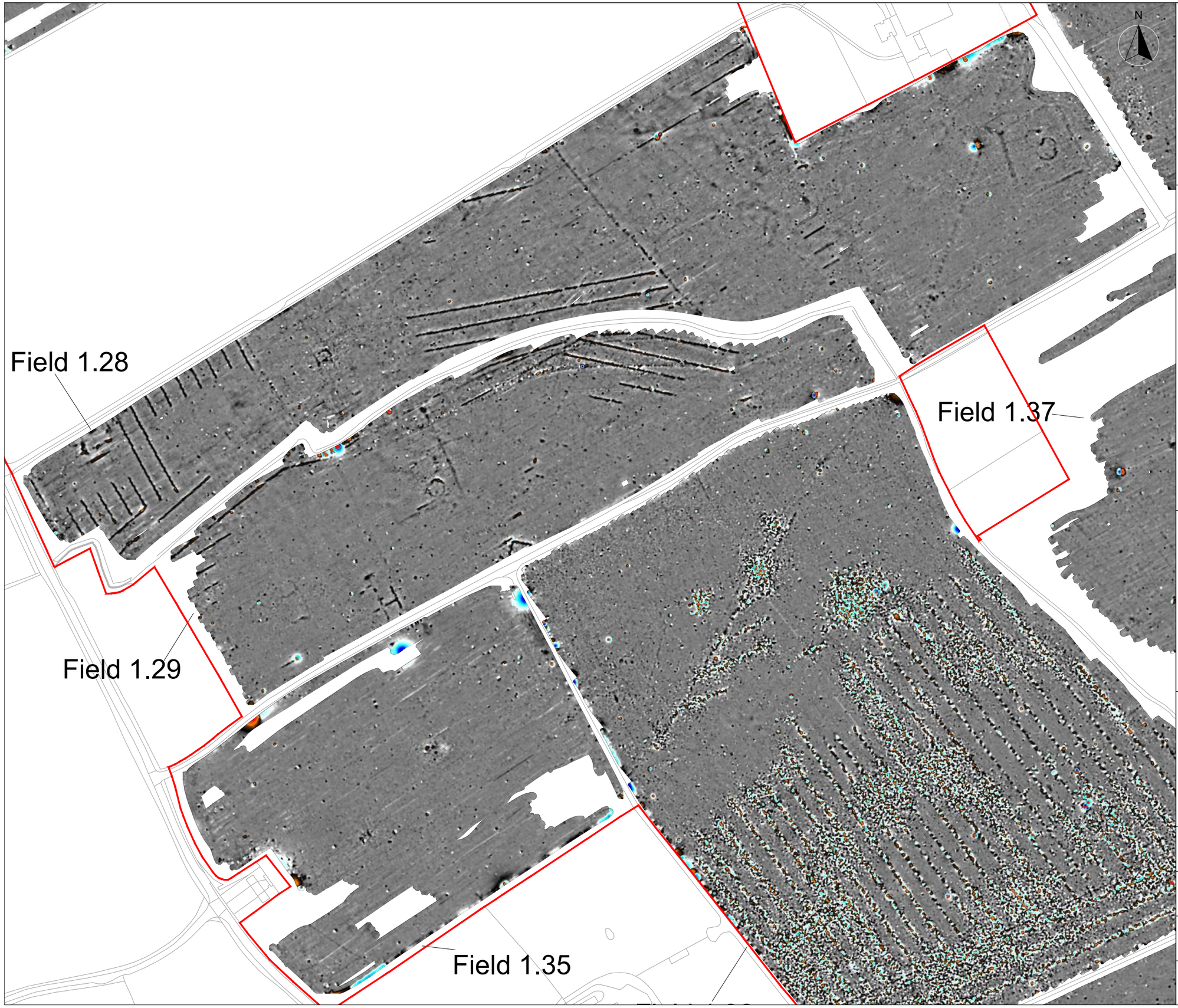
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.28, 1.29 & 1.35)

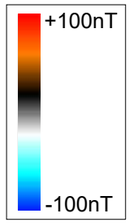
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
33





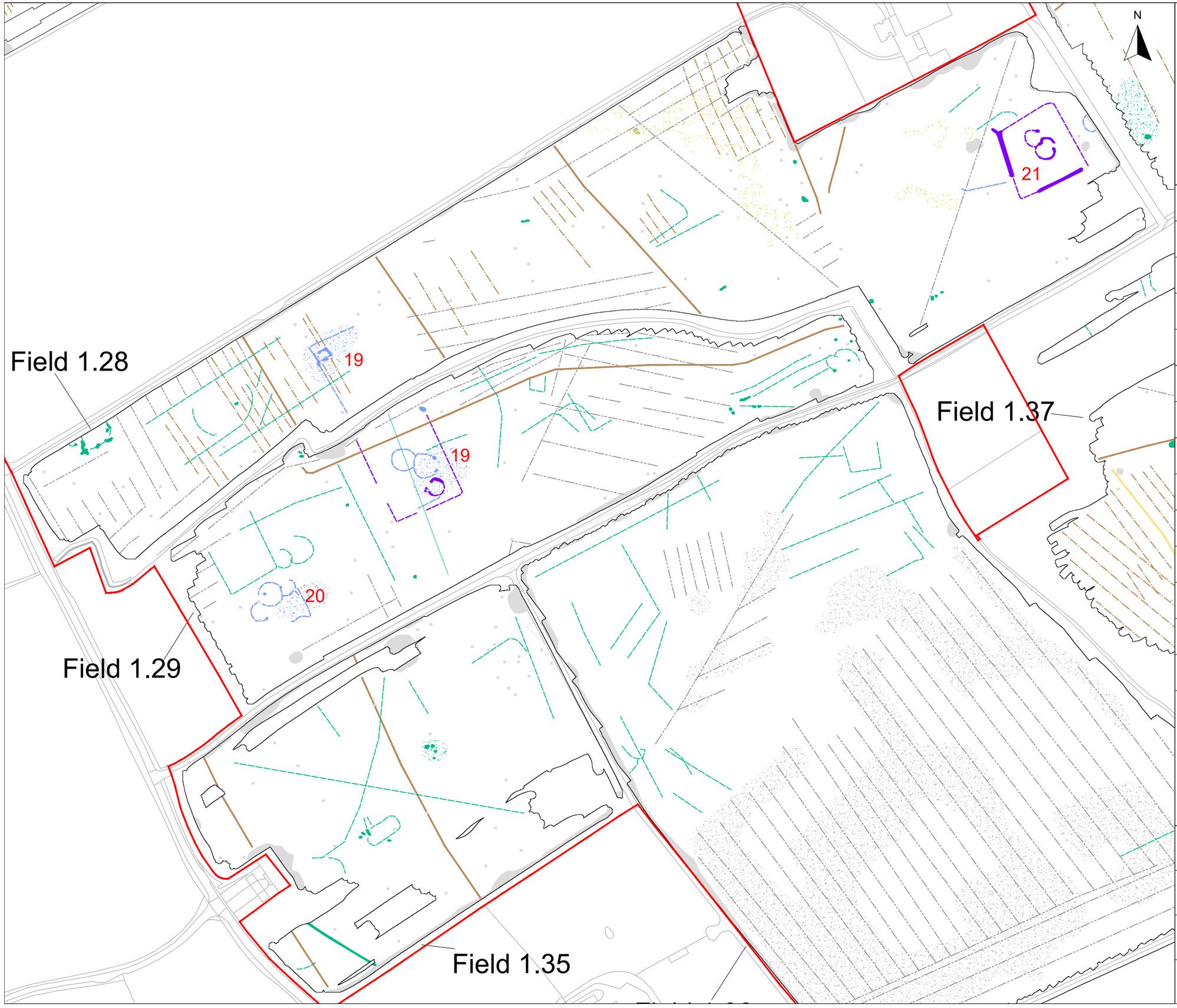
Title:
Magnetometer Survey - Colour Plots
(Fields 1.28, 1.29 & 1.35)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
34



KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

Title:
Magnetometer Survey - Interpretation
(Fields 1.28, 1.29 & 1.35)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
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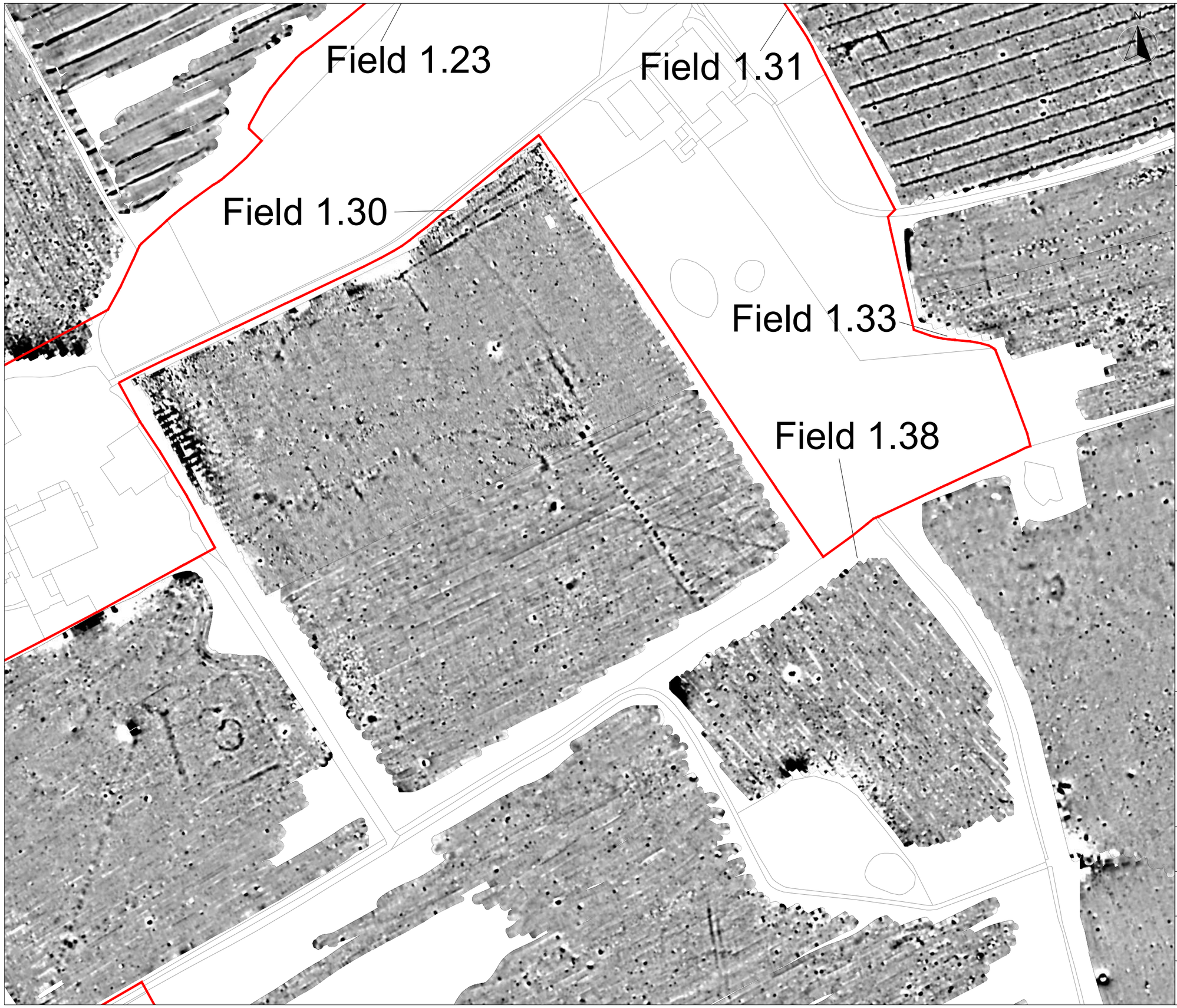
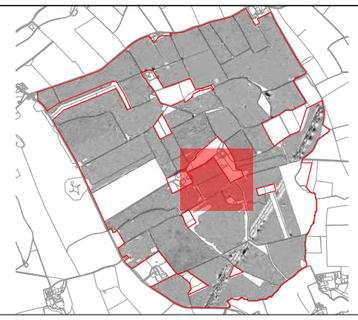
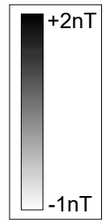






sumo GeoSurveys

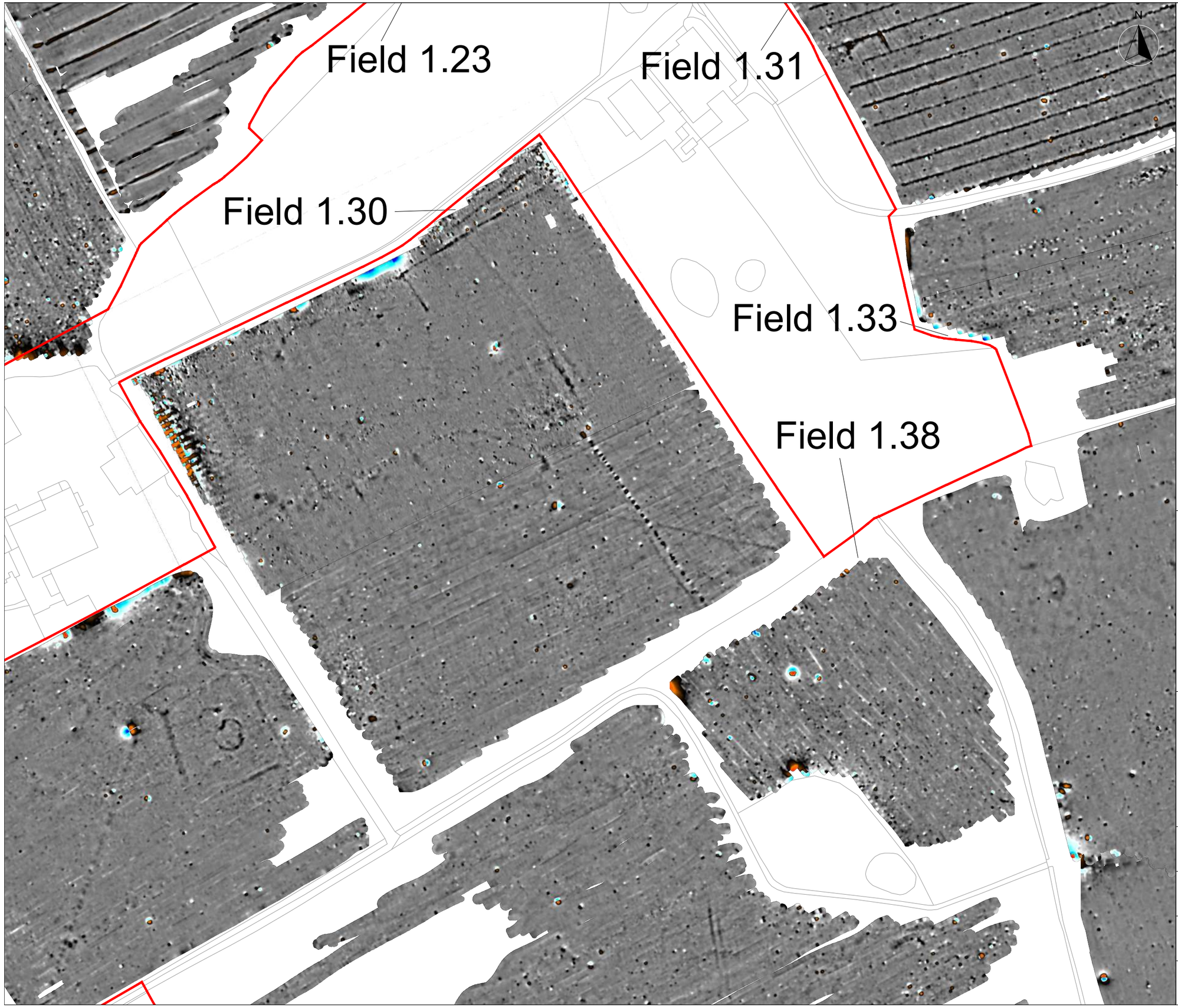
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.30 & 1.38)

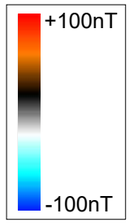
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
36





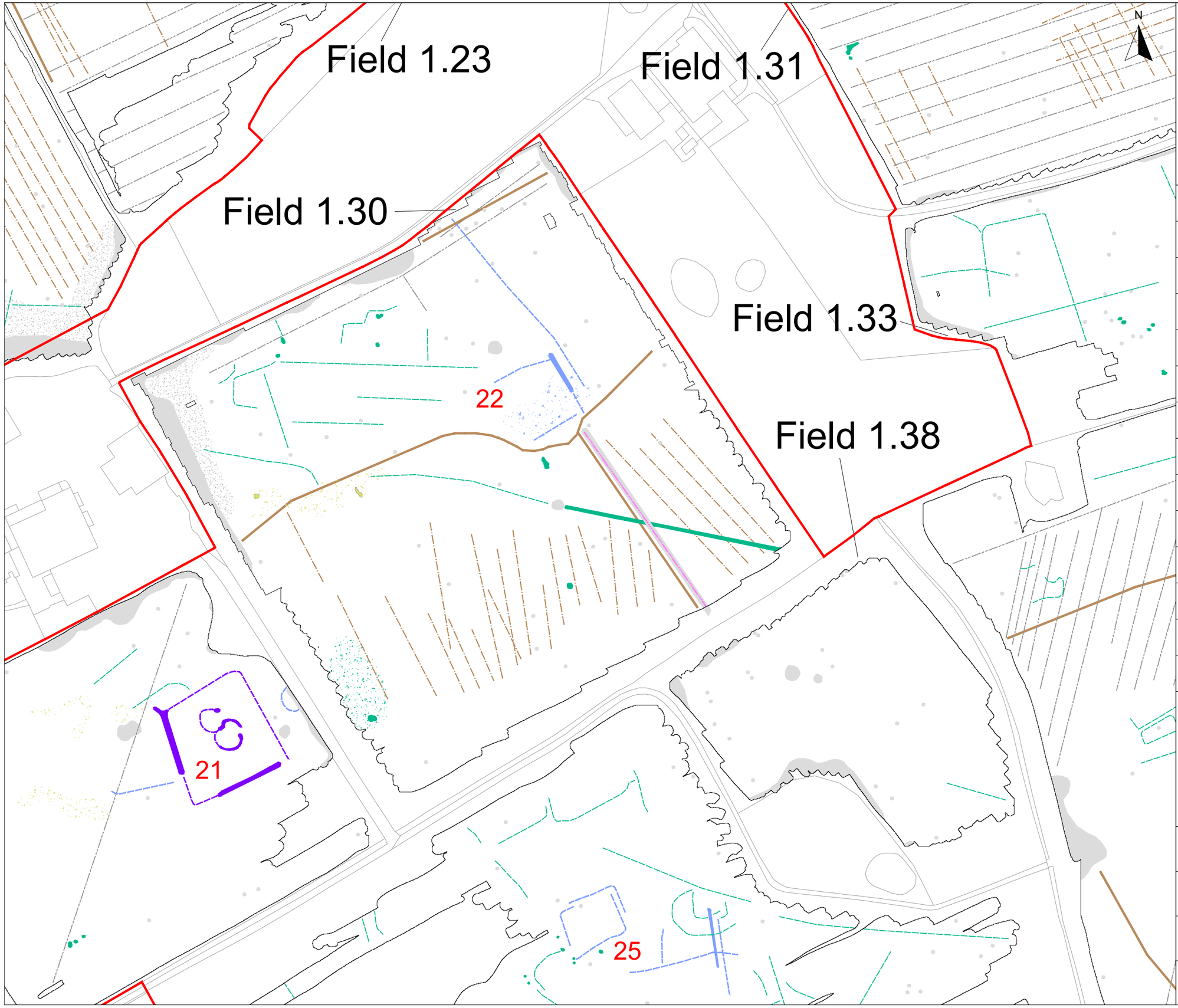
Title:
Magnetometer Survey - Colour Plots
(Fields 1.30 & 1.38)

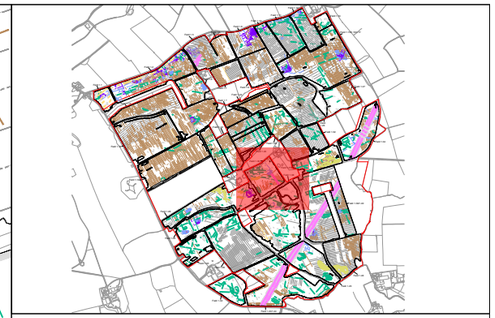
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
37





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

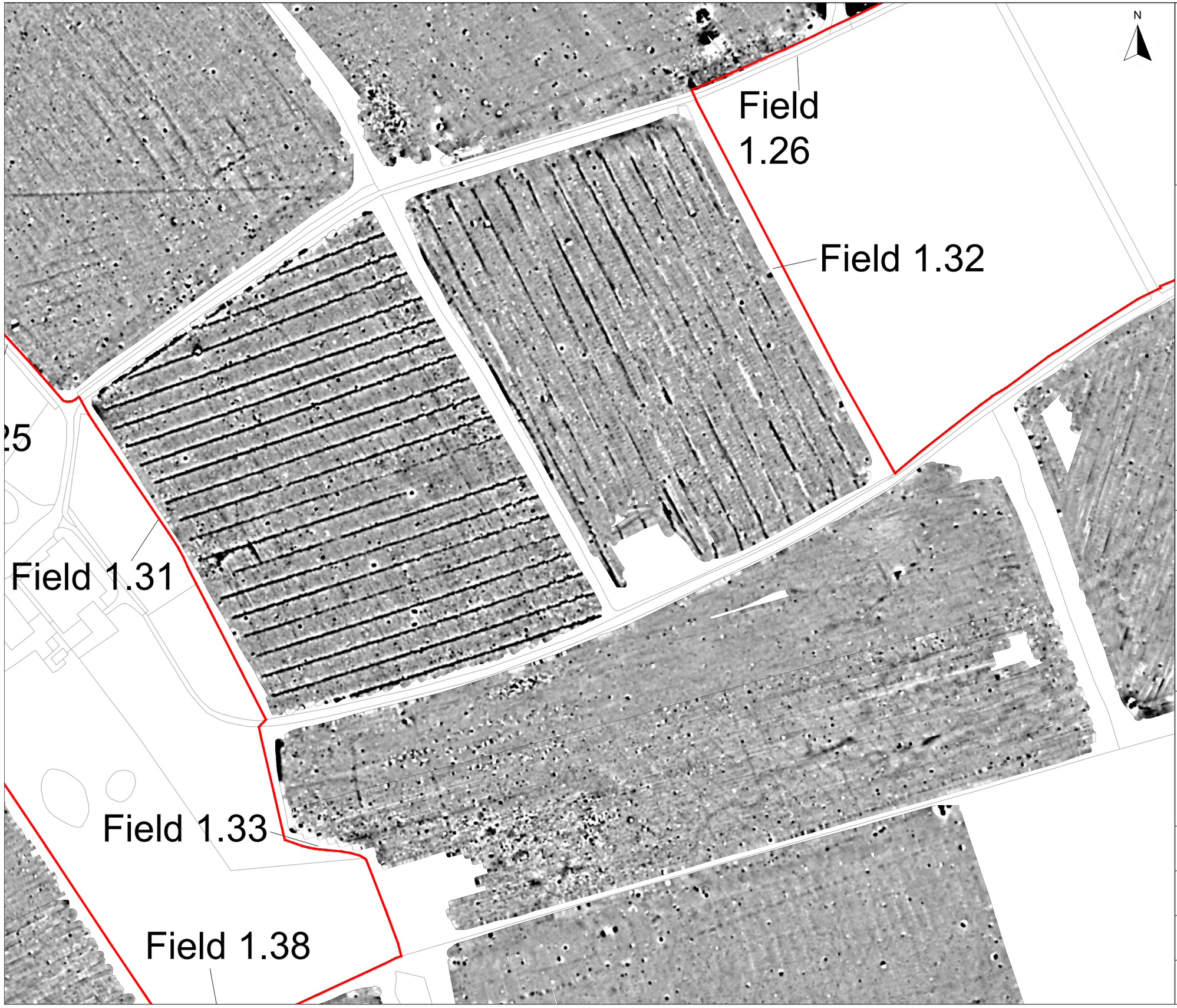
Title:
Magnetometer Survey - Interpretation
(Fields 1.30 & 1.38)

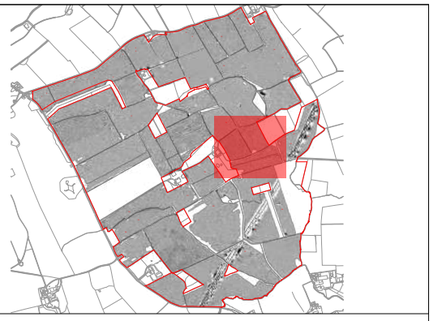
Client:
Island Green Power UK Limited

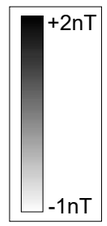
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
38







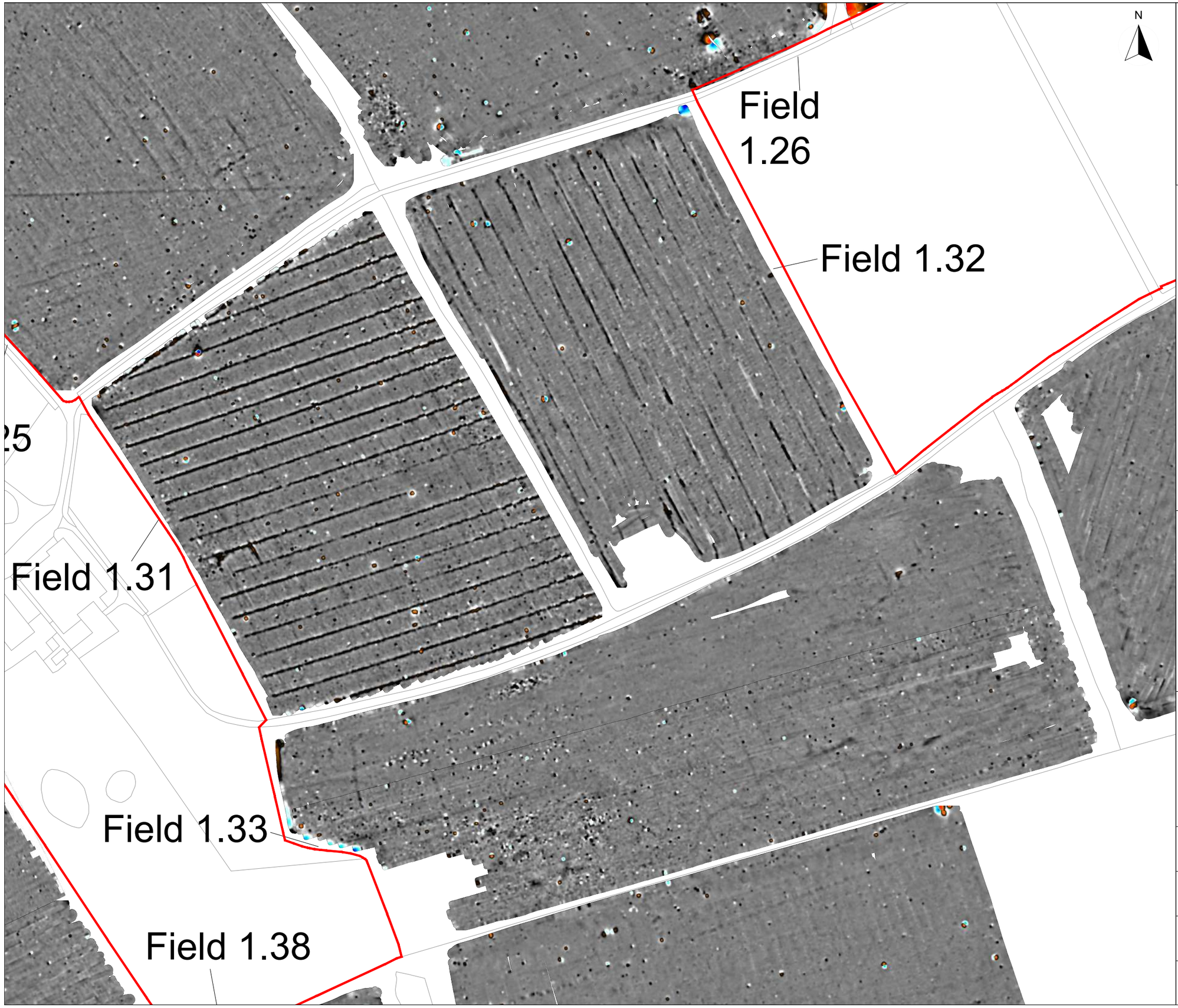
Title:
Magnetometer Survey - Greyscale Plots
(Fields 1.31, 1.32 & 1.33)

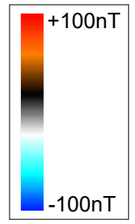
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
39





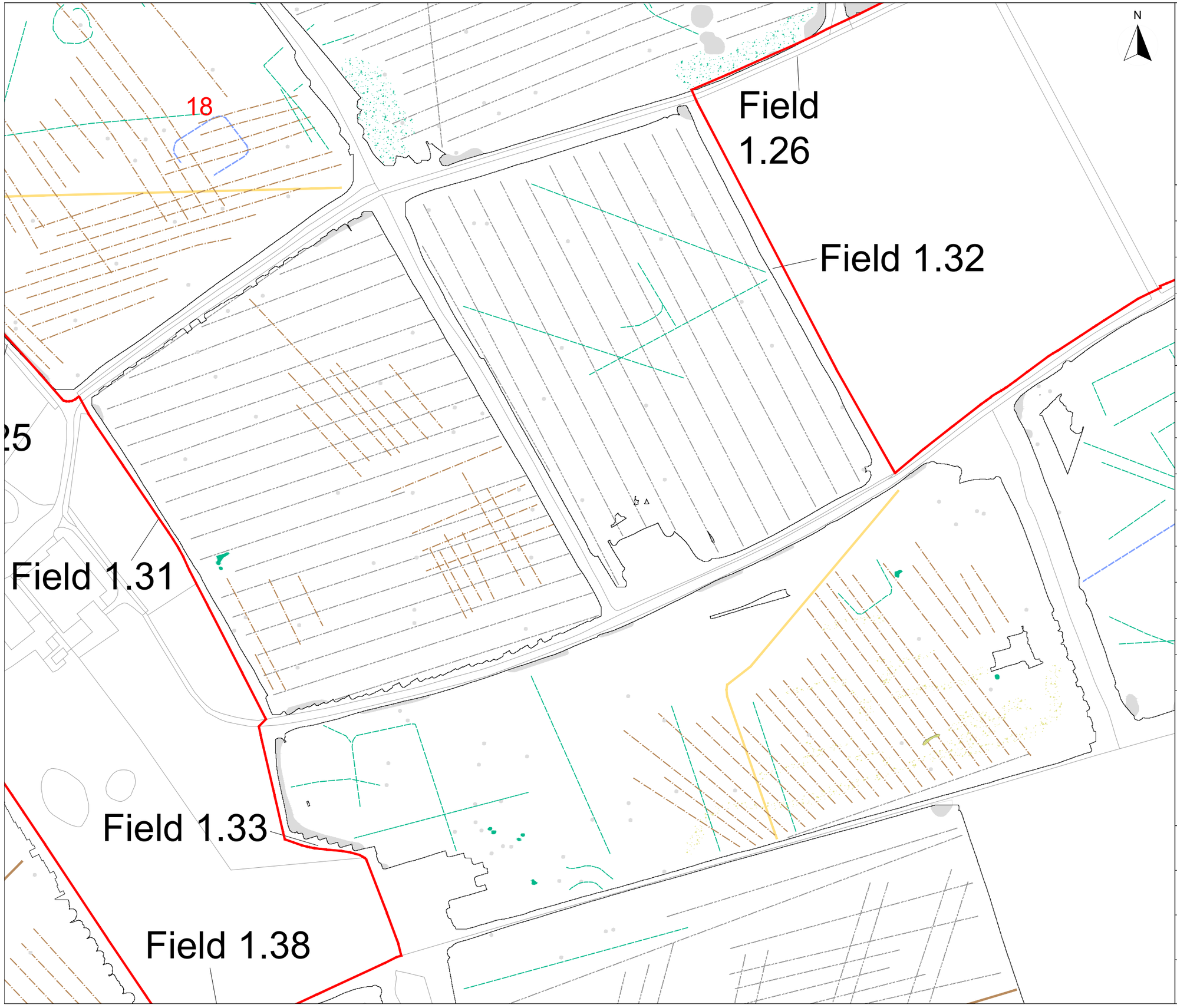
Title:
Magnetometer Survey - Colour Plots
(Fields 1.31, 1.32 & 1.33)

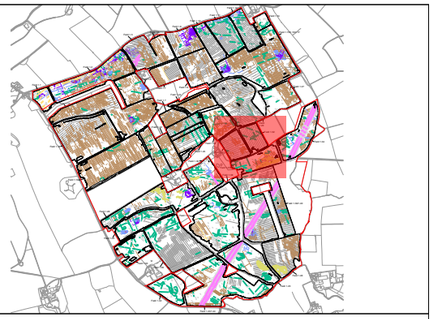
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
40





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
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	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

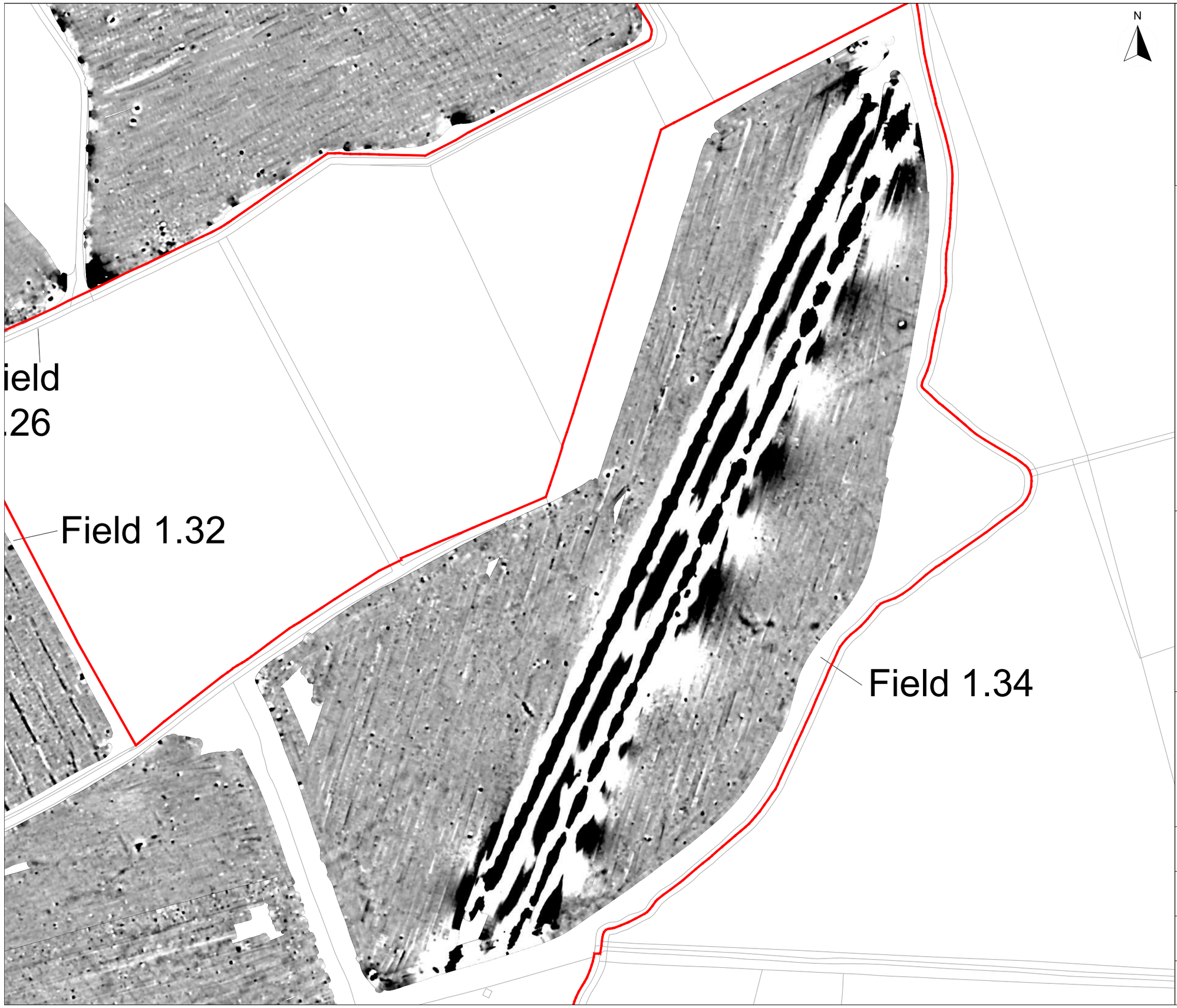
Title:
Magnetometer Survey - Interpretation
(Fields 1.31, 1.32 & 1.33)

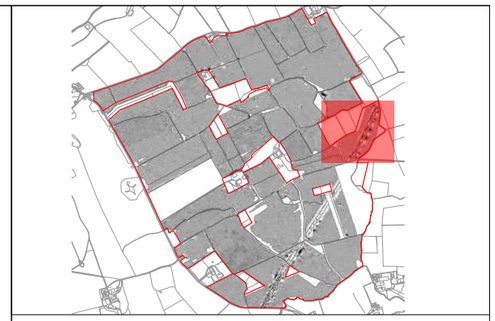
Client:
Island Green Power UK Limited

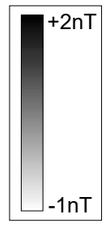
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
41







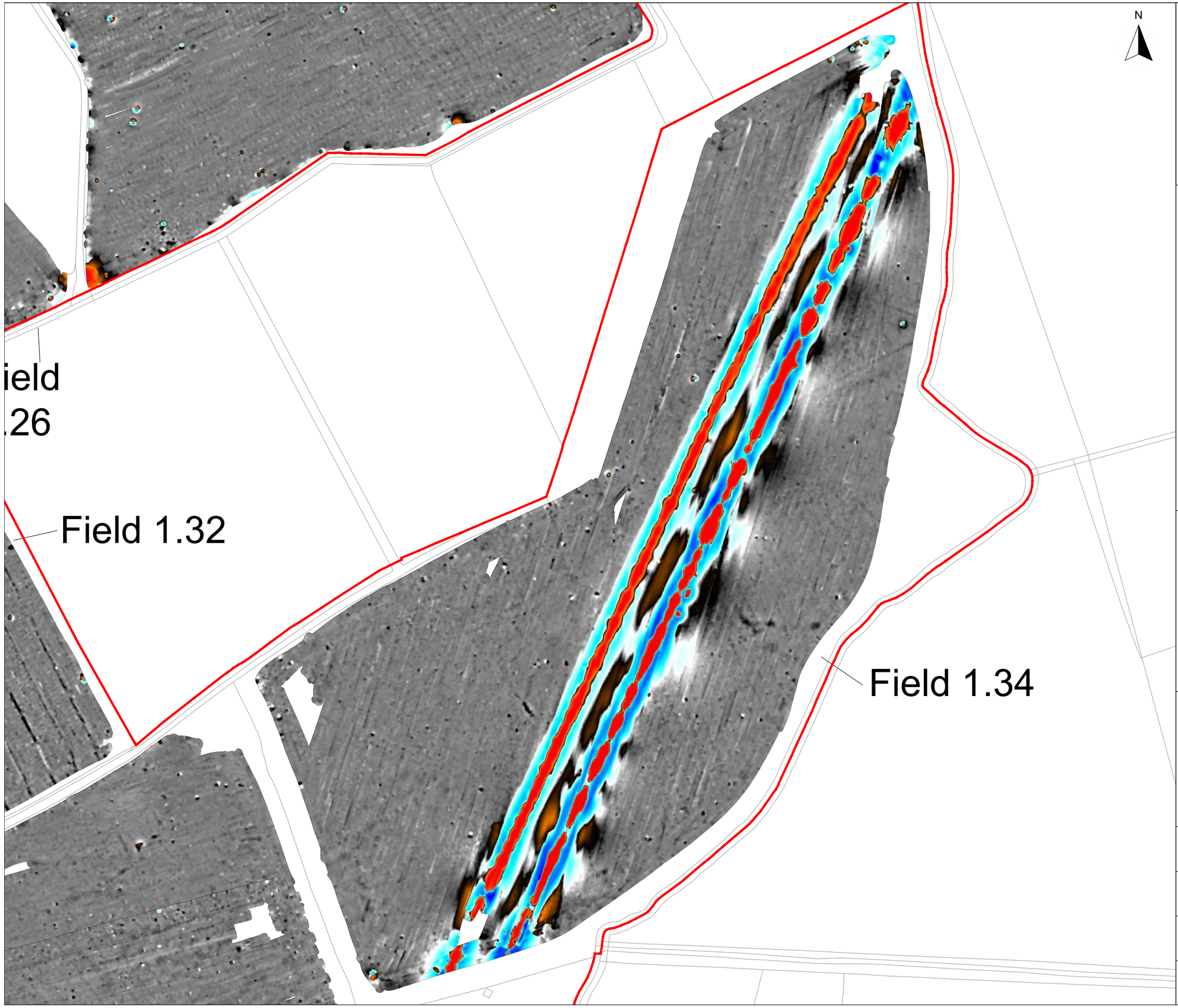
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.34)

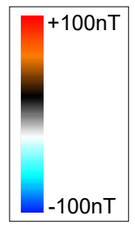
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
42





sumo GeoSurveys

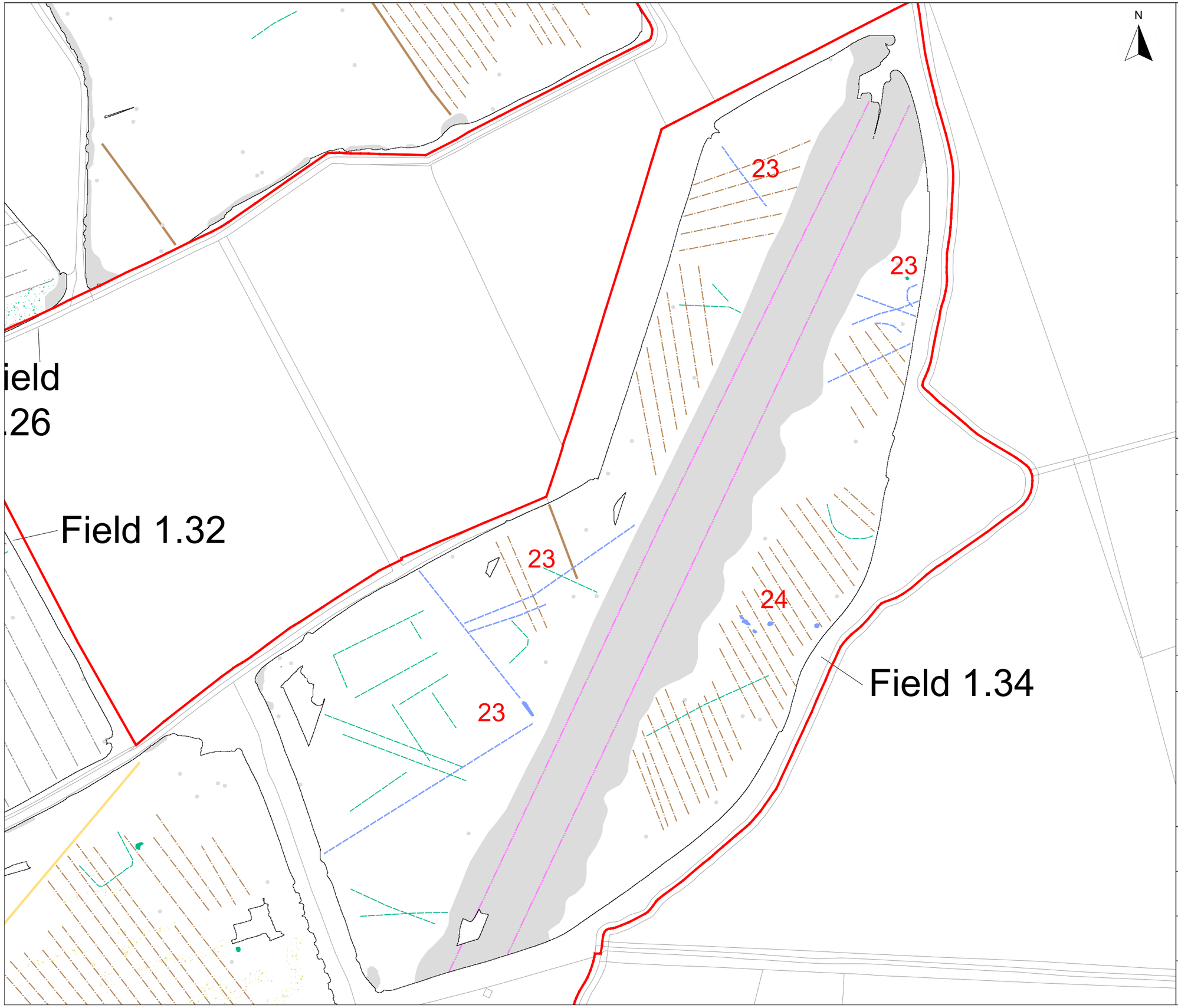
Title:
Magnetometer Survey - Colour Plots
(Field 1.34)

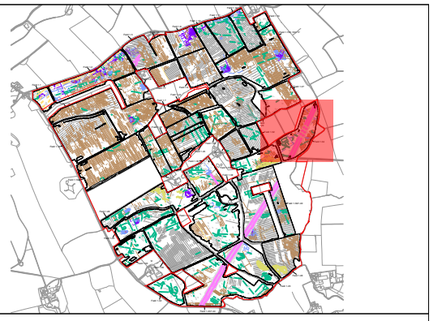
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
43





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

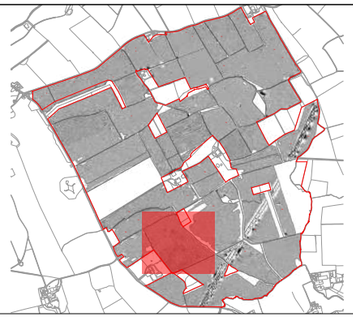
Title:
Magnetometer Survey - Interpretation
(Field 1.34)

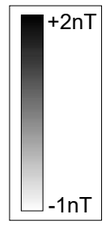
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
44





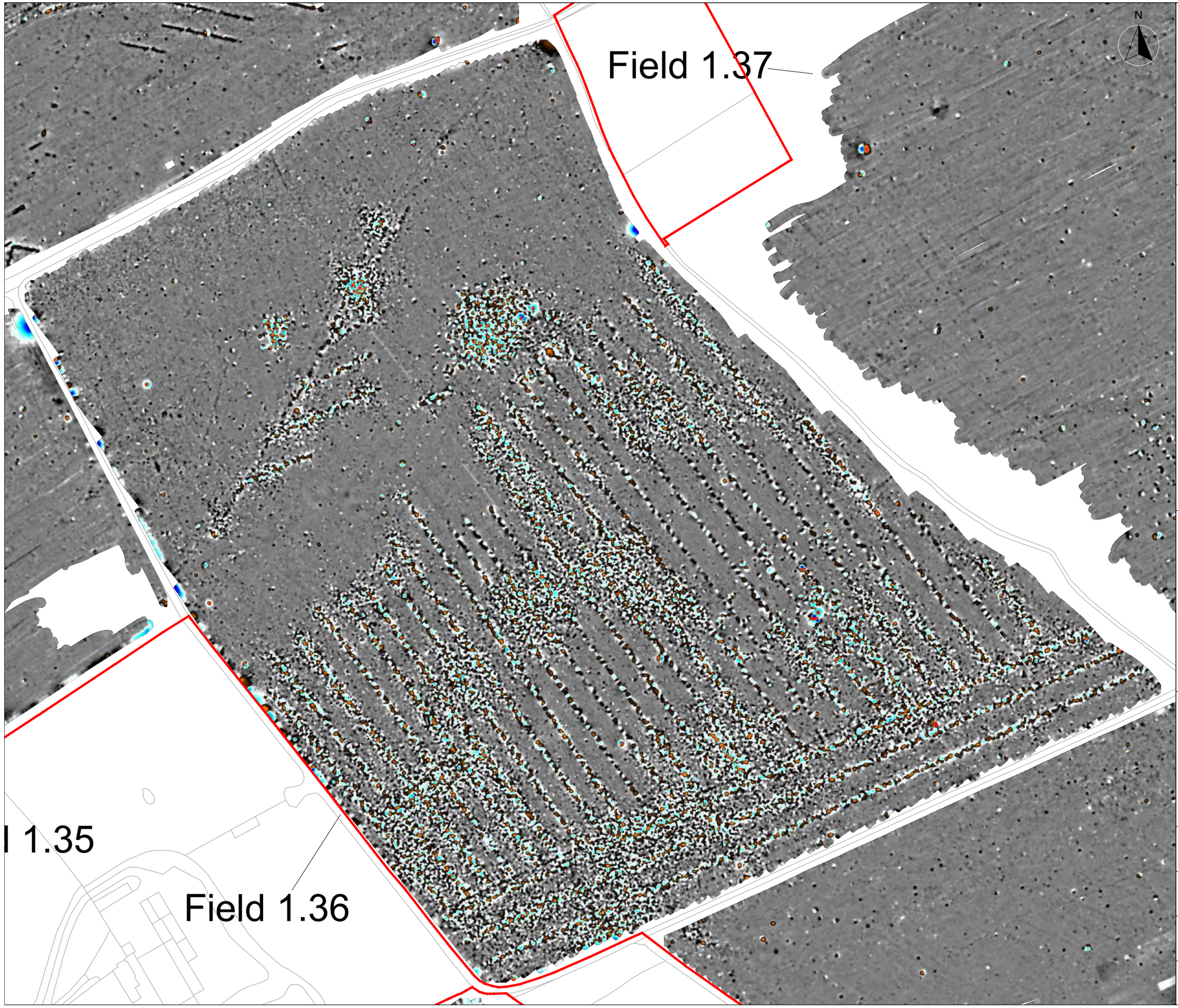
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.36)

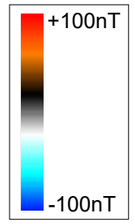
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
45





sumo GeoSurveys

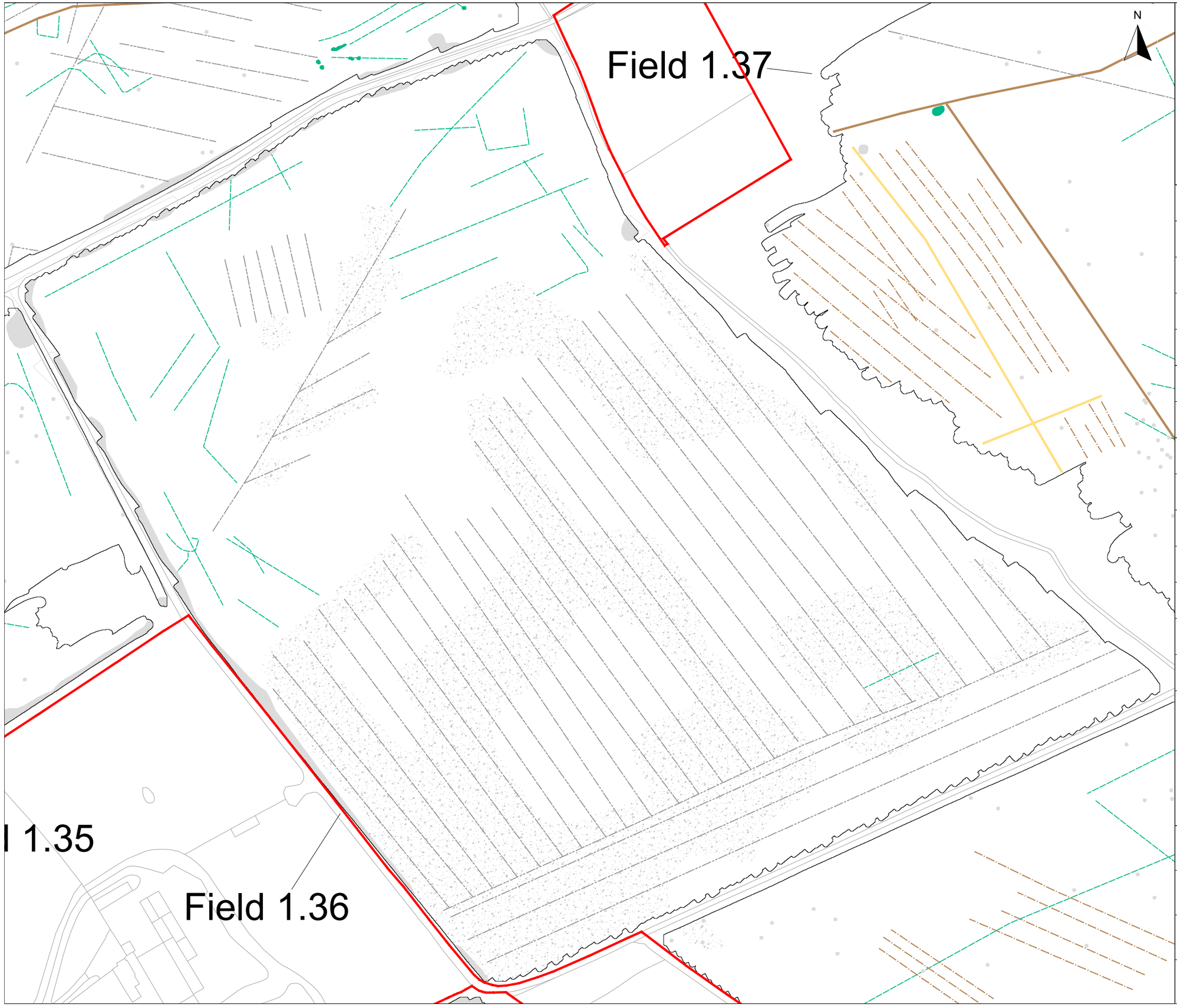
Title:
Magnetometer Survey - Colour Plots
(Field 1.36)

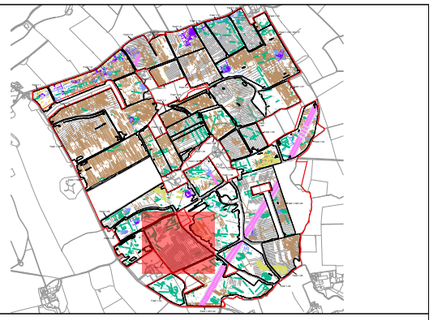
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
46





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
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	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

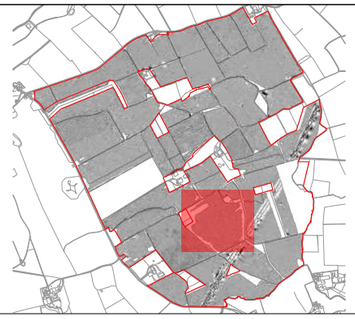
Title:
Magnetometer Survey - Interpretation
(Field 1.36)

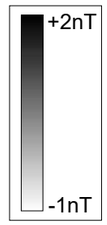
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
47





sumo GeoSurveys

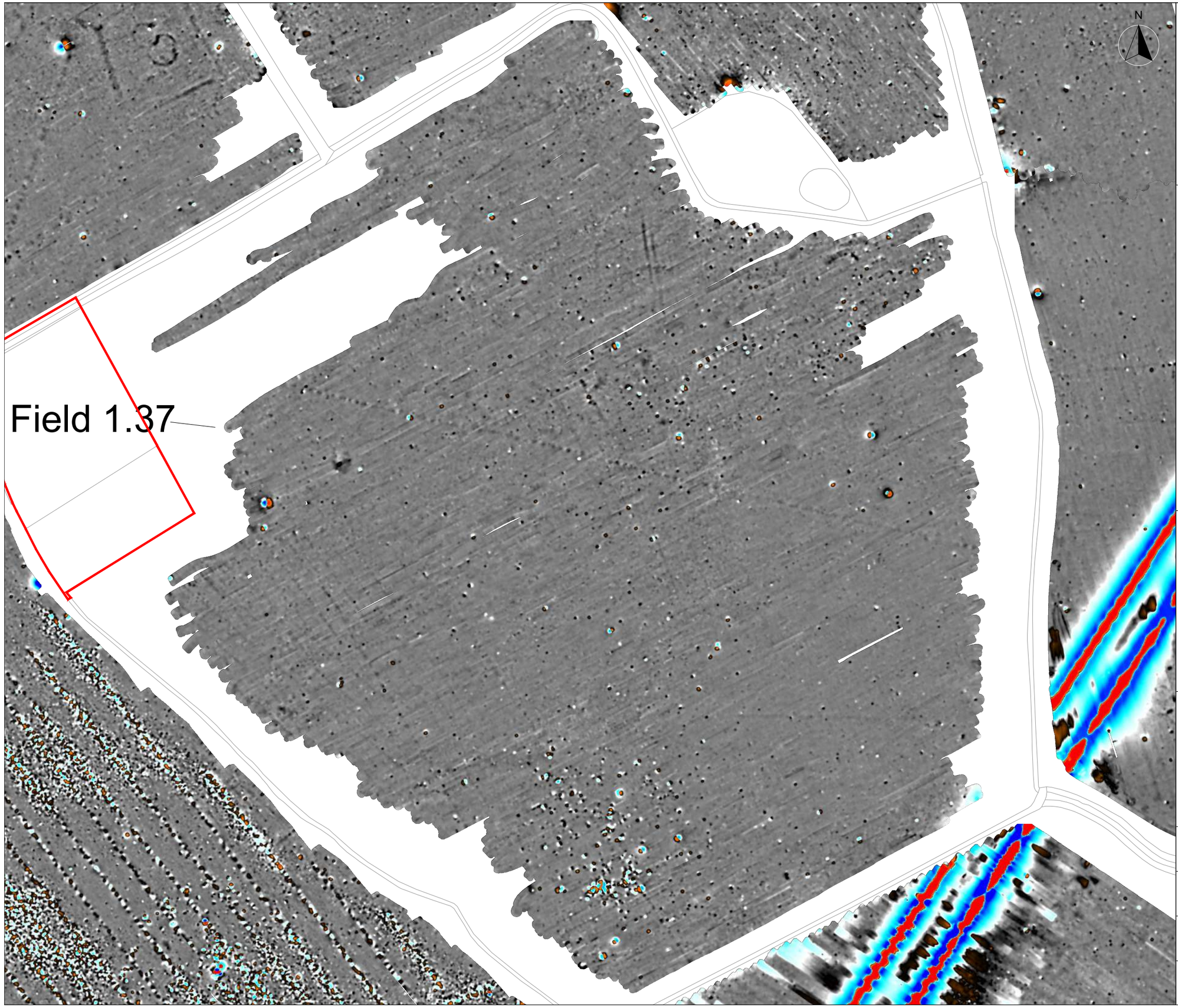
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.37)

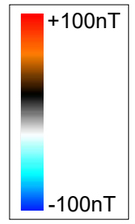
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
48





sumo GeoSurveys

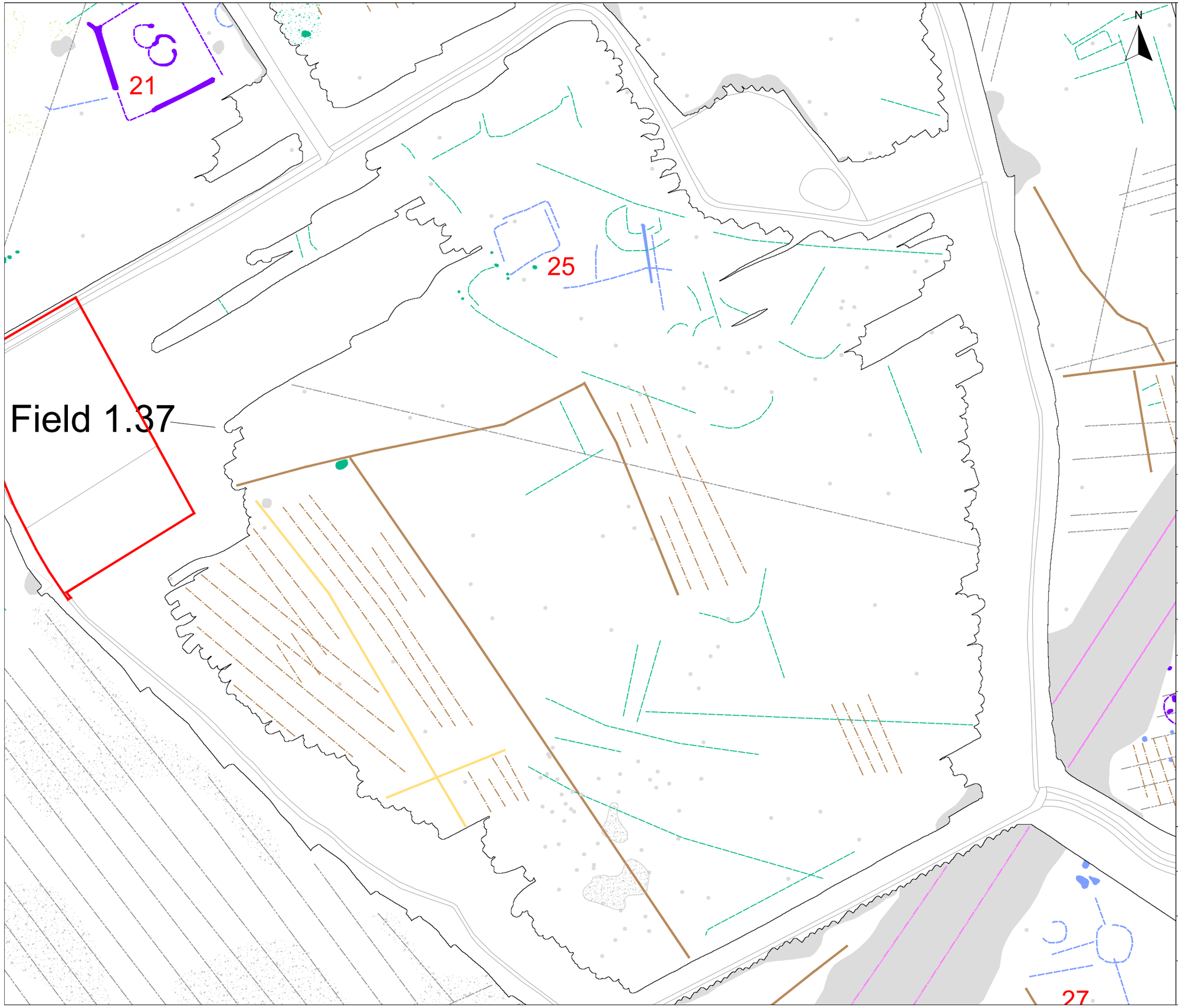
Title:
Magnetometer Survey - Colour Plots
(Field 1.37)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
49



KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
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	Former field boundary (conjectural)
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	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

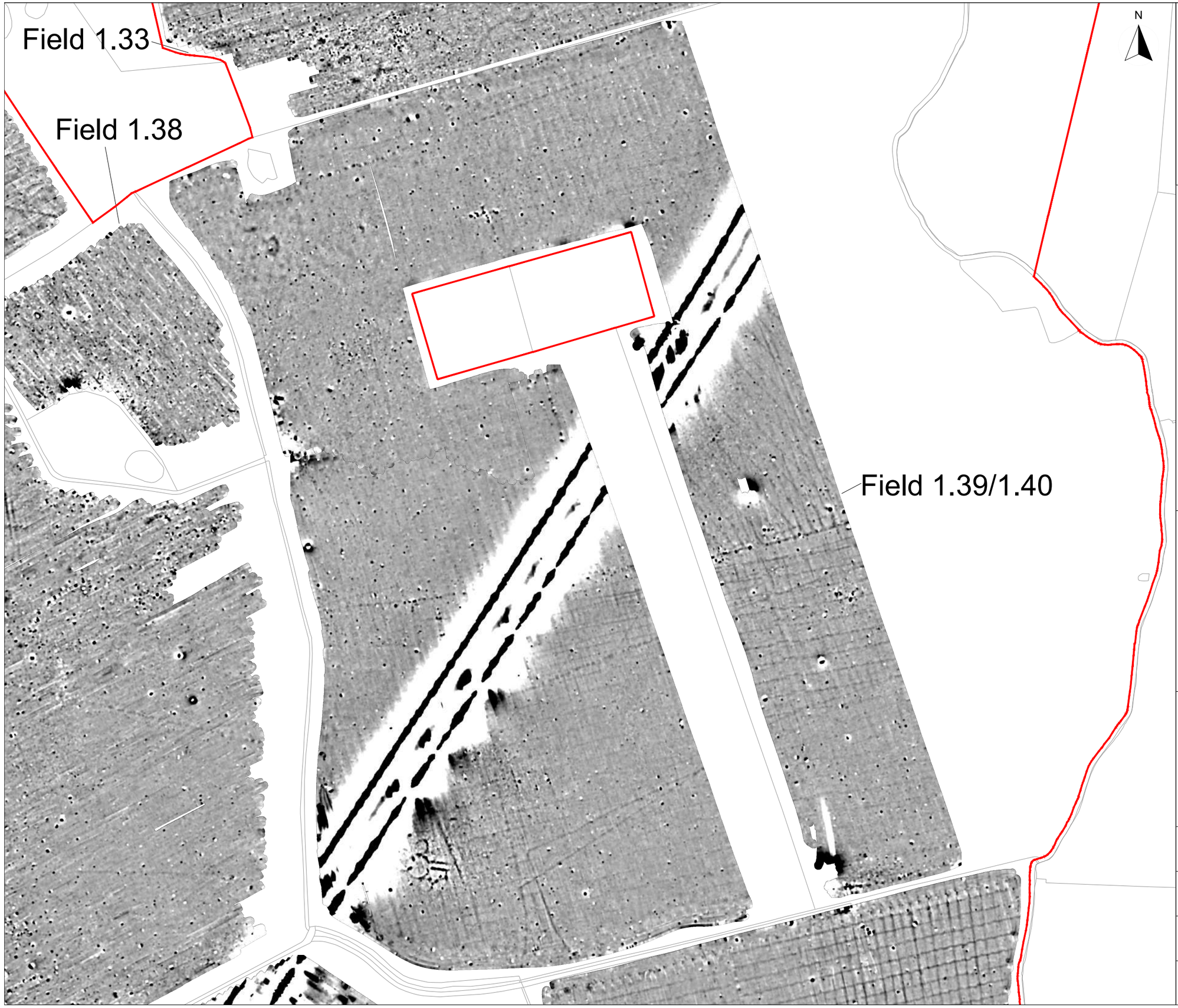
Title:
Magnetometer Survey - Interpretation
(Field 1.37)

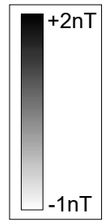
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
50





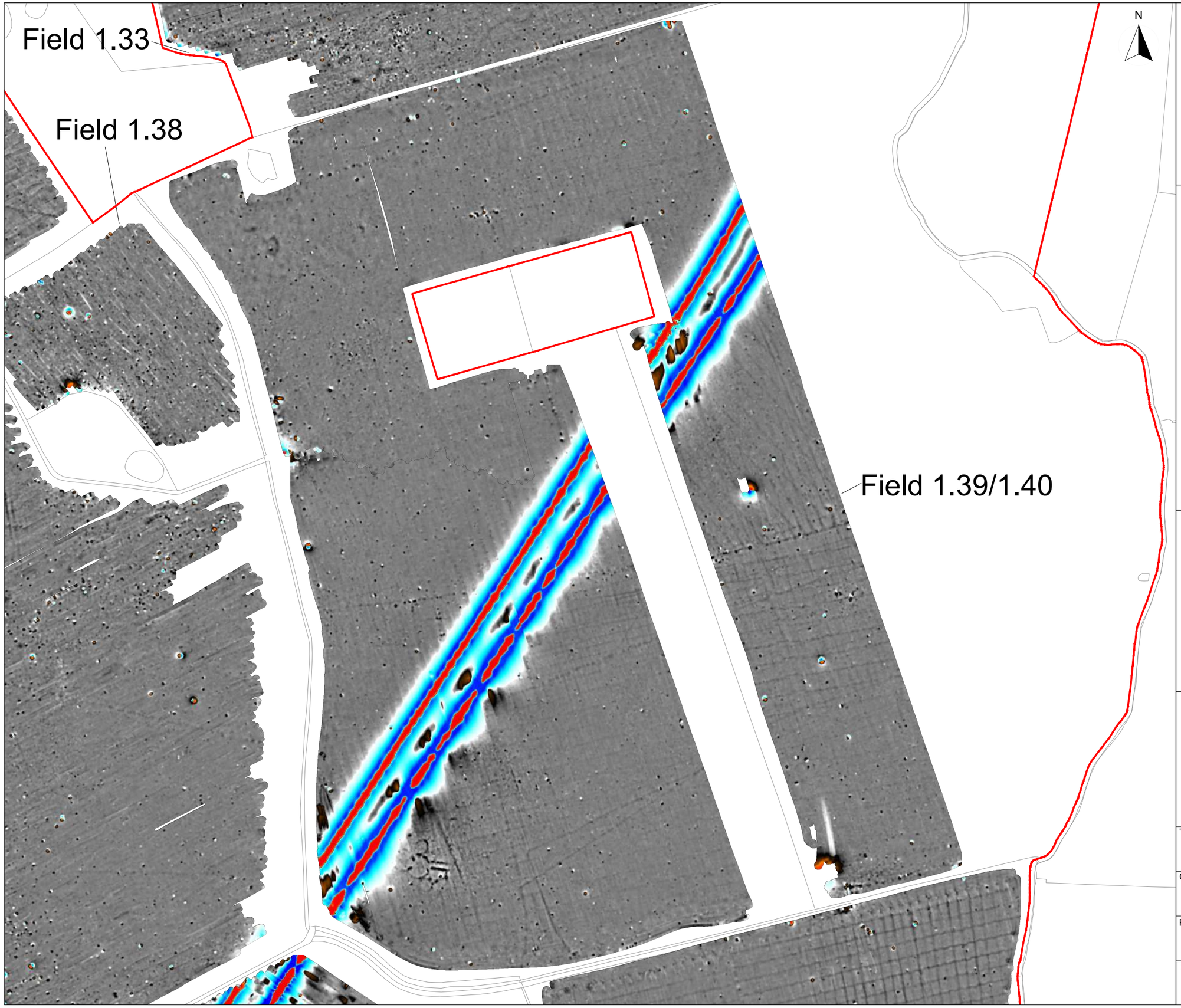
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.39/1.40)

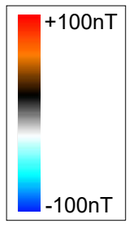
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
51





sumo GeoSurveys

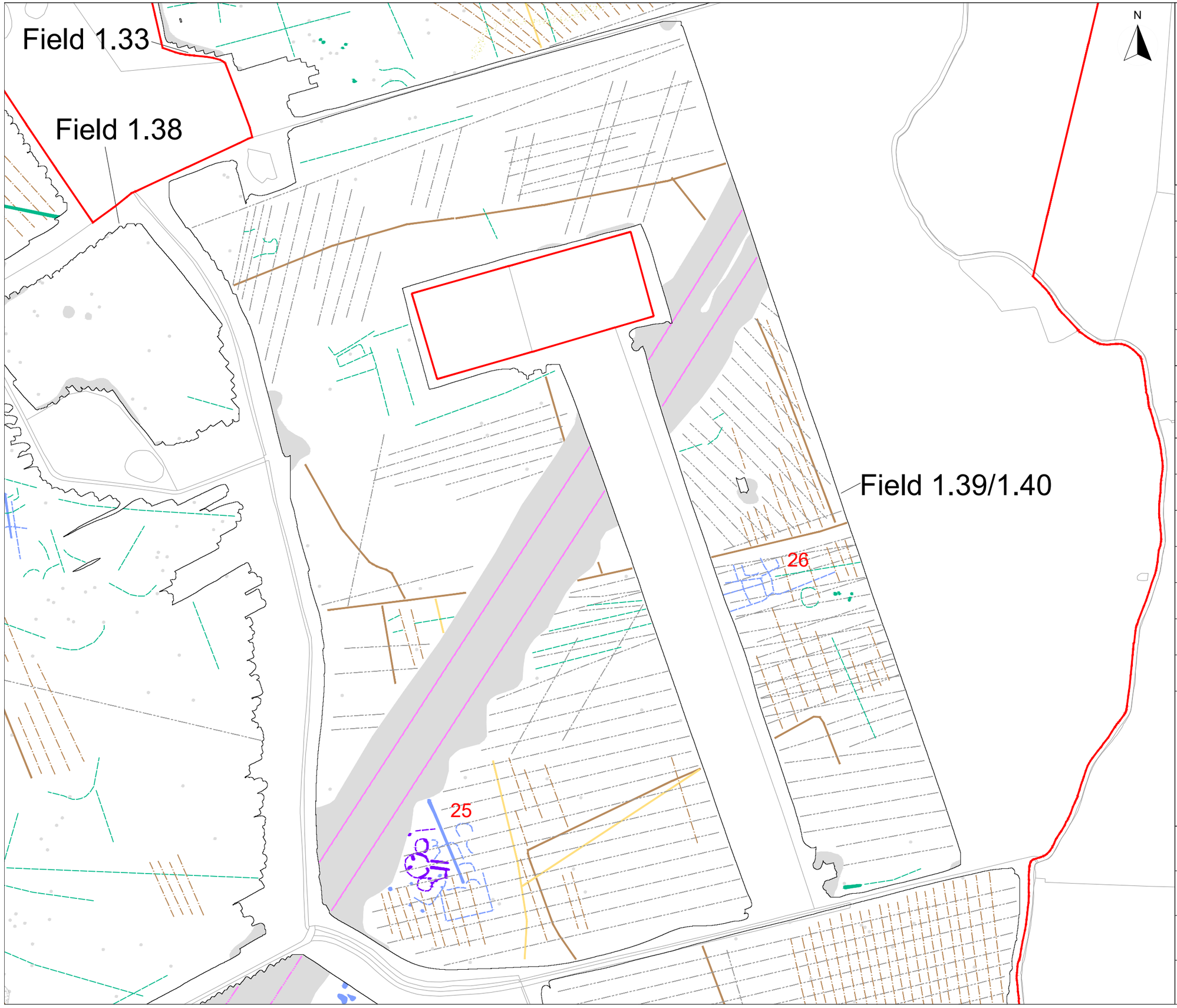
Title:
Magnetometer Survey - Colour Plots
(Field 1.39/1.40)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
52



KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

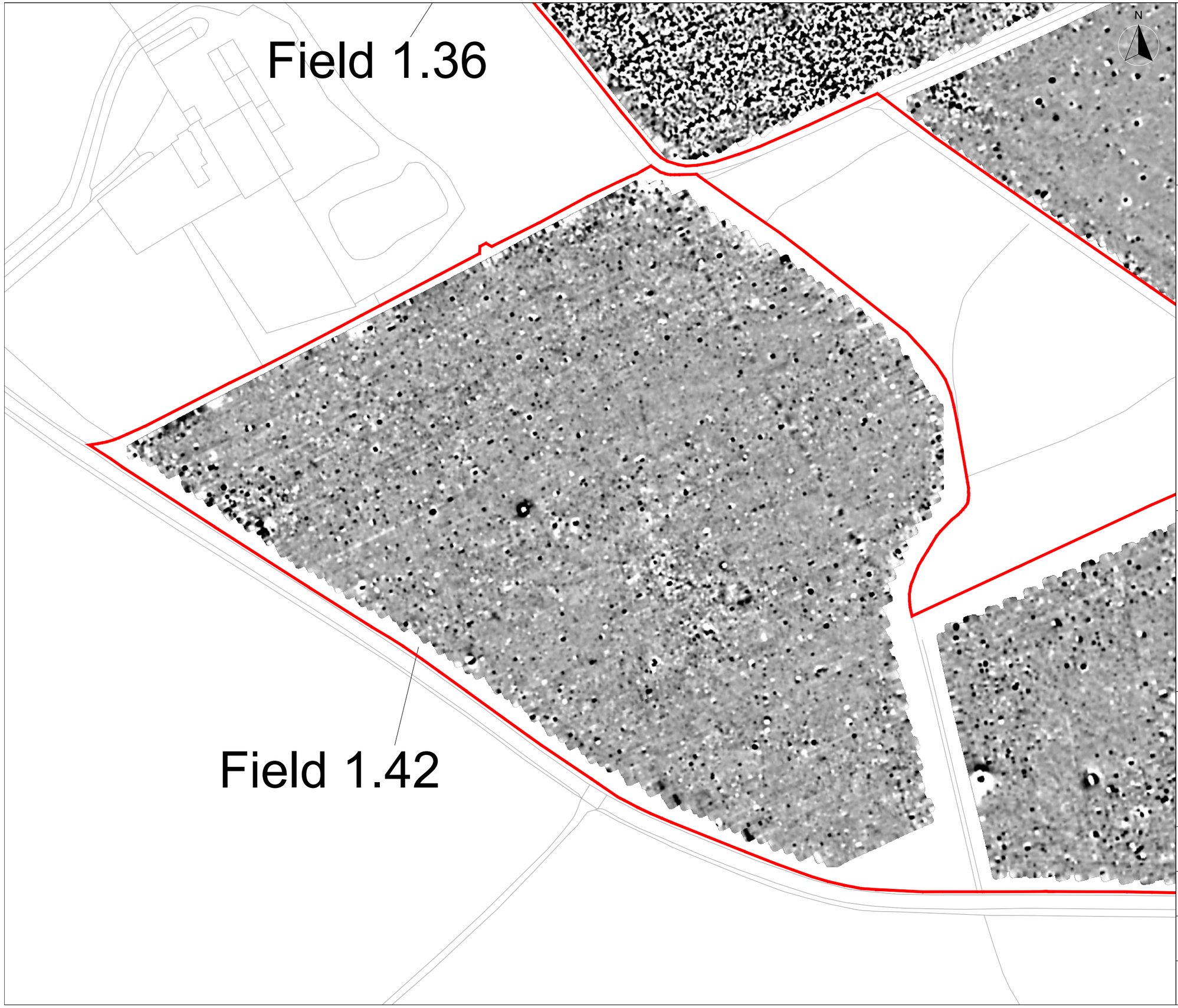
Title:
Magnetometer Survey - Interpretation
(Field 1.39/1.40)

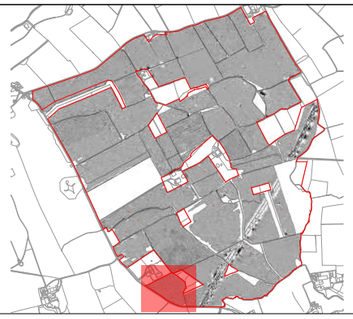
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
53





+2nT

-1nT

sumo GeoSurveys

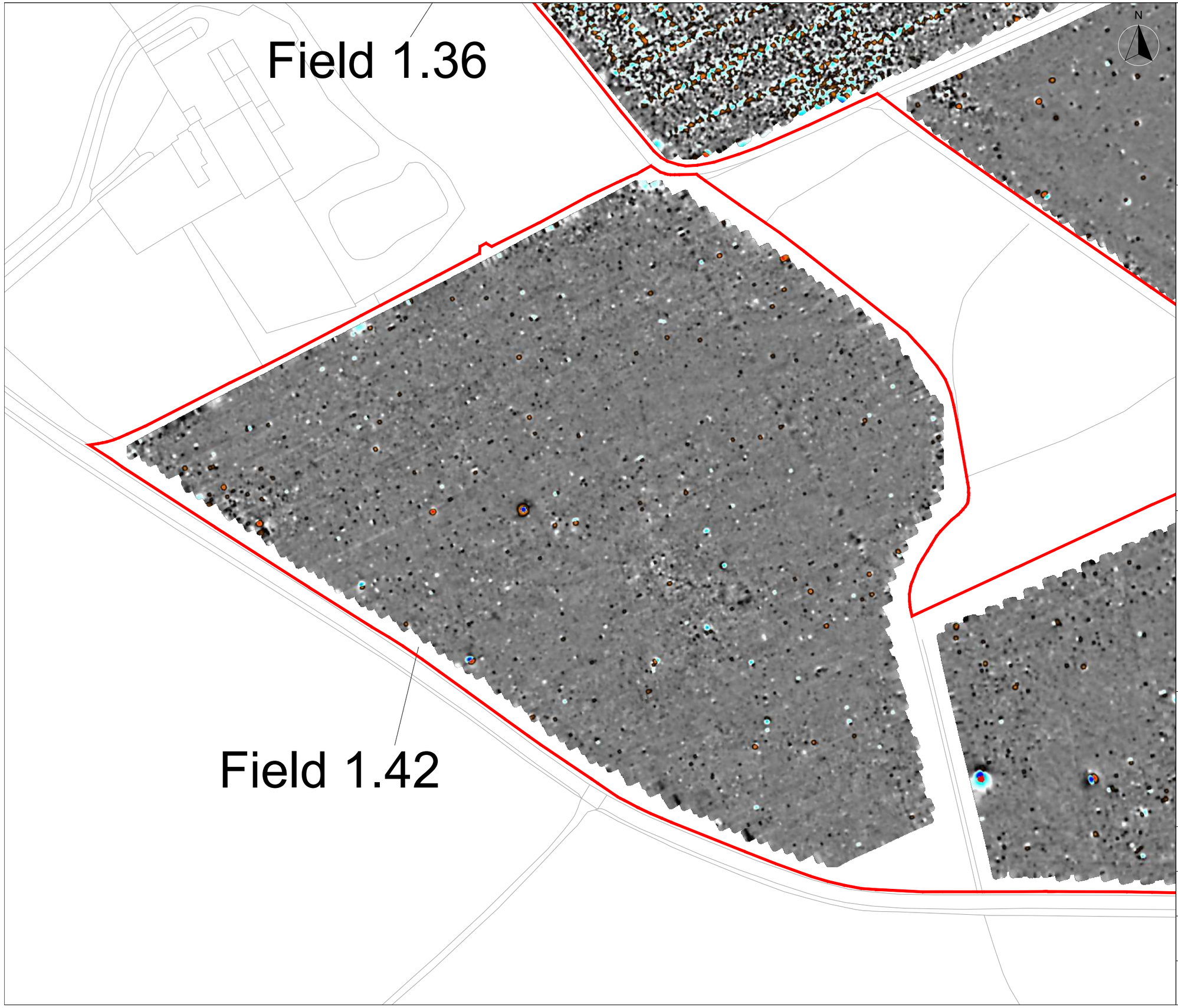
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.42)

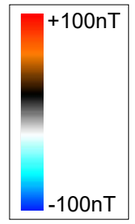
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
54





sumo GeoSurveys

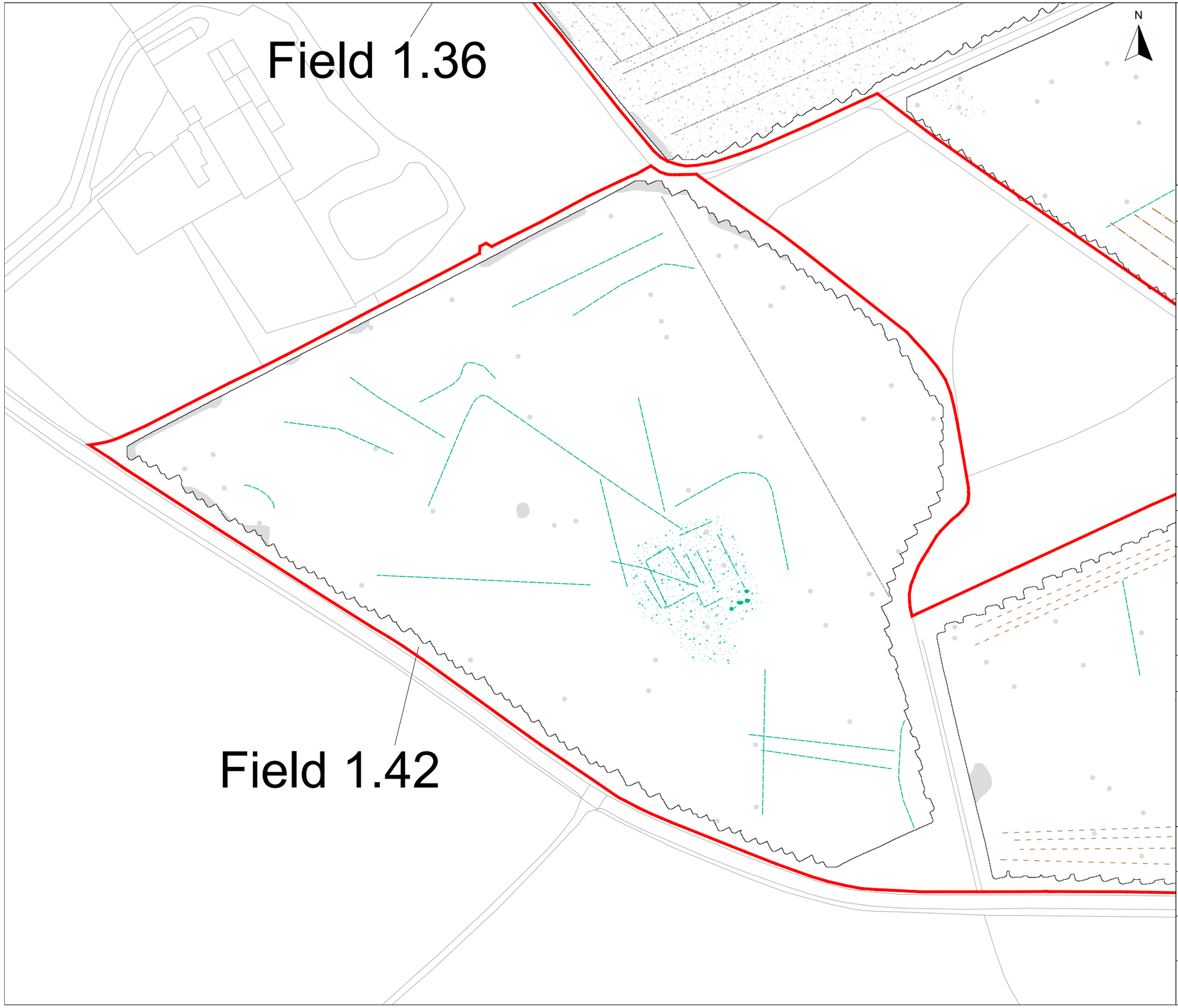
Title:
Magnetometer Survey - Colour Plots
(Field 1.39/1.40)

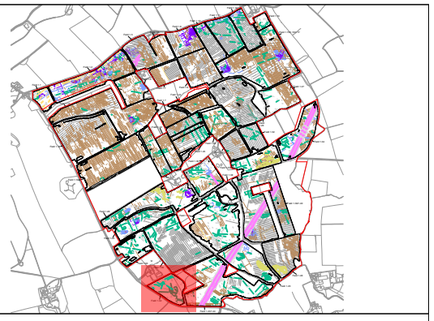
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
55





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

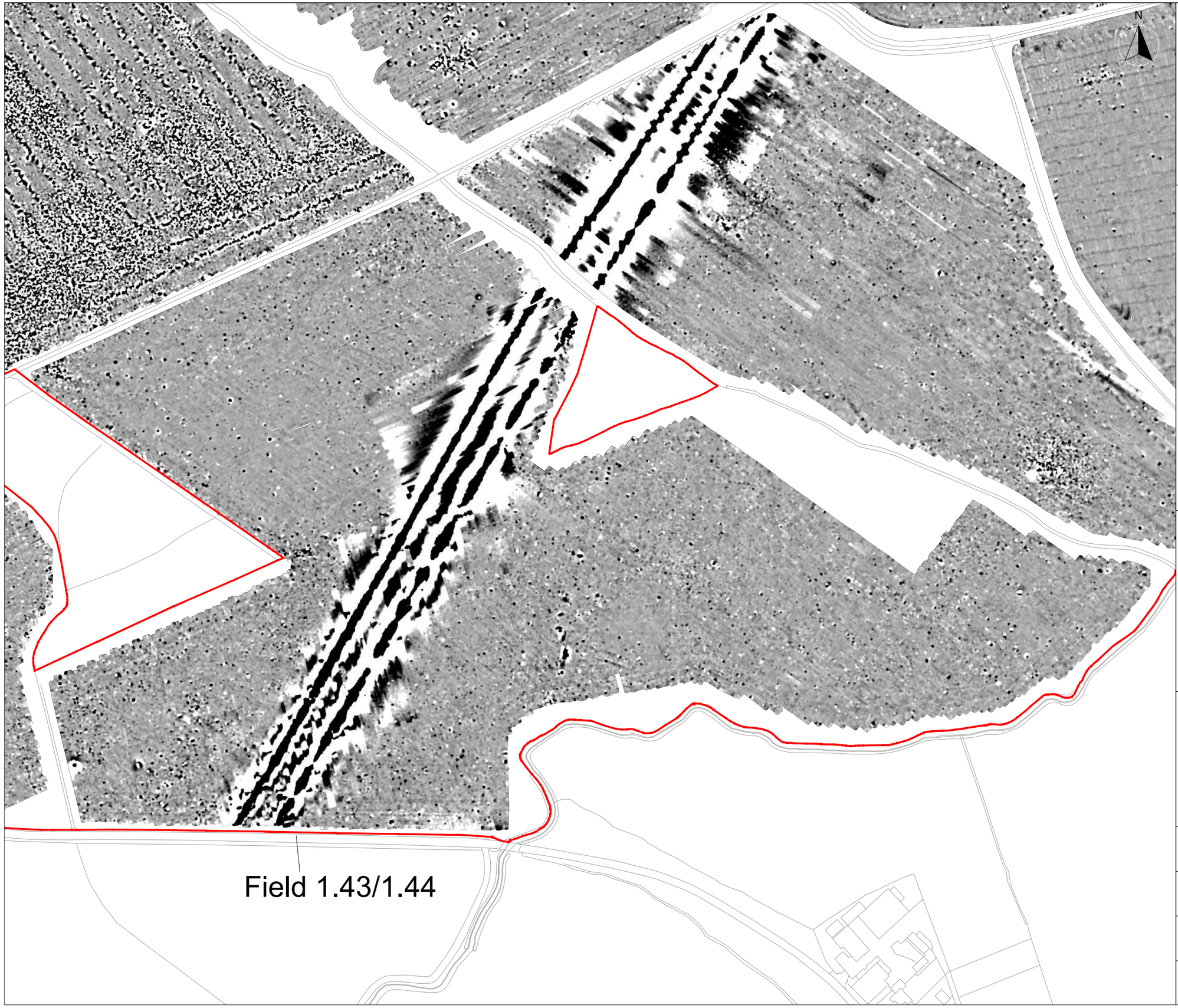
Title:
Magnetometer Survey - Interpretation
(Field 1.39/1.40)

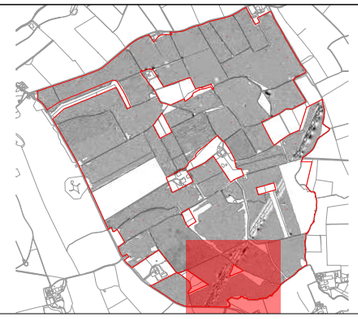
Client:
Island Green Power UK Limited

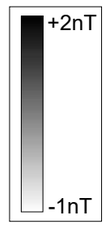
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
56







sumo GeoSurveys

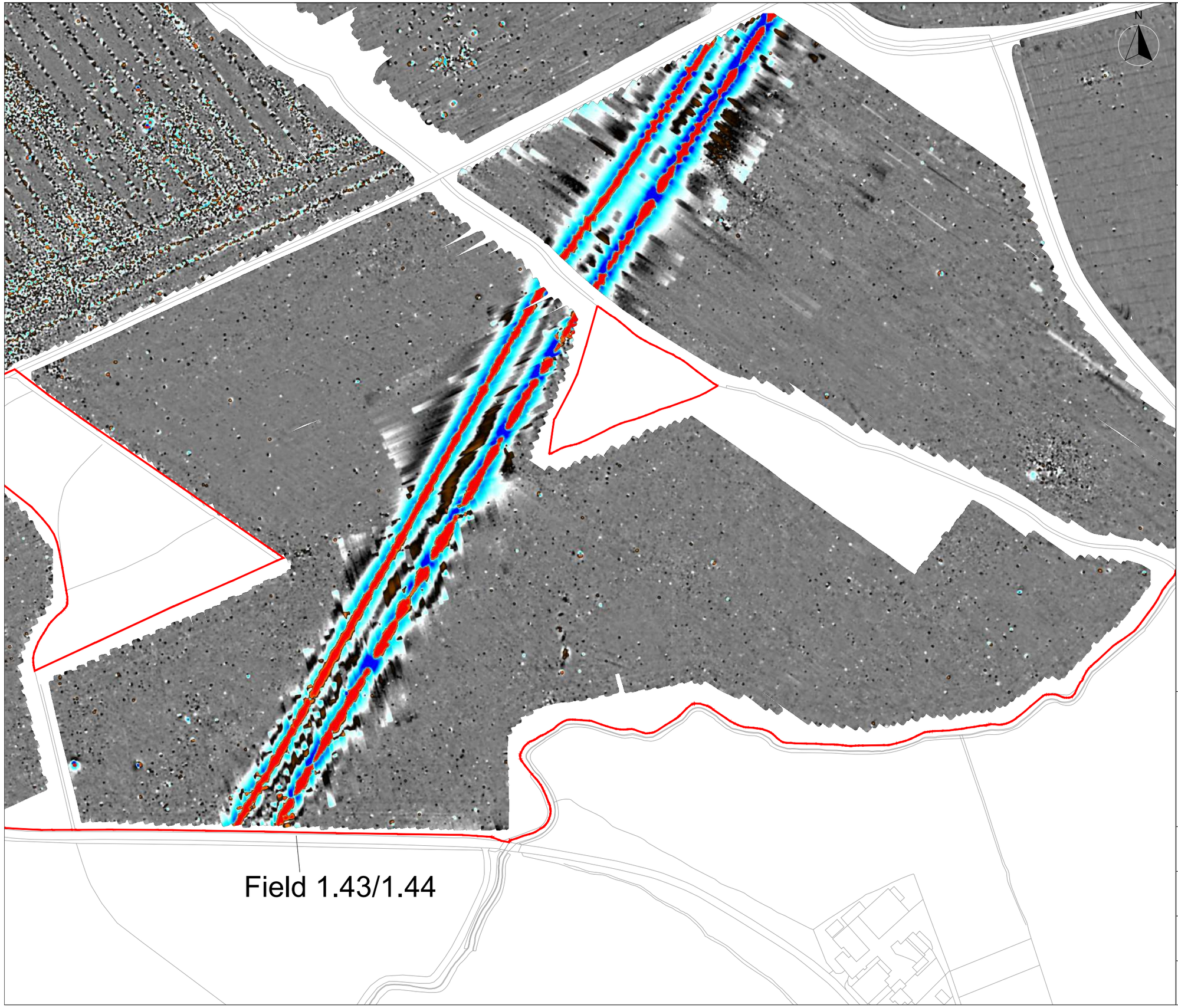
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.43/144)

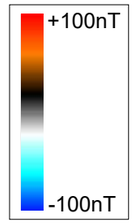
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
57





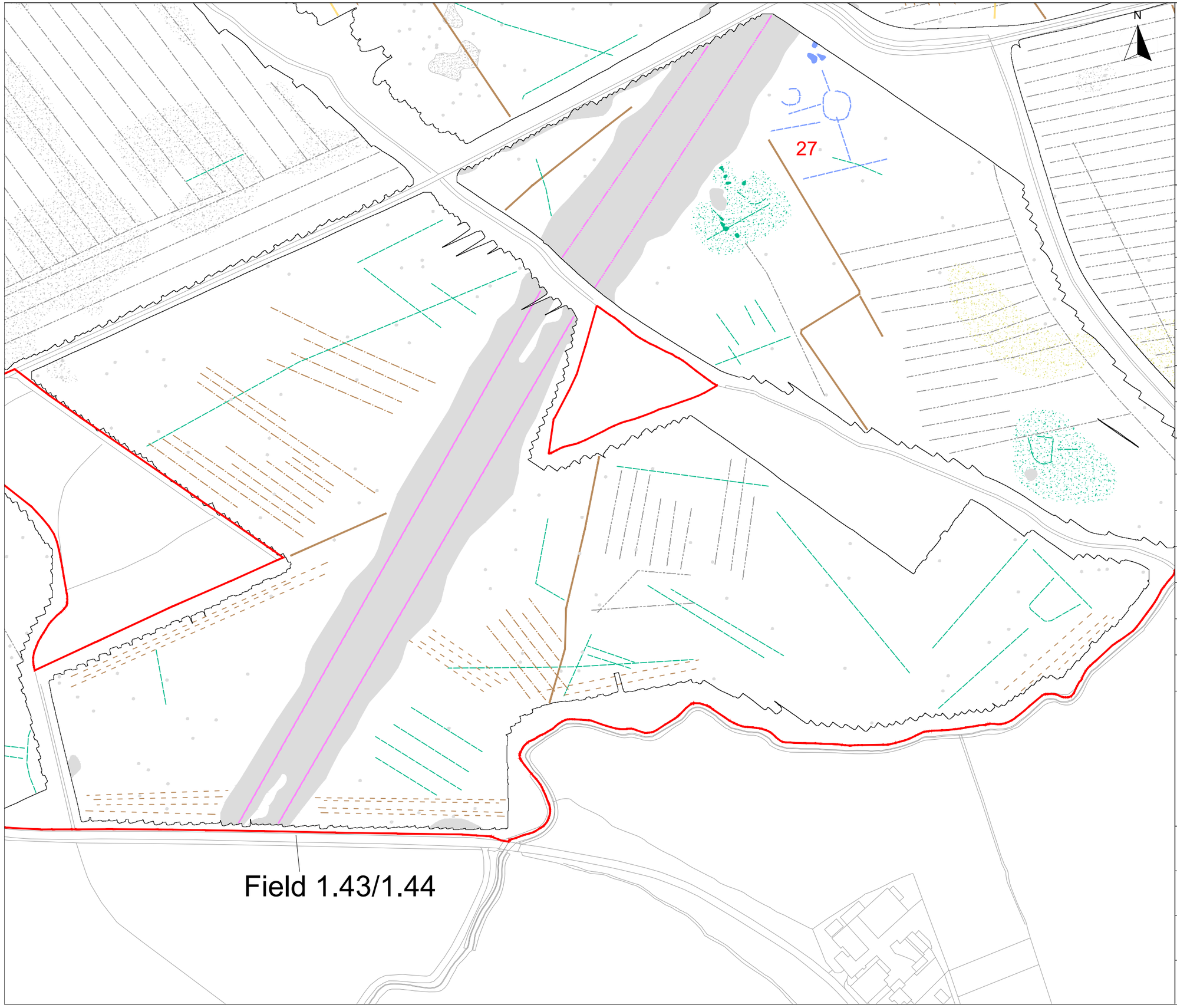
Title:
Magnetometer Survey - Colour Plots
(Field 1.43/144)

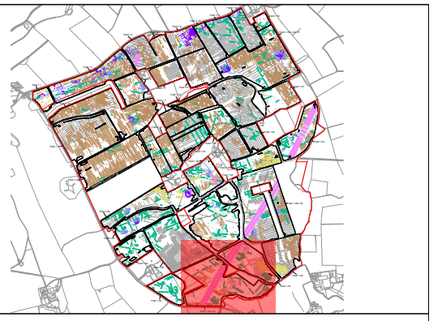
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
58





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

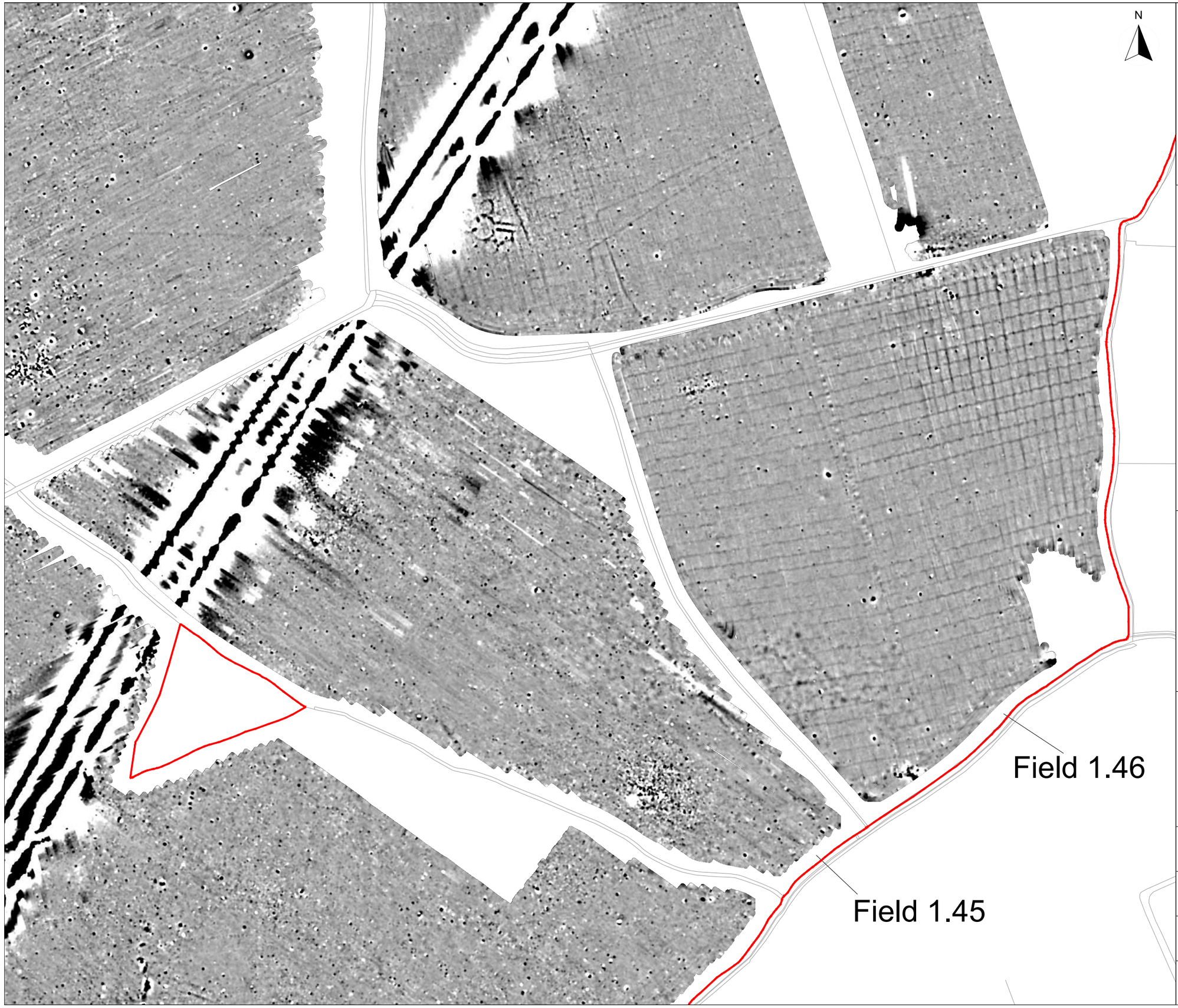
Title:
Magnetometer Survey - Interpretation
(Field 1.43/144)

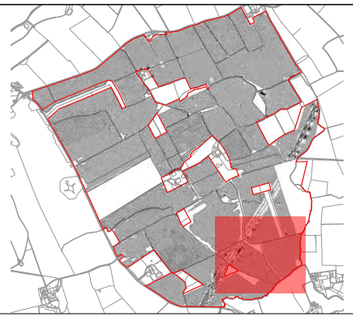
Client:
Island Green Power UK Limited

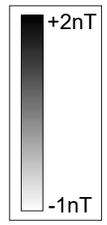
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
59







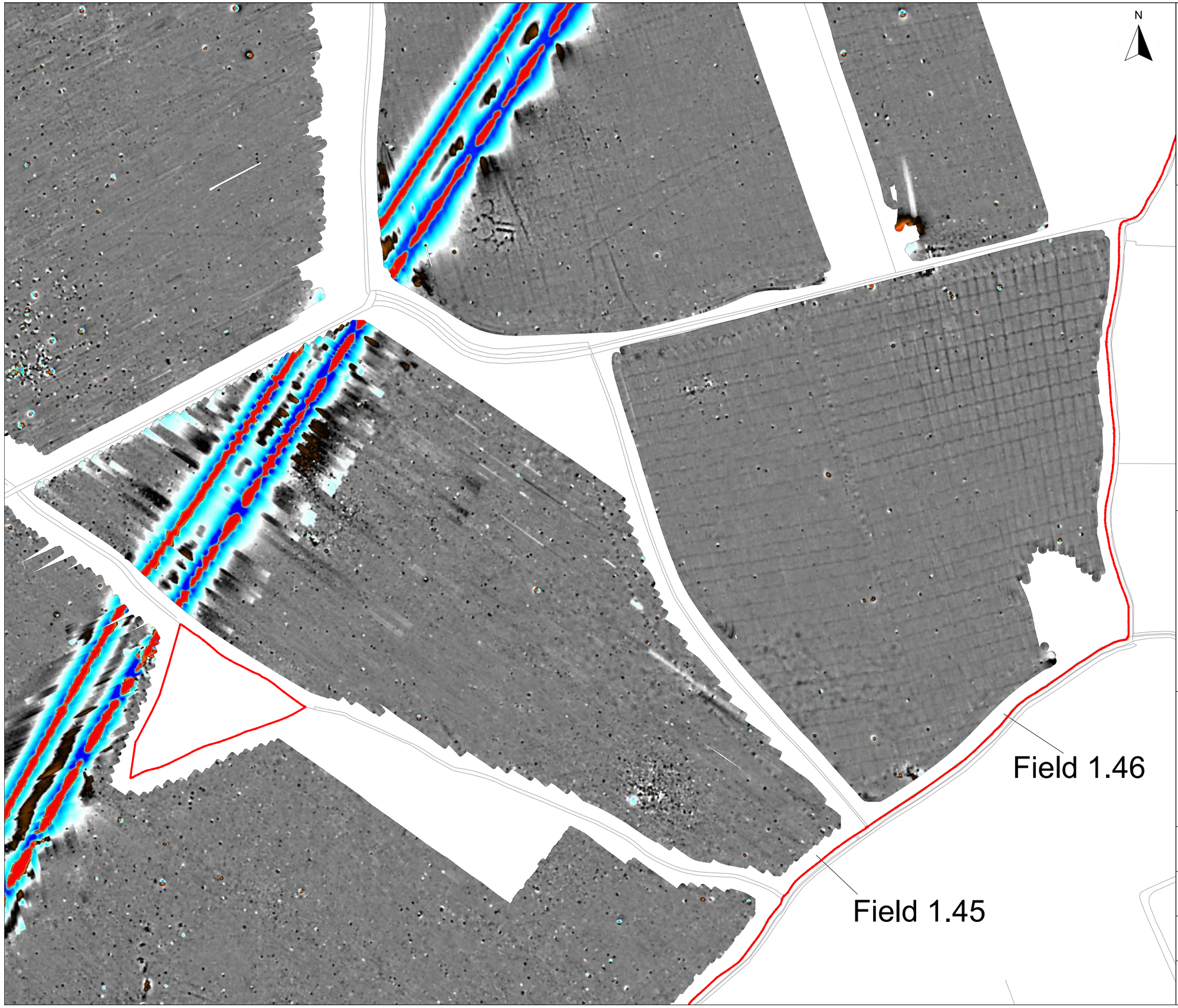
Title:
Magnetometer Survey - Greyscale Plots
(Field 1.45 & 1.46)

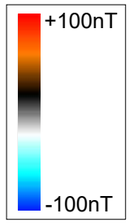
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
60





sumo GeoSurveys

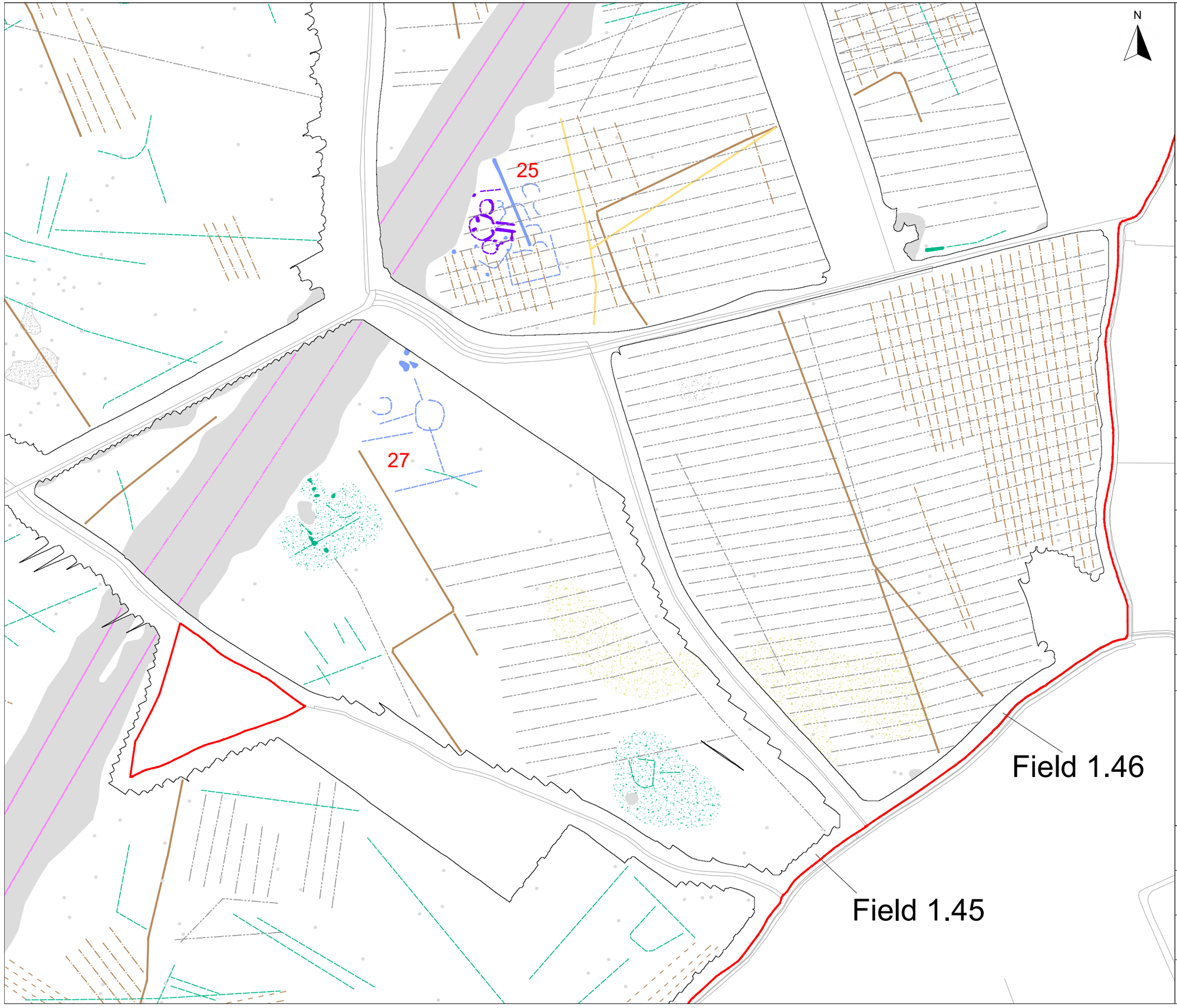
Title:
Magnetometer Survey - Colour Plots
(Field 1.43/144)

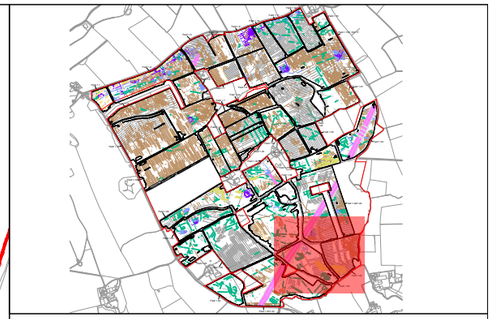
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
61





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

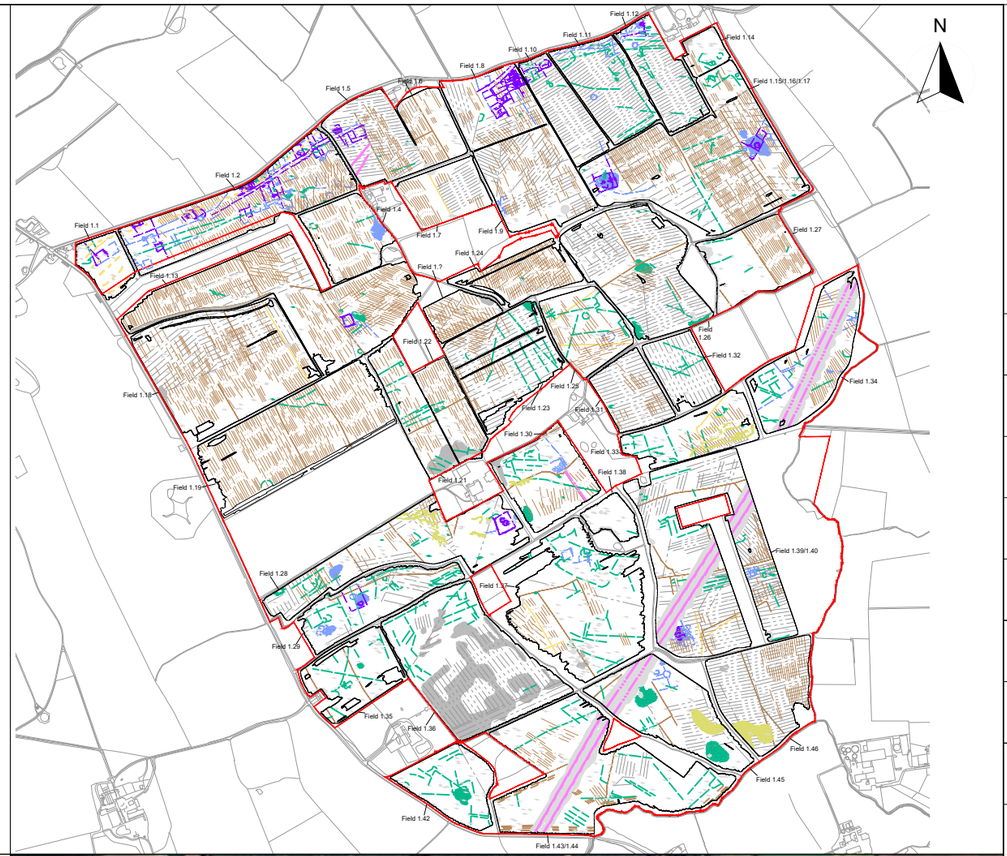
Title:
Magnetometer Survey - Interpretation
(Field 1.43/144)

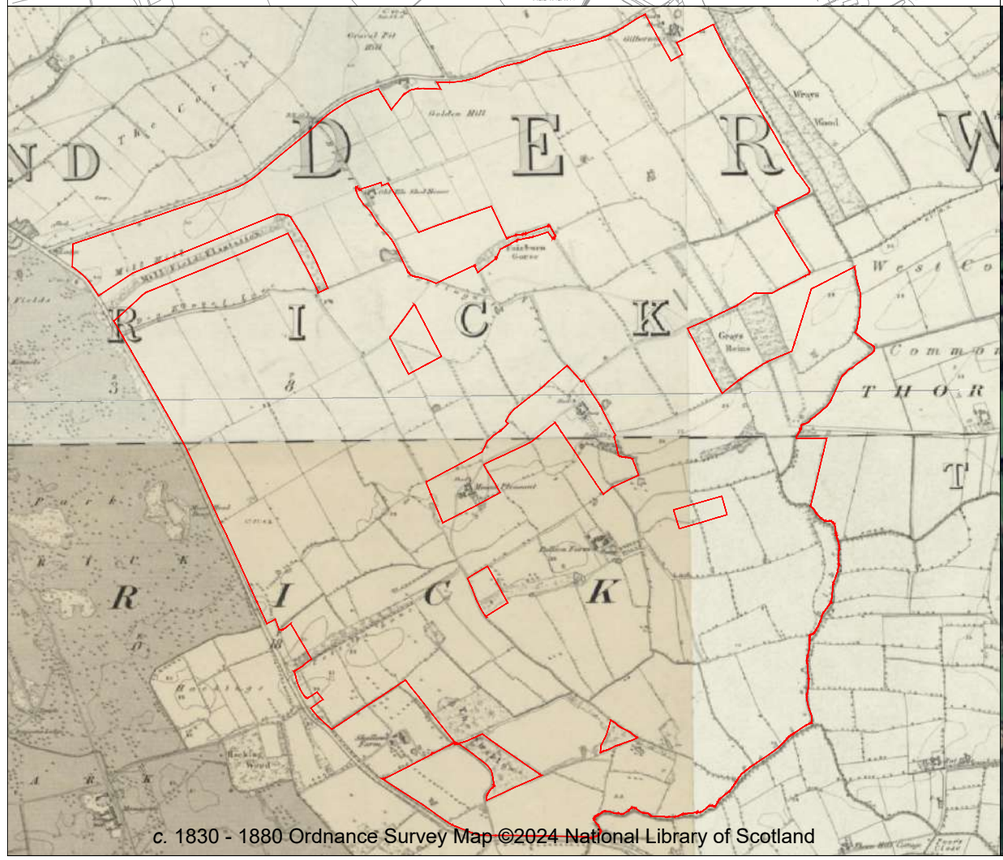
Client:
Island Green Power UK Limited

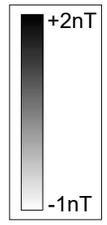
Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
62







KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

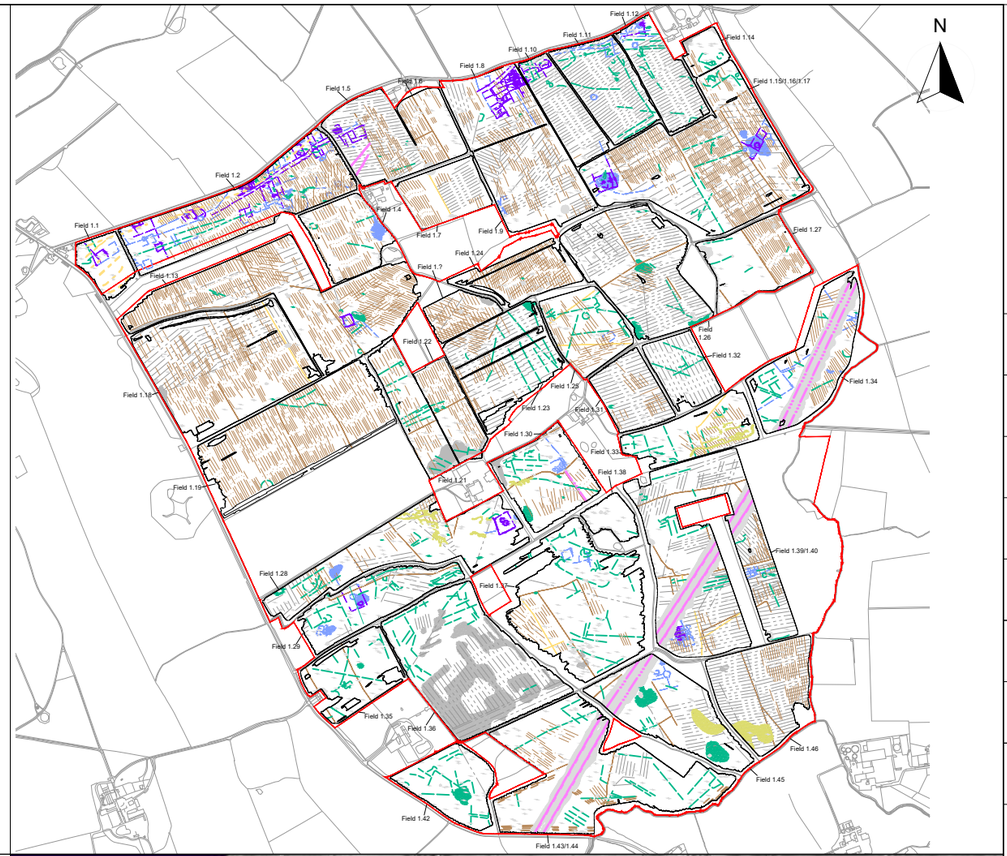
Title:
Greyscale Plots / Interpretation / 1830-1880 Ordnance Survey Map / 2023 Aerial Image

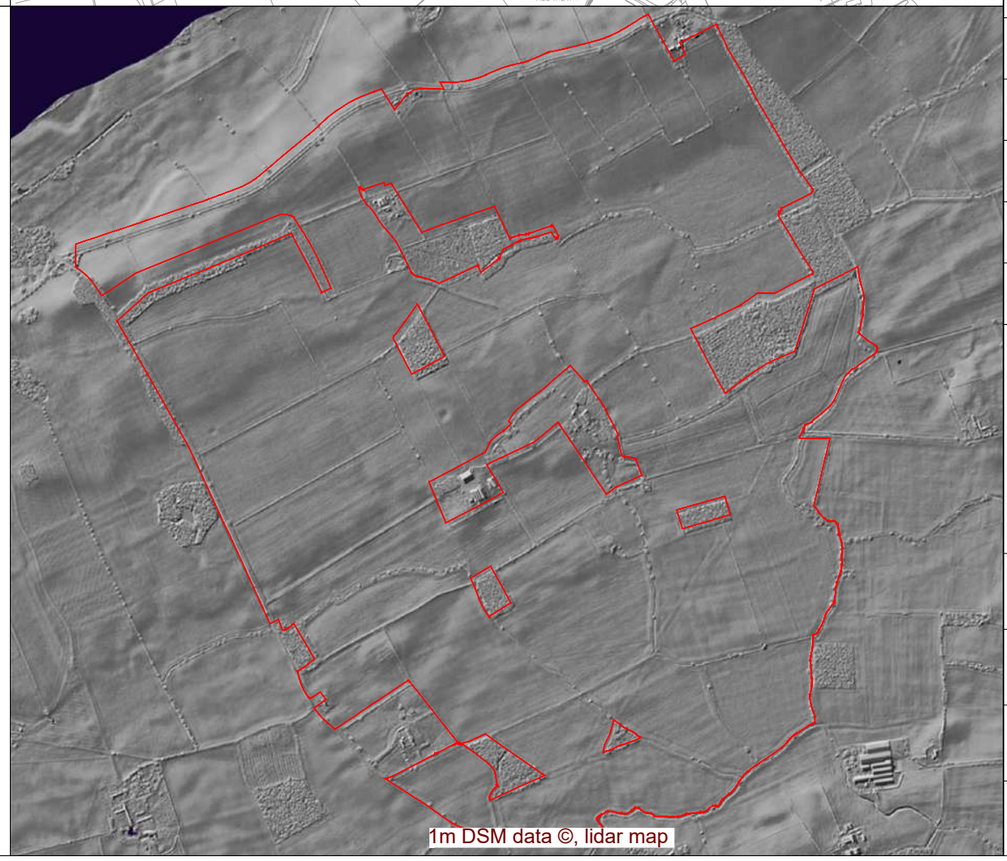
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
NOT TO SCALE

Fig No:
63





KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (plough)
	Agriculture (tramline)
	Agriculture (land drain)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

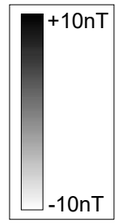
Title:
Greyscale and Colour Plots / Interpretation / LiDAR Data Plot

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
NOT TO SCALE

Fig No:
64



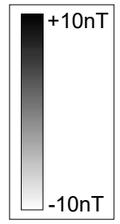
Title:
Minimally Processed Data - Greyscale Plots

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 250
1:5000 @ A3

Fig No:
65



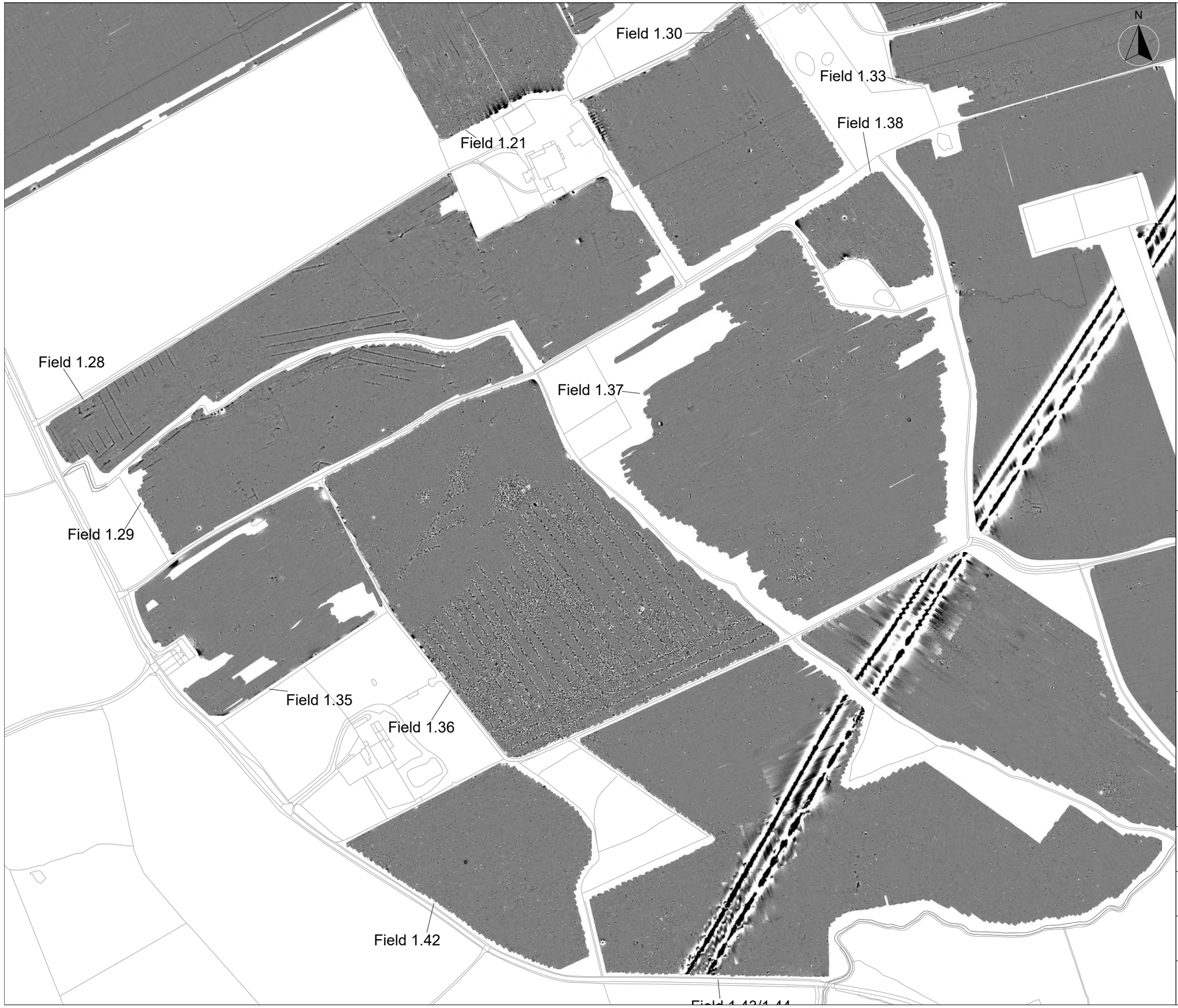
Title:
Minimally Processed Data - Greyscale Plots

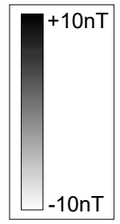
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 250
1:5000 @ A3

Fig No:
66





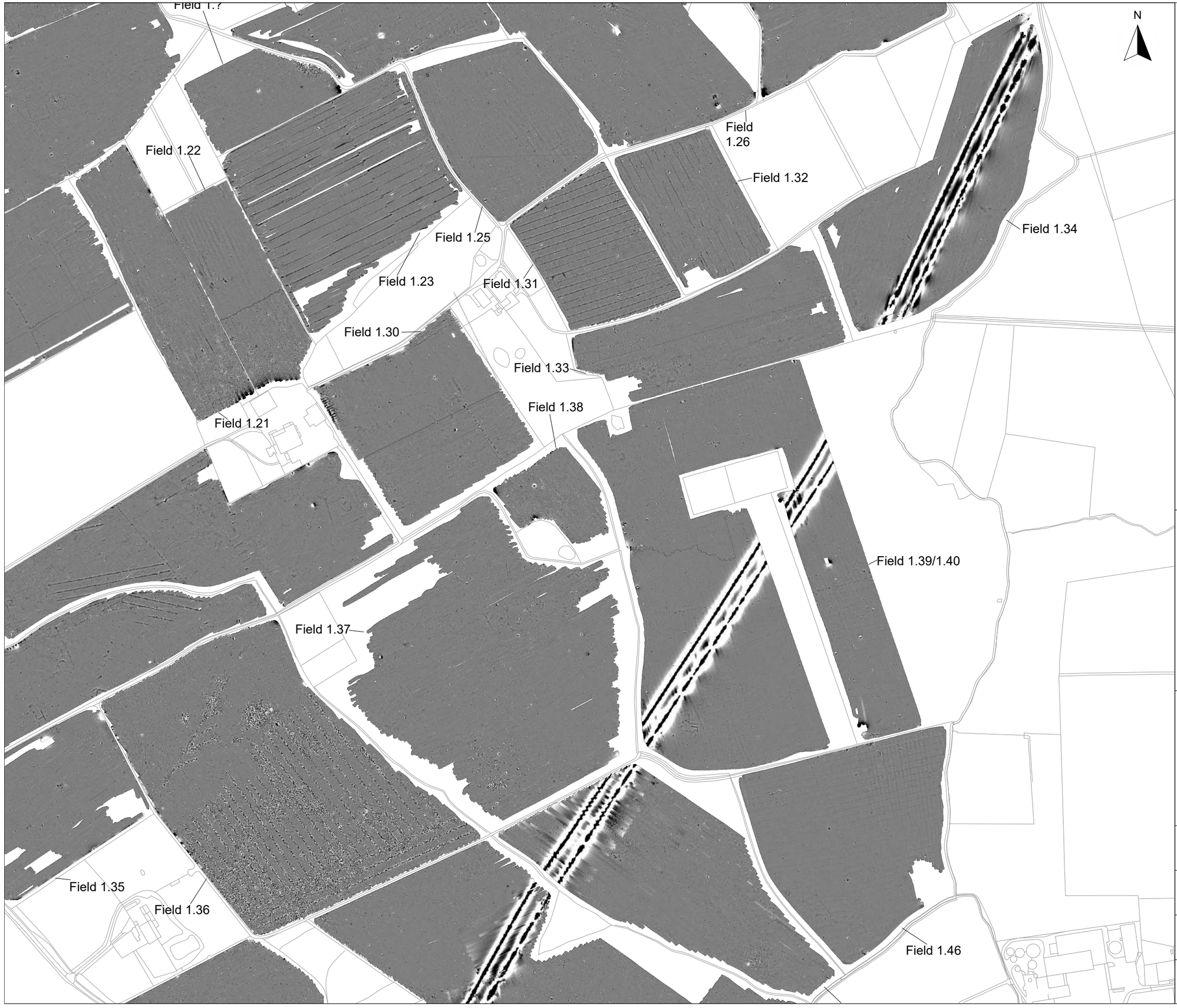
Title:
Minimally Processed Data - Greyscale Plots

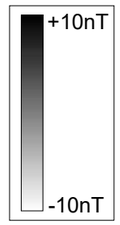
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 250
1:5000 @ A3

Fig No:
67





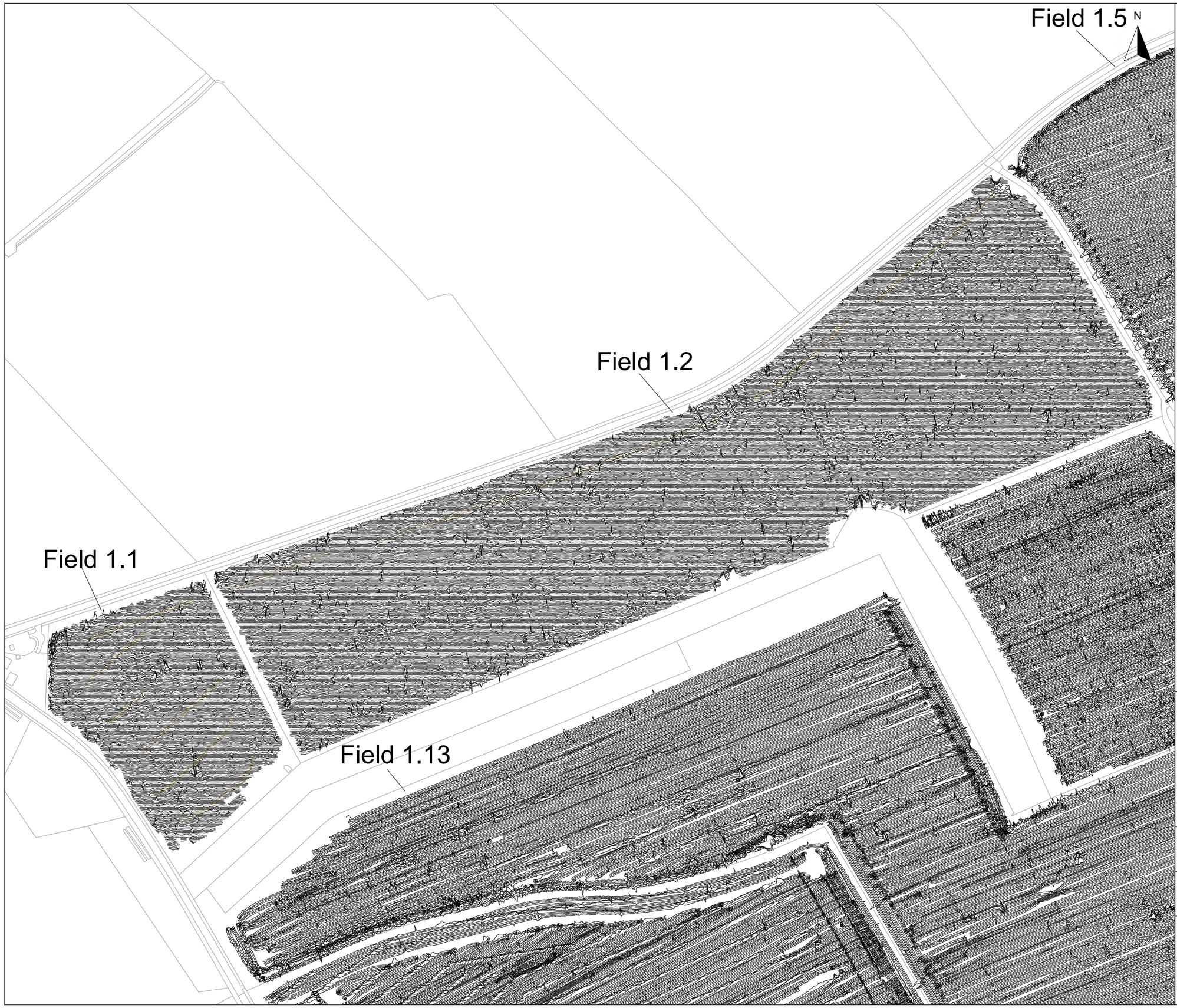
Title:
Minimally Processed Data - Greyscale Plots

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 300
1:6000 @ A3

Fig No:
68



sumo GeoSurveys

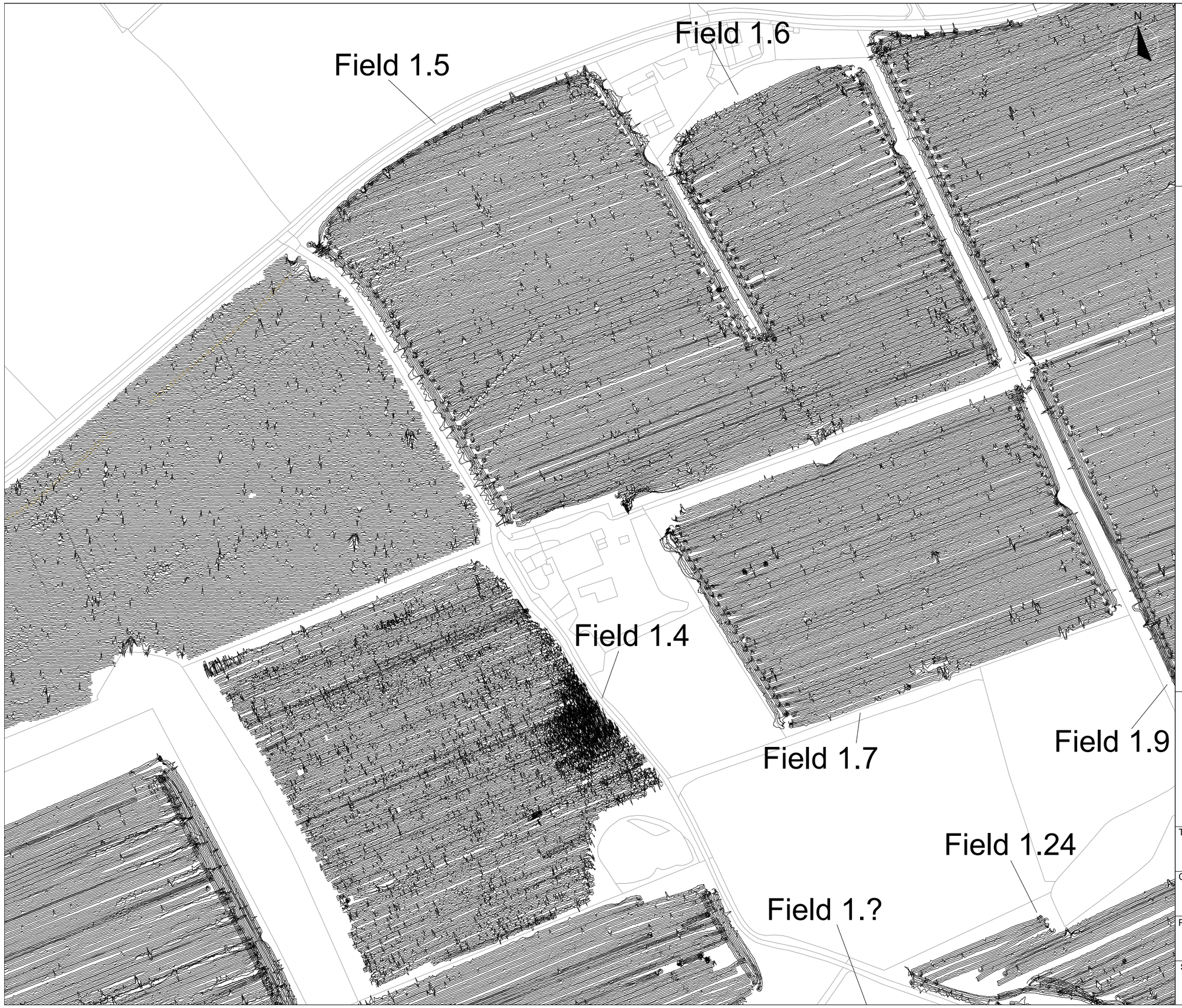
Title:
XY Trace Plots
(Fields 1.1 & 1.2 clipped at +/-15nT)

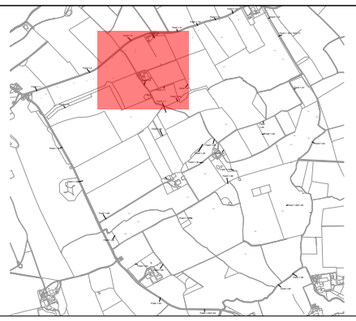
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 150
1:3000 @ A3

Fig No:
69





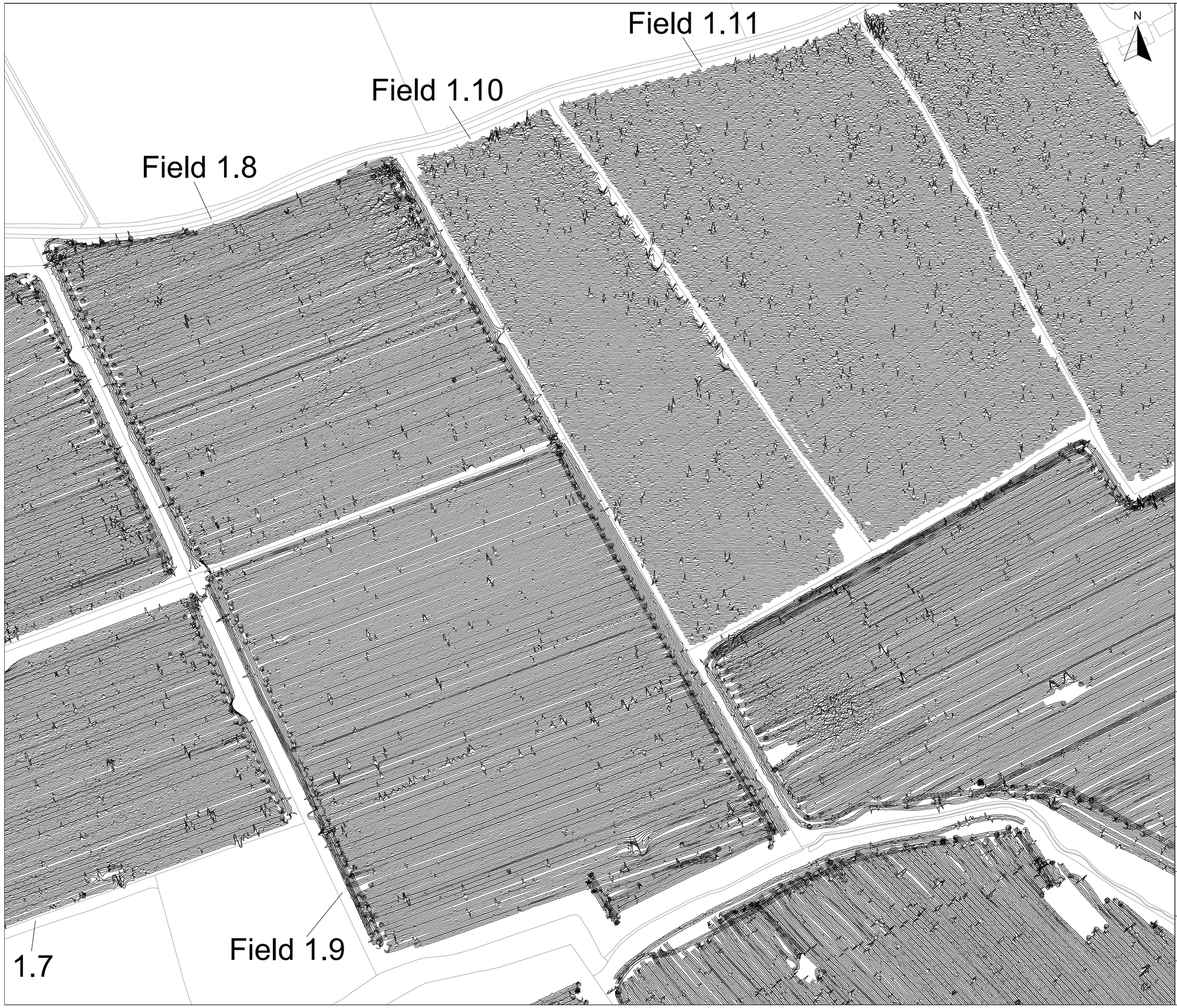
Title:
XY Trace Plots
(Fields 1.4, 1.5, 1.6 & 1.7 clipped at +/-15nT)

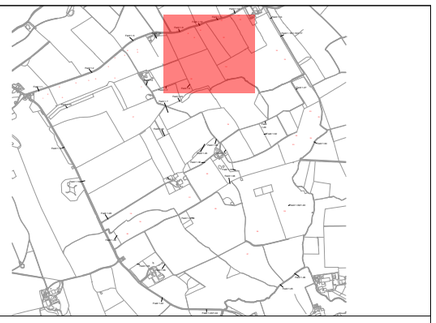
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
70





sumo GeoSurveys

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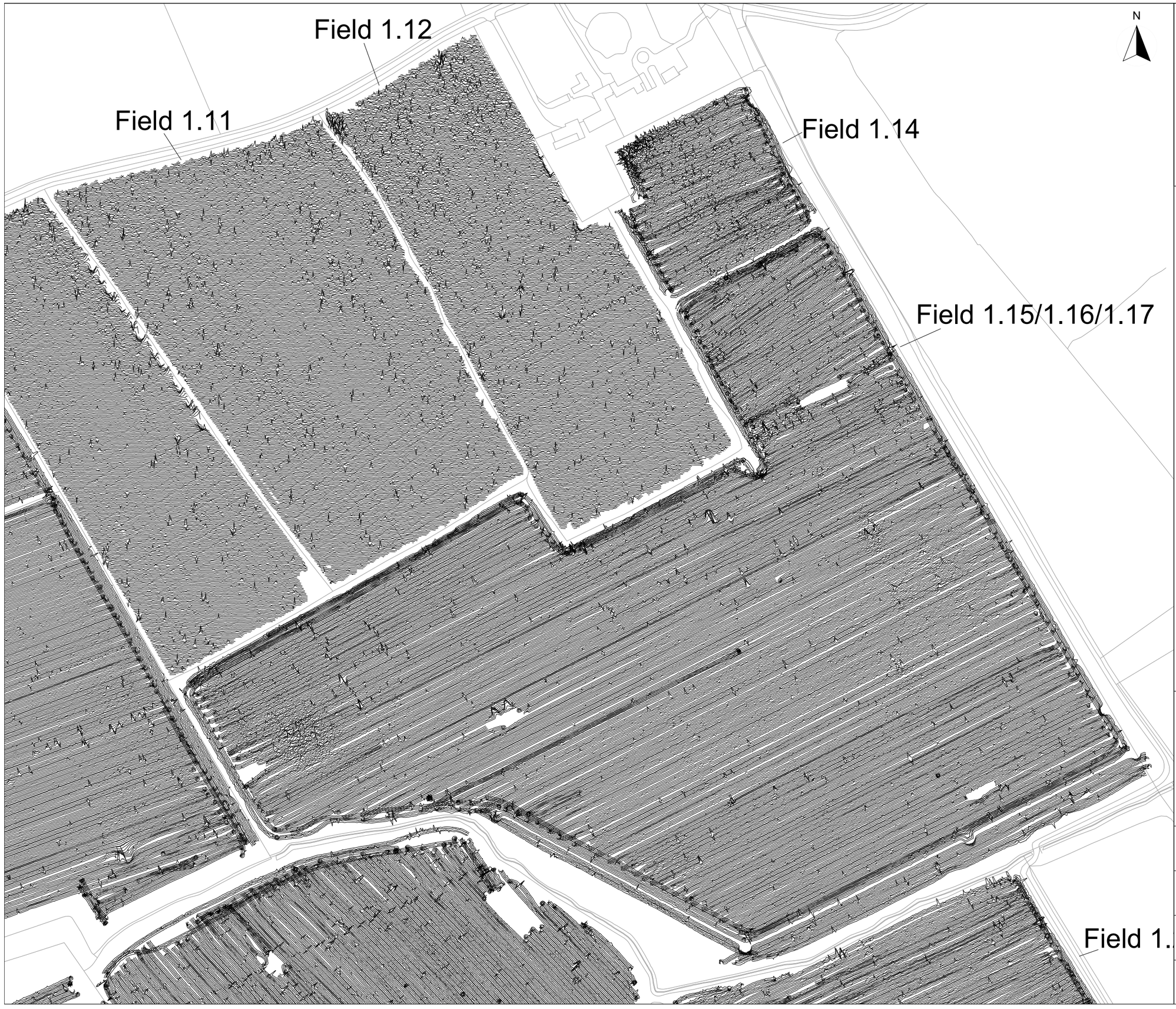
(Fields 1.8, 1.9, 1.10 & 1.11 clipped at +/-15nT)

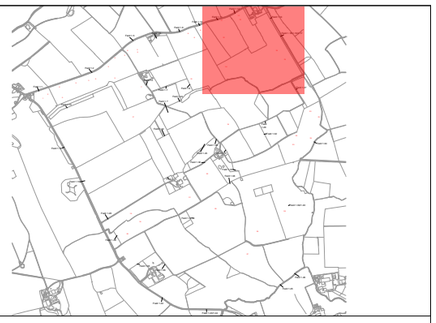
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
71





sumo GeoSurveys

Title:
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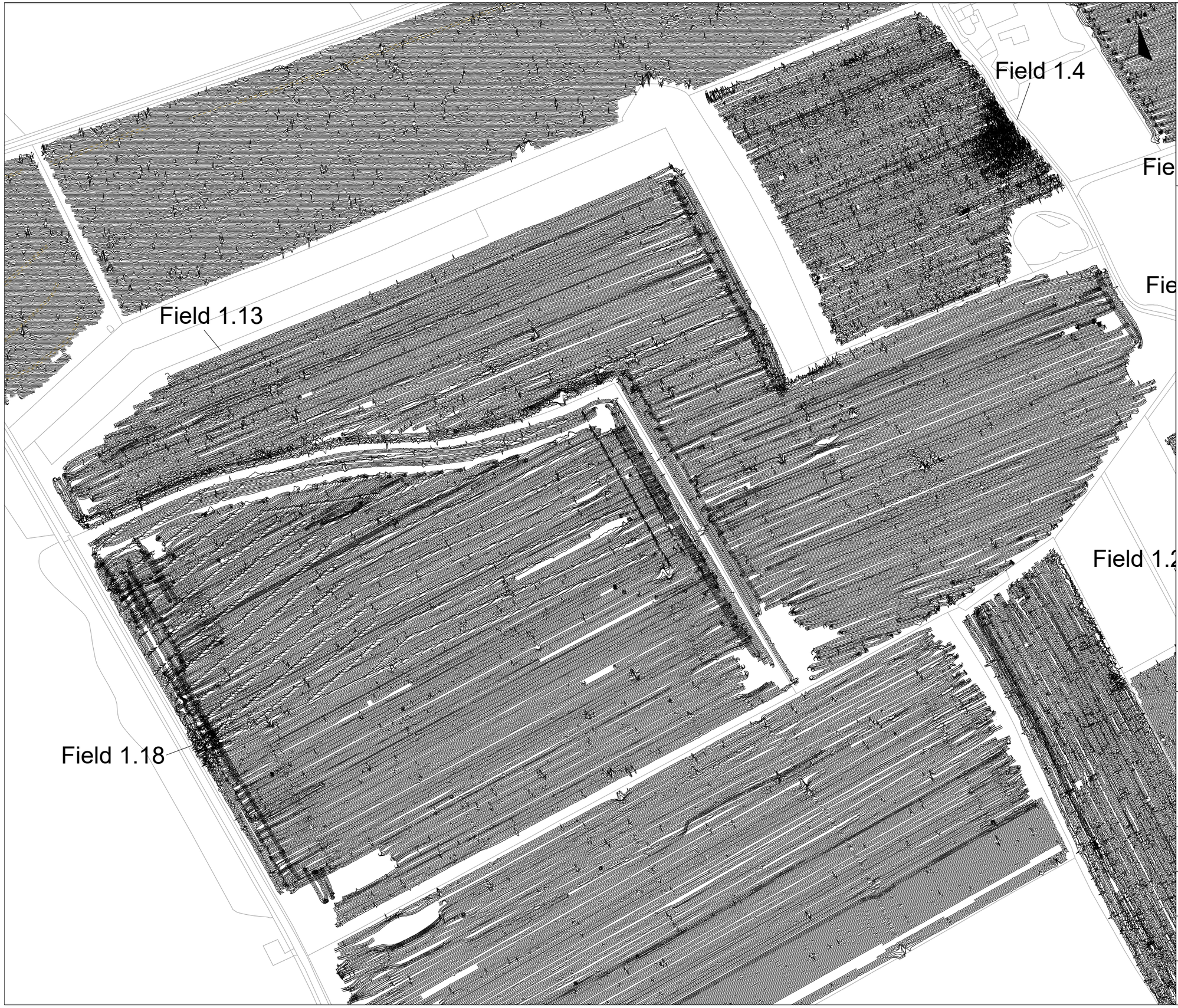
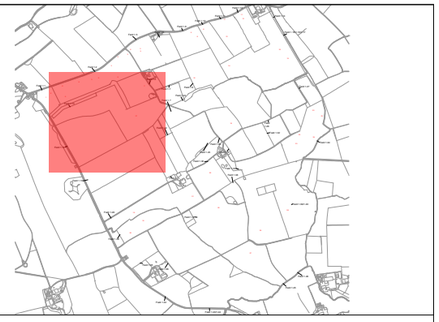
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
72





Title:
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Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
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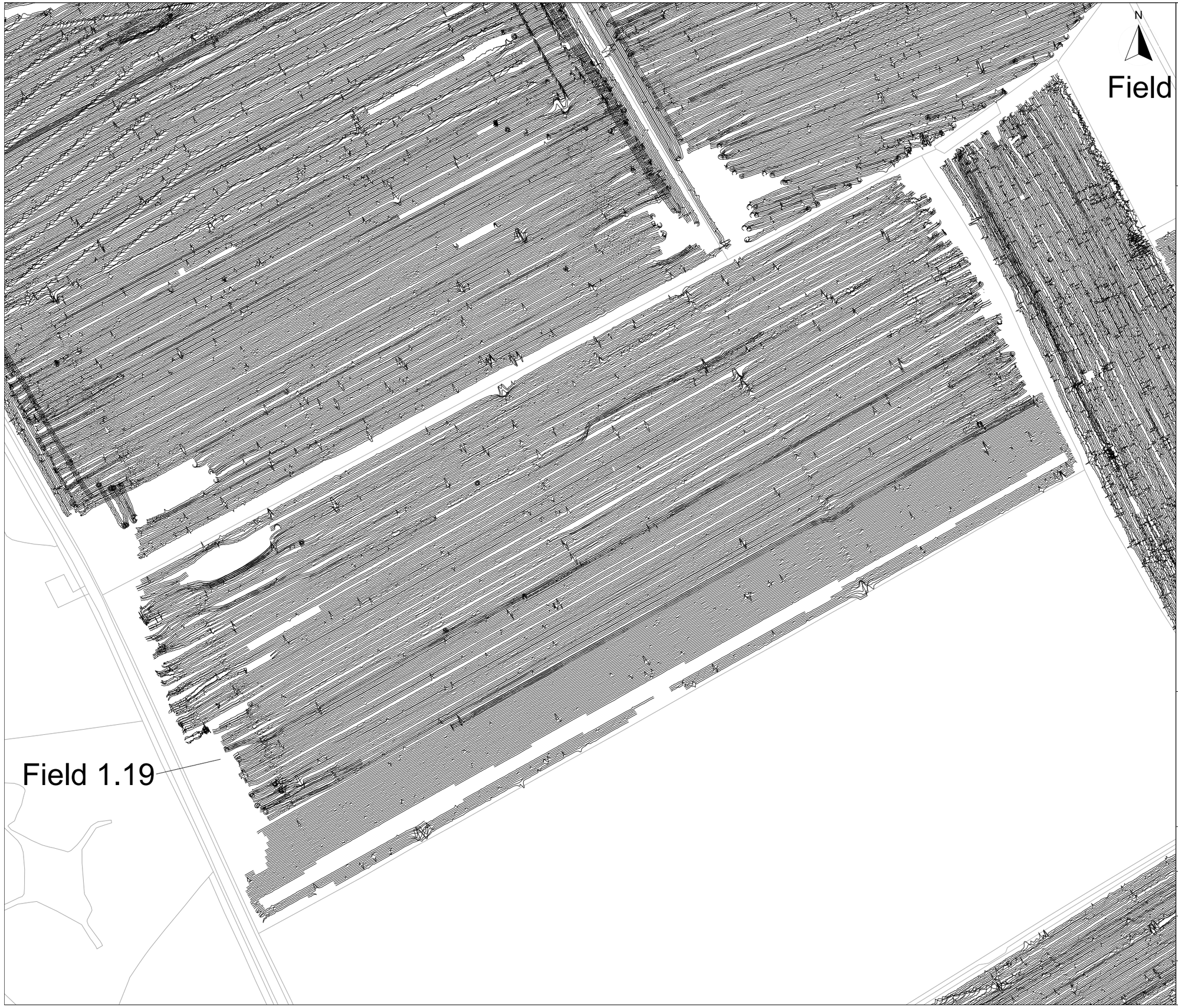
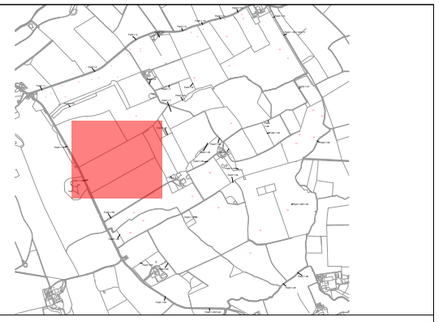
Fig No:
73





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Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
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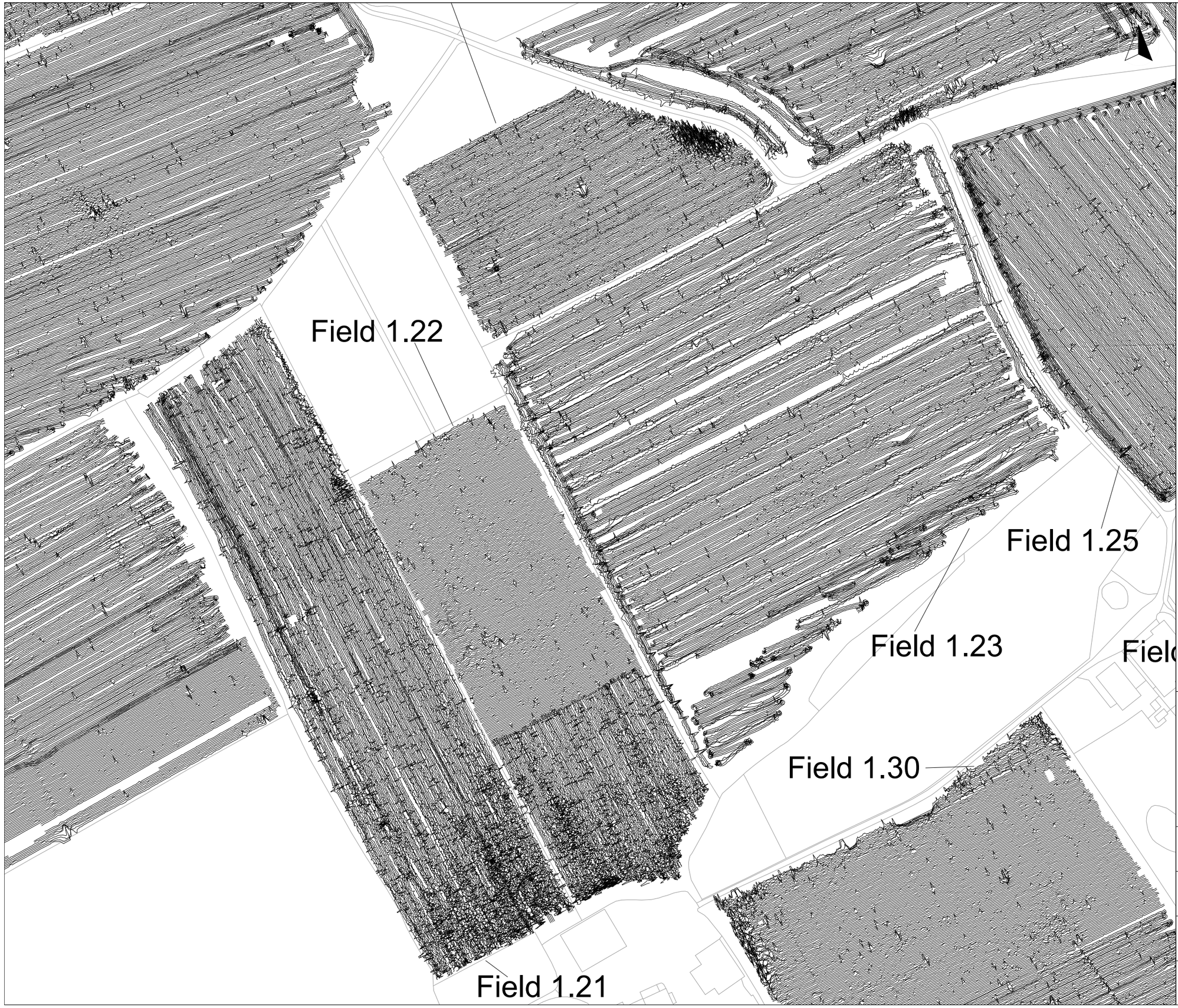
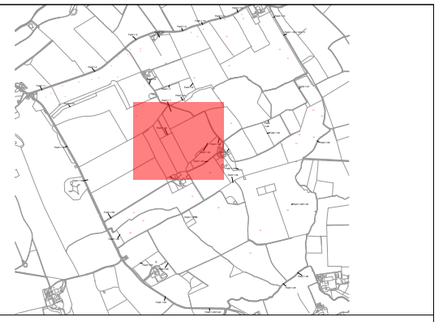
1:2500 @ A3

Fig No:
74





sumo GeoSurveys

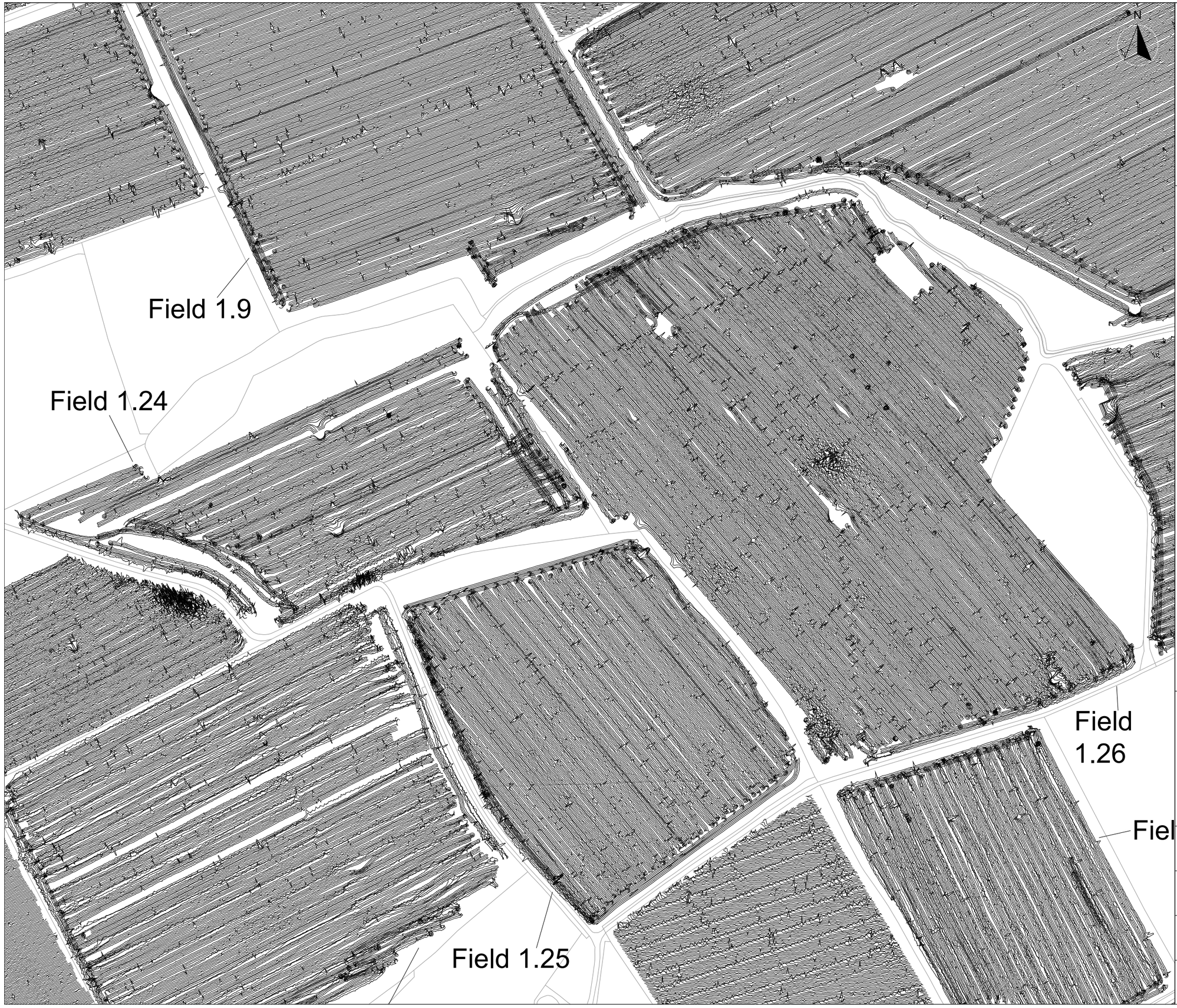
Title:
XY Trace Plots
(Fields 1.21, 1.22 & 1.23 clipped at +/-15nT)

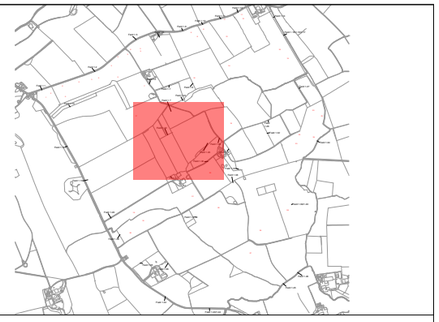
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
75





sumo GeoSurveys

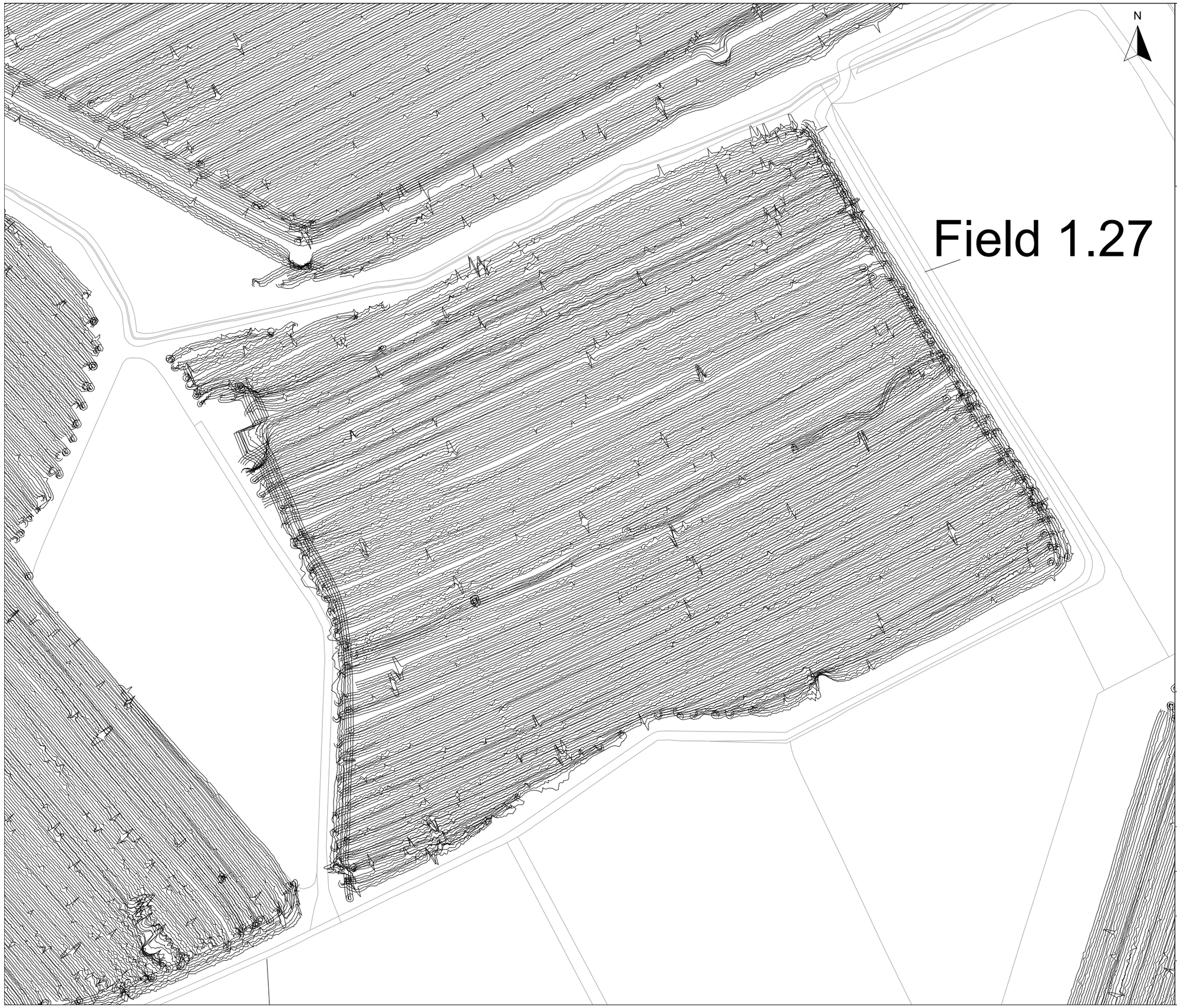
Title:
XY Trace Plots
(Fields 1.24, 1.25 & 1.26 clipped at +/-15nT)

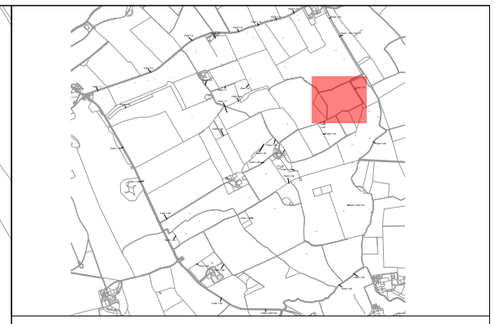
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
76





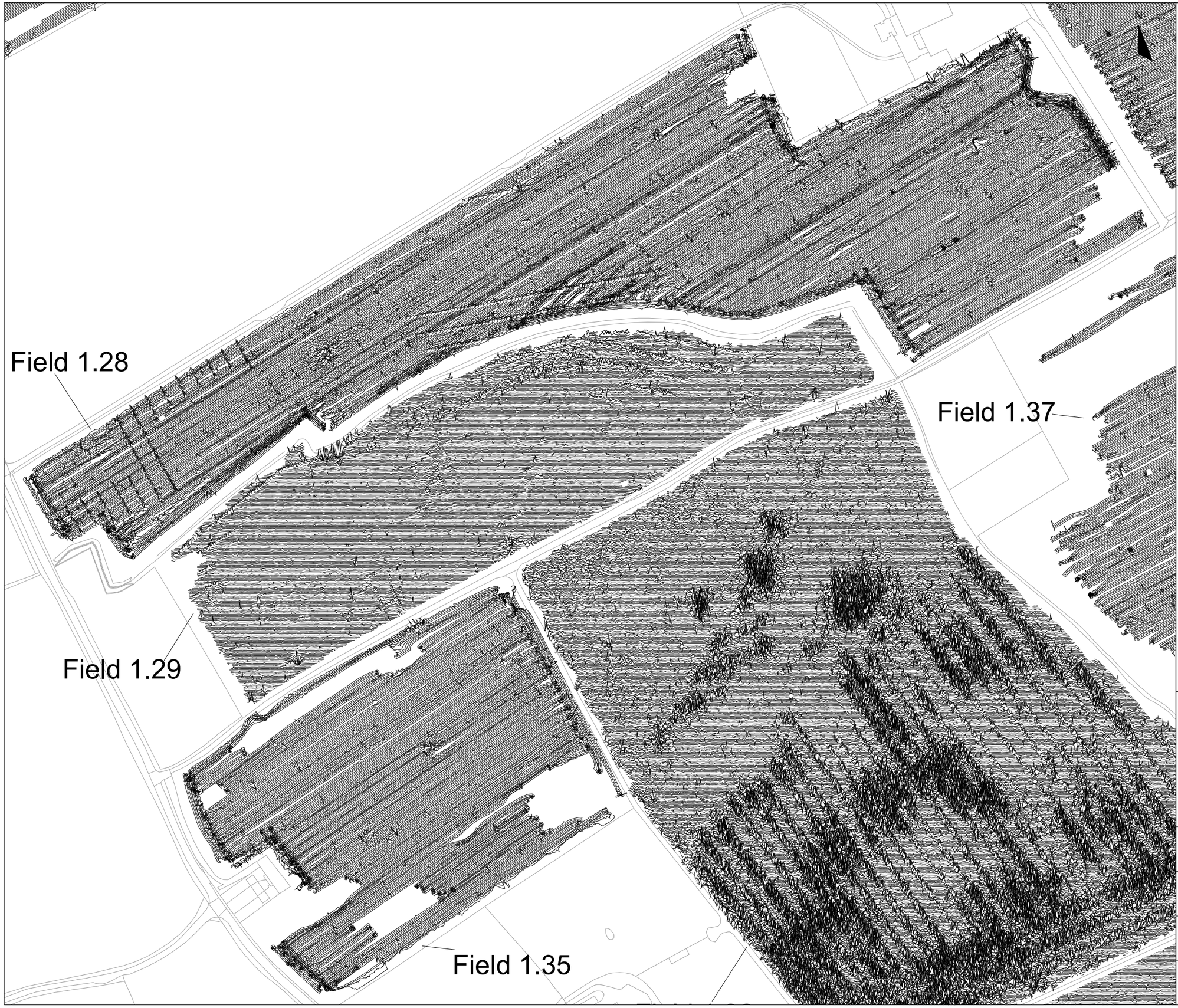
Title:
XY Trace Plots (Field 1.27 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
77



sumo GeoSurveys

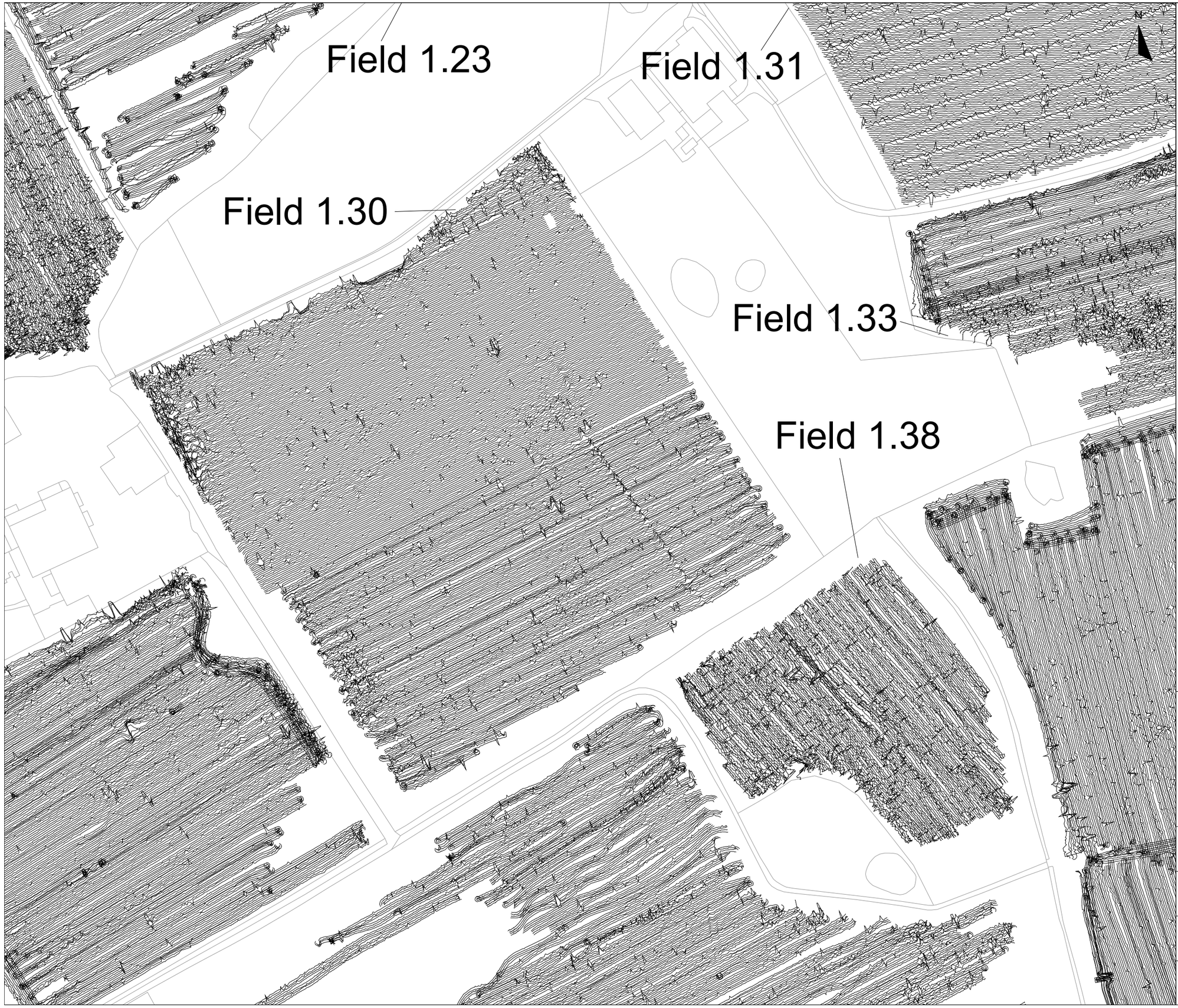
Title:
XY Trace Plots
(Fields 1.28, 1.29 & 1.35 clipped at +/-15nT)

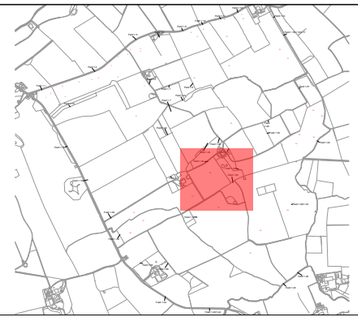
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 140
1:2800 @ A3

Fig No:
78





sumo GeoSurveys

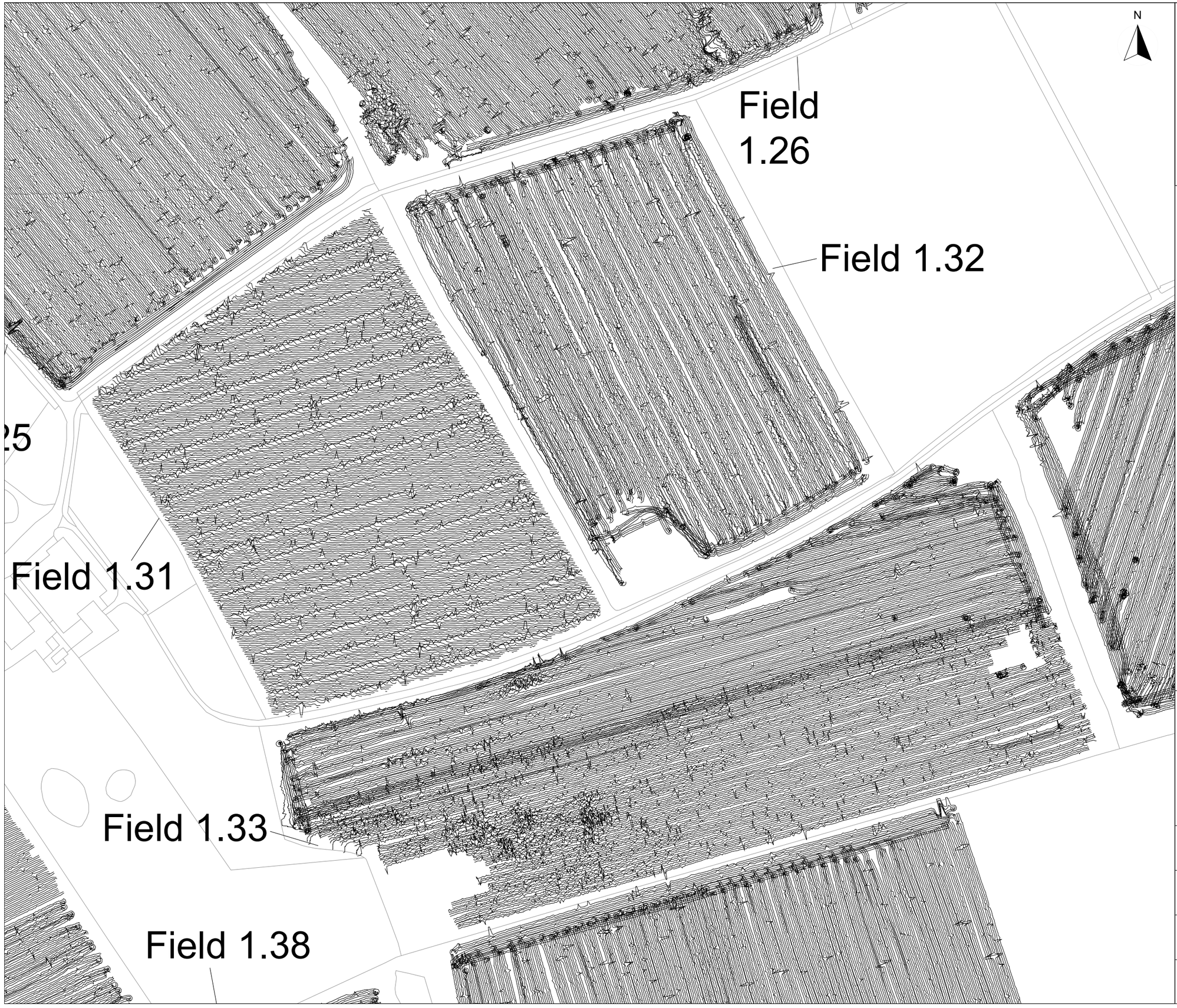
Title:
XY Trace Plots
(Fields 1.30 & 1.38 clipped at +/-15nT)

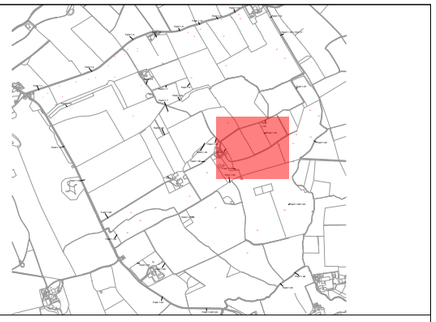
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
79





sumo GeoSurveys

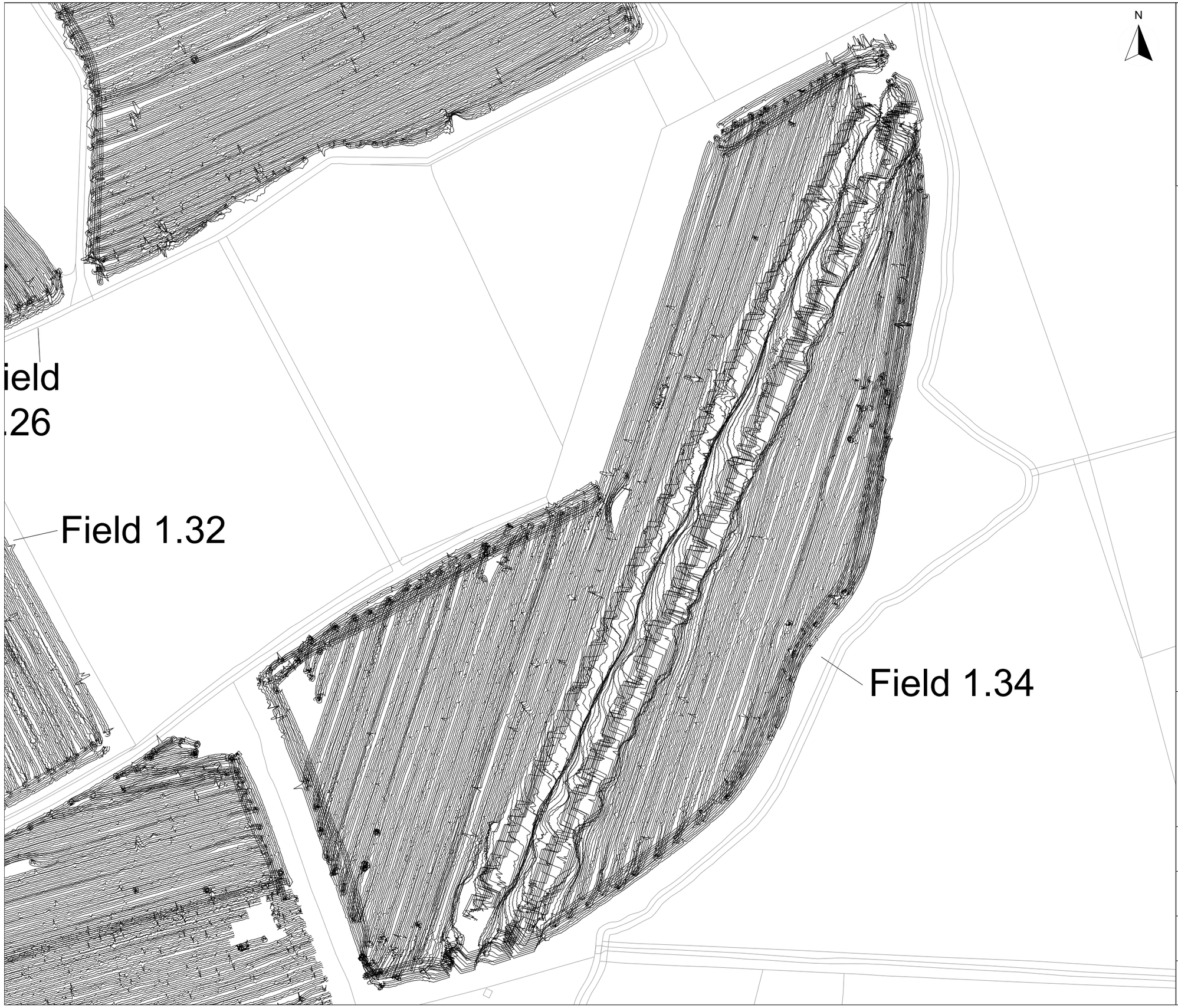
Title:
XY Trace Plots
(Fields 1.31, 1.32 & 1.33 clipped at +/-15nT)

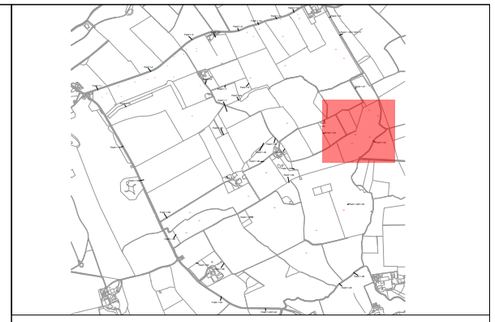
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
80





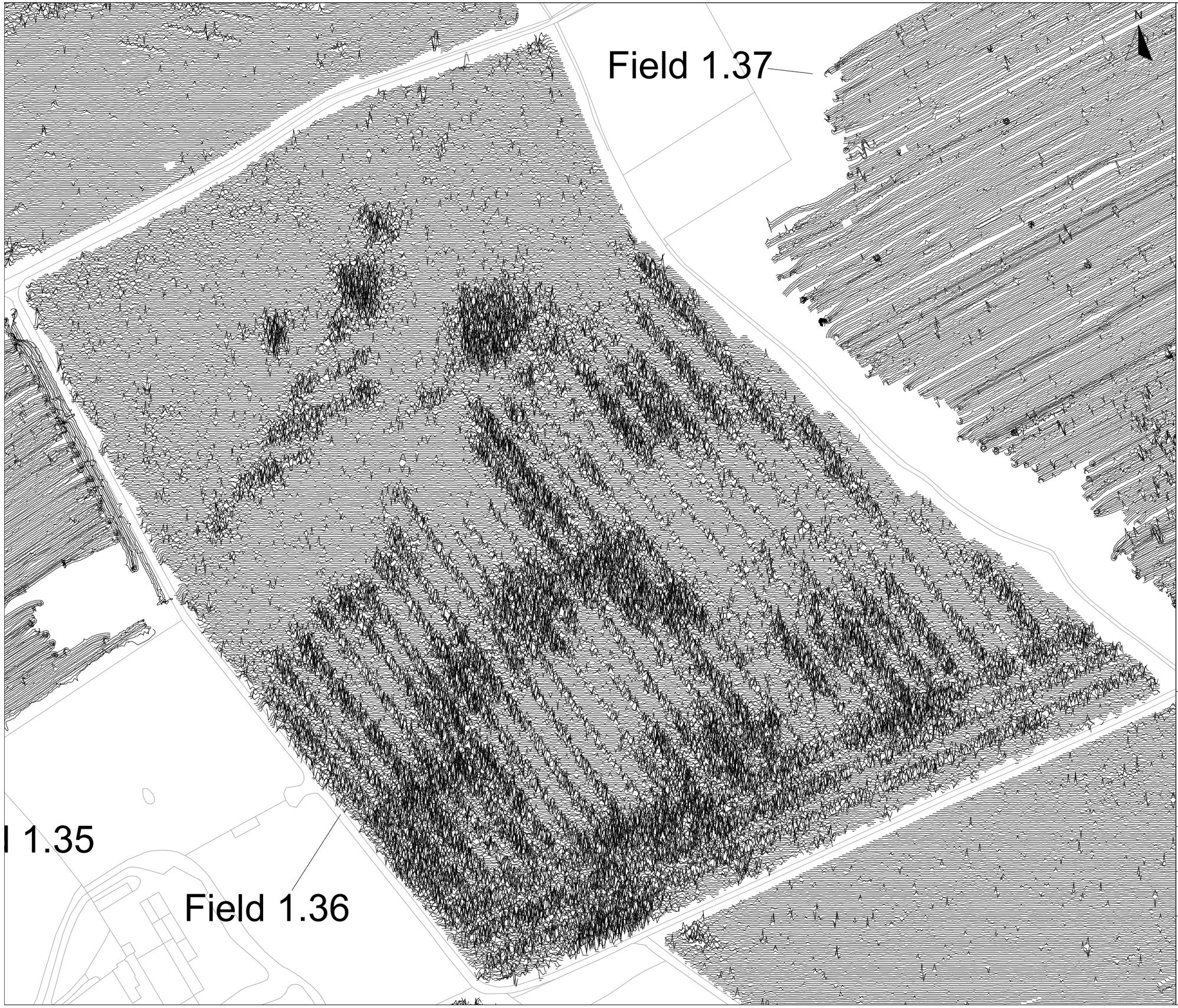
Title:
XY Trace Plots (Field 1.34 clipped at +/-15nT)

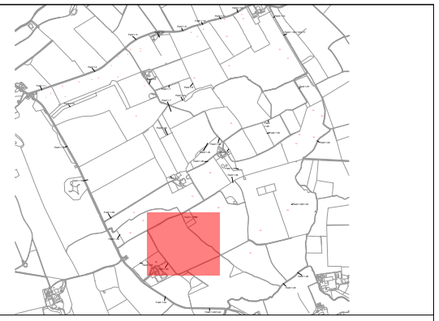
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
81





sumo GeoSurveys

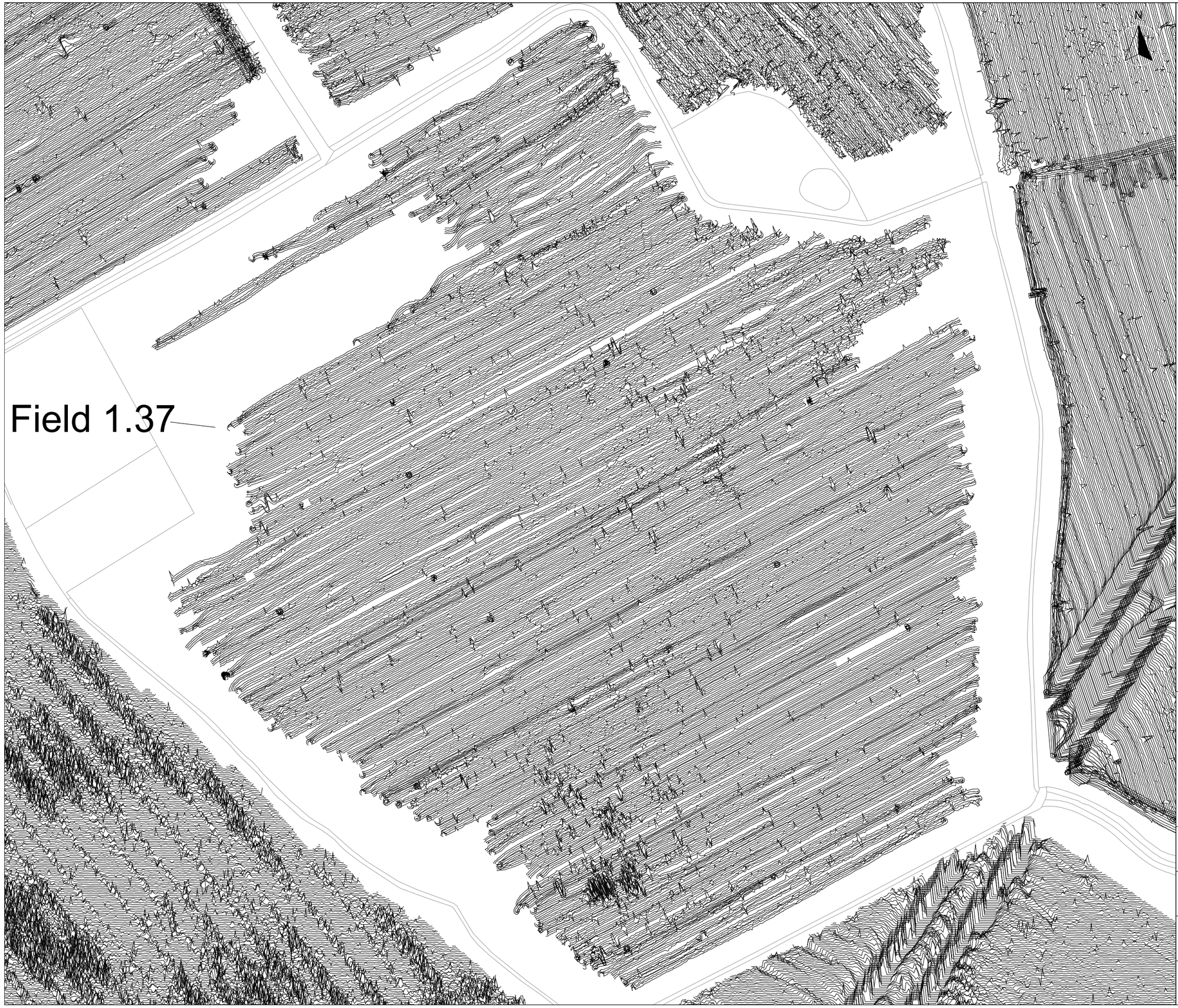
Title:
XY Trace Plots (Field 1.36 clipped at +/-15nT)

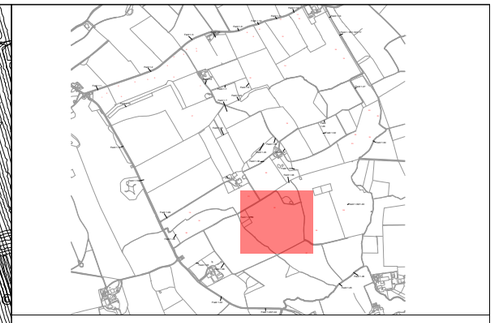
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
82





sumo GeoSurveys

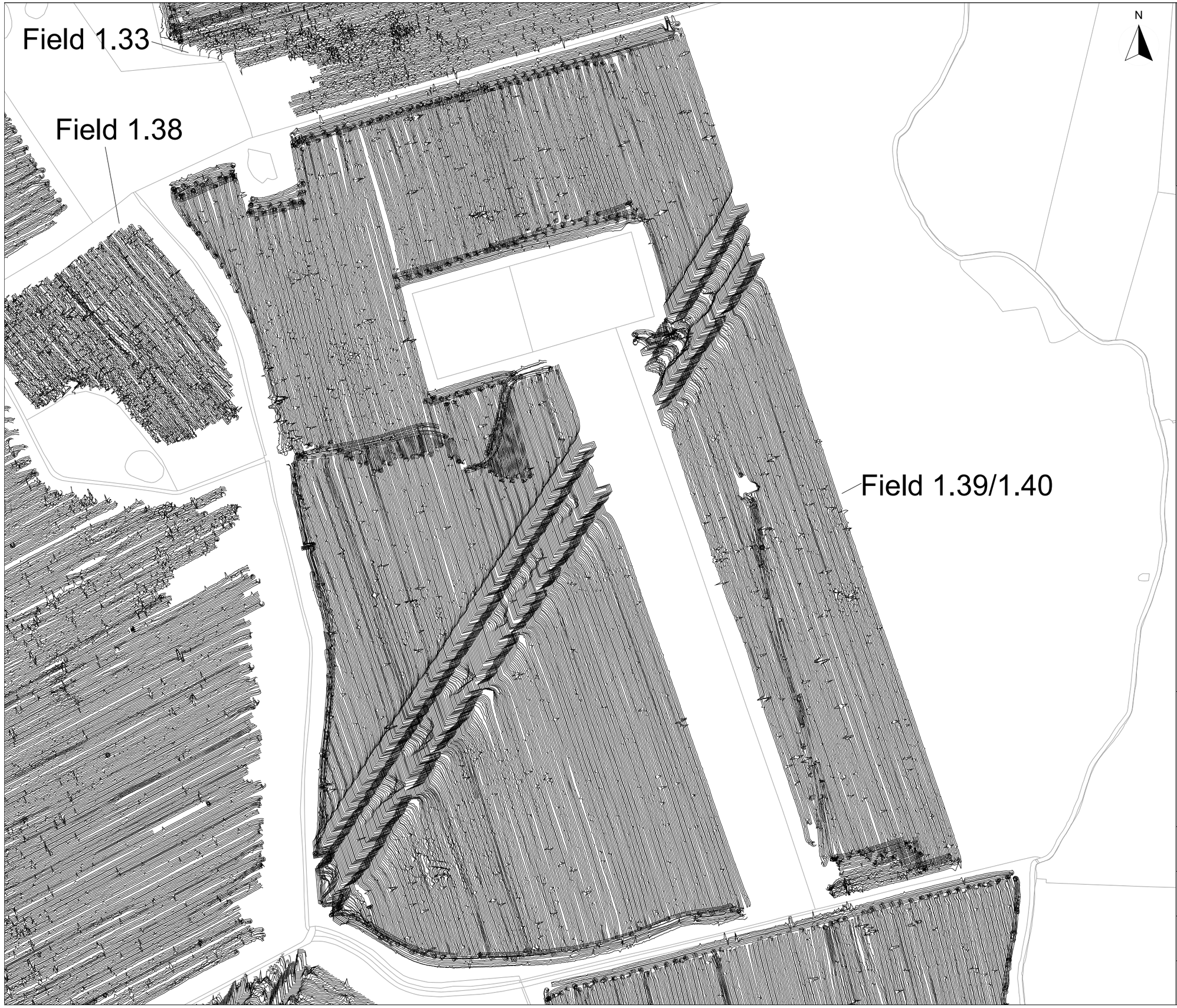
Title:
XY Trace Plots (Field 1.37 clipped at +/-15nT)

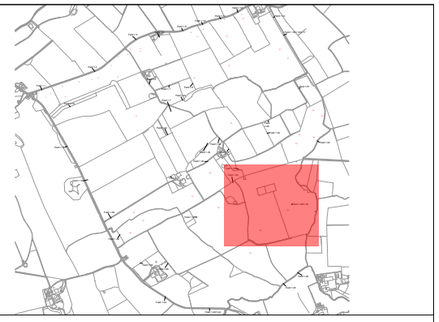
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 100
1:2000 @ A3

Fig No:
83





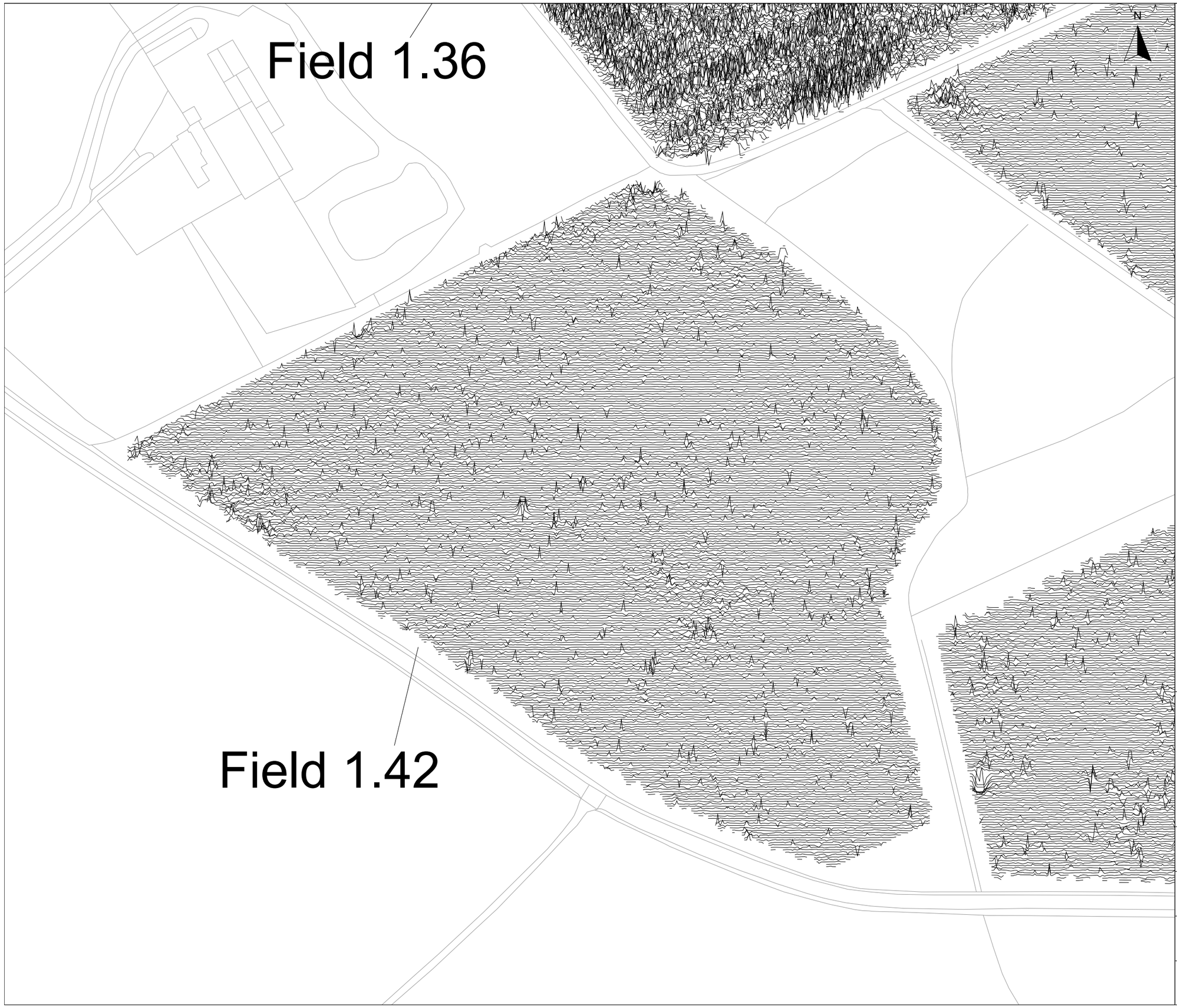
Title:
XY Trace Plots
(Field 1.39/1.40 clipped at +/-15nT)

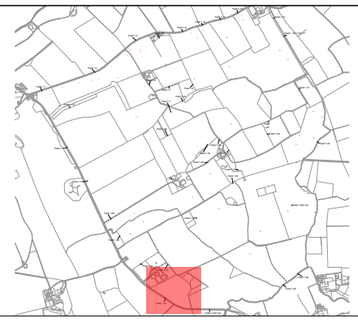
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
84





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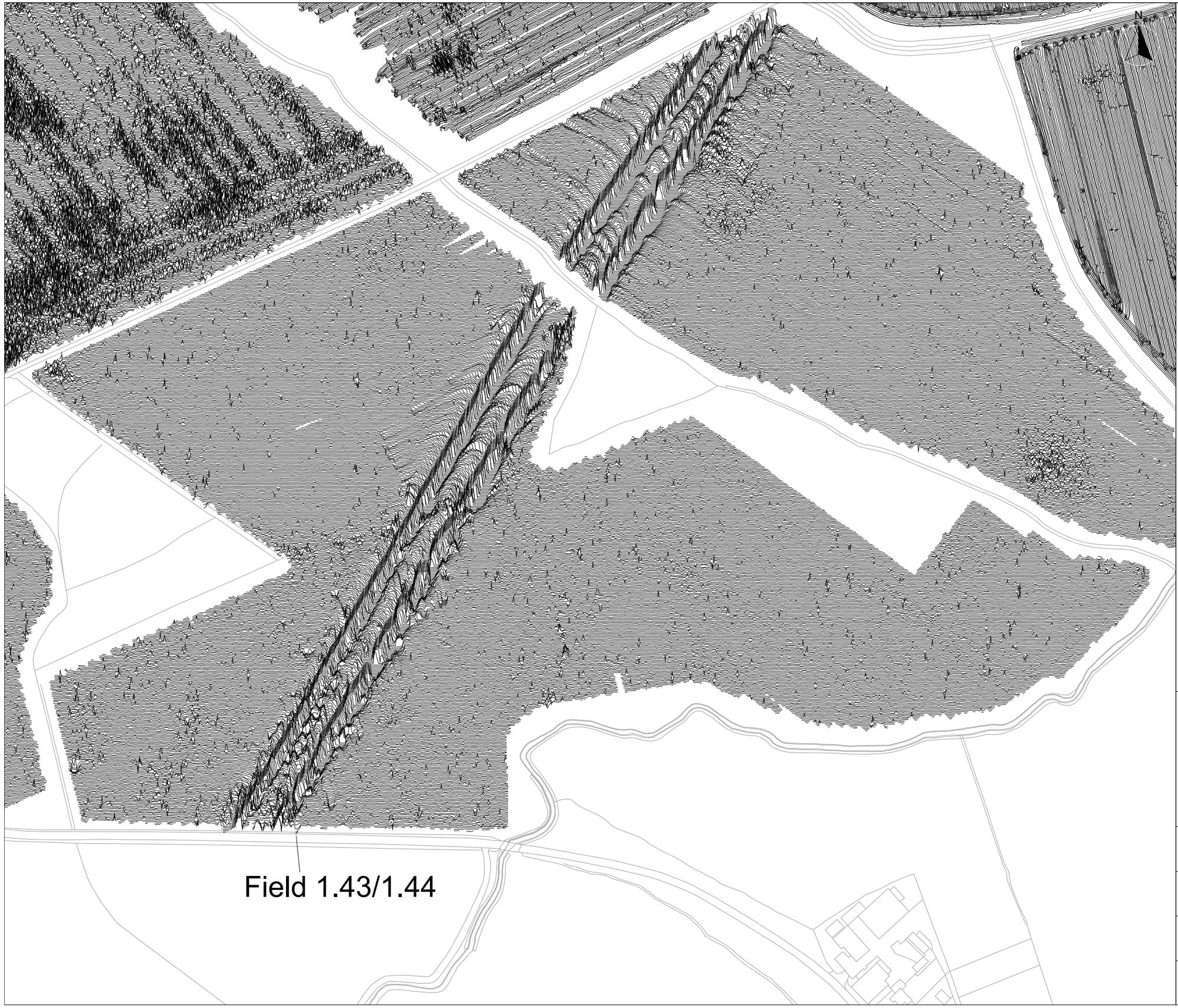
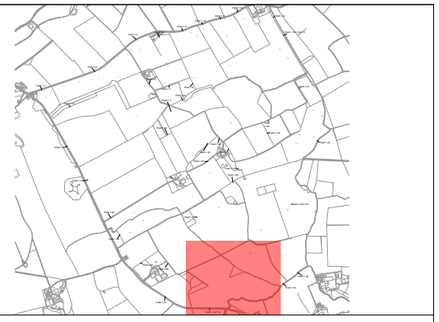
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 75
1:1500 @ A3

Fig No:
85





sumo GeoSurveys

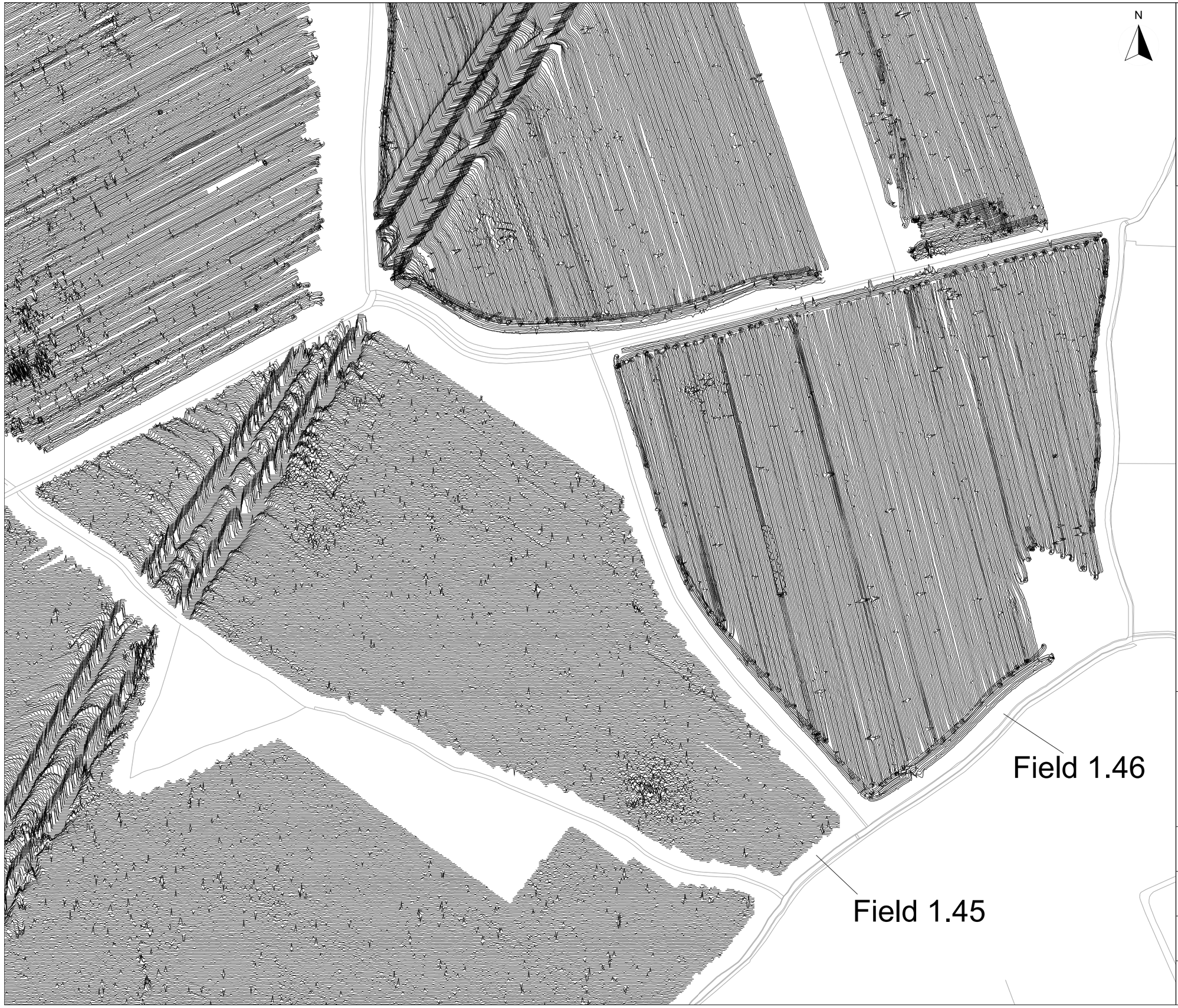
Title:
XY Trace Plots
(Field 1.43/144 clipped at +/-15nT)

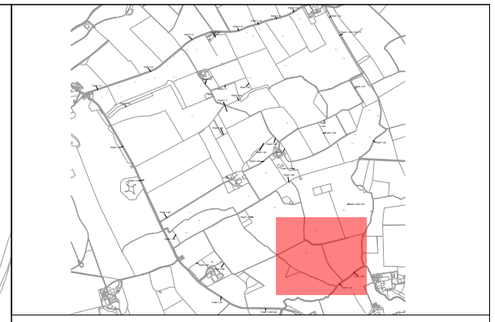
Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 130
1:2600 @ A3

Fig No:
86





sumo GeoSurveys

Title:
XY Trace Plots
(Field 1.43/144 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-1 - Light Valley Solar Project: Site 1

Scale:
0 metres 125
1:2500 @ A3

Fig No:
87

Appendix A - Technical Information: Magnetometer Survey Method

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m
Magnetometer	Bartington Cart System	1.0m	0.125m
Magnetometer	MACS Cart System (Foerster)	1.0m	0.125m

Instrumentation:

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted horizontally, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths.

Bartington Grad 601-2

Hand-Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines

Bartington Cart System

Data will be collected using a cart carrying four paired Bartington magnetic sensors. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

MACS Cart System (Foerster)

A multi-sensor array cart system (MACS) utilising 4 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 1m intervals, with a control unit and data logger was used for the magnetic survey. Each data point is geographically referenced using an on-board RTK GNSS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

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Display

Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall,* etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

Archaeology / Probable Archaeology	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
Possible Archaeology	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
Industrial / Burnt-Fired	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
Former Field Boundary (probable & possible)	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
Ridge & Furrow	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
Agriculture (ploughing)	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
Land Drain	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
Natural	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
Magnetic Disturbance	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
Service	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
Ferrous	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern.

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Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

Uncertain Origin Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology* / *Natural* or (in the case of linear responses) *Possible Archaeology* / *Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

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Appendix B - Technical Information: Magnetic Theory

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. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

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

Thermoremanence 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. Thermoremanent archaeological features can include hearths and kilns; 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 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 feature. The difference between the two sensors will relate to the strength of a magnetic field created by this 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 and disturbance from modern services.

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Appendix C - OASIS Summary

OASIS ID (UID)	sumogeop1-523845
Project Name	Magnetometry Survey, Geophysical Survey at Light Valley Solar Project: Site 1
Sitename	Light Valley Solar Project: Site 1
Sitecode	16614-1
Project Identifier(s)	SUMO-16614 Monk Fryston
Activity type	Magnetometry Survey, Geophysical Survey, MAGNETOMETRY SURVEY
Planning Id	
Reason For Investigation	Planning requirement
Organisation Responsible for work	SUMO Geophysics Ltd.
Project Dates	08-Apr-2024 - 27-Sep-2024
Location	**Light Valley Solar Project: Site 1** NGR: SE 65133 41963 LL: 53.869798509912926, -1.010934662777584 12 Fig: 465133,441963 NGR: SE 65817 41759 LL: 53.867882170289924, -1.000584213074114 12 Fig: 465817,441759 NGR: SE 64887 42314 LL: 53.872979391582106, -1.014611335328968 12 Fig: 464887,442314 NGR: SE 65011 42670 LL: 53.87616977549879, -1.012653728266969 12 Fig: 465011,442670 NGR: SE 65395 41049 LL: 53.86155193506129, -1.00715371585938 12 Fig: 465395,441049 NGR: SE 64790 42657 LL: 53.87607901976973, -1.016007828011558 12 Fig: 464790,442657 NGR: SE 65545 41025 LL: 53.86131283660176, -1.00487040539967 12 Fig: 465545,441025 NGR: SE 65419 41966 LL: 53.869785276272914, -1.006595586295792 12 Fig: 465419,441966 NGR: SE 66149 42294 LL: 53.872639842523455, -0.995429268337722 12 Fig: 466149,442294 NGR: SE 65122 41500 LL: 53.86563794703103, -1.011208131706272

	12 Fig: 465122,441500 NGR: SE 65137 41870 LL: 53.86895875415546, -1.010896244879487 12 Fig: 465137,441870
Administrative Areas	Country: England County/Local Authority: North Yorkshire Local Authority District: North Yorkshire Parish: Escrick Parish: Thorganby Parish: Skipwith
Project Methodology	A temporary grid system was established over the site and marked out using canes. The location of the grid will was set out using an RTK GPS system theoretically accurate to some 0.01m and referenced to OS co-ordinates. Hand Held: Data was collected using a Bartington Grad 601-2. The instrument consists of two paired sensors (see below) and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. Two sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Cart: Data was also collected using a cart carrying four paired Bartington magnetic sensors. Four sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart. The collection of data provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
Project Results	The magnetometer survey has recorded numerous magnetic responses which have been interpreted as being of archaeological interest. In the north of the site a ditched trackway has been plotted which appears to span the width of the survey area; it has been intermittently recorded for a distance of 1.8 km. Extending either side of this track are enclosures and ditches, some of which have ring-ditches and pits within them. In the north-west of Field 1.5 the location of a possible post-pit building has been marked. Several clusters of archaeological responses have also been recorded in Fields 1.13, 1.15/1.16/1.17, 1.28, 1.29, 1.30, 1.37, 1.39/1.40 and 1.45 which represent small farmsteads, enclosures and field systems. In the east of Field 1.4 the foundations of a relatively modern building and spreads of demolition debris have been plotted. Historic ridge and furrow cultivation have been marked in many of the survey areas. Numerous responses of uncertain origin have been marked throughout the data which is to be expected on a survey of this size. The majority of these have probably been caused by variations in the underlying geology or agricultural processes. However, archaeological origins for some of these responses cannot be entirely discounted. Corroborated and conjectural former field boundaries have been plotted throughout the survey and modern ploughing effects are visible in Field 1.43/1.44. Land drains have also been detected in many of the fields along with agricultural tractor tramlines in Fields 1.2 and 1.3. Amorphous zones of natural response are visible in Fields 1.28, 1.30, 1.33, 1.46 and 1.46. Two strong dipolar ferrous anomalies have been recorded in Fields 1.34, 1.39/1.40, 1.43/1.44 and 1.45

	which mark the routes of two underground aqueducts. While two smaller pipes have also been detected in Field 1.5.
Keywords	Multiple Ditch System - UNCERTAIN - FISH Thesaurus of Monument Types Ditched Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Ring Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Pit - UNCERTAIN - FISH Thesaurus of Monument Types Field System - UNCERTAIN - FISH Thesaurus of Monument Types Trackway - UNCERTAIN - FISH Thesaurus of Monument Types Coaxial Field System - UNCERTAIN - FISH Thesaurus of Monument Types Rectangular Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Rectangular Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Rectilinear Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Oval Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Circular Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Sub Circular Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Building - UNCERTAIN - FISH Thesaurus of Monument Types Enclosed Settlement - UNCERTAIN - FISH Thesaurus of Monument Types Farmstead - UNCERTAIN - FISH Thesaurus of Monument Types Ridge And Furrow - MEDIEVAL - FISH Thesaurus of Monument Types Field Boundary - POST MEDIEVAL - FISH Thesaurus of Monument Types Plough Marks - 20TH CENTURY - FISH Thesaurus of Monument Types Pipeline - 20TH CENTURY - FISH Thesaurus of Monument Types
Funder	Private or public corporation Island Green Power UK Limited
HER	North Yorkshire HER - unRev - STANDARD
Person Responsible for work	Thomas Cockcroft
HER Identifiers	
Archives	

Report generated on: 23-12-2024:1328

Appendix D – Data Management Plan & Archive Selection Strategy

Data Management Plan

Project ID / OASIS ID

SUMO-16614-1 / sumogeop1-523845

Project Name

Light Valley Solar Project: Site 1

Project Description

Detailed magnetic survey over approx. 420ha at Site 1

Client

Island Green Power UK Limited

Project Manager

Thomas Cockcroft

Field Leader

Jelmer Wubs / Robert Knight / Simon Lobel / Liam Brice-Bateman

Date DMP created

26.03.2024

Date DMP last updated

23.12.2024

Version

2

Technique - data

Detailed magnetic survey.

Manual – cart - other

ATV/Cart magnetometers.

Documentation and metadata

All documentation and data produced are stored on SUMO servers in a specific job file.

Data storage, access and back-up

- SUMO Secure server during the project life set up in a RAID configuration (a RAID configuration incorporates a level of data redundancy meaning if a single hard drive in fails data can still be restored).

- Snap shots of the data will be made at several intervals during the day to allow data to be restored for up to 30 days if changed / deleted.
- Once the final report has been completed data will be moved onto NAS drive set up in a RAID configuration.
- All data is backed up to an off-site location (Cloud storage).

Archive Selection Strategy

Digital Data

Selection

It is proposed that only the final version of all born digital documents (reports, images and CAD files) will be selected for inclusion in the Preserved Archive. All raw and processed survey data will be included in the preserved archive. Below is what will constitute the selected archive:

- Raw data in XYZ format .csv and .png plus .pgw world file
- Processed data as .png plus .pgw world file
- Final survey report .pdf
- CAD and Vector graphics (interpretations) in .dwg format

De-selected digital data

The de-selected material will be retained on the SUMO Secure server and Cloud storage.

Documents

Not applicable – no archive

Materials

Not applicable – no archive

- Archaeological Geophysics
- Engineering Geophysics
- Measured Building Services
- Utility and Topographic Services
- Aerial Surveys
- Rail Surveys

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.
SUMO Services Ltd, incorporated under the laws of England and Wales,
Company Registration No.4275993.
Registered Office Unit 8 Hayward Business Centre, New Lane, Havant, Hampshire, PO9 2NL

Annex B Light Valley Site 2 Geophysical Survey Report

GEOPHYSICAL SURVEY REPORT

Light Valley Solar Project: Site 2

Client

Island Green Power UK Limited

Survey Report

16614-2

OASIS Ref. No.

sumogeop1-529783

Date

27 November 2024

Survey Report 16614-2: Light Valley Solar Project: Site 2

Survey dates	29-31July 2024 1 August 2024 11&12 September 2024
Field co-ordinator	Simon Lobel BSc Liam Brice-Bateman BA
Field Team	Craig Wakefield MSc William Vernon BA (Hons)
Report Date	27 November 2024
CAD Illustrations	Thomas Cockcroft MSc MCIfA
Report Author	Thomas Cockcroft MSc MCIfA
Project Manager	Thomas Cockcroft MSc MCIfA
Report approved	Dr John Gater BSc DSc(Hon) MCIfA FSA

SUMO GeoSurveys
Suite1
Deer Park Business Centre
Woollas Hill
Eckington
Pershore
Worcestershire
WR10 3DN
T: 01684 592266
[redacted]
geophysics@sumoservices.com

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.

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Appendix A	Technical Information: Magnetometer Survey Methods, Processing and Presentation
Appendix B	Technical Information: Magnetic Theory
Appendix C	OASIS Data Collection Sheet

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Appendix D Data Management Plan & Archive Selection Strategy

3 SURVEY TECHNIQUE

3.1 Detailed magnetic survey (magnetometry) was chosen as the most efficient and effective method of locating the type of archaeological anomalies which might be expected at this site. All survey techniques followed the guidance set out by CIfA (2020) and the European Archaeology Council (EAC) (2016).

Bartington Cart System Traverse Interval 1.0m Sample Interval 0.125m

The only processes performed on data are the following unless specifically stated otherwise:

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes instrument striping effects and edge discontinuities over the whole of the data set.

4 EXECUTIVE SUMMARY OF RESULTS

4.1 A magnetometer survey of 83 hectares of land at Site 2 of the Light Valley Solar Project has recorded magnetic responses that have been interpreted as being of archaeological interest. in Area 4 numerous anomalies are visible which mark the locations of enclosures, pits, a trackway, a probable ring-ditch and spreads of habitation type features. These anomalies are likely to represent small farmsteads and wider scale landscape divisions. Ridge and furrow cultivation has also been plotted in Areas 3, 4, 5 and 6. Uncertain responses have been detected throughout the survey data and while archaeological origins cannot be discounted for all of them, the majority have probably been caused by natural and agricultural processes. Former field boundaries, land drains and two service pipes have also been marked. Ferrous responses in the north-east of Area 3 have been caused by the foundations of a former building.

5 INTRODUCTION

5.1 **SUMO GeoSurveys** was commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by **Island Green Power UK Limited**.

5.2 This survey is part of the Light Valley Solar Project which is composed of a five separative magnetometer survey reports.

5.3 Site Details

NGR / Postcode	SE 52791 30311 / LS25 5EW	
Location	The site is located 4km south-east of Sherburn in Elmet and 1.2km east of Monk Fryston. The survey area surrounds Siddle Farmhouse, and is bounded to the south by the A63, while Fryston Common Lane passes between Areas 1/2 and Area 3.	
HER	North Yorkshire HER	
OASIS Ref. No.	sumogeop1-529783	
District	N/A	
Parish	Monk Fryston Civil Parish	
Topography	Flat	
Land Use	Arable	
Geology (BGS 2024)	Bedrock:	Roxby Formation - Mudstone, calcareous
		Sherwood Sandstone Group – Sandstone
	Superficial:	Alluvium - Clay, silt, sand and gravel

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	Hemingbrough Glaciolacustrine Formation - Clay, silty. Breighton Sand Formation - Sand
Soils (CU 2024)	Soilscape 22: Loamy soils with naturally high groundwater
Survey Methods	Magnetometer survey (fluxgate gradiometer)
Study Area	83ha

5.4 *Archaeological Background*

5.4.1 A search of the HER has revealed that no designated or non-designated heritage assets are recorded within the survey area. A geophysical survey was conducted across land at Hillam Farm 300m south-west of the site (ENY9910). The survey identified several previous field boundaries, areas of former ridge and furrow ploughing, and modern cultivation trends. On the northeastern boundary of the surveyed area, a series of anomalies were interpreted as potentially showing a trackway and enclosures, although it was noted that they might also show a geological feature such as a paleochannel. 300m east of the site the HER records fragmentary remains of rectilinear enclosures that are visible as cropmarks (MNY10363). They HER records numerous cropmarks 600-900 m north of the site, these include enclosures, ring ditches, ditches and a drove way (MNY39992, MNY17139, MNY17140, MNY10350, MNY39993, MNY17141 & MNY17159).

5.5 *Aims and Objectives*

5.5.1 To locate and characterise any anomalies of possible archaeological interest within the study area.

6 RESULTS

6.1 *The survey has been divided into six survey areas (Areas 1-6).*

6.2 *Probable / Possible Archaeology*

6.2.1 In Area 4 ditch-like anomalies, pits, trends and zones of increased response are visible across the survey which have been assigned to the categories of *Probable* / *Possible Archaeology* in accordance with their magnetic strengths. These anomalies mark the locations of several enclosures, a ditched trackway, a ring-ditch and probable refuse pits; while the zones of increased response could indicate spreads of habitation features. These anomalies could mark the locations of small farmsteads or nucleated small settlements plus wider landscape divisions or field systems.

6.3 *Ridge and Furrow*

6.3.1 In Areas 3, 4, 5 and 6 broad and widely spaced parallel linear anomalies have been detected have been caused by historic ridge and furrow cultivation. In places, it has been difficult to distinguish between the ridge and furrow cultivation and the land drains which have been detected across the site (6.6.1).

6.4 *Uncertain*

6.4.1 Linear and curvilinear trends, discrete anomalies and zones of increased response are visible throughout the survey area which have been assigned to the category of *Uncertain*. The majority lack the defined morphologies of anomalies that would ordinarily warrant an archaeological interpretation. They have probably been caused by variations in the underlying geology or relatively modern agricultural processes. In places, it has been difficult to interpret

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some of the responses with confidence due to the high density of anomalies that have been detected in parts of the survey.

6.5 *Former Field Boundary – Corroborated / Conjectural*

6.5.1 In Areas 3, 4, 5 and 6 numerous linear responses have been recorded which correspond with the routes of former field boundaries that are visible on several editions of historic mapping (see Figures 20 & 21).

6.5.2 Linear anomalies in Areas 3, 5 and 6 have been interpreted as conjectural boundaries. While they don't appear to available historic mapping, they have a similar magnetic signature to the corroborated field boundaries (see 6.5.1).

6.6 *Agricultural – Land Drains*

6.6.1 Across all six of the survey areas widely spaced linear responses of varying magnetic strengths have recorded which mark the routes of land drains.

6.7 *Service*

6.7.1 Magnetically strong linear anomalies have been plotted in Areas 3, 5 and 6 which have been caused by two underground service pipes.

6.8 *Ferrous / Magnetic Disturbance*

6.8.1 In the north-east of Area 2 eight ferrous responses forming two rows of evenly spaced anomalies have been detected within a zone of magnetic disturbance. They correspond with the location of a former building that is visible on 1888-1915 & 1937-1961 Ordnance Survey Mapping (see Figure 20 & 21). The strong ferrous responses are the result of the foundation of the former building, while the zone of magnetic disturbance has probably been caused by spreads of modern debris. Magnetic disturbance has also been recorded in the north of Area 1 and in the south of Areas 5 and 6. These are due to made ground or spreads of debris associated with the construction of the A63 to the south.

6.8.2 Ferrous responses close to boundaries are due to adjacent fences and gates. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick / tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretation diagram.

7 DATA APPRAISAL & CONFIDENCE ASSESSMENT

7.1 Historic England Table 4 (EH 2008) states that the typical magnetic response on the local soils / geology is variable. The results from this survey indicate the presence of enclosures, pits and ditches; consequently, the survey is deemed to have worked well. However, in places, it has been difficult to confidently interpret some of the responses due to high density of anomalies that are present in parts of the site.

8 CONCLUSION

8.1 The magnetometer survey has recorded magnetic responses that have been interpreted as being of archaeological interest. In Area 4 a series of enclosures, pits, a trackway and a probable ring-ditch have been detected. They likely represent small farmsteads and wider scale landscape divisions. Ridge and furrow cultivation has also been plotted in Areas 3, 4, 5 and 6. Numerous responses of uncertain origin are visible across the data and while archaeological origins cannot be discounted for all these responses, the majority have probably been caused by natural and agricultural processes. Former field boundaries, land drains and two service pipes have also been marked in the survey. Ferrous responses in the north-east of Area 3 have

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been caused by the foundations of a former building, while zones of magnetic disturbance are due to spreads of modern debris or made ground.

9 REFERENCES

BGS 2024 *Geology of Britain Viewer,* British Geological Survey, website:
[redacted]

CIfA 2020 *Standard and Guidance for Archaeological Geophysical Survey.* 2014 amended 2020. CIfA Guidance note. Chartered Institute for Archaeologists, Reading
[redacted]

CU 2024 *The Soils Guide*. www.landis.org.uk. Cranfield University, UK. website:
[redacted]

EAC 2016 *EAC Guidelines for the Use of Geophysics in Archaeology,* European Archaeological Council, Guidelines 2.

EH 2008 *Geophysical Survey in Archaeological Field Evaluation.* English Heritage, Swindon (now withdrawn, but used for evaluating suitability of soil types)

10 ARCHIVE

10.1 The minimally processed data, data images, XY traces and a copy of this report are stored in **SUMO GeoSurveys'** digital archive, on an internal RAID configured NAS drive in the Midlands Office. These data are also backed up to the Cloud for off-site storage.

10.2 The Grey Literature will be archived with OASIS and the relevant HER within a period of 12 months.

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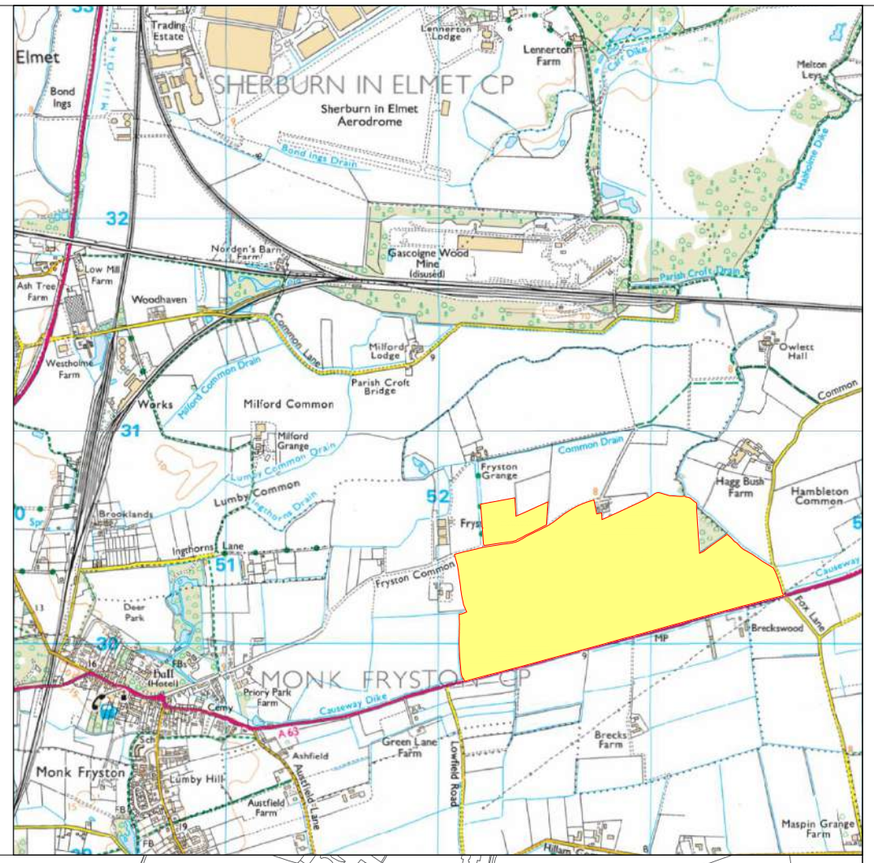

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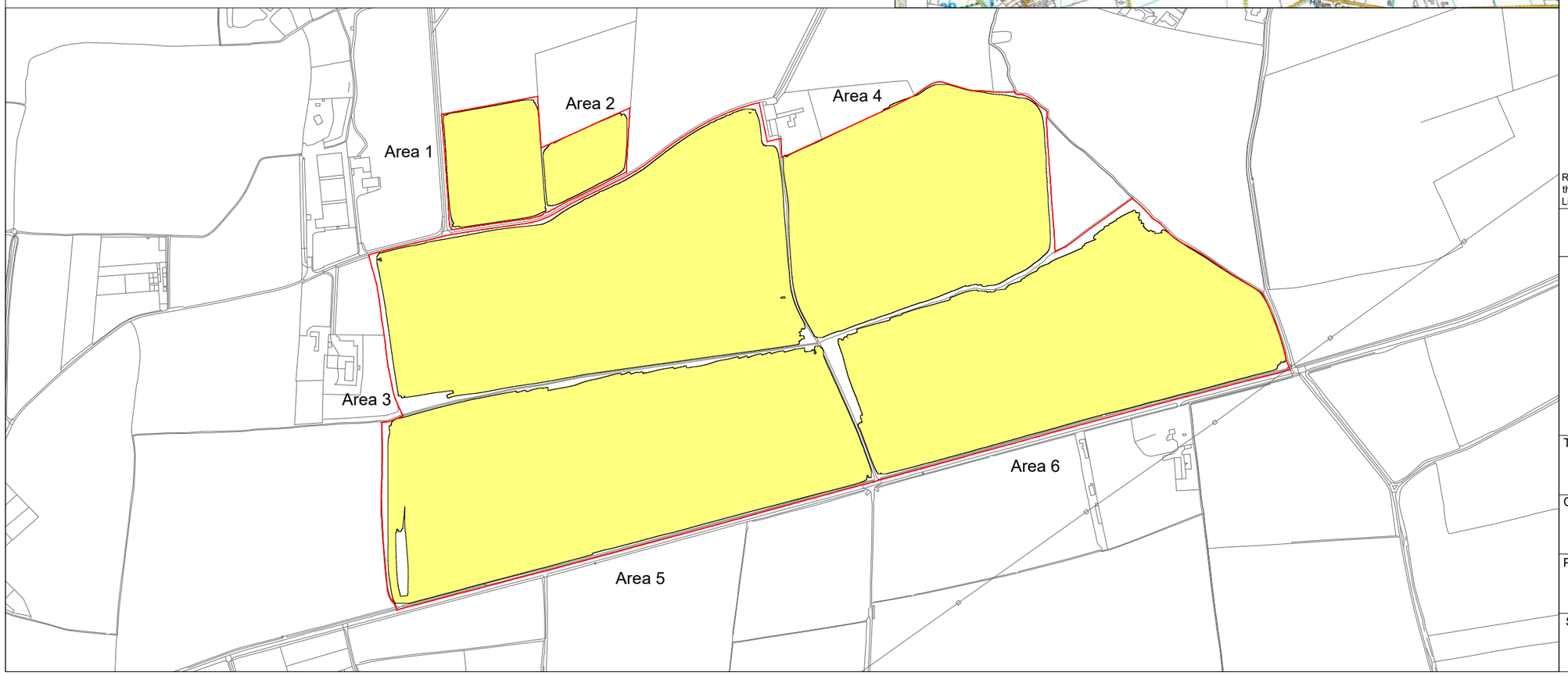

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Survey Areas

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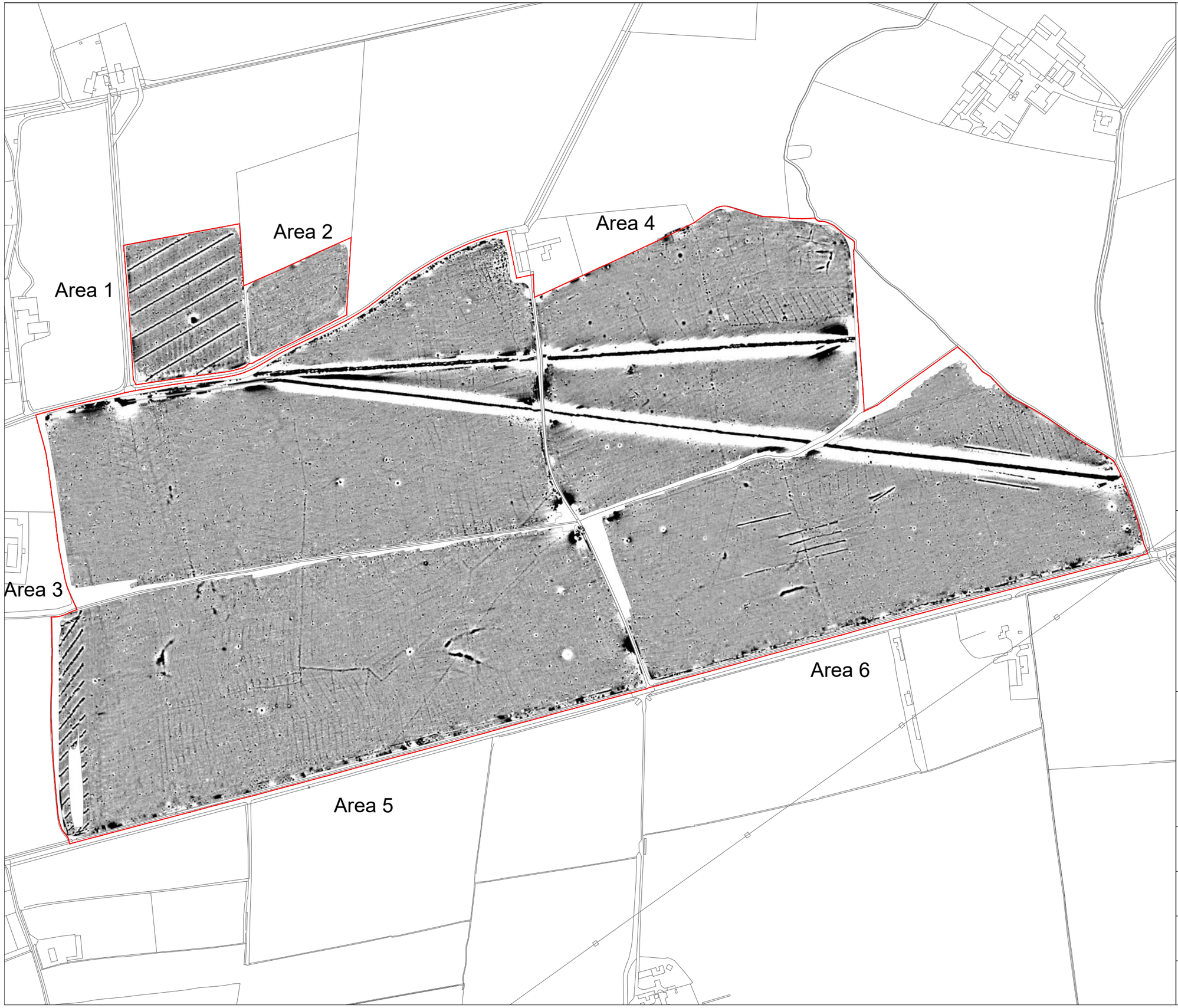
Title:
Site Location

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
NOT TO SCALE

Fig No:
01



N

+2nT

-1nT

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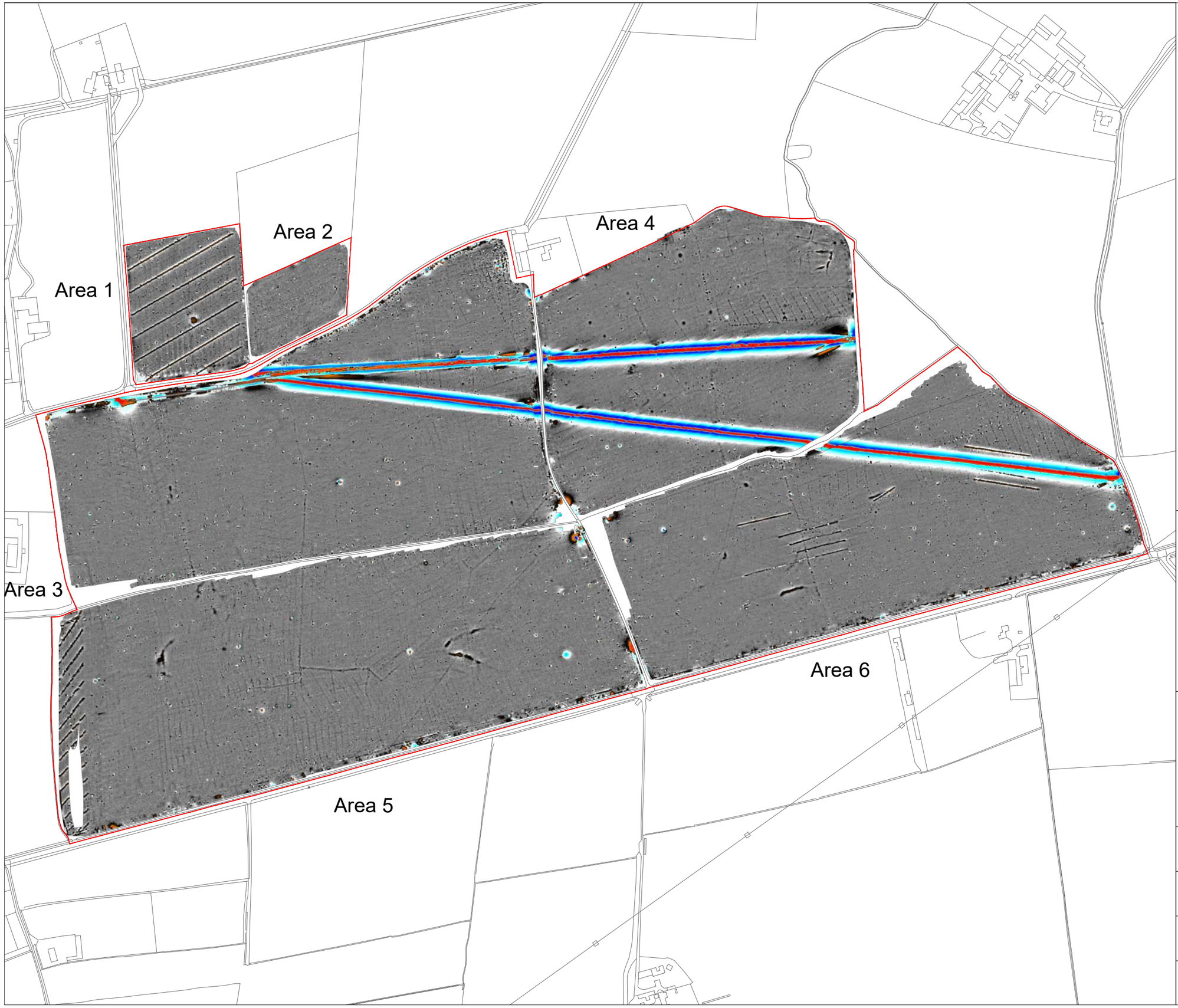
Title:
Magnetometer Survey - Greyscale Plots

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 250
1:5000 @ A3

Fig No:
02



N

+100nT

-100nT

sumo GeoSurveys

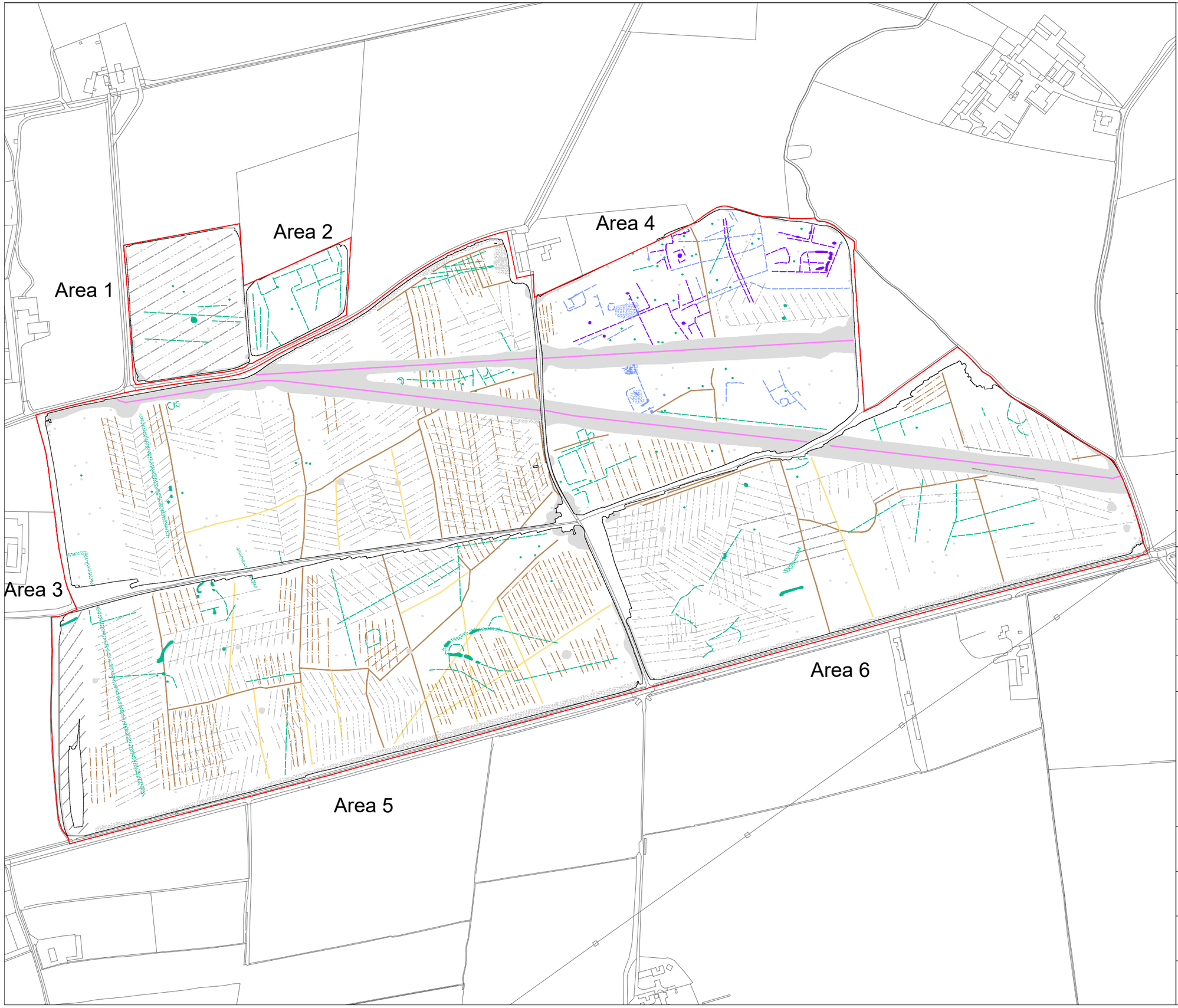
Title:
Magnetometer Survey - Colour Plots

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 250
1:5000 @ A3

Fig No:
03



N

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

Title:
Magnetometer Survey - Interpretation

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 250
1:5000 @ A3

Fig No:
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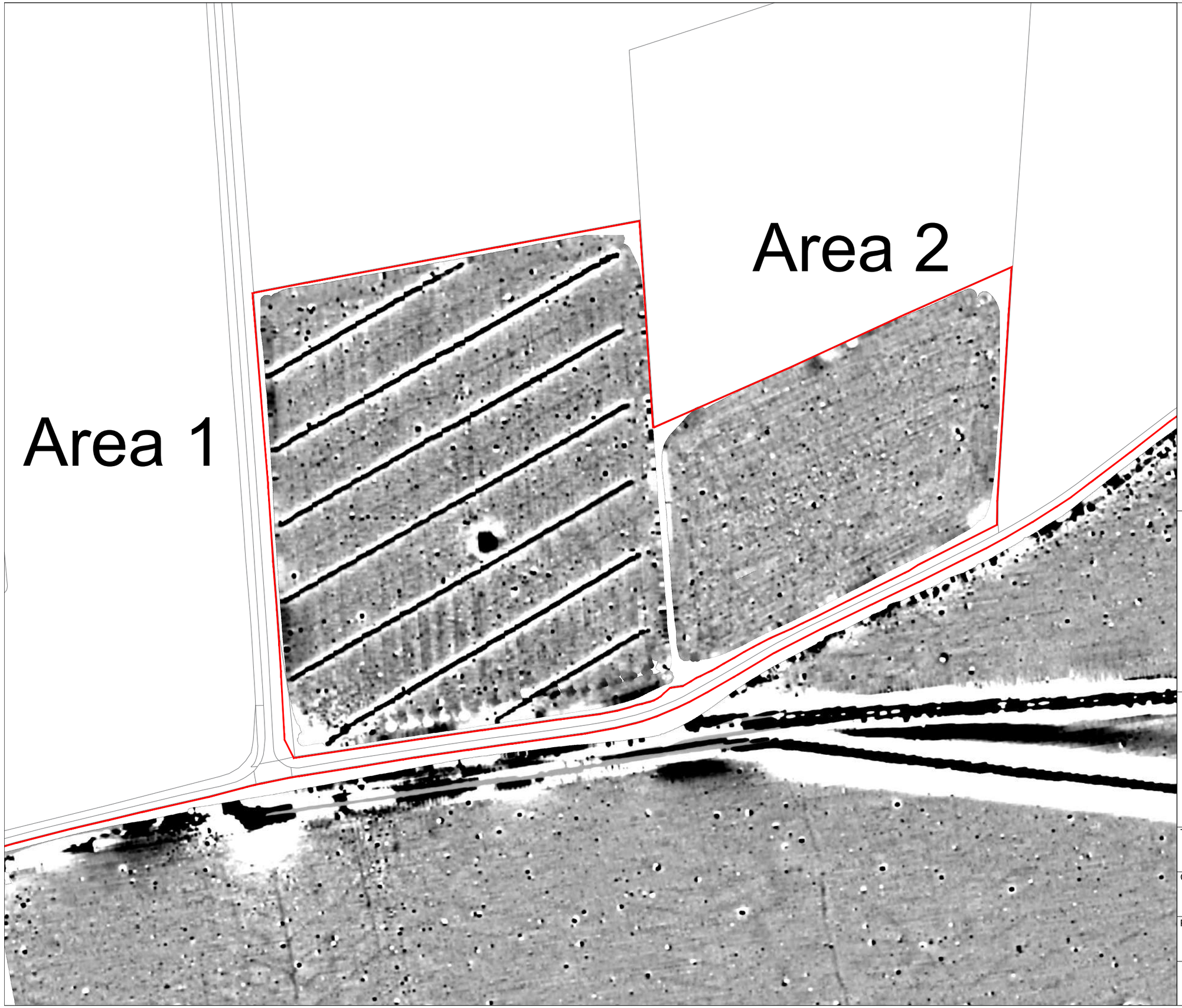

N

+2nT

-1nT

sumo GeoSurveys

Title:
Magnetometer Survey - Greyscale Plots
(Areas 1 & 2)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 75
1:1500 @ A3

Fig No:
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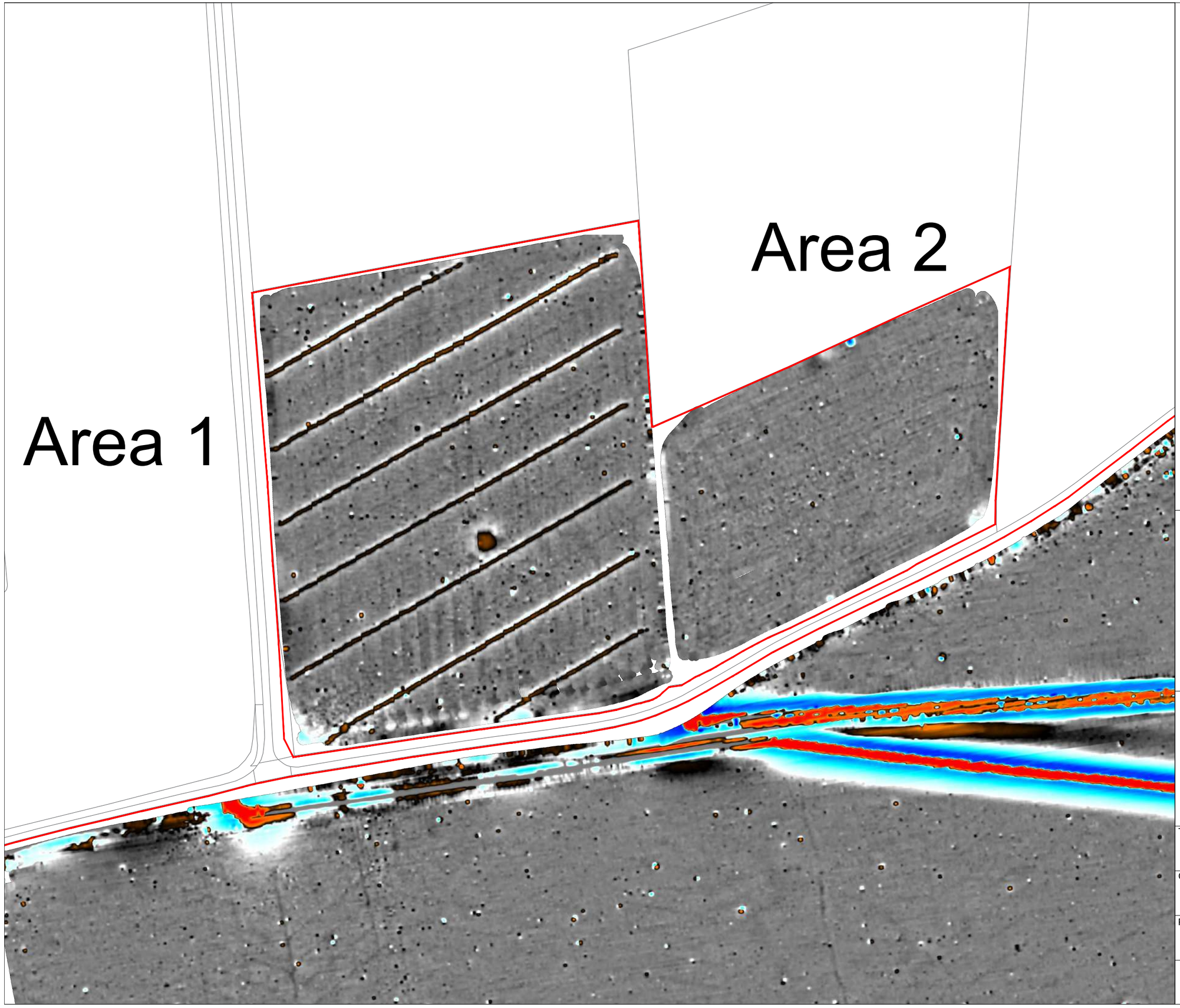


Title:
Magnetometer Survey - Colour Plots
(Areas 1 & 2)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 75
1:1500 @ A3

Fig No:
06

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

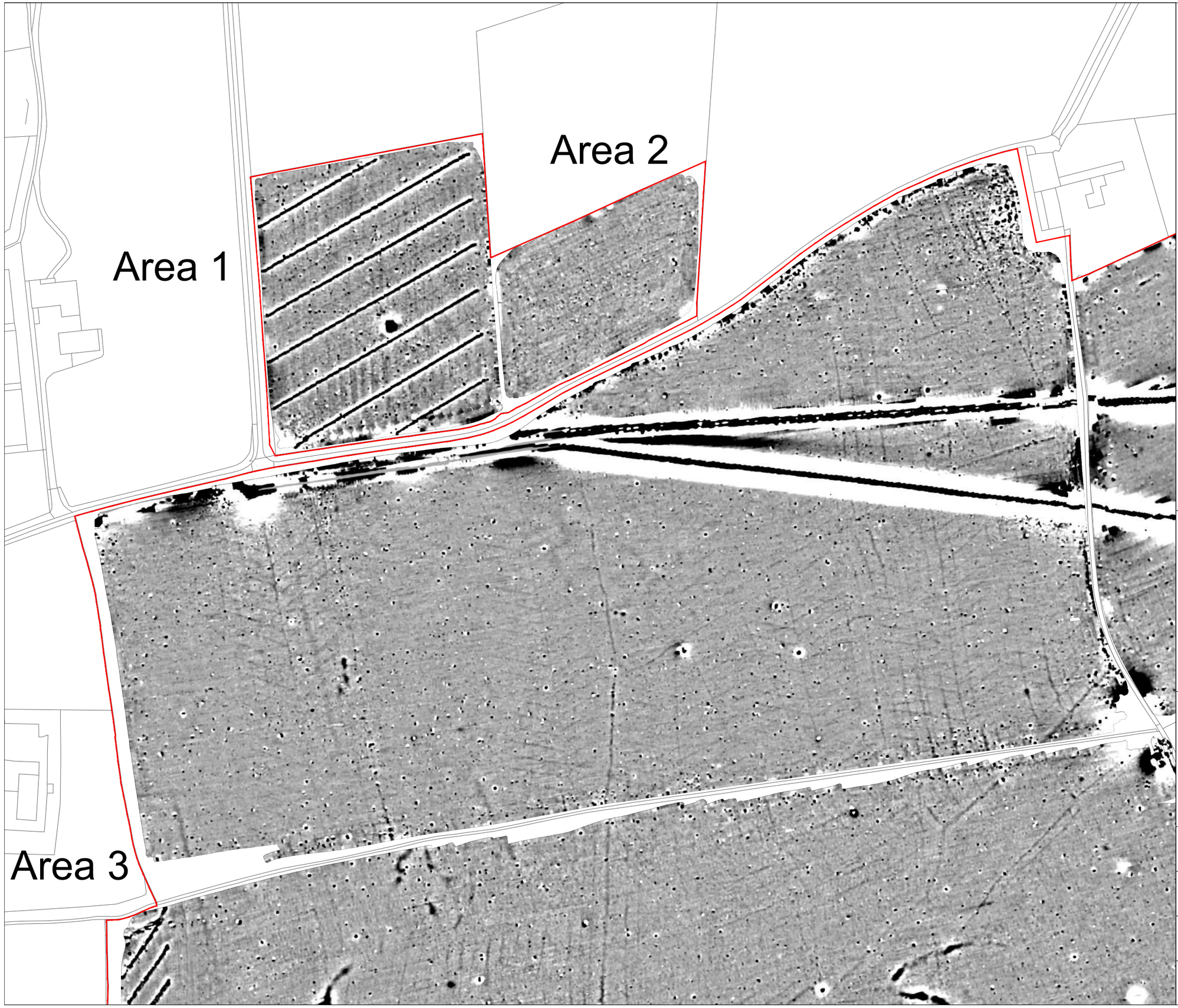
Title:
Magnetometer Survey - Interpretation
(Areas 1 & 2)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 75
1:1500 @ A3

Fig No:
07



N

+2nT

-1nT

sumo GeoSurveys

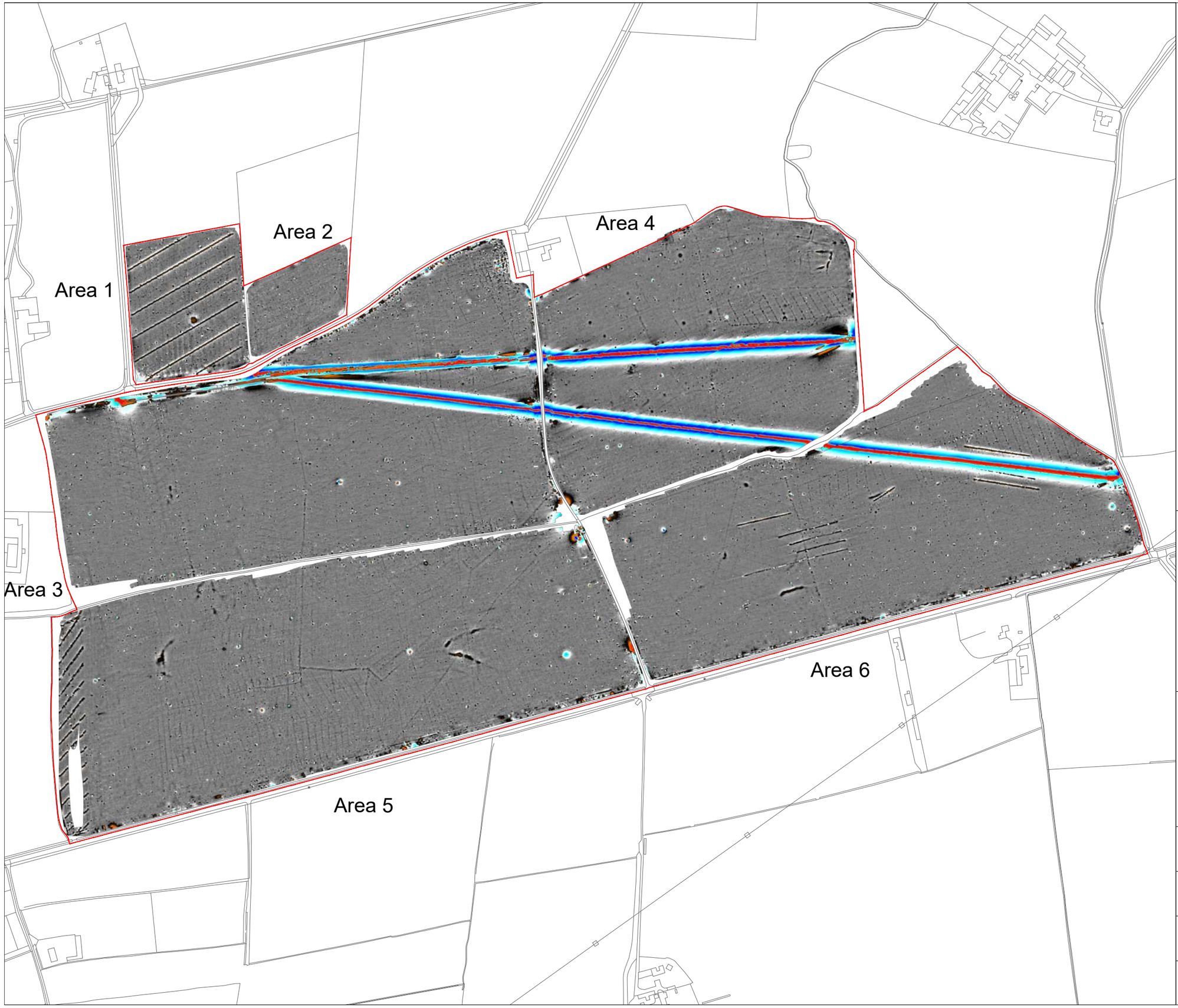
Title:
Magnetometer Survey - Greyscale Plot (Area 3)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
08



N

+100nT

-100nT

sumo GeoSurveys

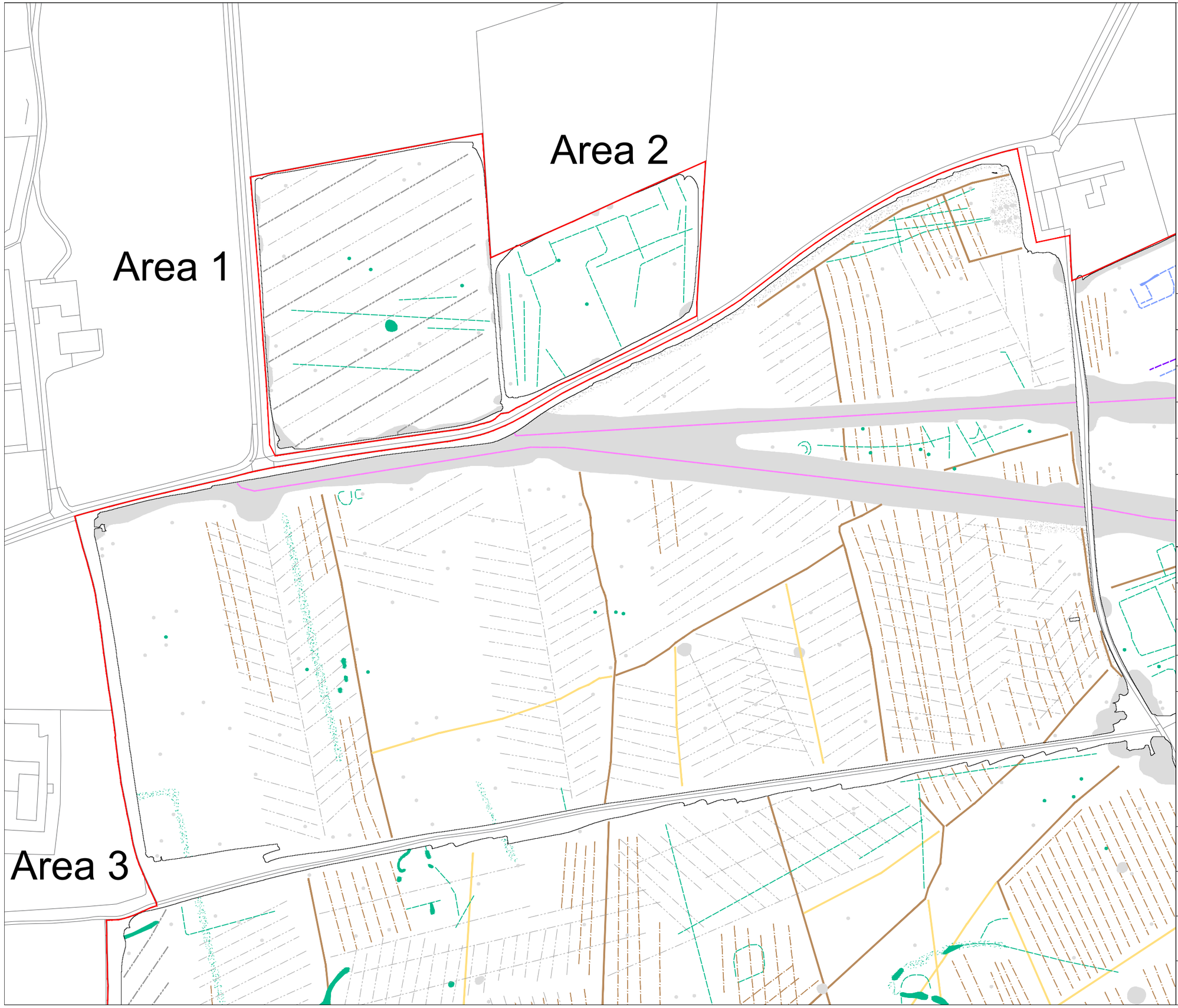
Title:
Magnetometer Survey - Colour Plot (Area 3)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
09



N

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

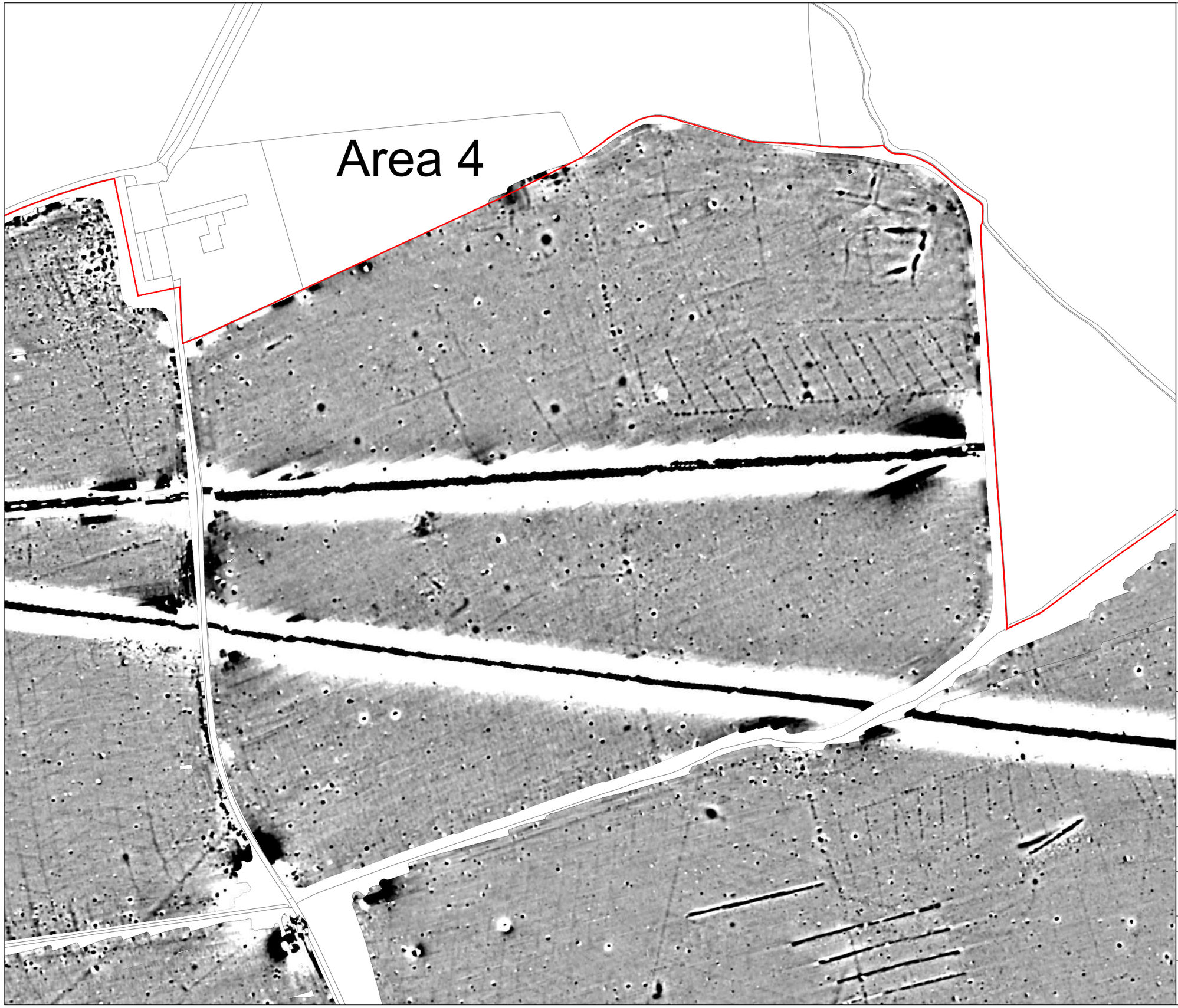
Title:
Magnetometer Survey - Interpretation (Area 3)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
10



N

+2nT

-1nT

sumo GeoSurveys

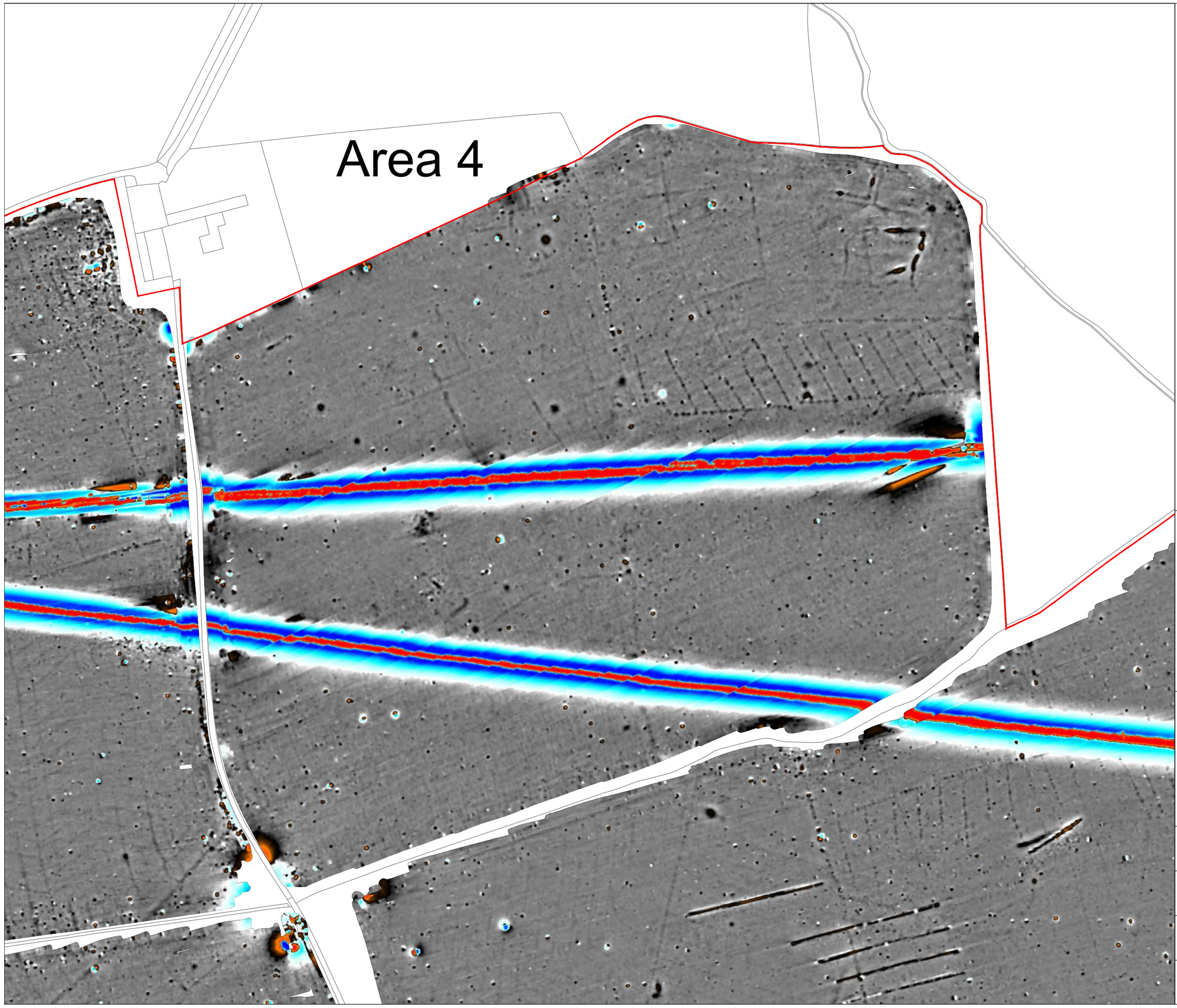
Title:
Magnetometer Survey - Greyscale Plot (Area 4)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 100
1:2000 @ A3

Fig No:
11



N

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-100nT

sumo GeoSurveys

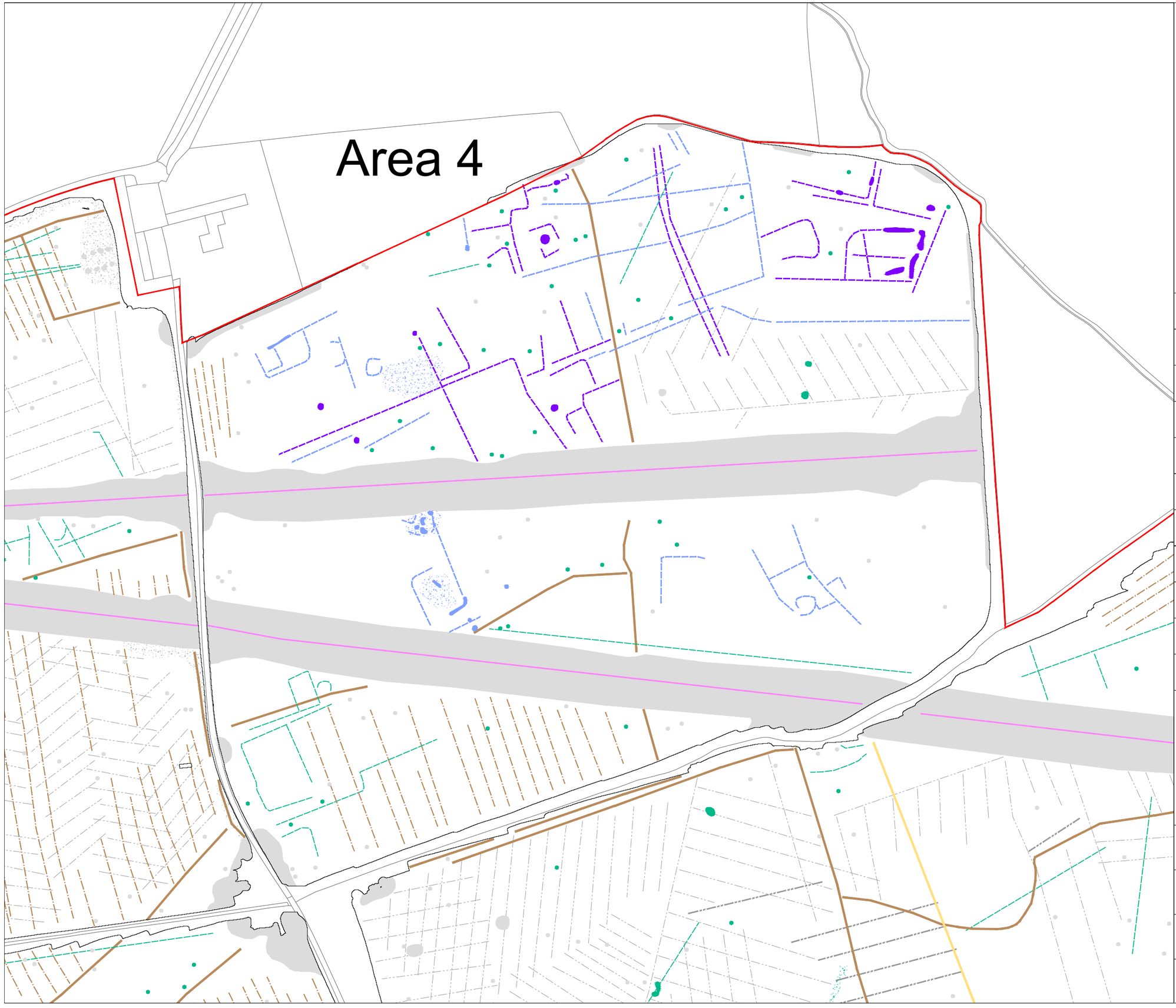
Title:
Magnetometer Survey - Colour Plot (Area 4)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 100
1:2000 @ A3

Fig No:
12



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KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

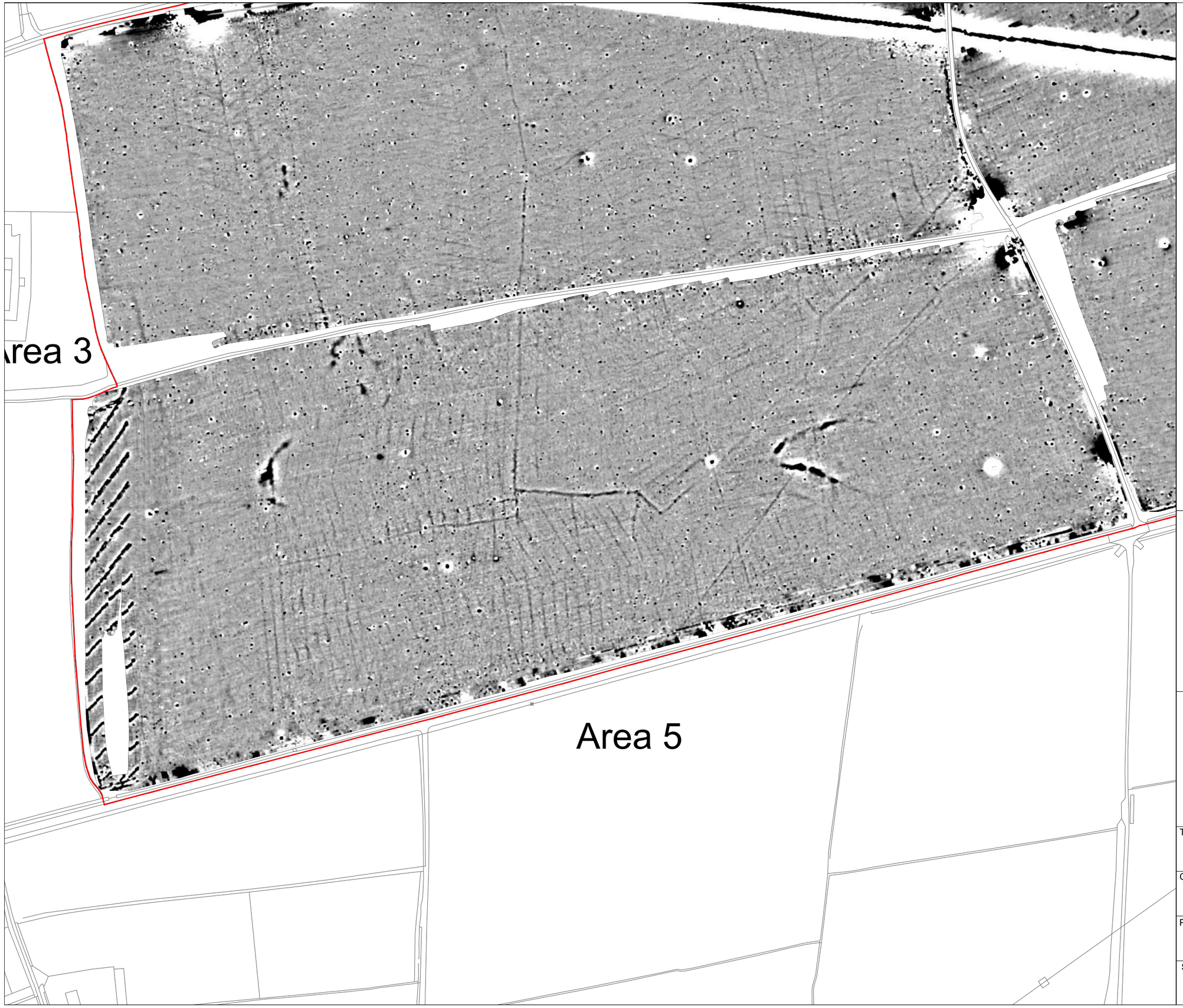
Title:
Magnetometer Survey - Interpretation (Area 4)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 100
1:2000 @ A3

Fig No:
13



N

+2nT

-1nT

sumo GeoSurveys

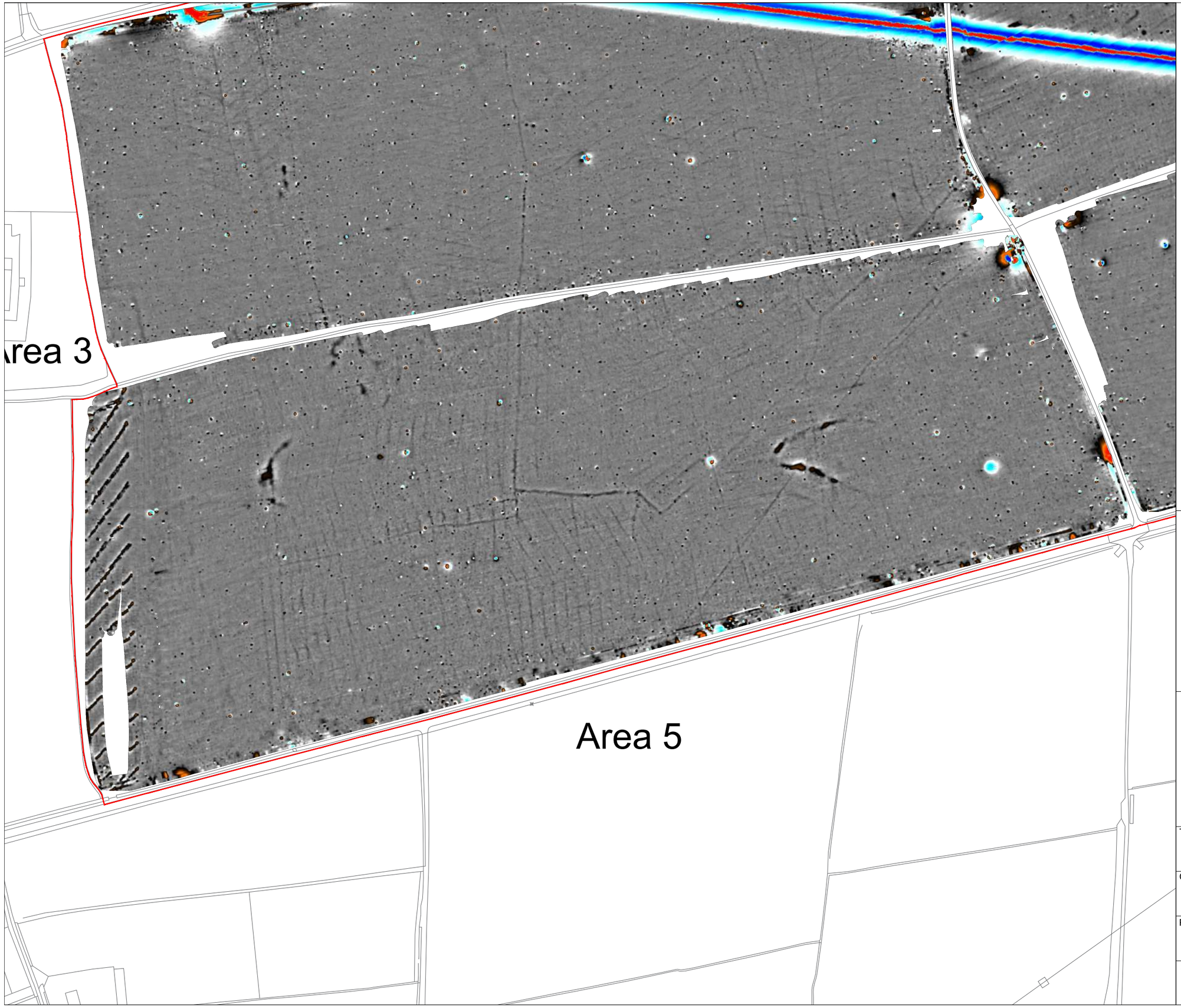
Title:
Magnetometer Survey - Greyscale Plot (Area 5)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 140
1:2800 @ A3

Fig No:
14



N

+100nT

-100nT

sumo GeoSurveys

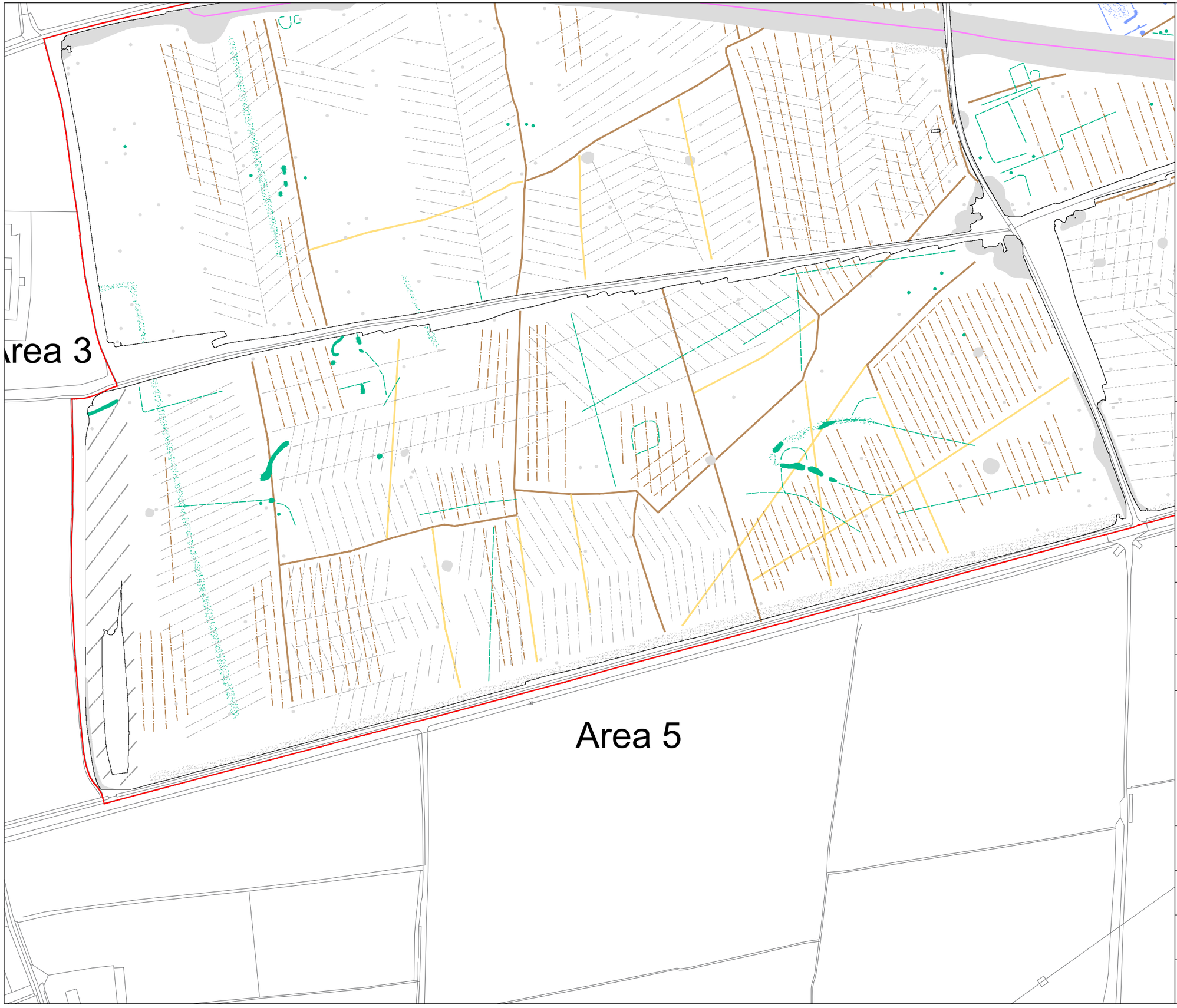
Title:
Magnetometer Survey - Colour Plot (Area 5)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 140
1:2800 @ A3

Fig No:
15



N

KEY

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	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

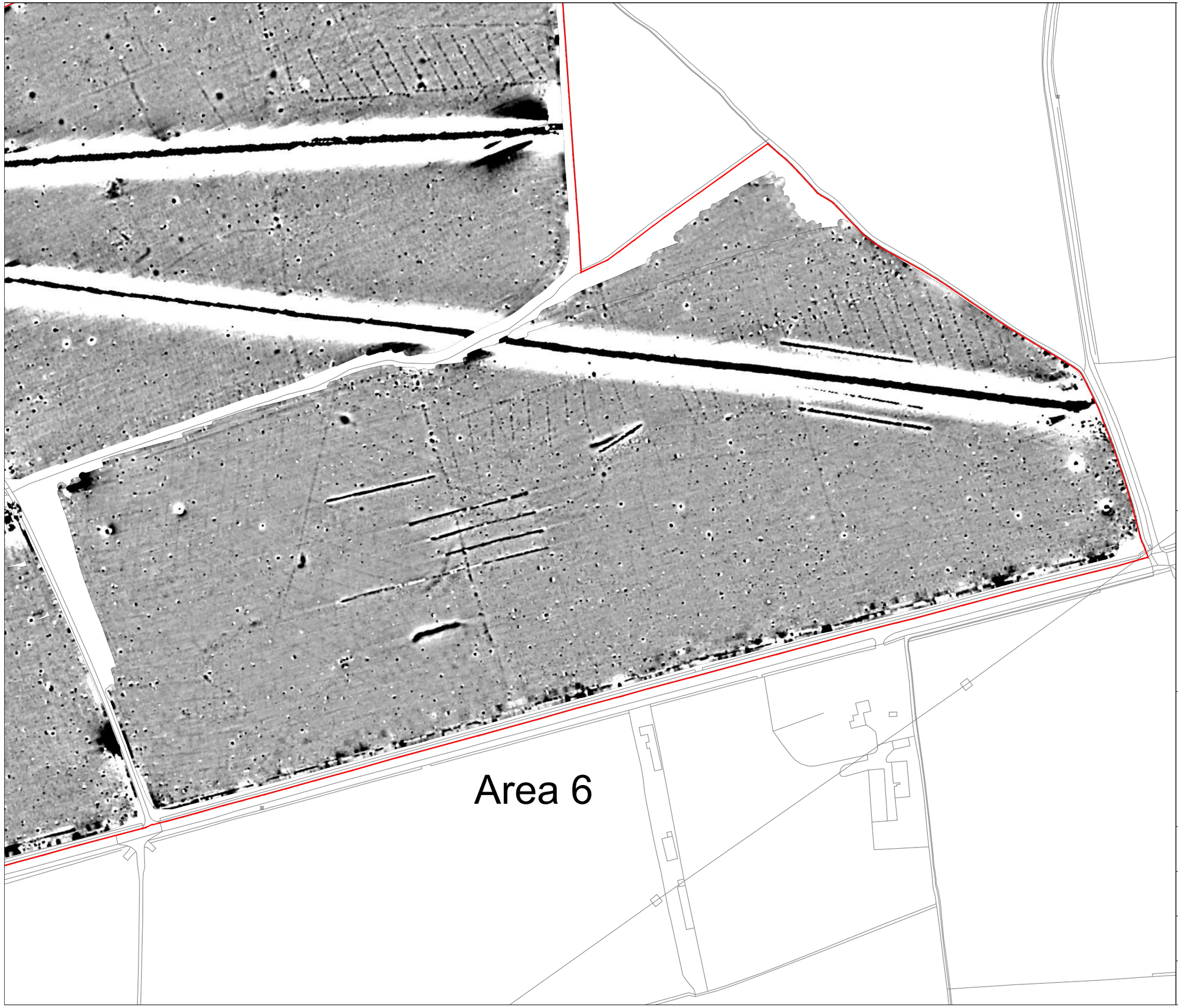
Title:
Magnetometer Survey - Interpretation (Area 5)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 140
1:2800 @ A3

Fig No:
16



N

+2nT

-1nT

sumo GeoSurveys

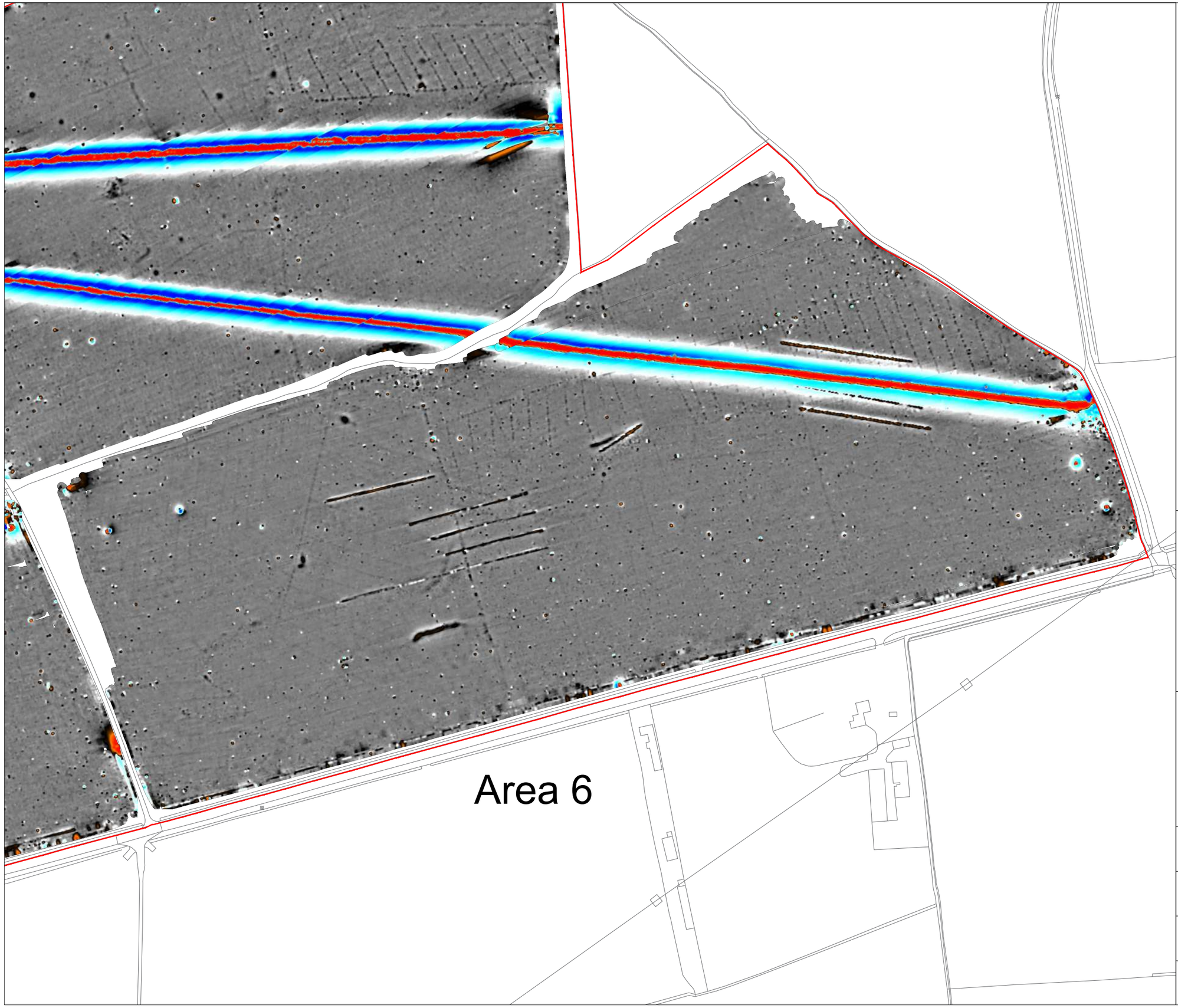
Title:
Magnetometer Survey - Greyscale Plot (Area 6)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
17



N

+100nT

-100nT

sumo GeoSurveys

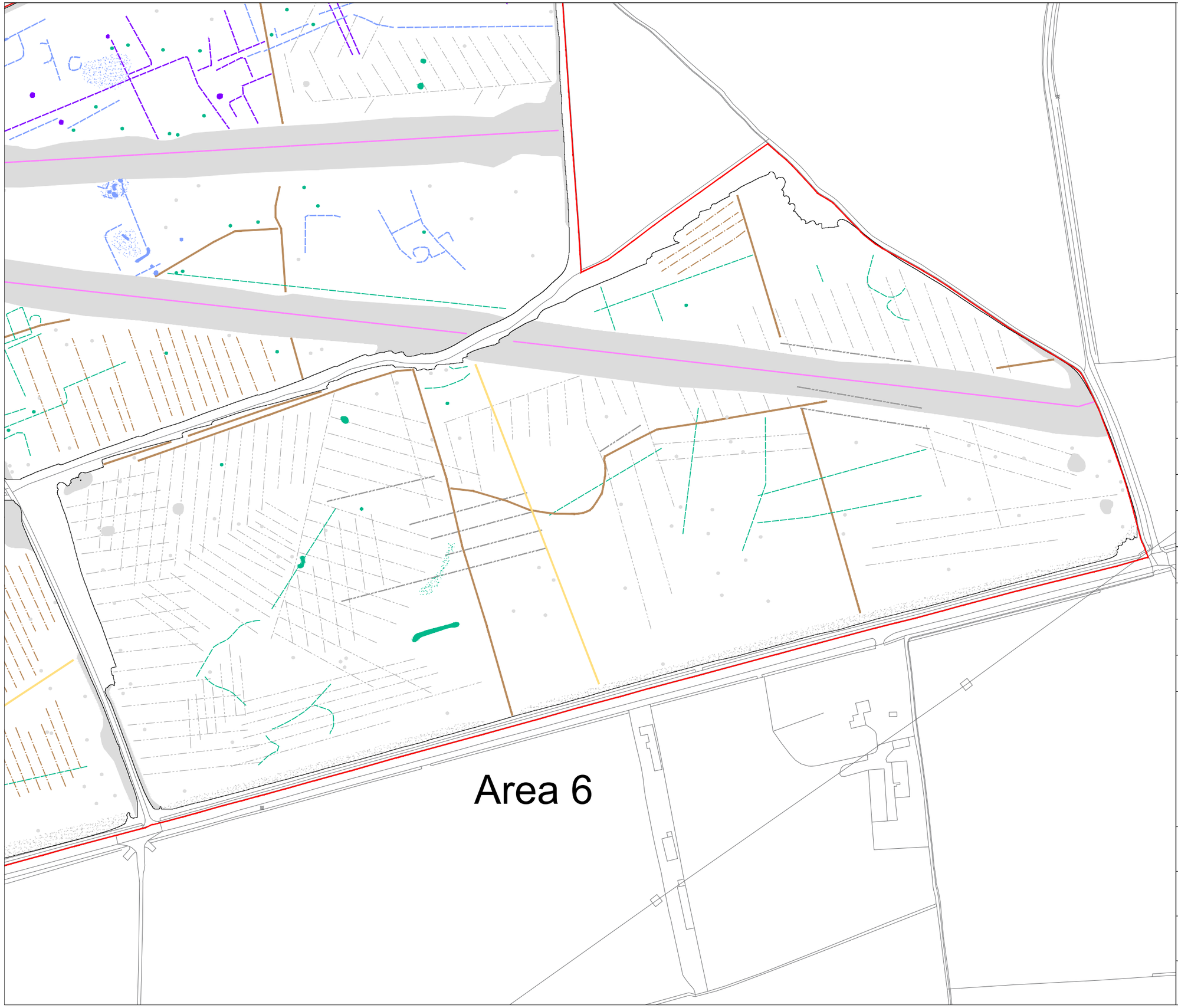
Title:
Magnetometer Survey - Colour Plot (Area 6)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
18



N

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

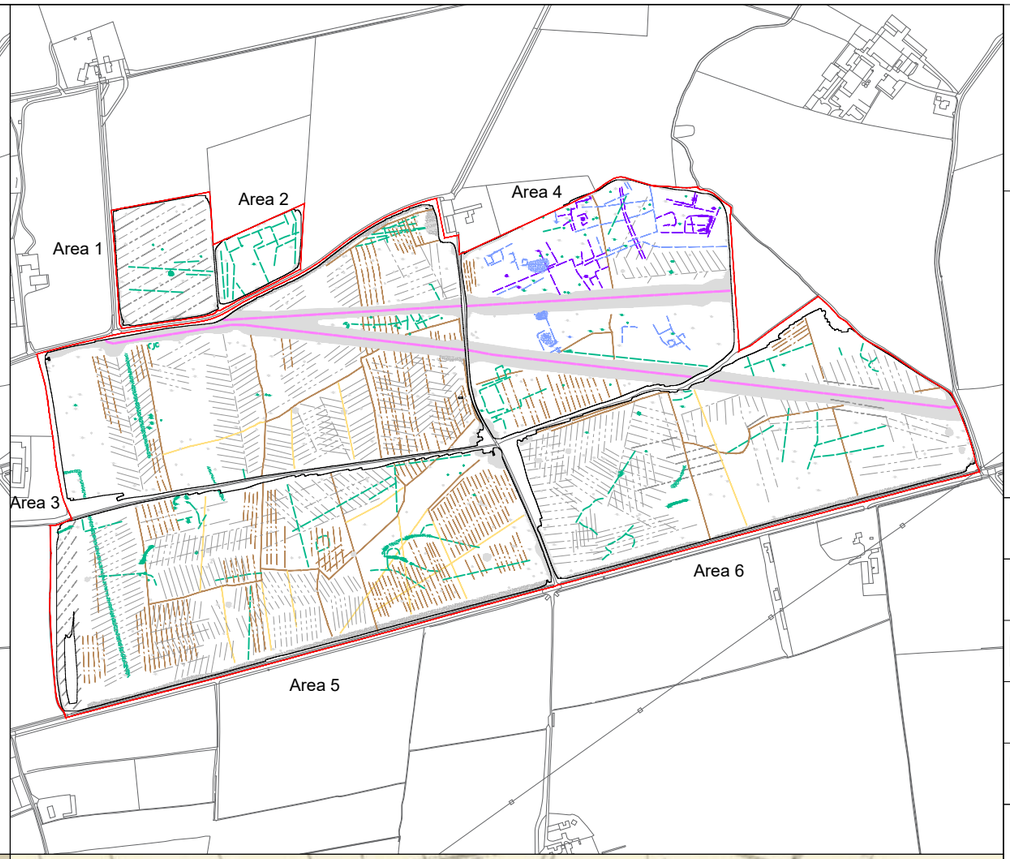
Title:
Magnetometer Survey - Interpretation (Area 6)

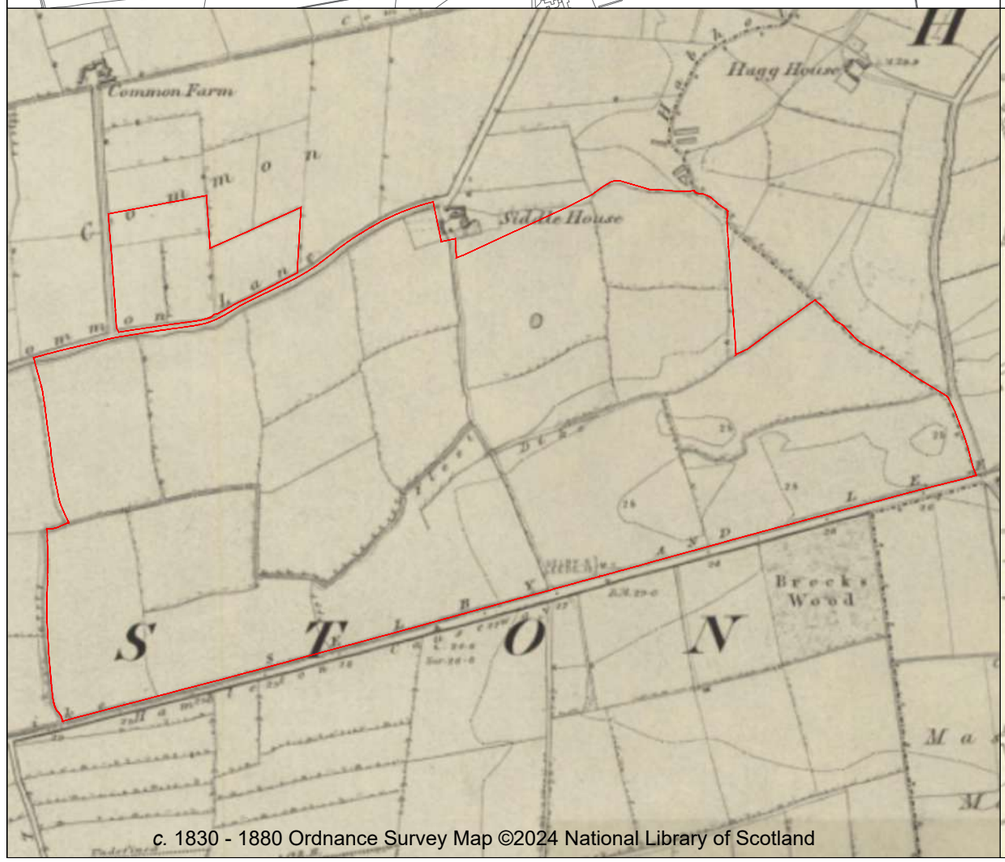
Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

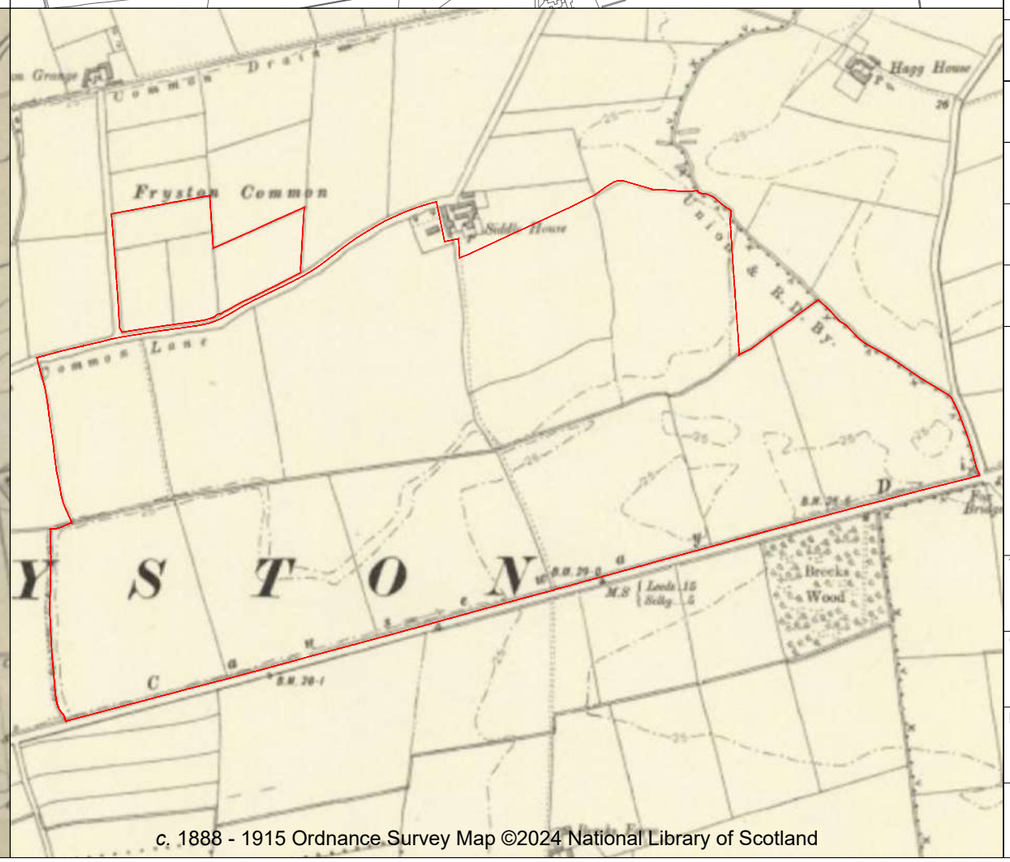
Scale:
0 metres 125
1:2500 @ A3

Fig No:
19





c. 1830 - 1880 Ordnance Survey Map ©2024 National Library of Scotland



c. 1888 - 1915 Ordnance Survey Map ©2024 National Library of Scotland

N

+2nT

-1nT

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

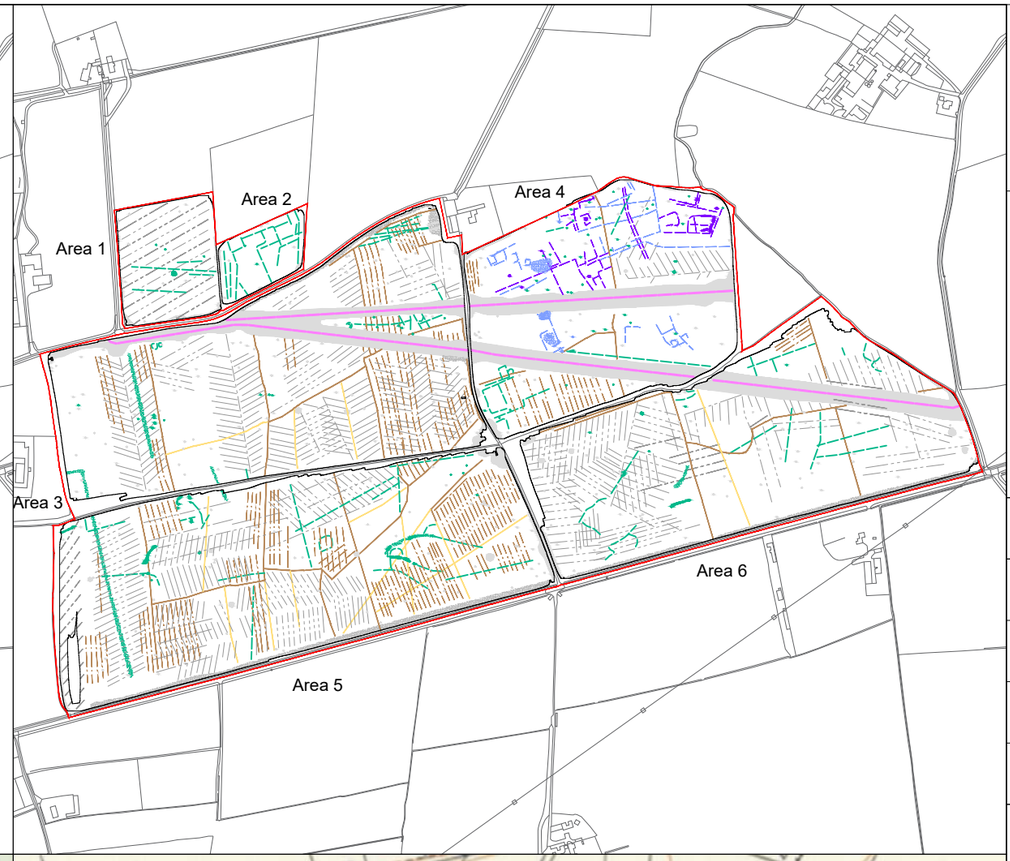
Title: Greyscale Plots / Interpretation / 1830-1880 (bottom left) & 1888-1915 (bottom right) Ordnance Survey Mapping

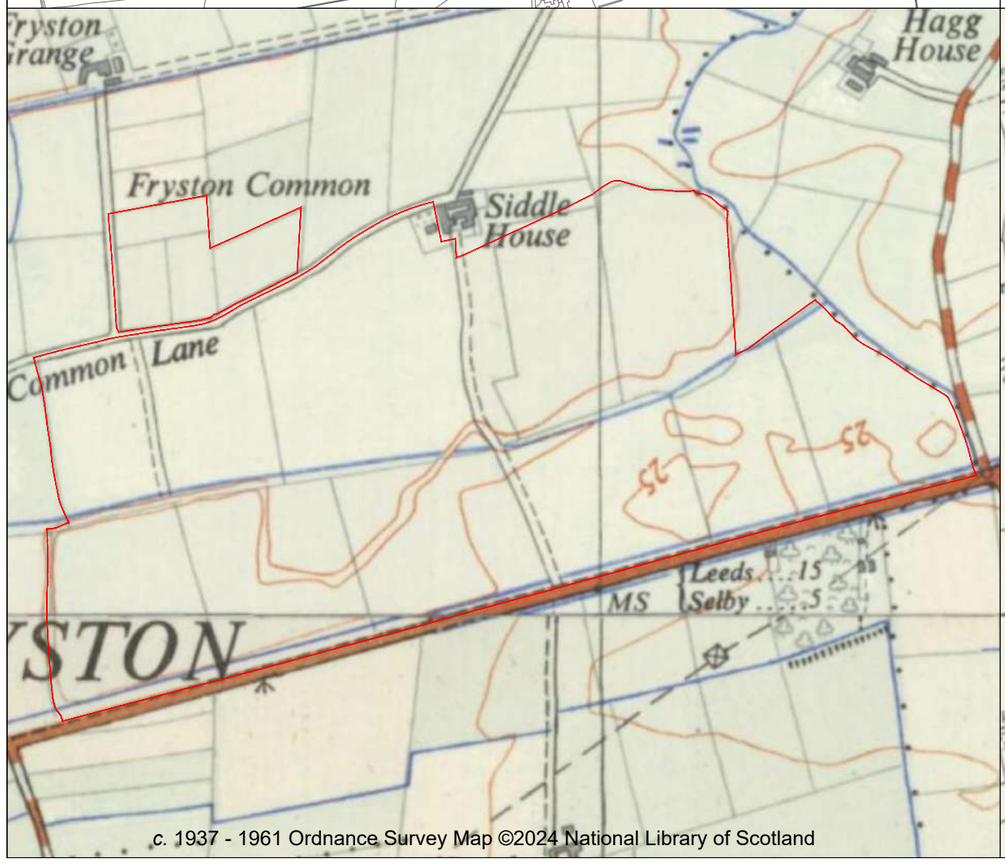
Client: Island Green Power UK Limited

Project: 16614-2 - Light Valley Solar Project: Site 2

Scale: NOT TO SCALE

Fig No: 20





c. 1937 - 1961 Ordnance Survey Map ©2024 National Library of Scotland

c. 1949 - 1973 Ordnance Survey Map ©2024 National Library of Scotland

N

+2nT

-1nT

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

Title: Greyscale Plots / Interpretation / 1937-1961 (bottom left) & 1949-1973 (bottom right) Ordnance Survey Mapping

Client: Island Green Power UK Limited

Project: 16614-2 - Light Valley Solar Project: Site 2

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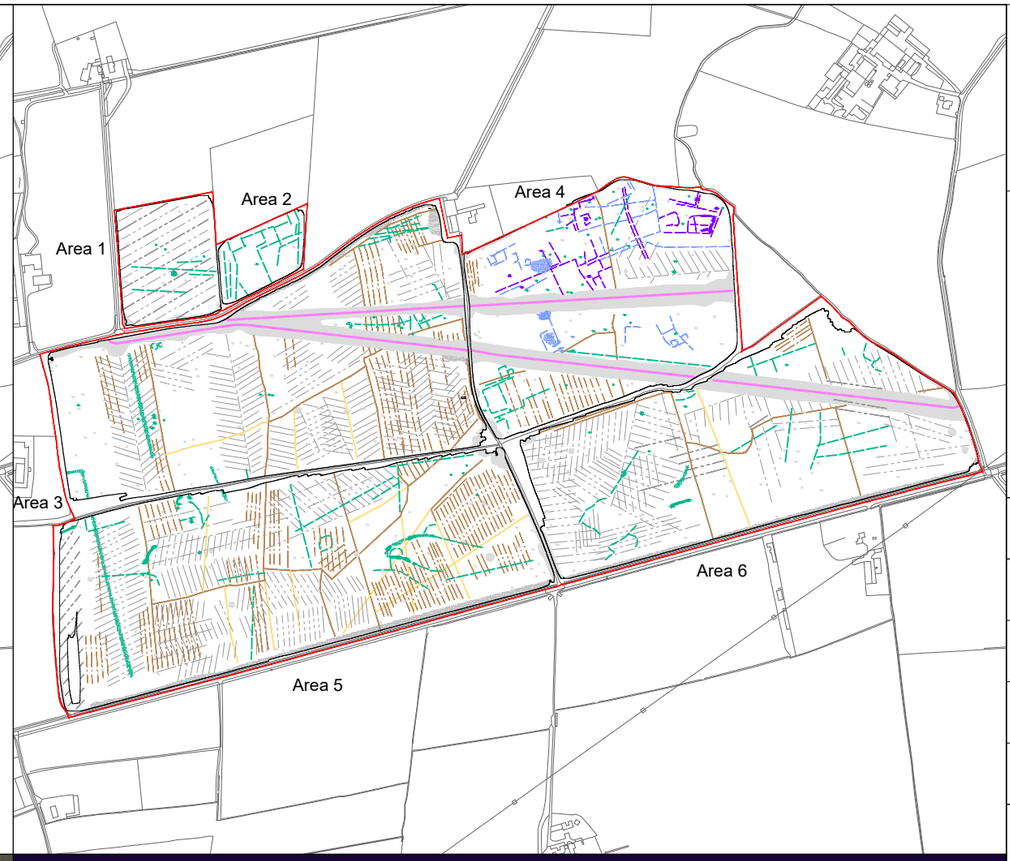

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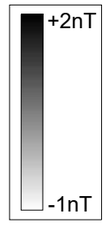


KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

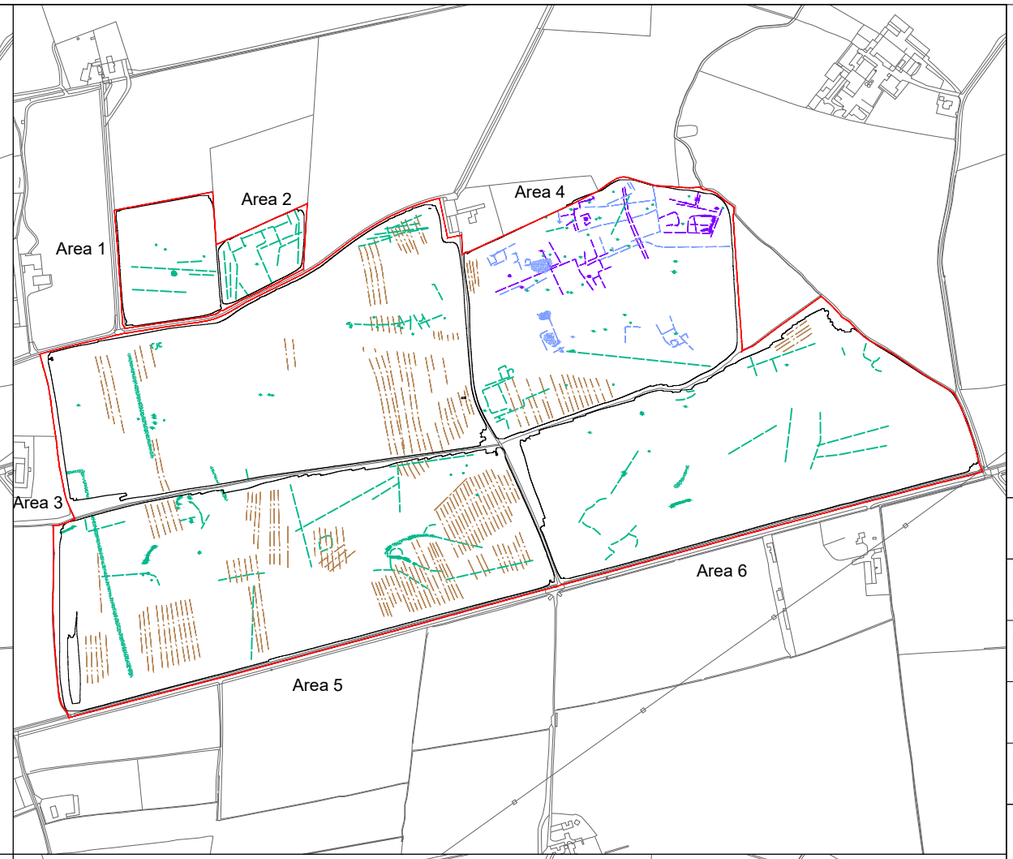
Title:
Greyscale Plots / Interpretation / 2022 Aerial Image / LiDAR Data Plot

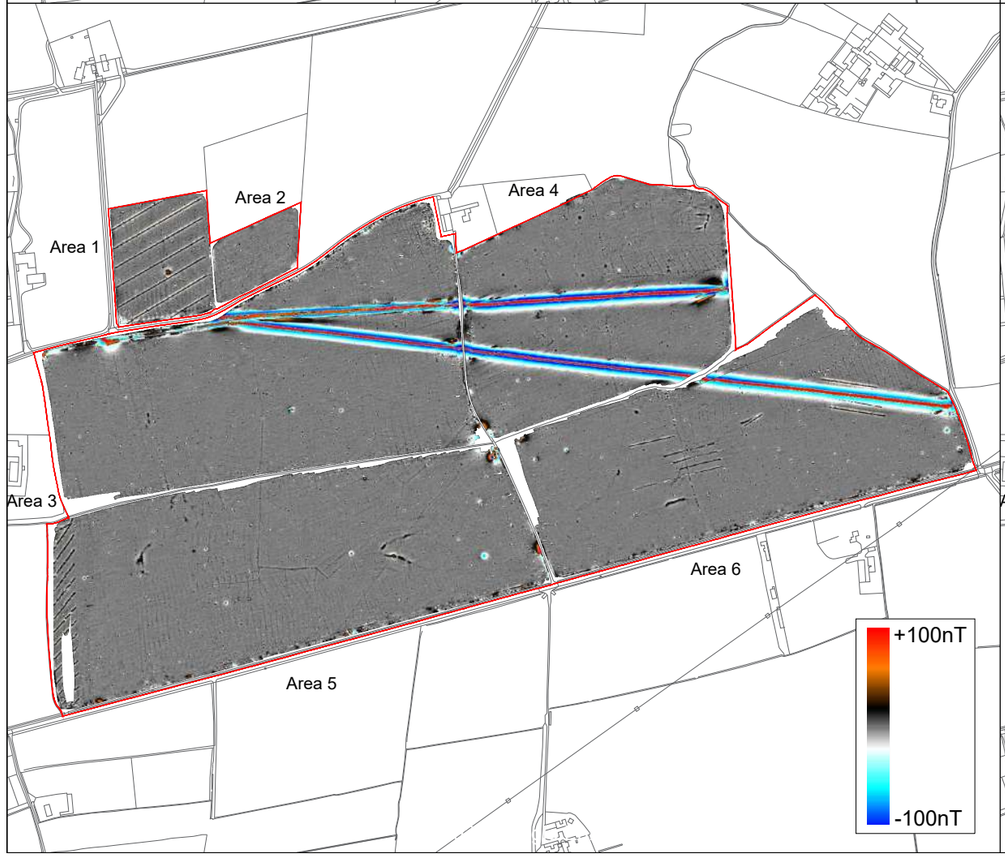
Client:
Island Green Power UK Limited

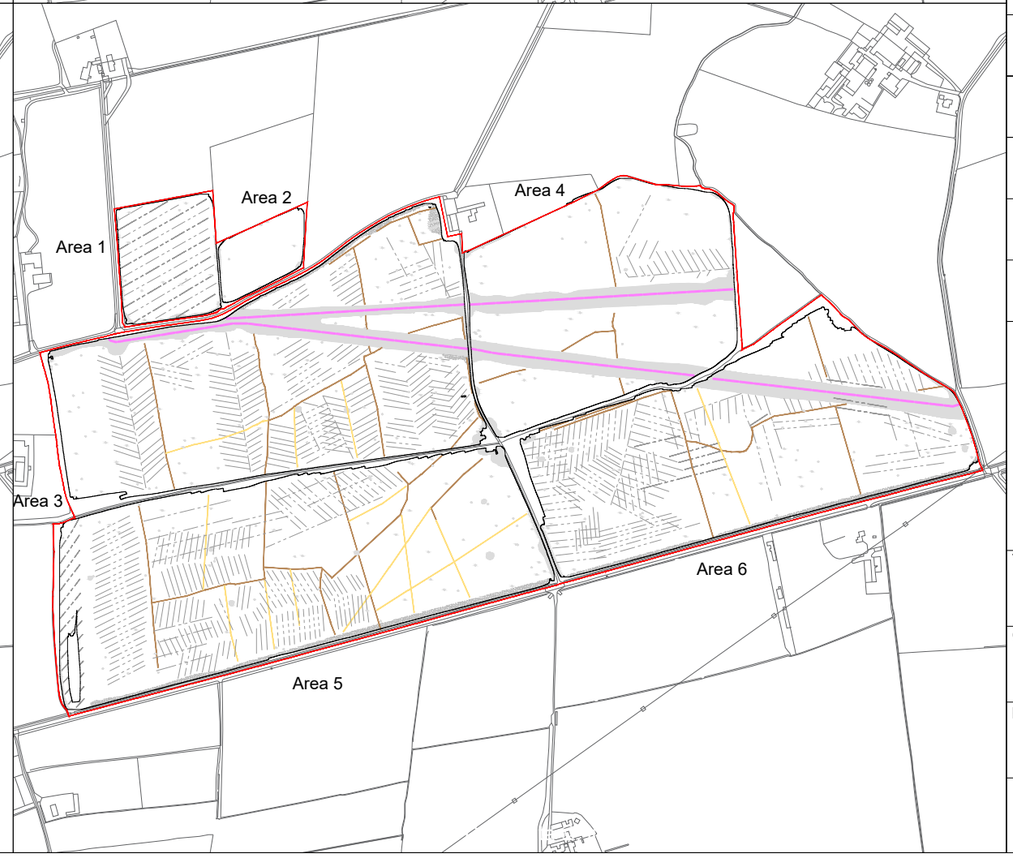
Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
NOT TO SCALE

Fig No:
22







N

KEY

	Probable archaeology (discrete anomaly / trend / increased response)
	Possible archaeology (discrete anomaly / trend / increased response)
	Ridge and furrow
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Former field boundary (conjectural)
	Agriculture (land drain)
	Magnetic disturbance
	Service
	Ferrous

sumo GeoSurveys

Title:
Greyscale and Colour Plots / Interpretation

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
NOT TO SCALE

Fig No:
23

N

+10nT

-10nT

sumo GeoSurveys

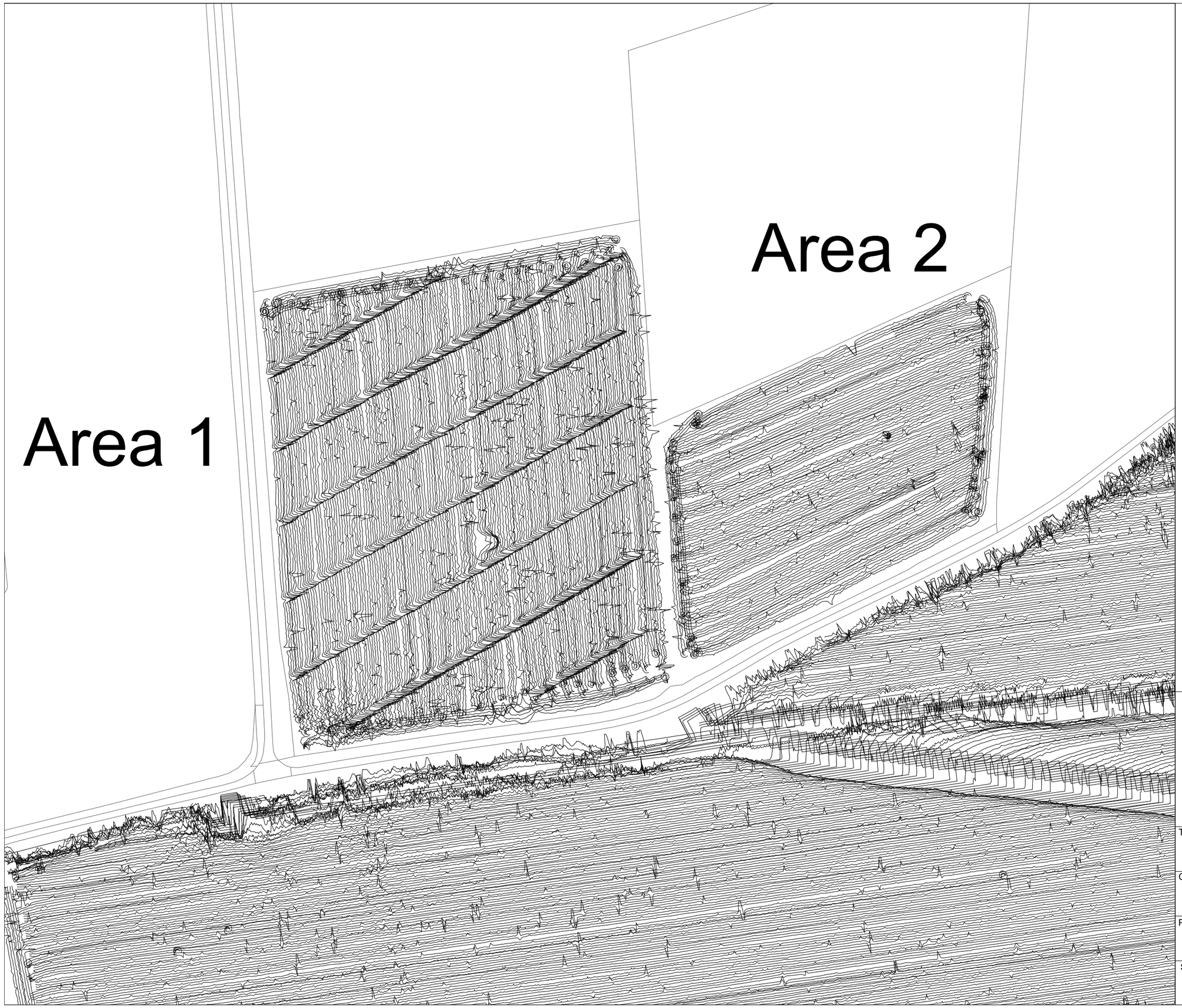
Title:
Minimally Processed Data - Greyscale Plots

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 250
1:5000 @ A3

Fig No:
24



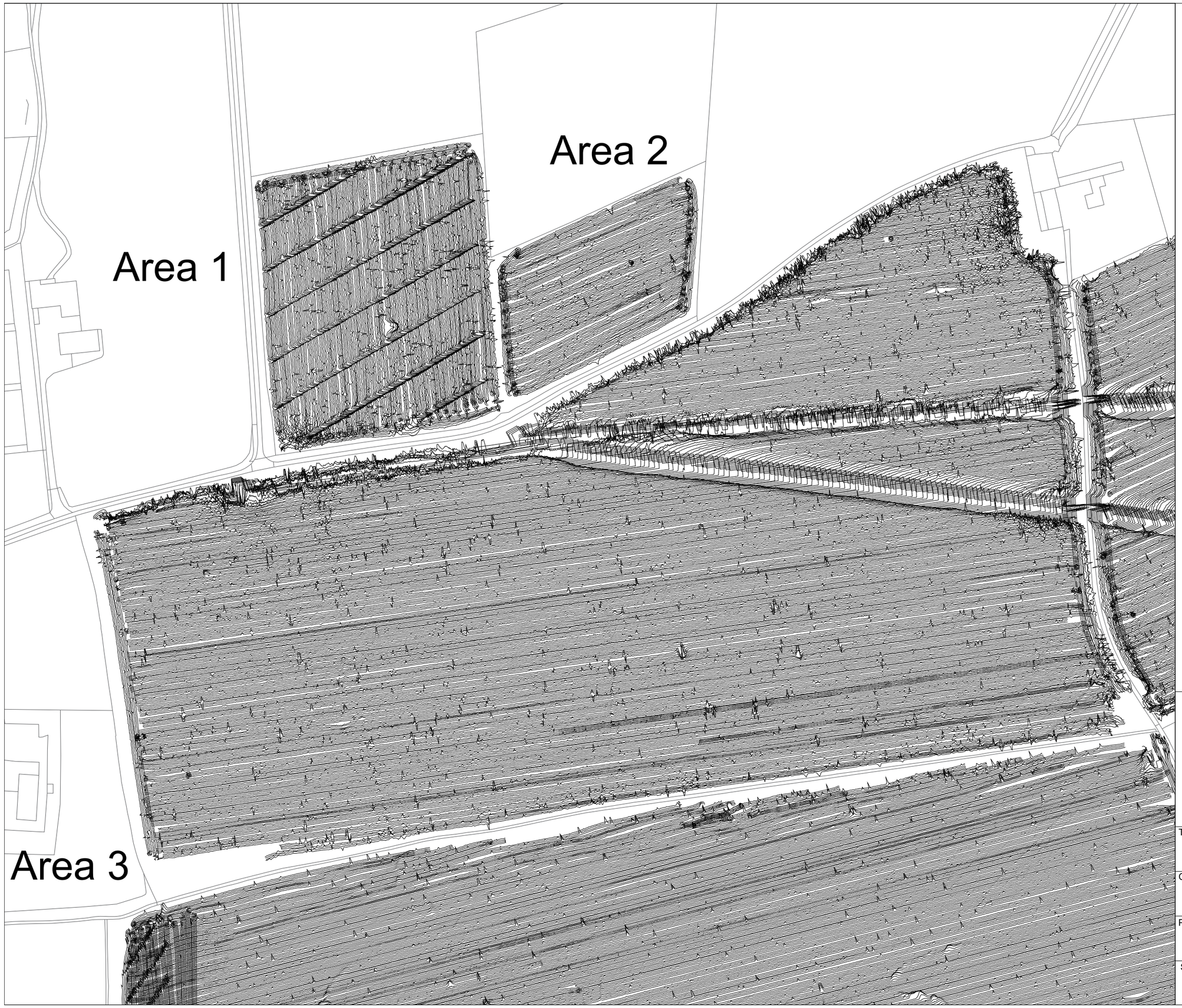
Title:
XY Trace Plots (Areas 1 & 2 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 75
1:1500 @ A3

Fig No:
25



sumo GeoSurveys

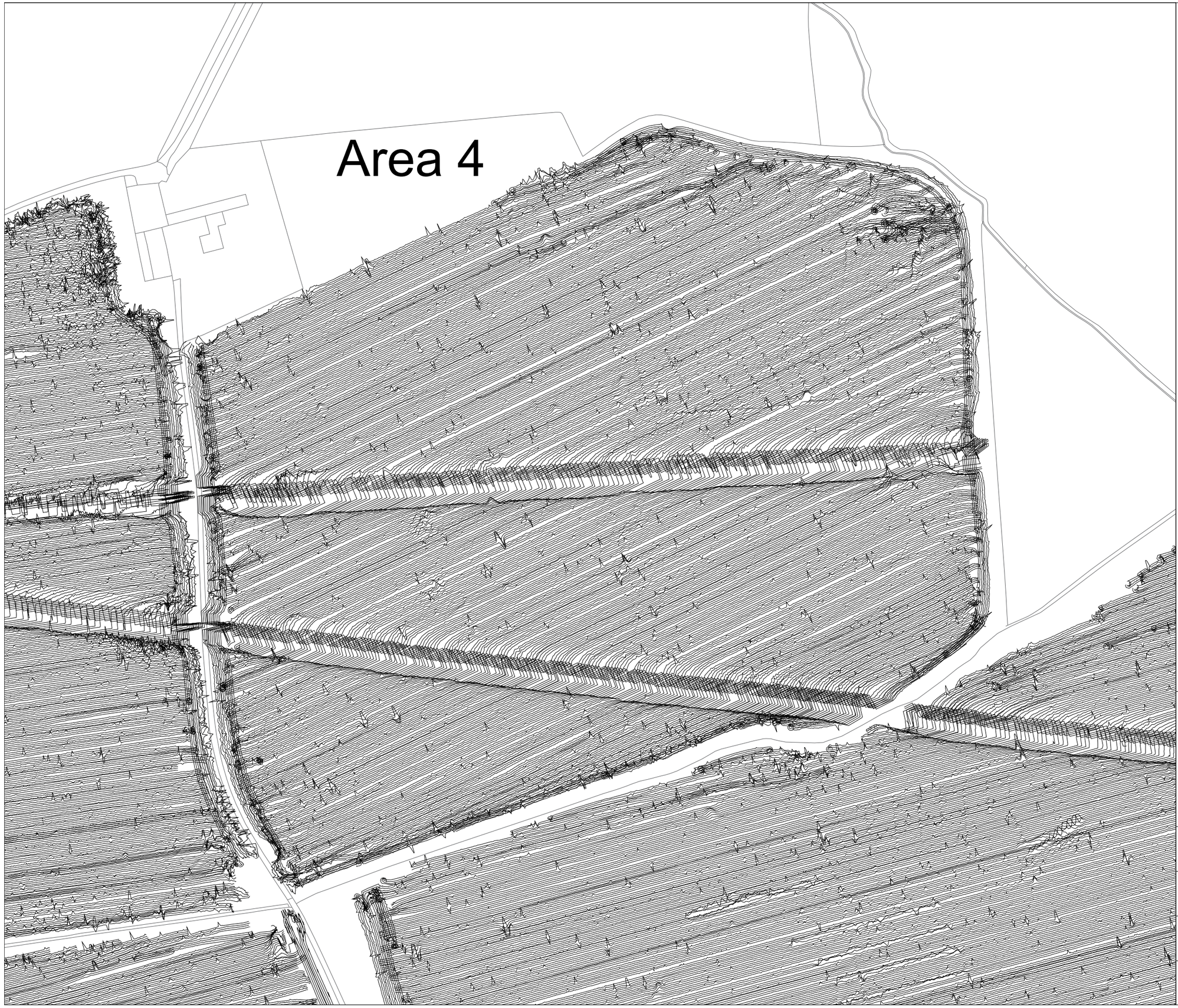
Title:
XY Trace Plots (Area 3 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
26



N

sumo GeoSurveys

Title:
XY Trace Plots (Area 4 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 100
1:2000 @ A3

Fig No:
27

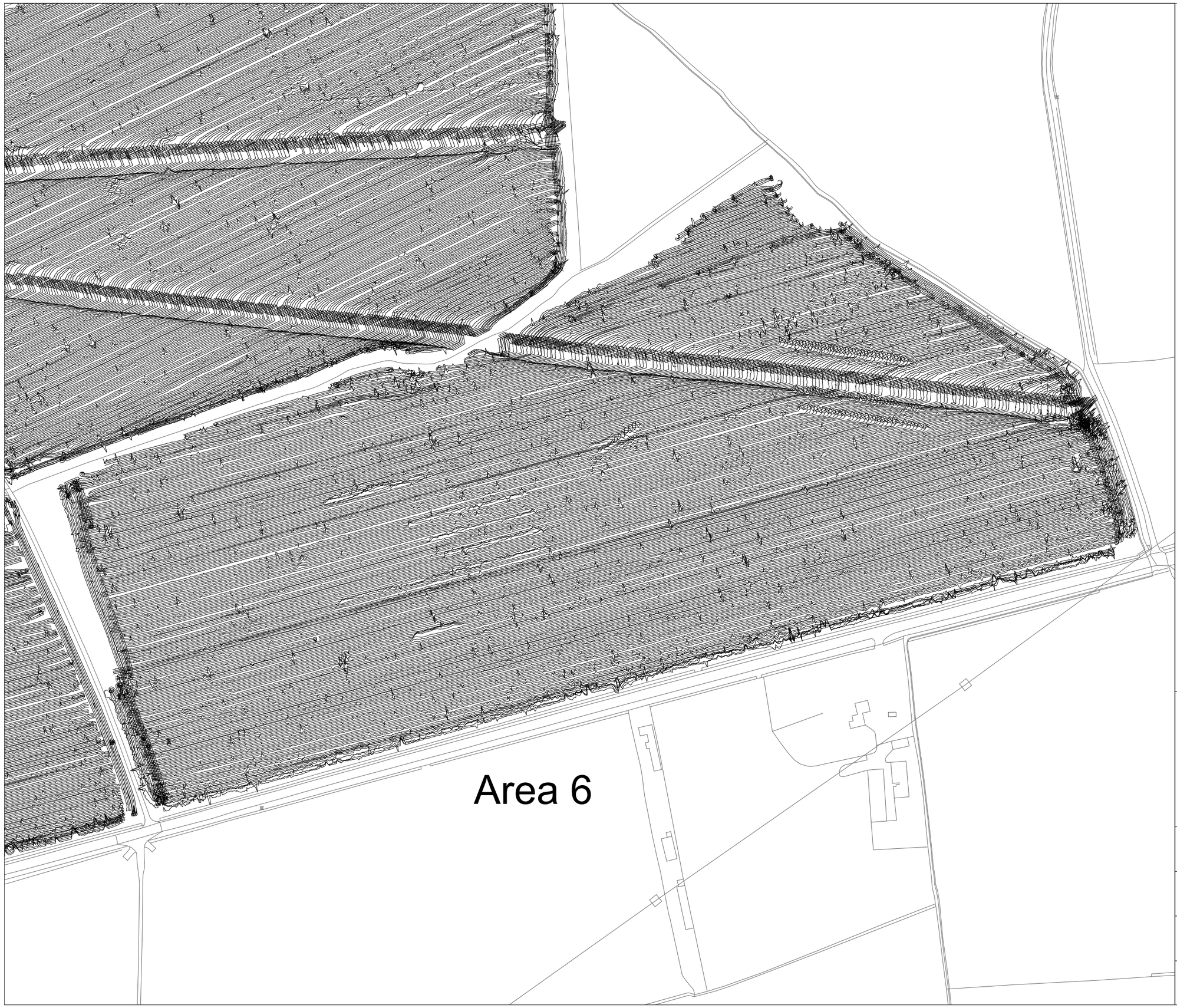
Title:
XY Trace Plots (Area 5 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 140
1:2800 @ A3

Fig No:
28



N

sumo GeoSurveys

Title:
XY Trace Plots (Area 6 clipped at +/-15nT)

Client:
Island Green Power UK Limited

Project:
16614-2 - Light Valley Solar Project: Site 2

Scale:
0 metres 125
1:2500 @ A3

Fig No:
29

Appendix A - Technical Information: Magnetometer Survey Method

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m
Magnetometer	Bartington Cart System	1.0m	0.125m
Magnetometer	MACS Cart System (Foerster)	1.0m	0.125m

Instrumentation:

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted horizontally, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths.

Bartington Grad 601-2

Hand-Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines

Bartington Cart System

Data will be collected using a cart carrying four paired Bartington magnetic sensors. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

MACS Cart System (Foerster)

A multi-sensor array cart system (MACS) utilising 4 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 1m intervals, with a control unit and data logger was used for the magnetic survey. Each data point is geographically referenced using an on-board RTK GNSS system. Readings will be taken at 0.125m centres along traverses 1.0m apart.

Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

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Display

Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall,* etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

Archaeology / Probable Archaeology	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
Possible Archaeology	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
Industrial / Burnt-Fired	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
Former Field Boundary (probable & possible)	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
Ridge & Furrow	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
Agriculture (ploughing)	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
Land Drain	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
Natural	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
Magnetic Disturbance	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
Service	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
Ferrous	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern.

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Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

Uncertain Origin Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology* / *Natural* or (in the case of linear responses) *Possible Archaeology* / *Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

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Appendix B - Technical Information: Magnetic Theory

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. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

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

Thermoremanence 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. Thermoremanent archaeological features can include hearths and kilns; 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 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 feature. The difference between the two sensors will relate to the strength of a magnetic field created by this 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 and disturbance from modern services.

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Appendix C - OASIS Summary

OASIS ID (UID)	sumogeop1-529783
Project Name	Geophysical Survey, Magnetometry Survey at Light Valley Solar Project: Site 2
Sitename	Light Valley Solar Project: Site 2
Sitecode	16614-2
Project Identifier(s)	SUMO-16614-2 Light Valley Solar Project: Site 2
Activity type	Geophysical Survey, Magnetometry Survey, MAGNETOMETRY SURVEY
Planning Id	
Reason For Investigation	Planning requirement
Organisation Responsible for work	SUMO Geophysics Ltd.
Project Dates	29-Jul-2024 - 12-Sep-2024
Location	**Light Valley Solar Project: Site 2** NGR: SE 52799 30285 LL: 53.76624942582038, -1.200501630895012 12 Fig: 452799,430285 NGR: SE 52350 30579 LL: 53.76893225715847, -1.207255892684032 12 Fig: 452350,430579
Administrative Areas	Country: England County/Local Authority: North Yorkshire Local Authority District: North Yorkshire Parish: Hambleton Parish: Monk Fryston
Project Methodology	A temporary grid system was established over the site and marked out using canes. The location of the grid was set out using an RTK GPS system theoretically accurate to some 0.01m and referenced to

	OS co-ordinates. Data was collected using a cart carrying four paired Bartington magnetic sensors. Four sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. Each data point is geographically referenced using an on-board Trimble RTK survey grade GPS system. Readings were taken at 0.125m centres along traverses 1.0m apart. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
Project Results	The magnetometer survey has recorded magnetic responses that have been interpreted as being of archaeological interest. In Area 4 a series of enclosures, pits, a trackway and a probable ring-ditch have been detected. They likely represent small farmsteads and wider scale landscape divisions. Ridge and furrow cultivation has also been plotted in Areas 3, 4, 5 and 6. Numerous responses of uncertain origin are visible across the data and while archaeological origins cannot be discounted for all these responses, the majority have probably been caused by natural and agricultural processes. Former field boundaries, land drains and two service pipes have also been marked in the survey. Ferrous responses in the north-east of Area 3 have been caused by the foundations of a former building, while zones of magnetic disturbance are due to spreads of modern debris or made ground.
Keywords	Ditched Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Pit - UNCERTAIN - FISH Thesaurus of Monument Types Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Ring Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Ridge And Furrow - MEDIEVAL - FISH Thesaurus of Monument Types Field Boundary - POST MEDIEVAL - FISH Thesaurus of Monument Types Drain - 20TH CENTURY - FISH Thesaurus of Monument Types Pipeline - 20TH CENTURY - FISH Thesaurus of Monument Types
Funder	Private or public corporation Island Green Power UK Limited
HER	North Yorkshire HER - unRev - STANDARD

Person Responsible for work	Thomas Cockcroft
HER Identifiers	
Archives	

Report generated on: 27-11-2024:1552

Appendix D – Data Management Plan & Archive Selection Strategy

Data Management Plan

Project ID / OASIS ID

16614-2 / sumogeop1-529783

Project Name

Light Valley Solar Project: Site 2

Project Description

A magnetometer survey of 83 hectares of land at Site 2 of the Light Valley Solar Project

Client

Island Green Power UK Limited

Project Manager

Thomas Cockcroft

Field Leader

Simon Lobel / Liam Brice-Bateman

Date DMP created

26.03.2024

Date DMP last updated

27.11.2024

Version

2

Technique - data

Detailed magnetic survey.

Manual – cart - other

ATV/Cart magnetometers

Documentation and metadata

All documentation and data produced are stored on SUMO servers in a specific job file.

Data storage, access and back-up

- SUMO Secure server during the project life set up in a RAID configuration (a RAID configuration incorporates a level of data redundancy meaning if a single hard drive in fails data can still be restored).

- Snap shots of the data will be made at several intervals during the day to allow data to be restored for up to 30 days if changed / deleted.
- Once the final report has been completed data will be moved onto NAS drive set up in a RAID configuration.
- All data is backed up to an off-site location (Cloud storage).

Archive Selection Strategy

Digital Data

Selection

It is proposed that only the final version of all born digital documents (reports, images and CAD files) will be selected for inclusion in the Preserved Archive. All raw and processed survey data will be included in the preserved archive. Below is what will constitute the selected archive:

- Raw data in XYZ format .csv and .png plus .pgw world file
- Processed data as .png plus .pgw world file
- Final survey report .pdf
- CAD and Vector graphics (interpretations) in .dwg format

De-selected digital data

The de-selected material will be retained on the SUMO Secure server and Cloud storage.

Documents

Not applicable – no archive

Materials

Not applicable – no archive

- Archaeological Geophysics
- Engineering Geophysics
- Measured Building Services
- Utility and Topographic Services
- Aerial Surveys
- Rail Surveys

SUMO GeoSurveys is a trading name of SUMO Geophysics Ltd.
SUMO Services Ltd, incorporated under the laws of England and Wales,
Company Registration No.4275993.
Registered Office Unit 8 Hayward Business Centre, New Lane, Havant, Hampshire, PO9 2NL

Light Valley
Solar

W: Lightvalleysolar.co.uk
E: info@lightvalleysolar.co.uk