

# Light Valley Solar

Environmental Statement Volume 3

## Appendix 8.3: Geophysical Survey

### Results Part Bii

Document Reference: EN0110012/APP/LVS/06.03.08.03.01ii

March 2026

Planning Inspectorate Reference: EN0110012

APFP Regulation: 5(2)(a)



# Infrastructure Planning

## Planning Act 2008

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

## Light Valley Solar

## Development Consent Order 2025

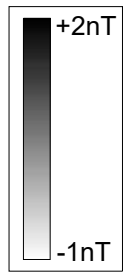
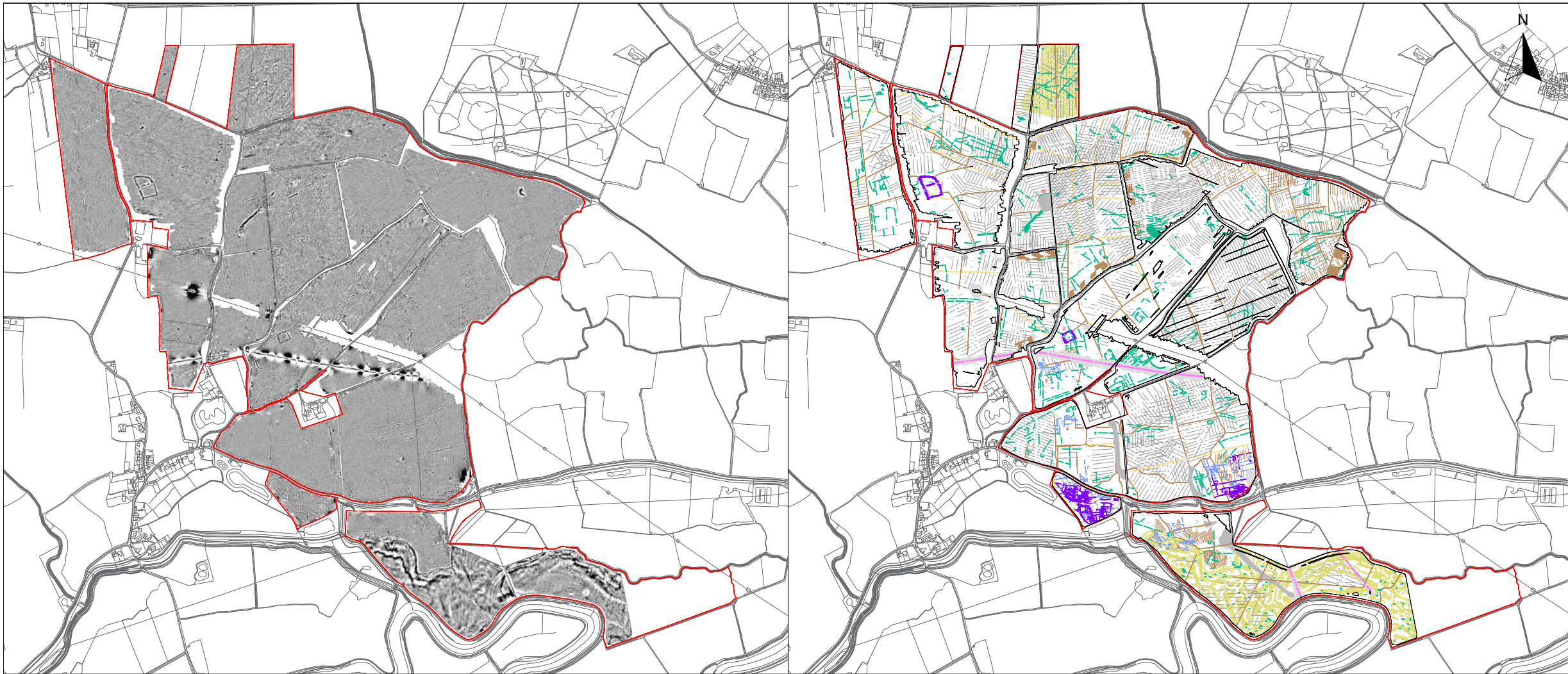
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### Appendix 8.3: Geophysical Survey Results Part Bii

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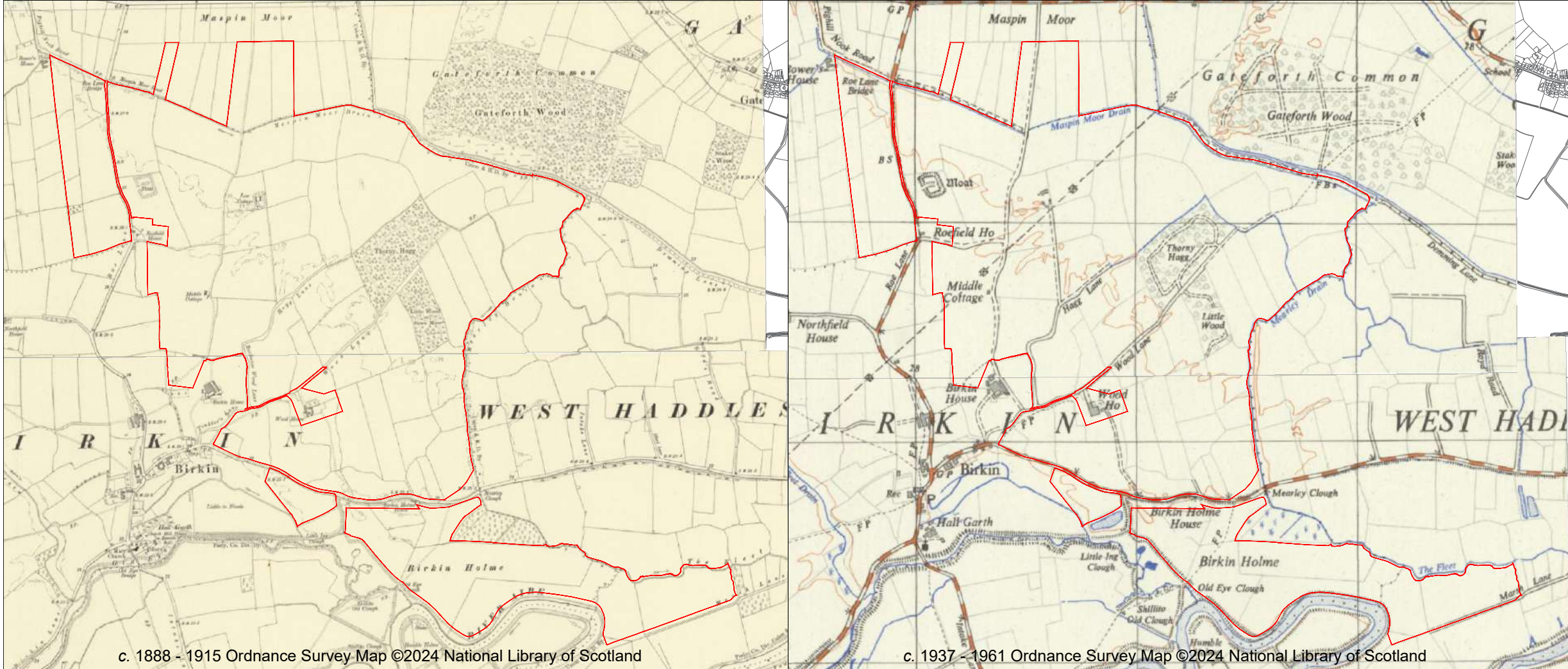
<b>Regulation Reference</b>	APFP Regulation 5(2)(a)
<b>Planning Inspectorate Case Reference</b>	EN0110012
<b>Application Document Reference</b>	EN0110012/APP/LVS/06.03.08.03.01ii
<b>Author</b>	Light Valley Solar Limited

Version	Date	Status of Version
1.0	March 2026	DCO Submission



**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



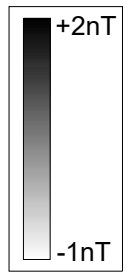
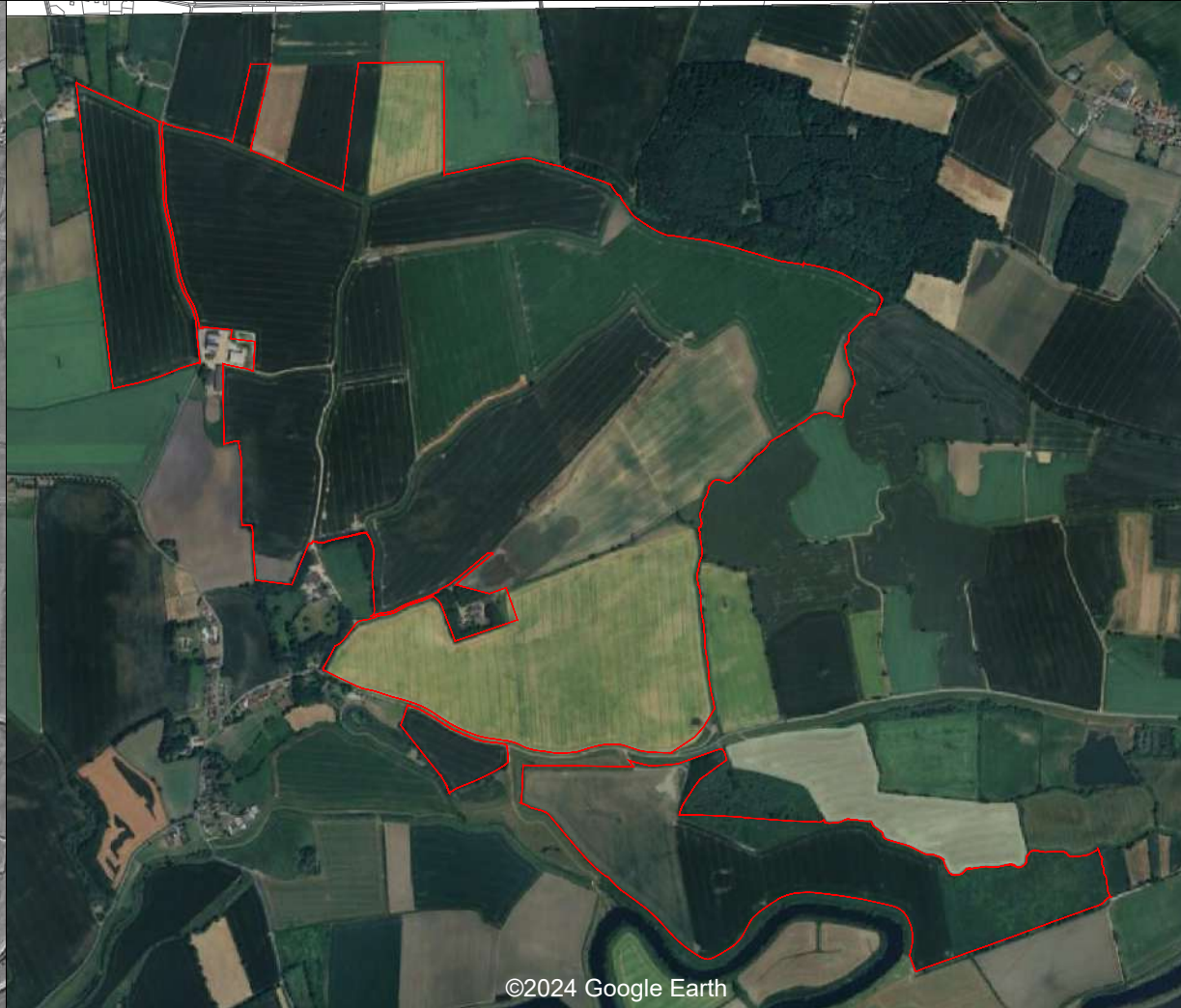
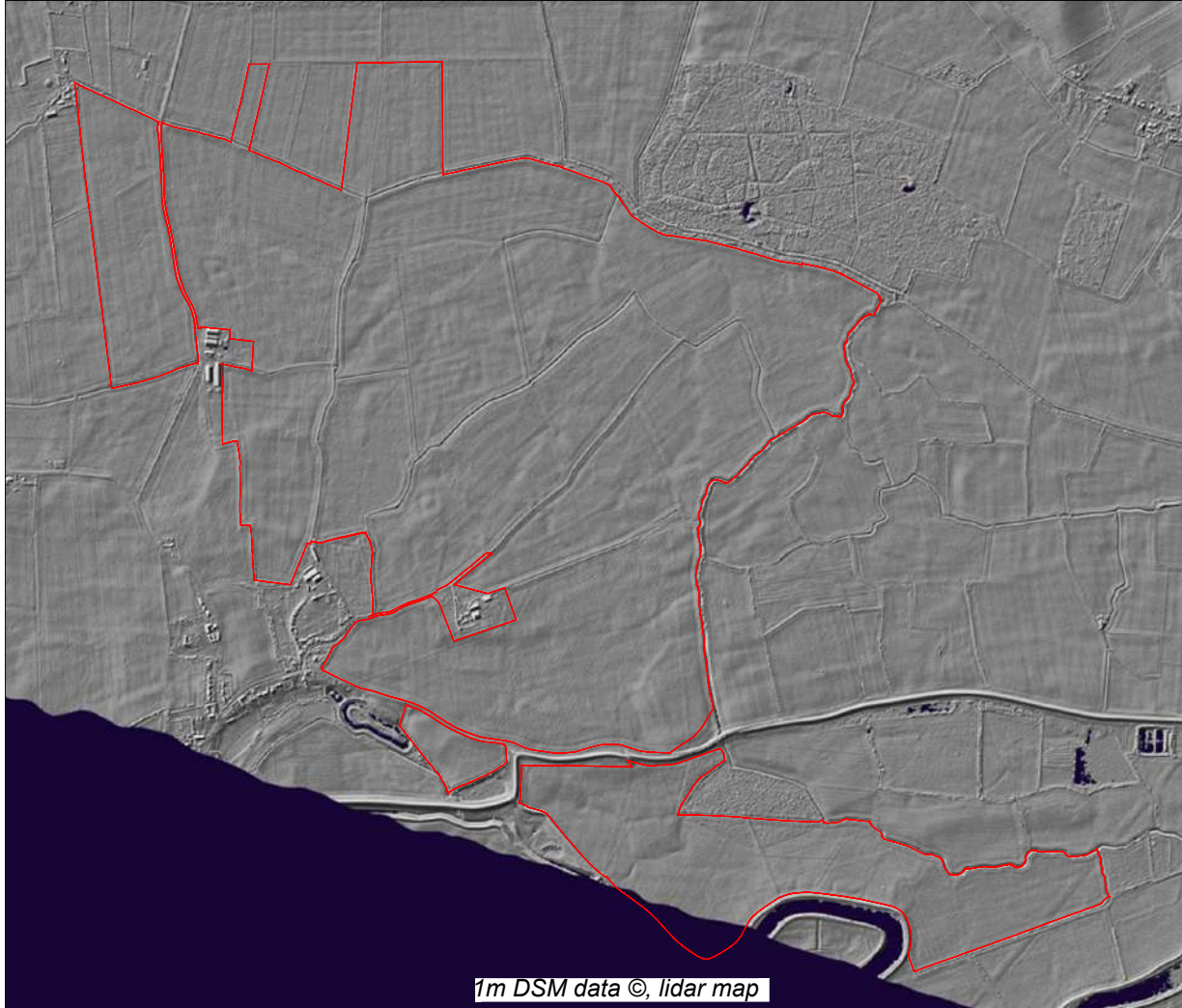
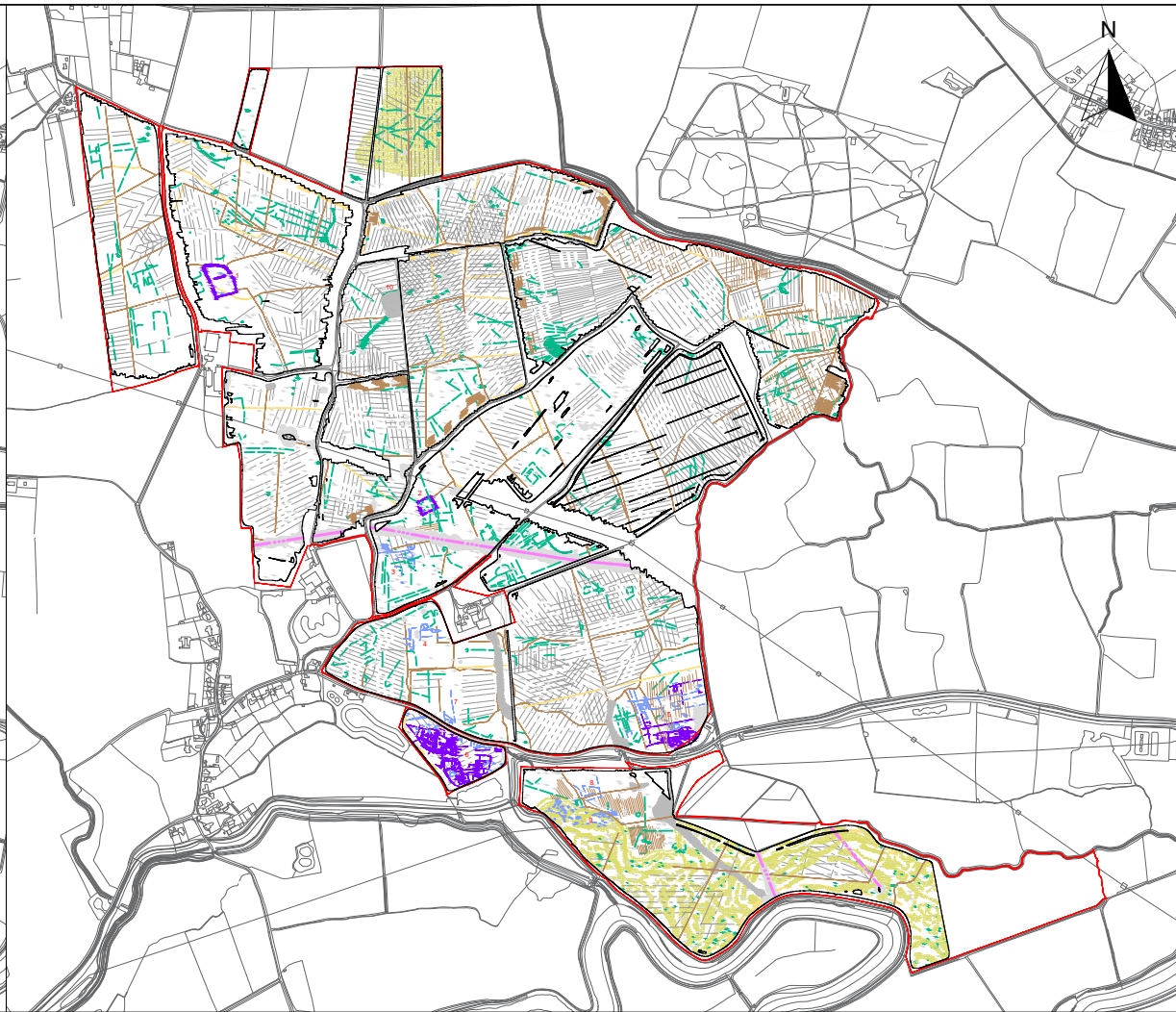
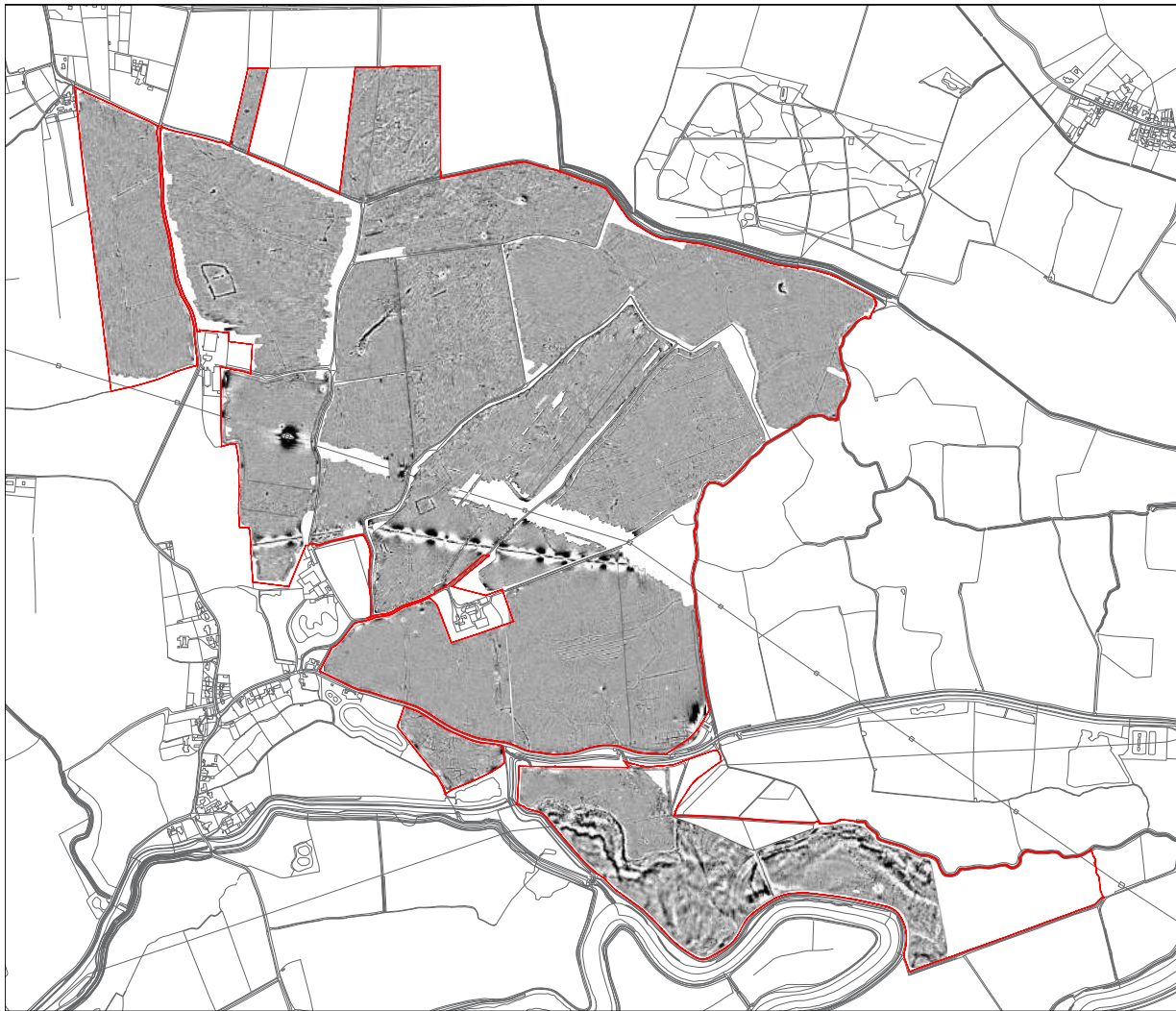
Title: Greyscale Plots / Interpretation / 1888-1915 (bottom left) & 1937-1961 (bottom right) Ordnance Survey Mapping

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: NOT TO SCALE

Fig No: 42



**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



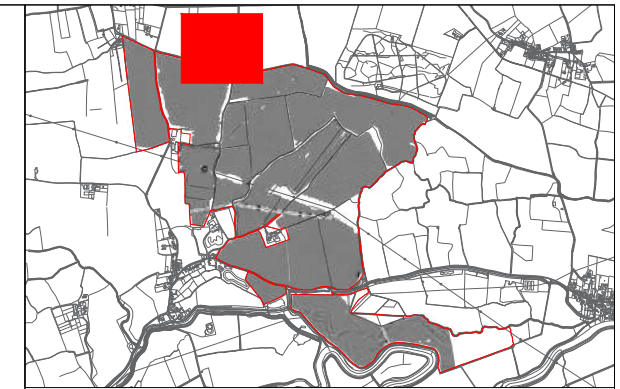
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Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: NOT TO SCALE

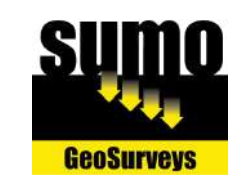
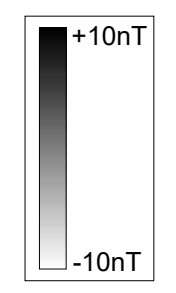
Fig No: 43



Field 4.3

Field 4.1

Field 4.2



Title: Minimally Processed Data - Greyscale Plots (Fields 4.1, 4.2 & 4.3)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

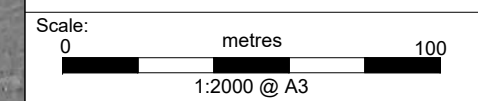
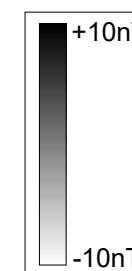
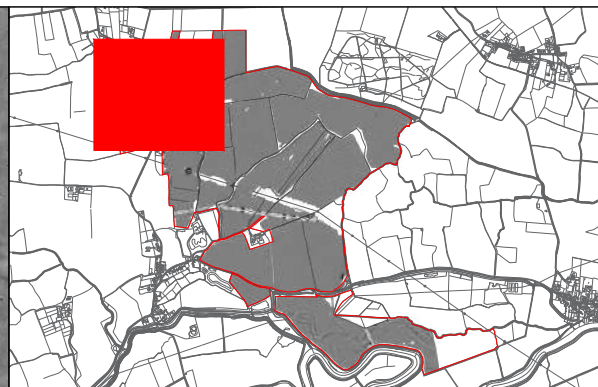


Fig No: 44



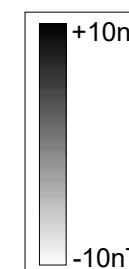
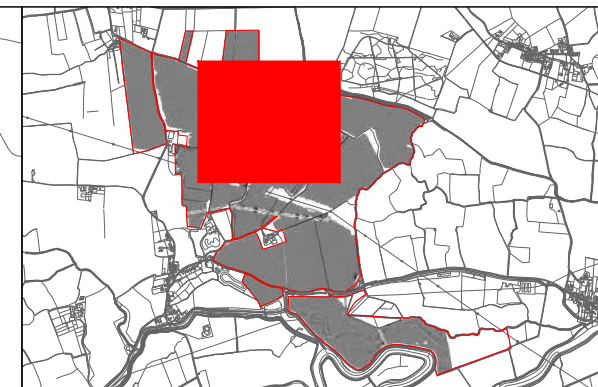
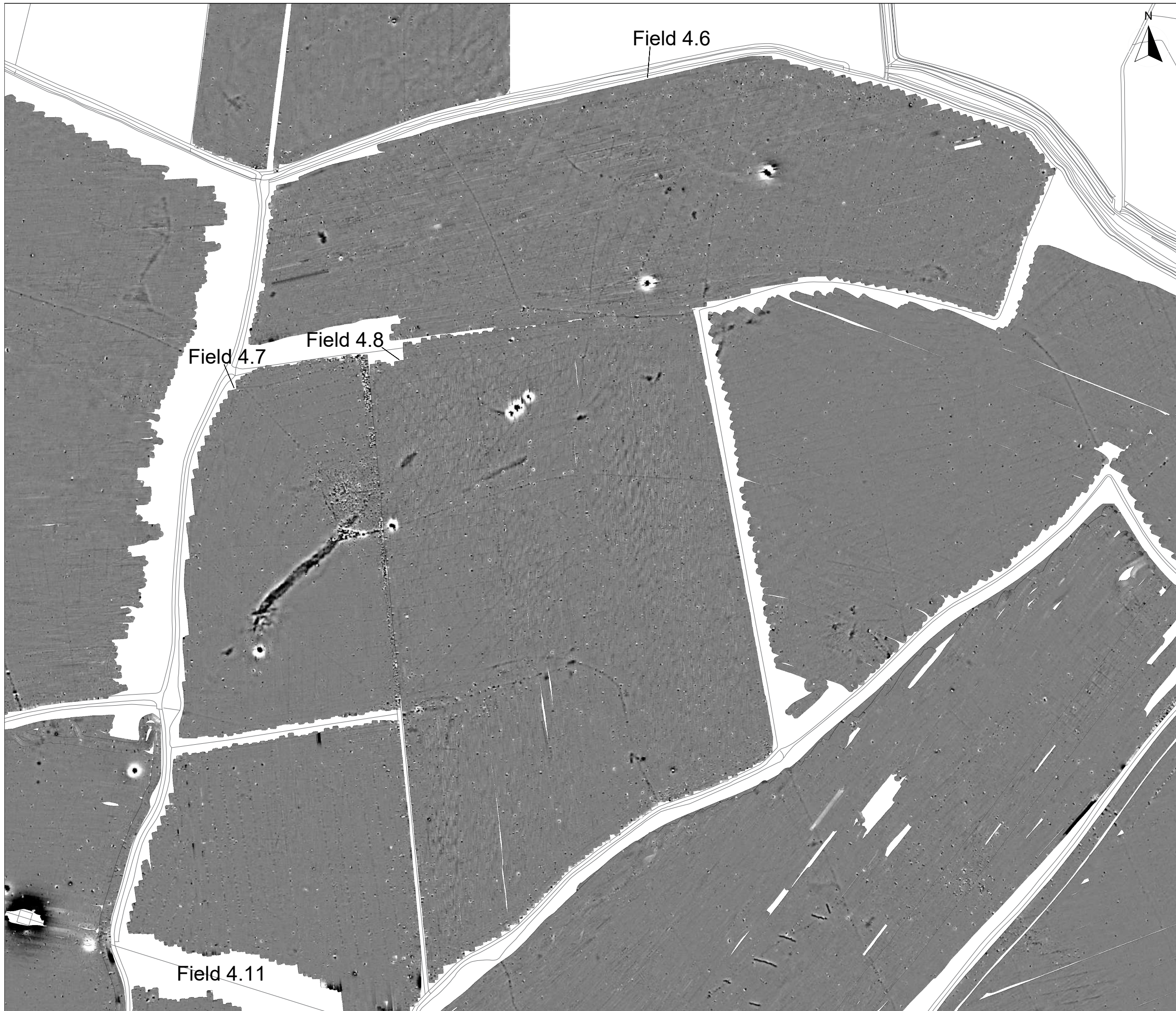
Title: Minimally Processed Data - Greyscale Plots (Fields 4.4 & 4.5)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 160  
1:3200 @ A3

Fig No: 45



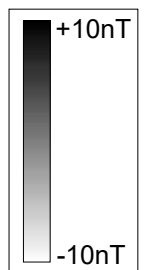
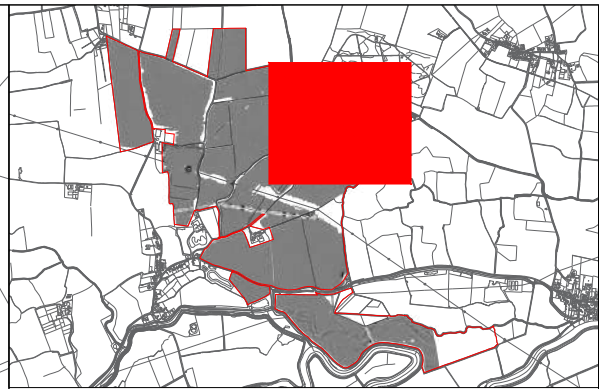
Title:  
Minimally Processed Data - Greyscale Plots  
(Fields 4.6, 4.7 & 4.8)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 175  
1:3500 @ A3

Fig No:  
46



Field 4.9

Title: Minimally Processed Data - Grayscale Plot (Field 4.9)

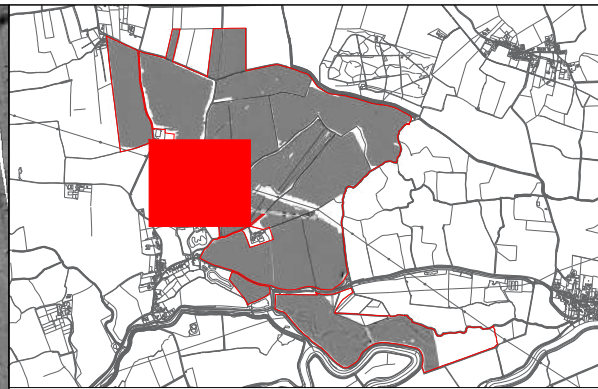
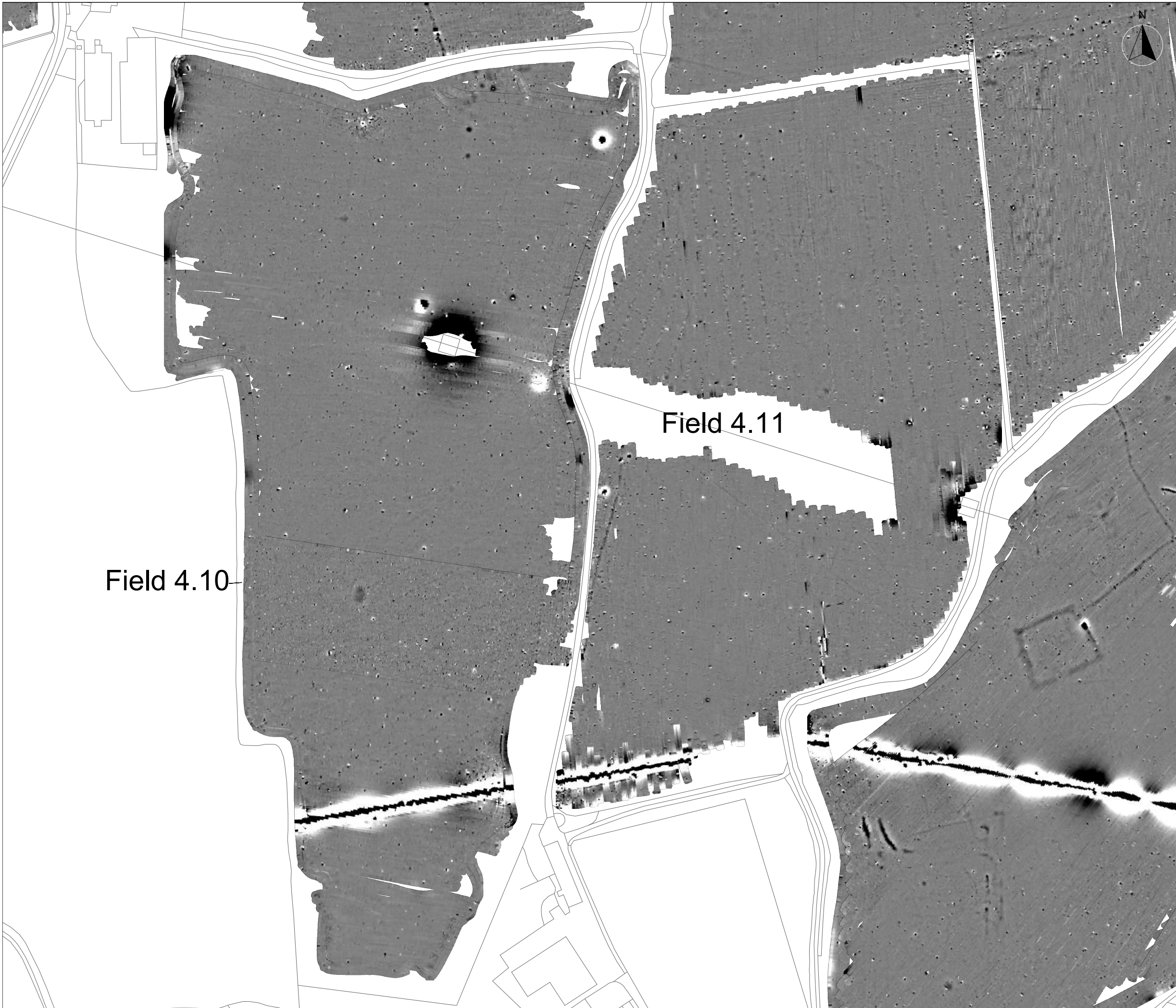
Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 175  
1:3500 @ A3

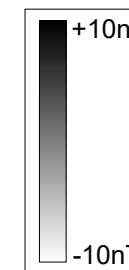
Fig No: 47





Field 4.10

Field 4.11



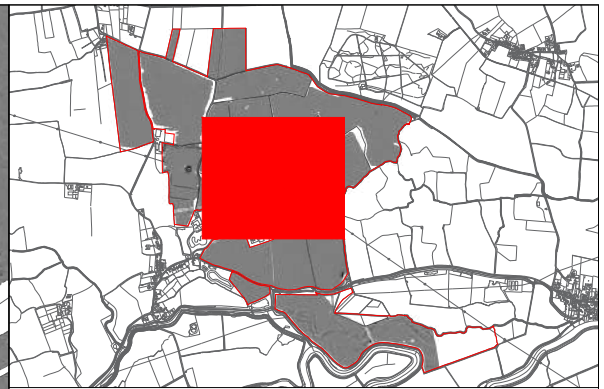
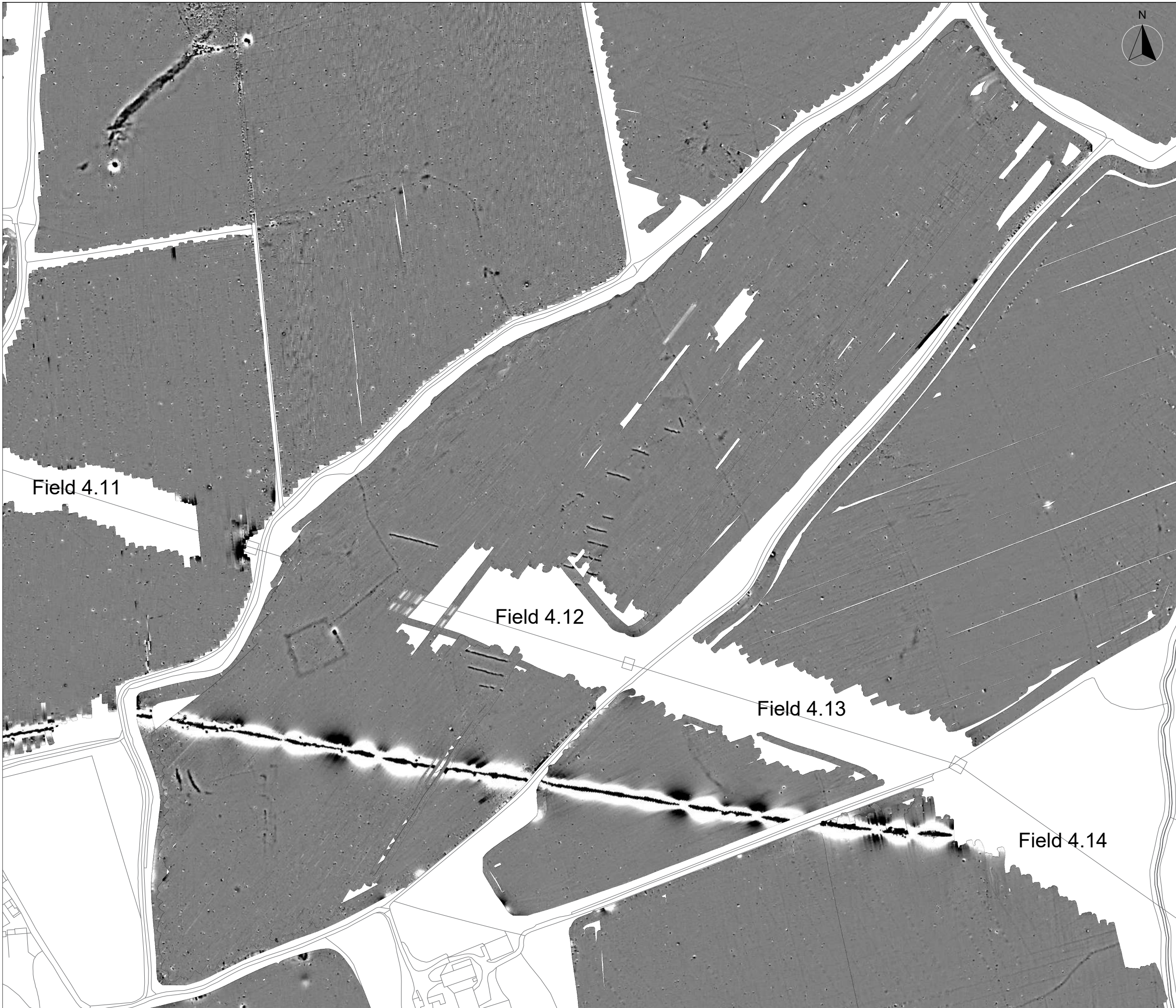
Title:  
Minimally Processed Data - Greyscale Plots  
(Fields 4.10 & 4.11)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
48

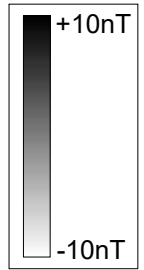


Field 4.11

Field 4.12

Field 4.13

Field 4.14



Title: Minimally Processed Data - Greyscale Plot (Field 4.12)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

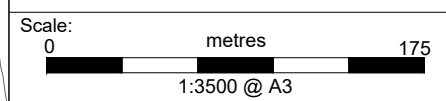
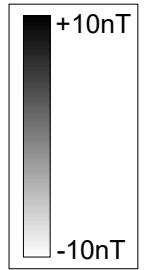
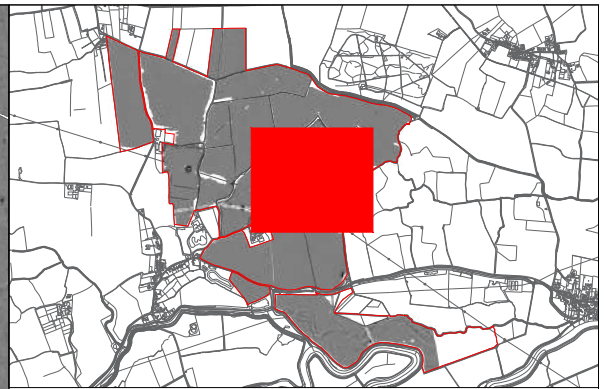
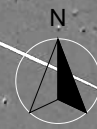
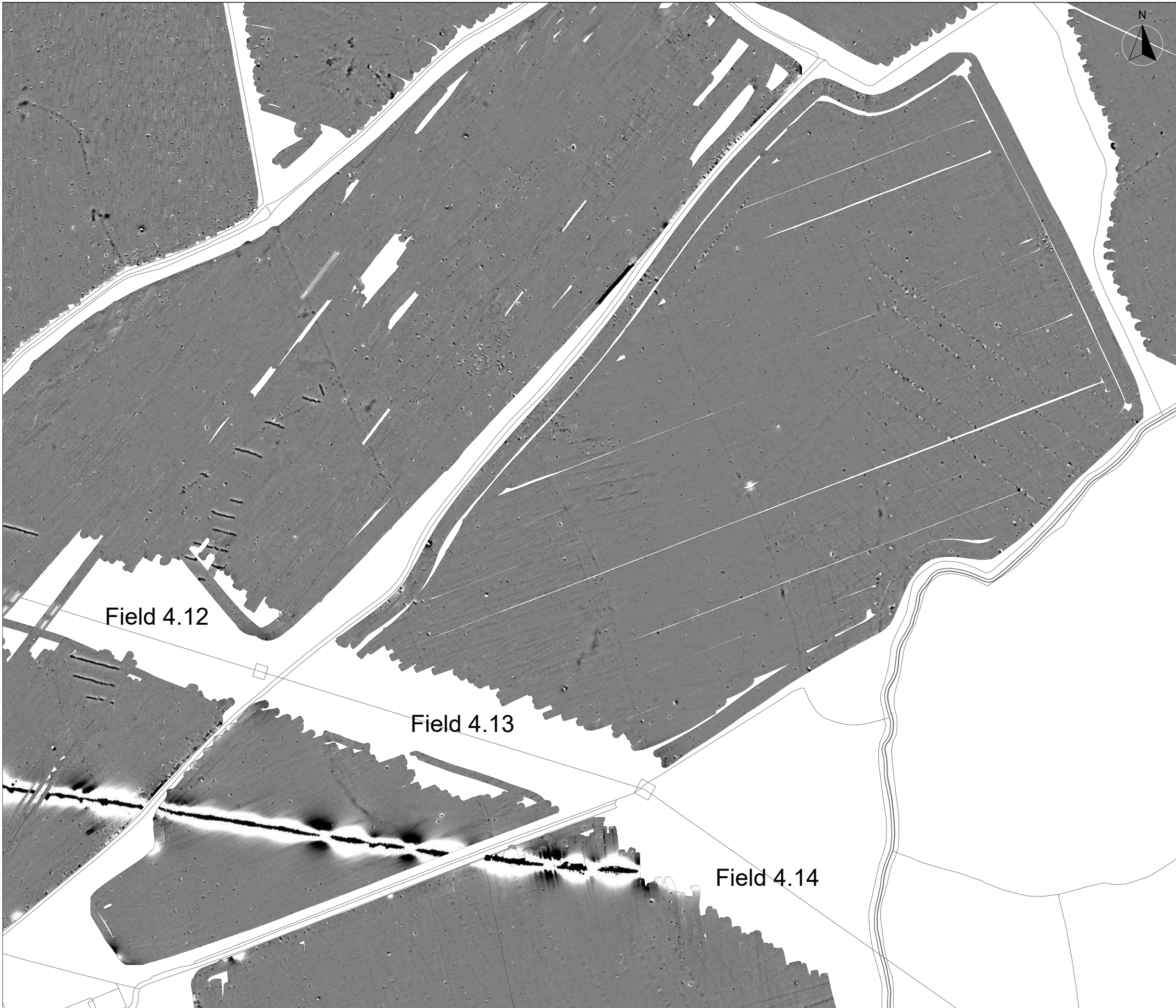


Fig No: 49



Title: Minimally Processed Data - Greyscale Plot (Field 4.13)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

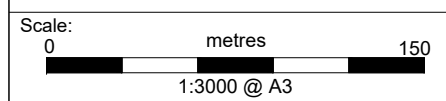
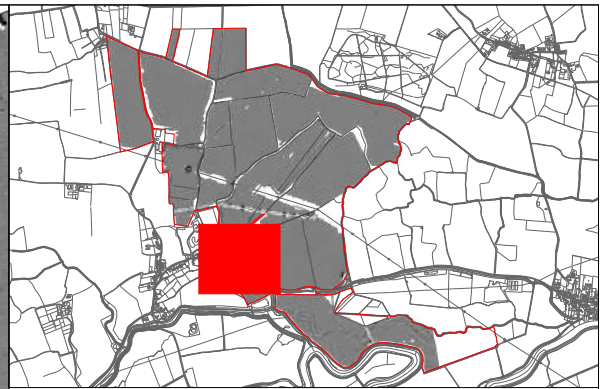
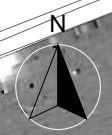
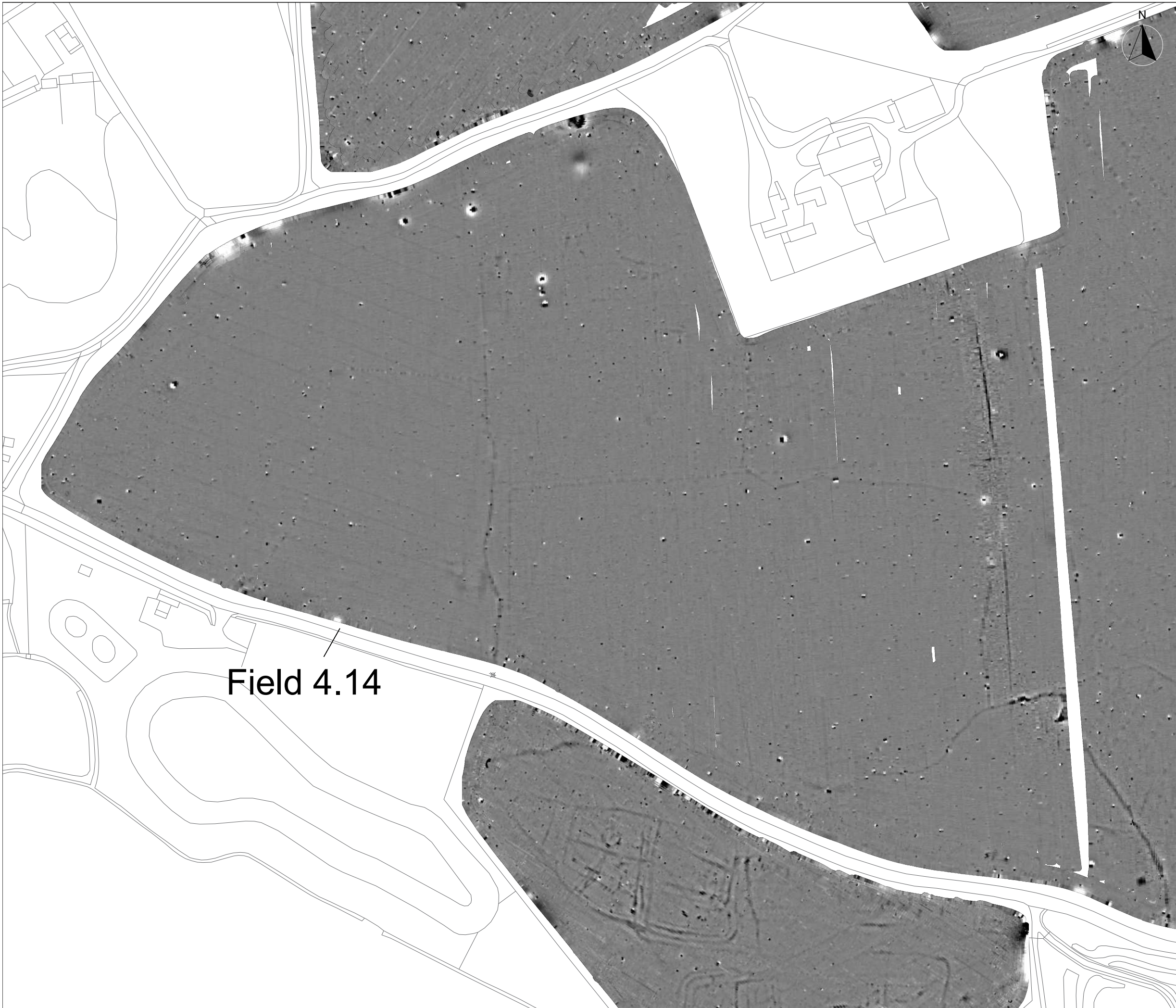
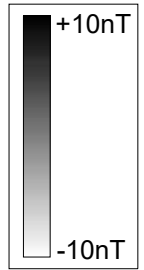


Fig No: 50



Field 4.14



Title: Minimally Processed Data - Greyscale Plot  
(Field 4.14 - west)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

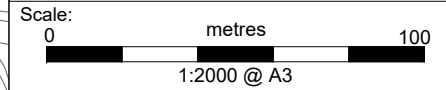
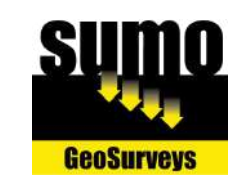
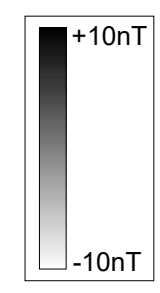
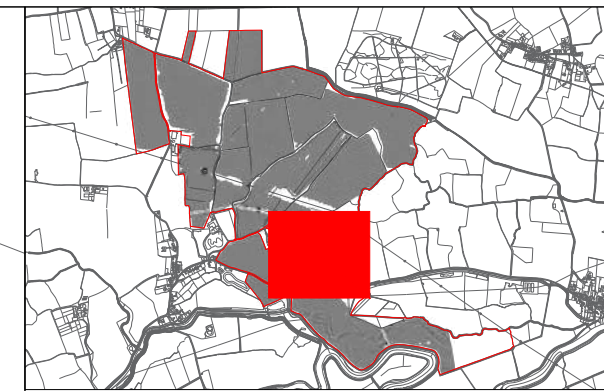


Fig No: 51

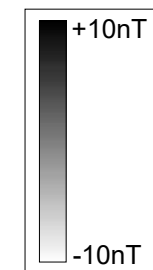
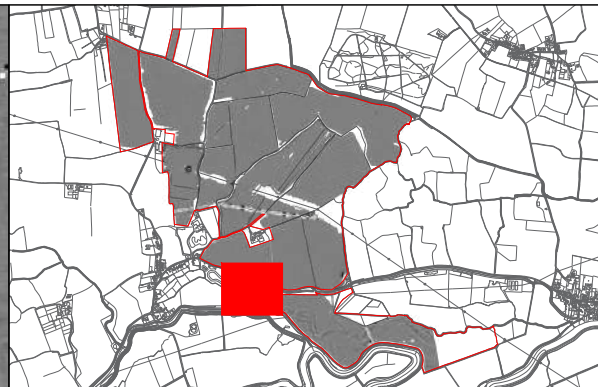
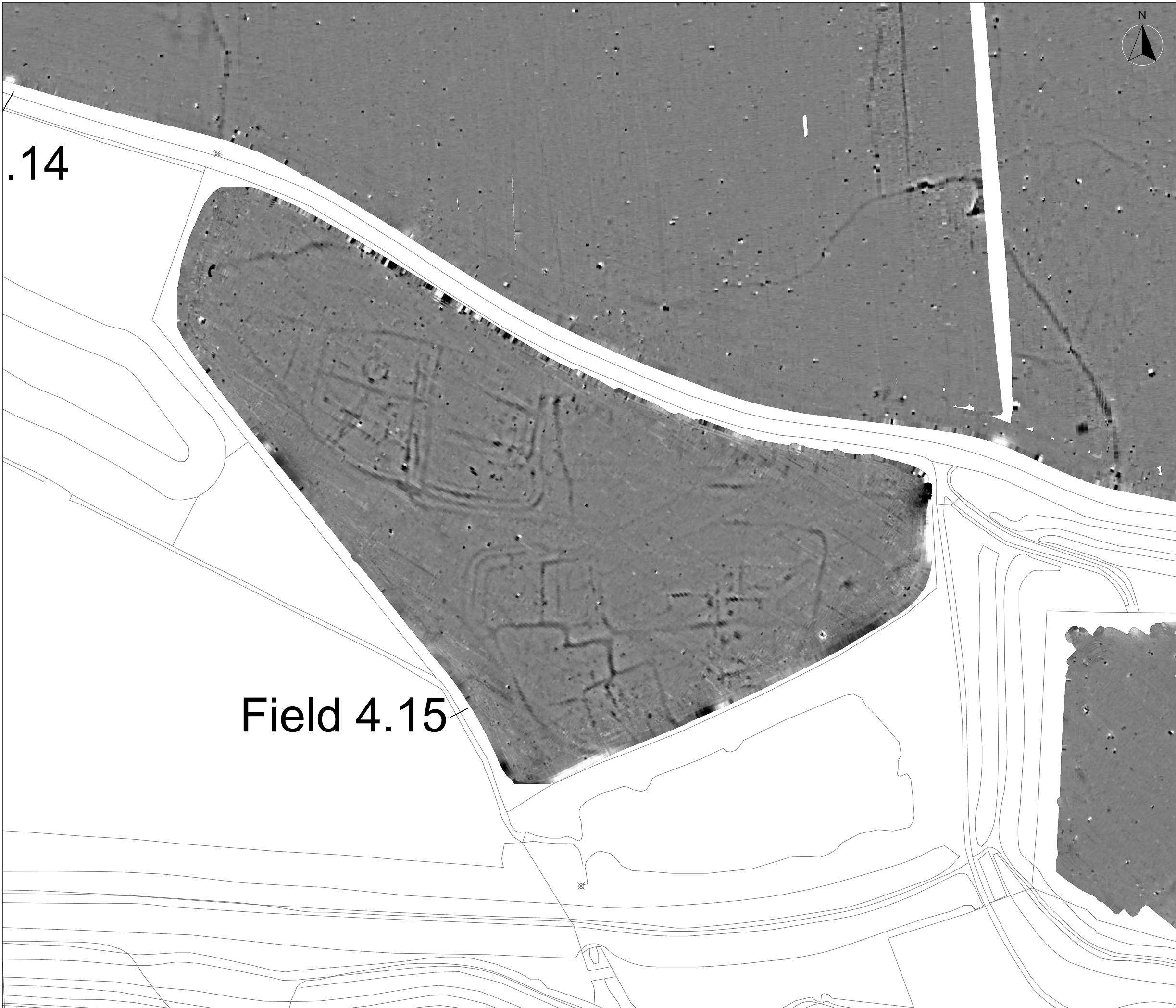


Title: Minimally Processed Data - Greyscale Plot  
(Field 4.14 - east)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 125  
1:2500 @ A3 Fig No: 52



Title: Minimally Processed Data - Greyscale Plot (Field 4.15)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

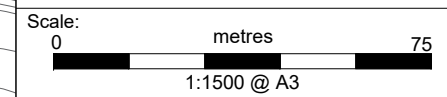
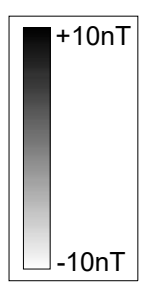
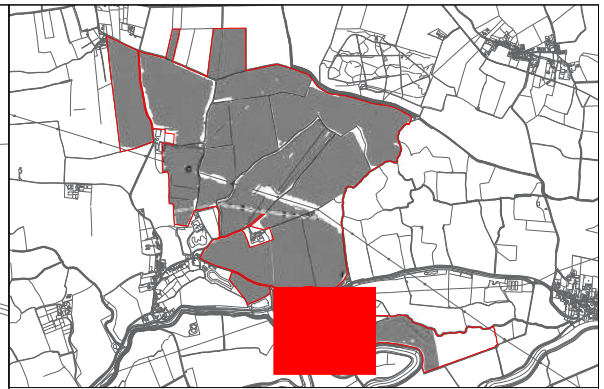
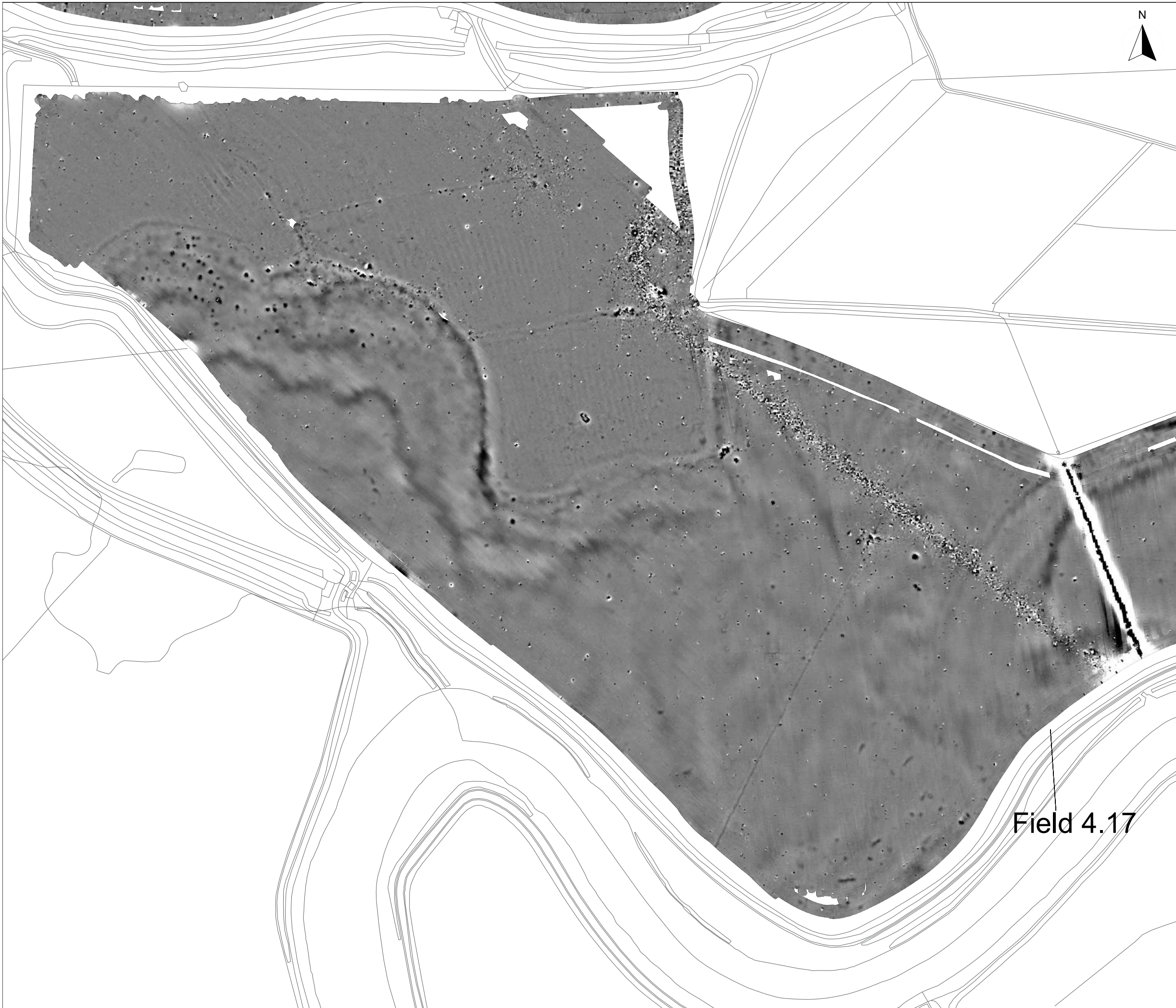


Fig No: 53



Field 4.17

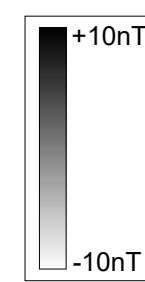
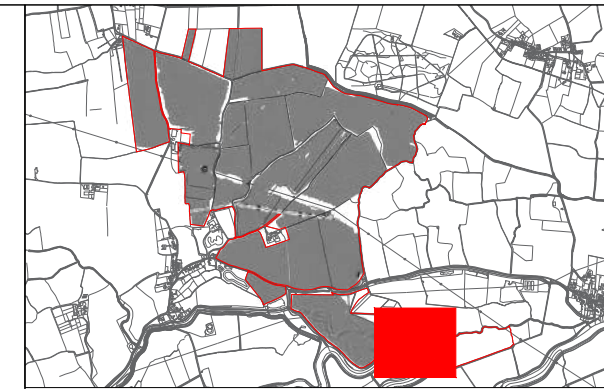
Title:  
Minimally Processed Data - Grayscale Plot  
(Field 4.17 - west)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
54



Field 4.17

Title: Minimally Processed Data - Greyscale Plot  
(Field 4.17 - east)

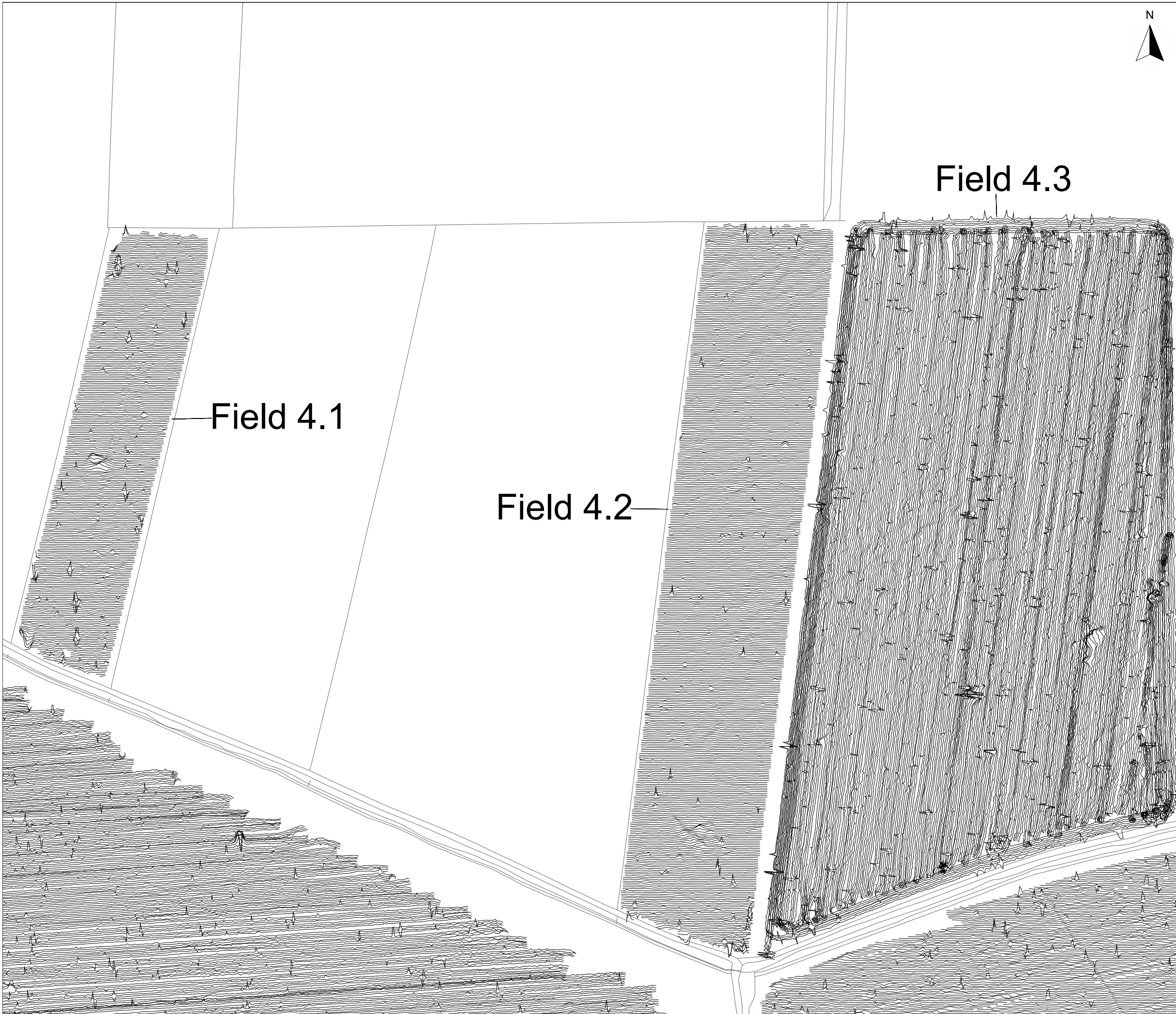
Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 100  
1:2000 @ A3

Fig No: 55

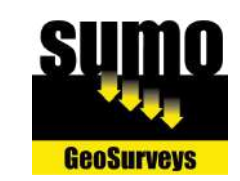




Field 4.1

Field 4.2

Field 4.3



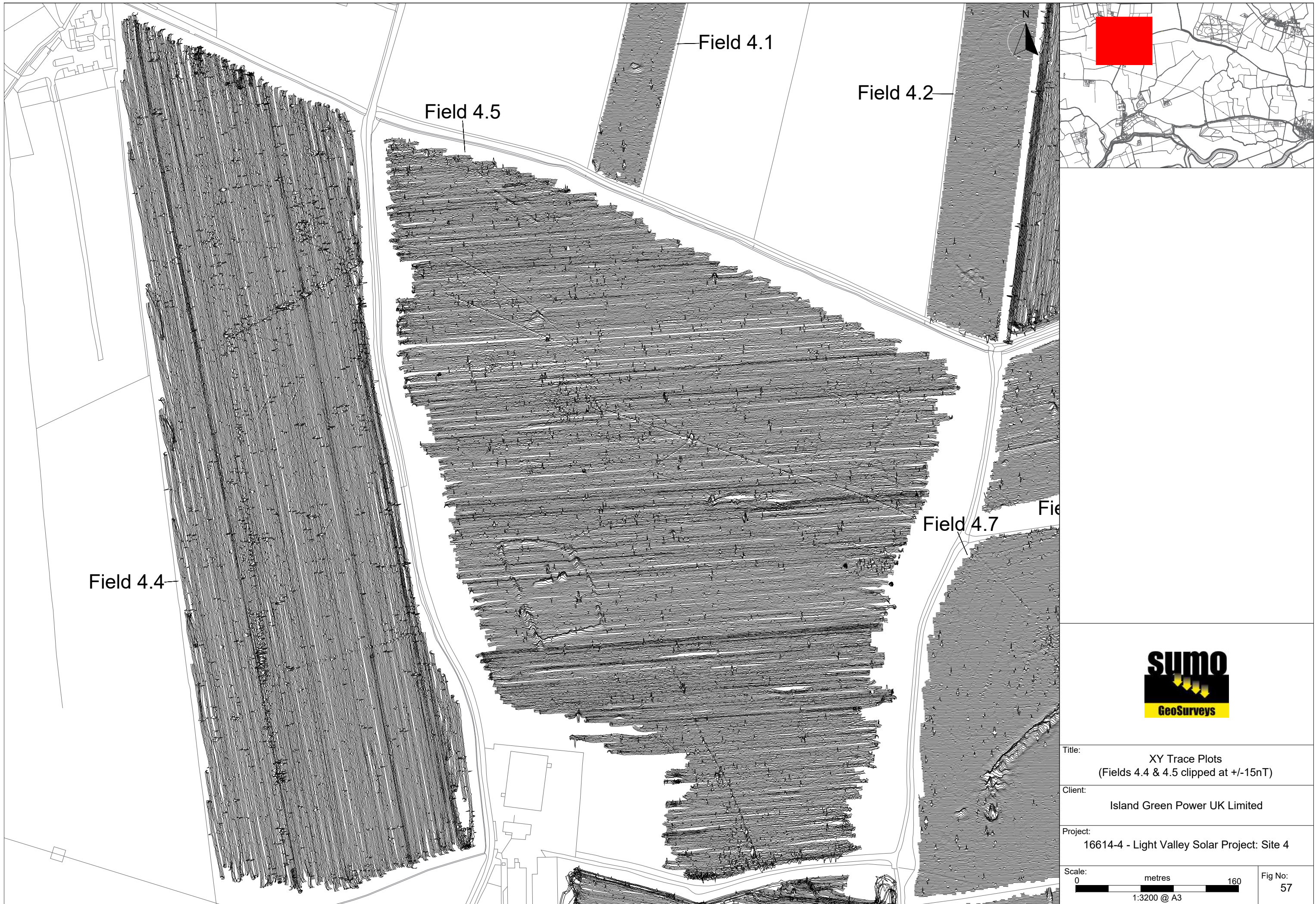
Title: XY Trace Plots  
(Fields 4.1, 4.2 & 4.3 clipped at +/-15nT)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 100  
1:2000 @ A3

Fig No: 56



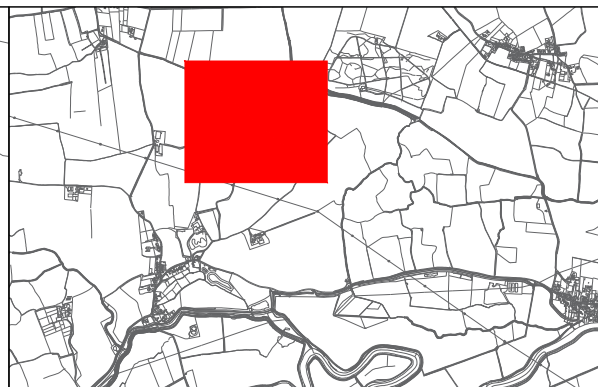
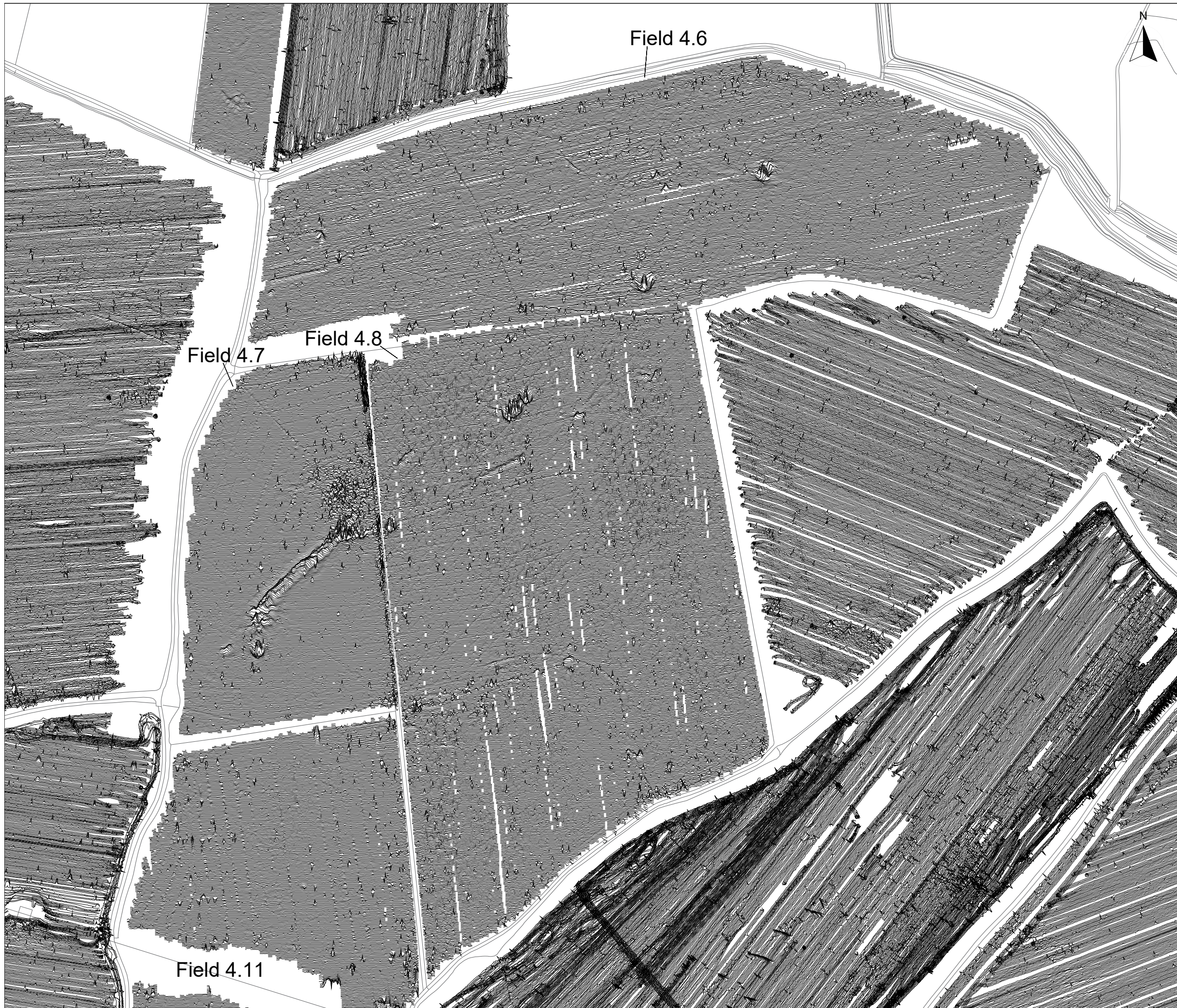
Title: XY Trace Plots  
(Fields 4.4 & 4.5 clipped at +/-15nT)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 160  
1:3200 @ A3

Fig No: 57



Field 4.6

Field 4.7

Field 4.8

Field 4.11



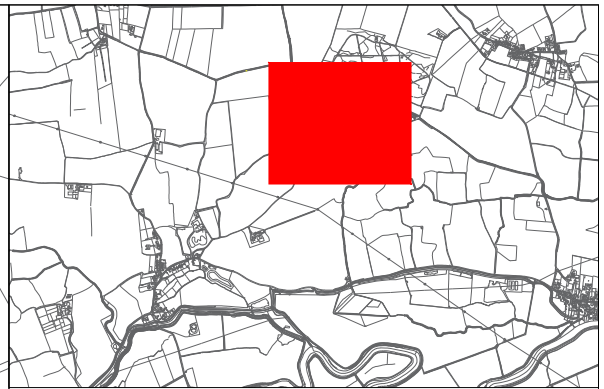
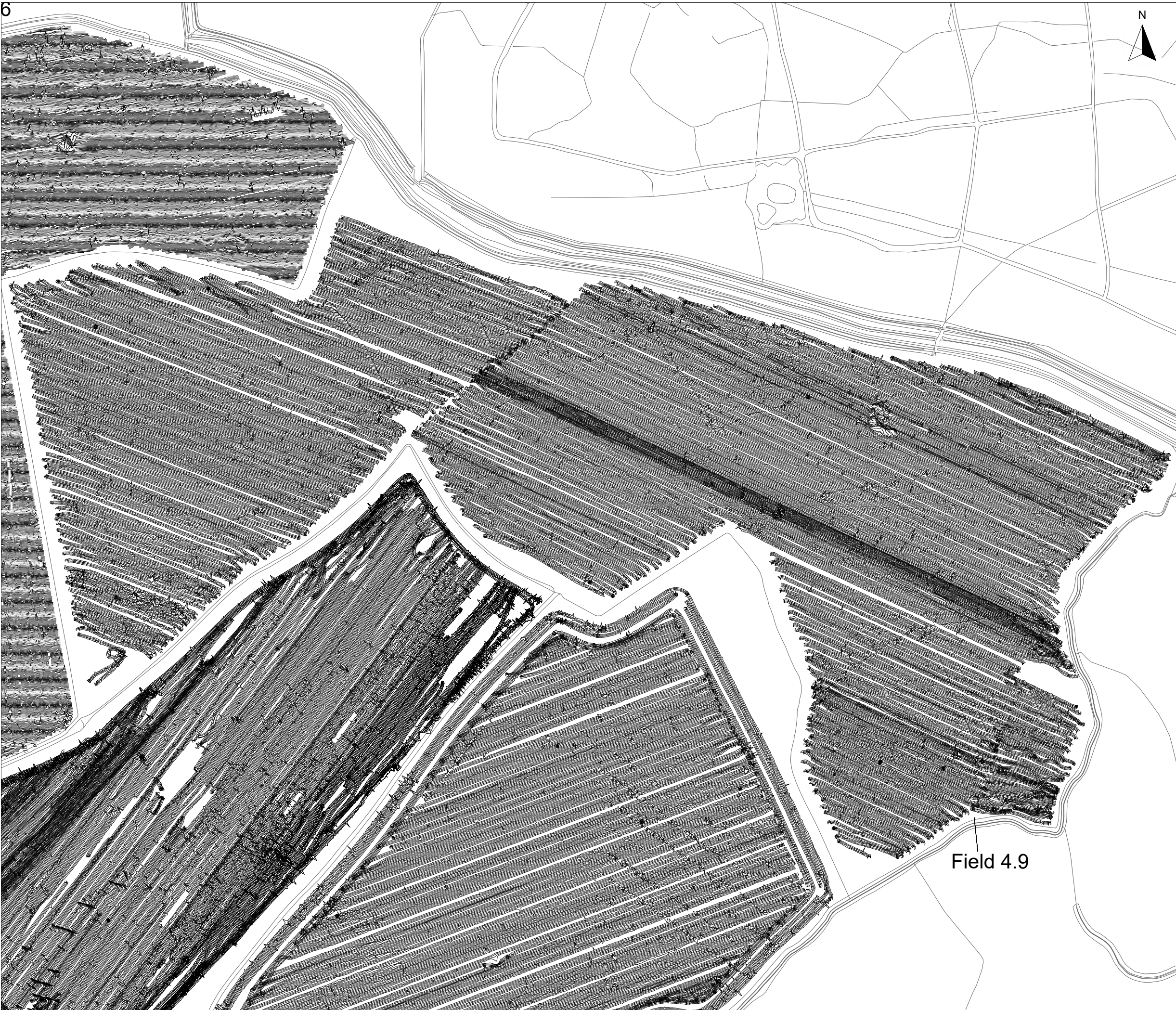
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(Fields 4.6, 4.7 & 4.8 clipped at +/-15nT)

Client: Island Green Power UK Limited

Project: 16614-4 - Light Valley Solar Project: Site 4

Scale: 0 metres 175  
1:3500 @ A3

Fig No: 58



Field 4.9



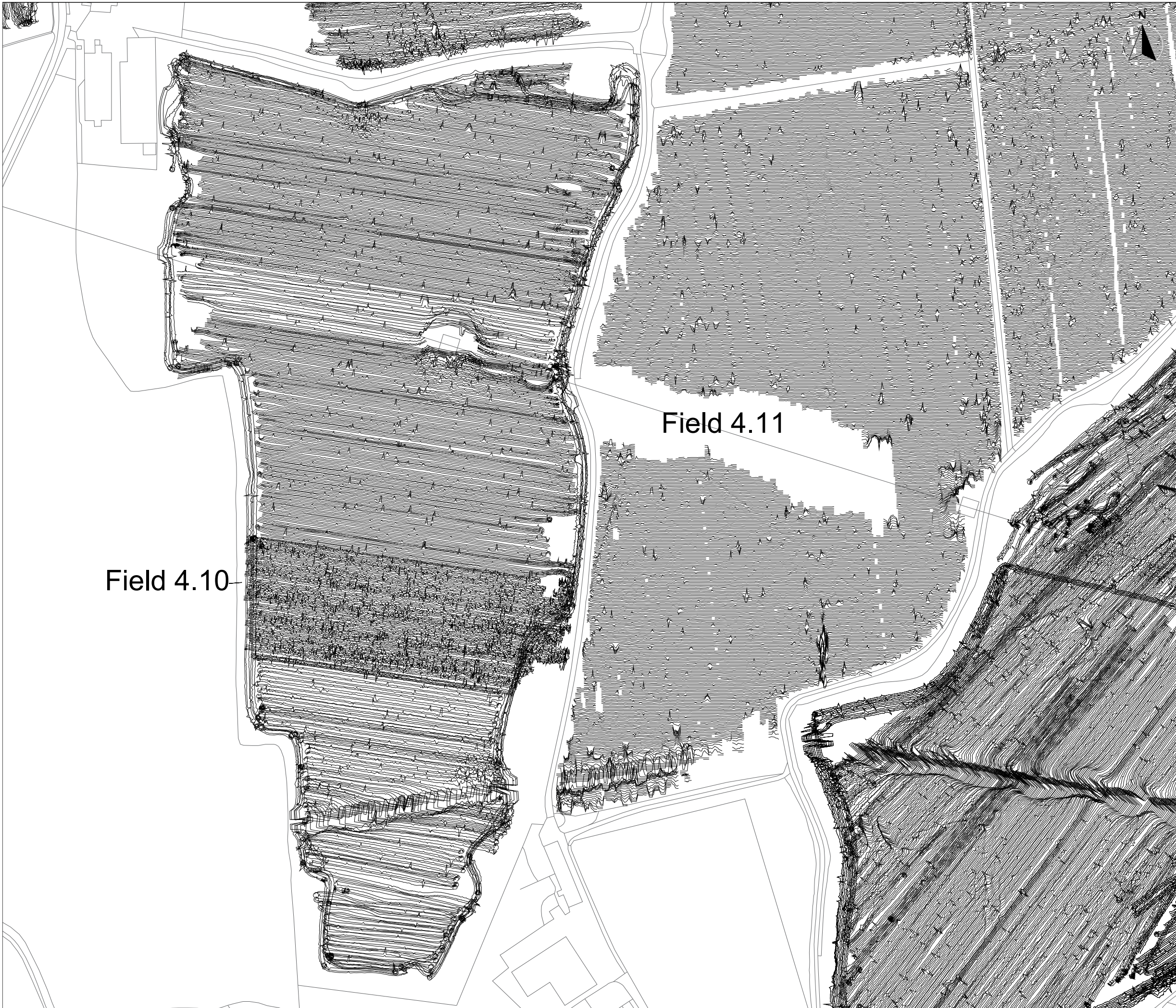
Title:  
XY Trace Plots (Field 4.9 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 175  
1:3500 @ A3

Fig No:  
59

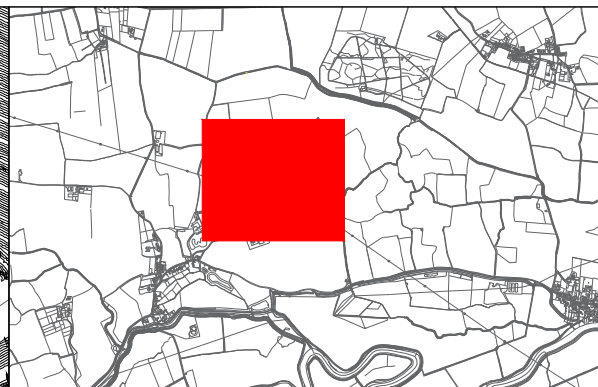
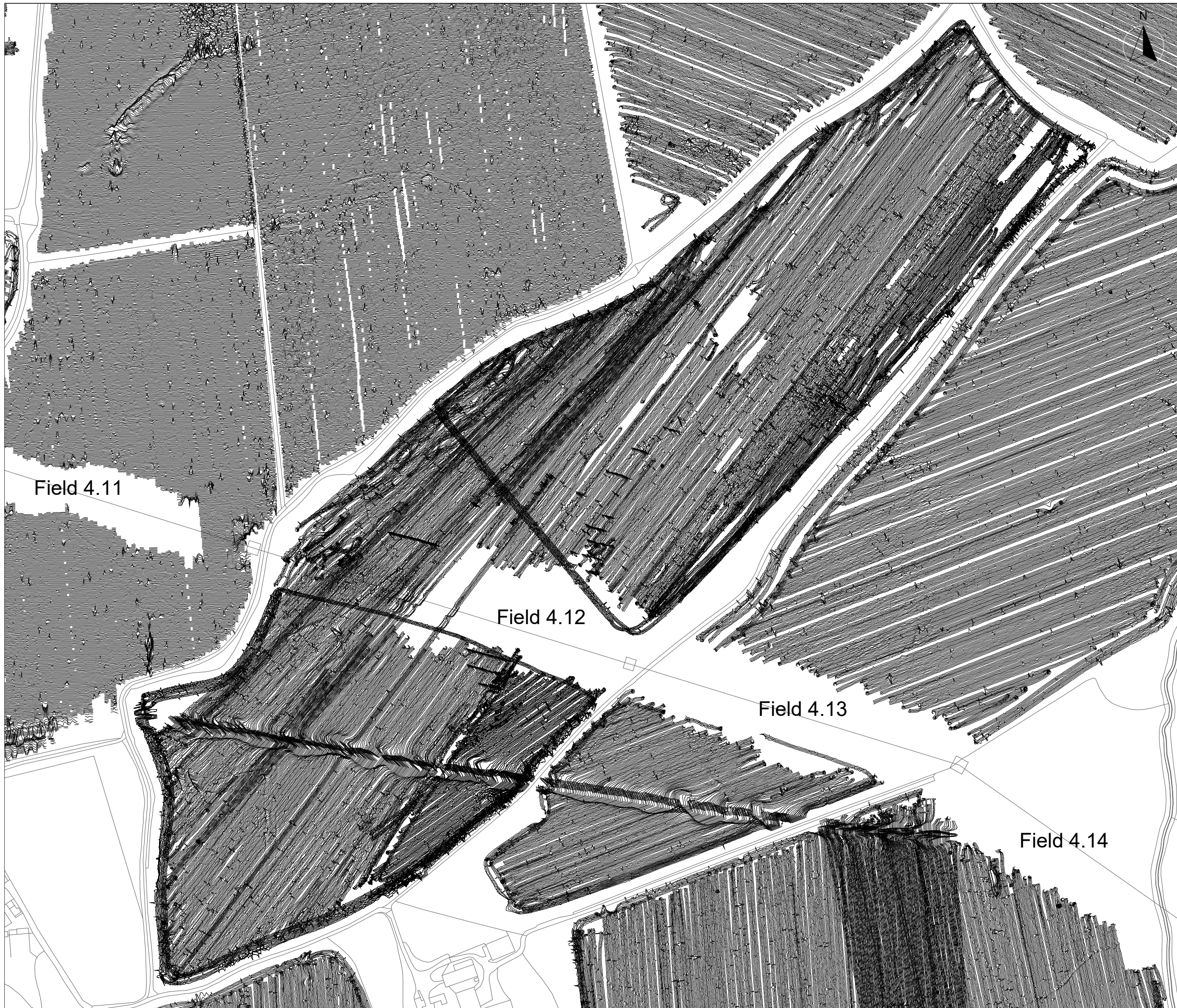


Field 4.10

Field 4.11



Title:	XY Trace Plots (Fields 4.10 & 4.11 clipped at +/-15nT)	
Client:	Island Green Power UK Limited	
Project:	16614-4 - Light Valley Solar Project: Site 4	
Scale:	0 metres 125 1:2500 @ A3	Fig No: 60



Field 4.11

Field 4.12

Field 4.13

Field 4.14



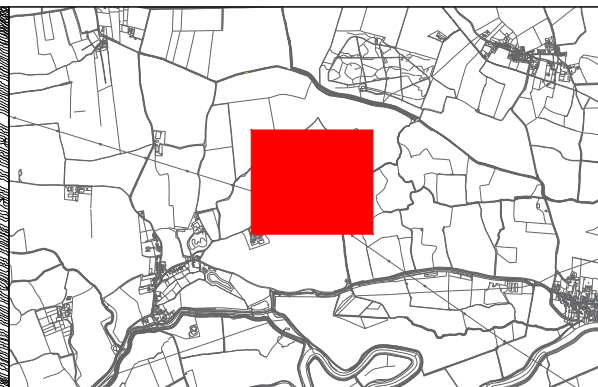
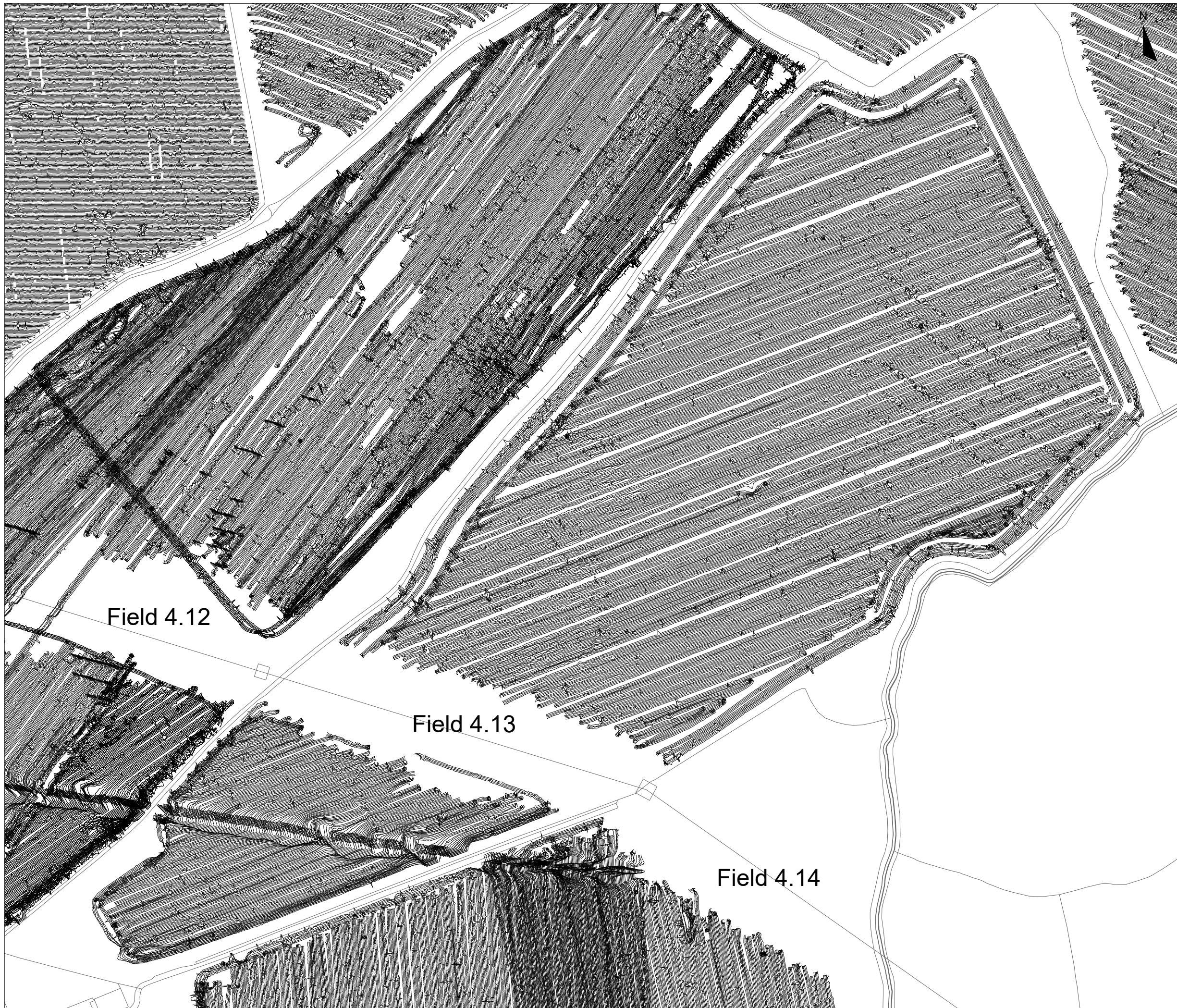
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XY Trace Plots (Field 4.12 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 175  
1:3500 @ A3

Fig No:  
61



Field 4.12

Field 4.13

Field 4.14



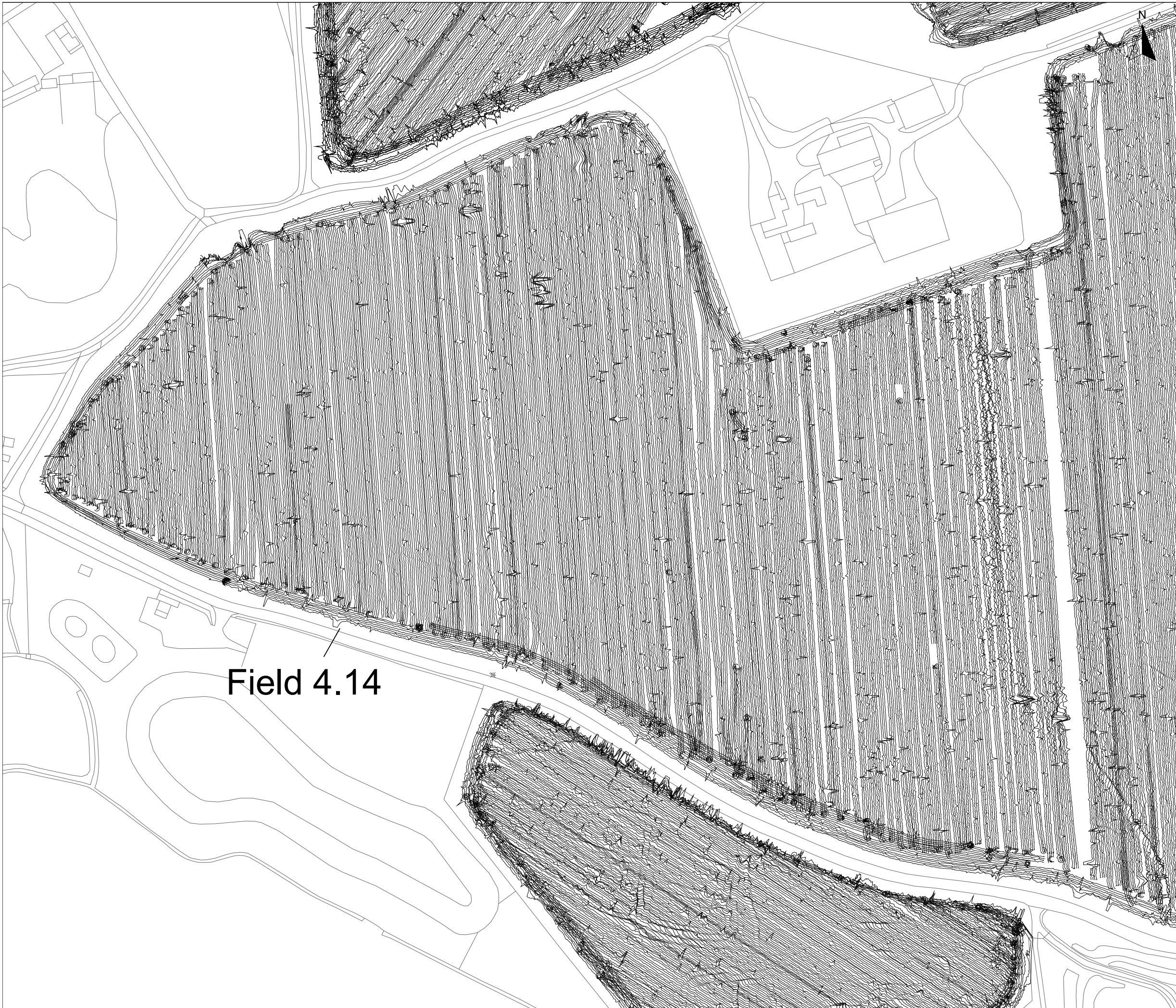
Title:  
XY Trace Plots (Field 4.13 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 150  
1:3000 @ A3

Fig No:  
62



Field 4.14



Title:  
XY Trace Plots (Field 4.14 clipped at +/-15nT)

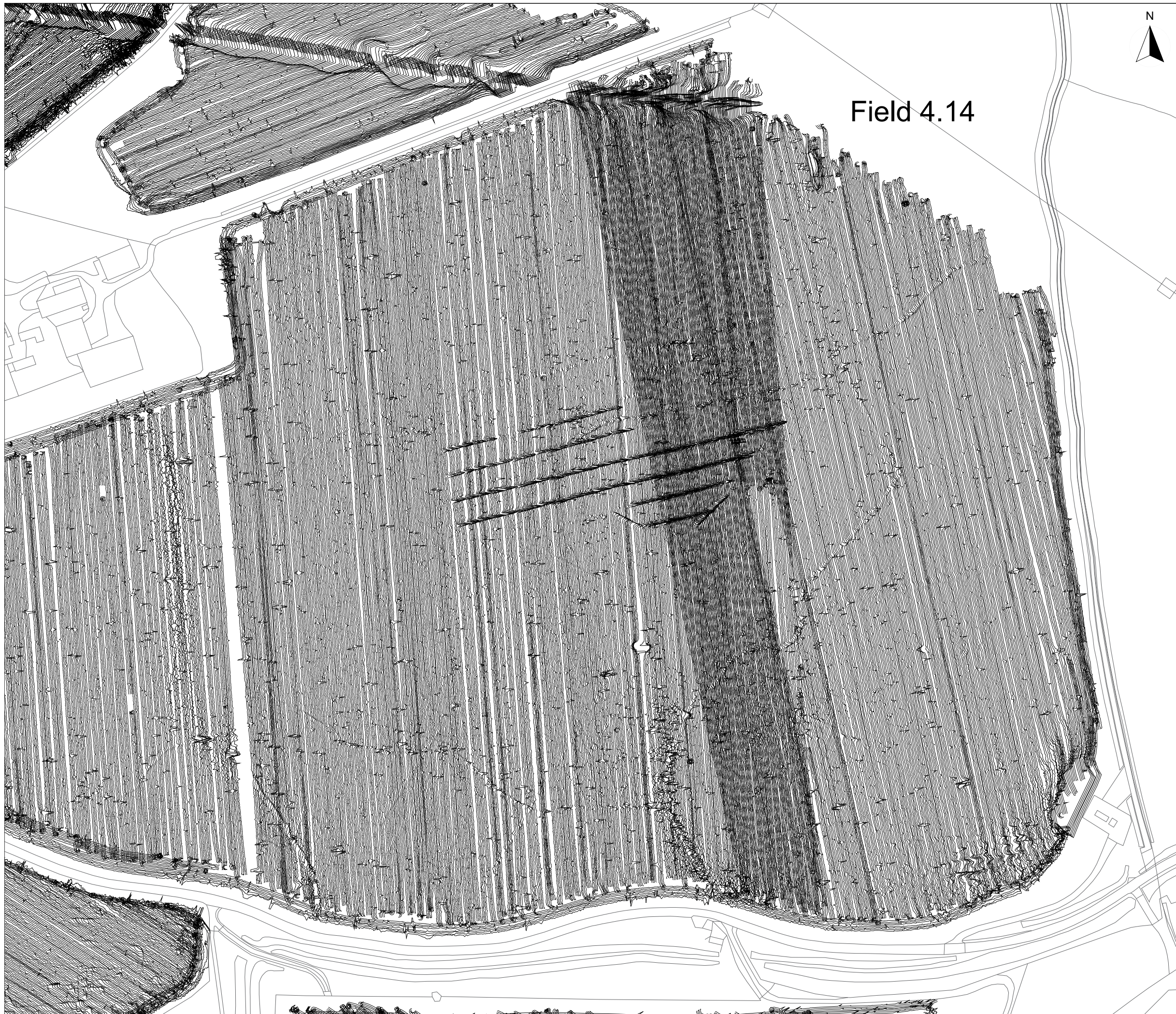
Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 100  
1:2000 @ A3

Fig No:  
63





Field 4.14



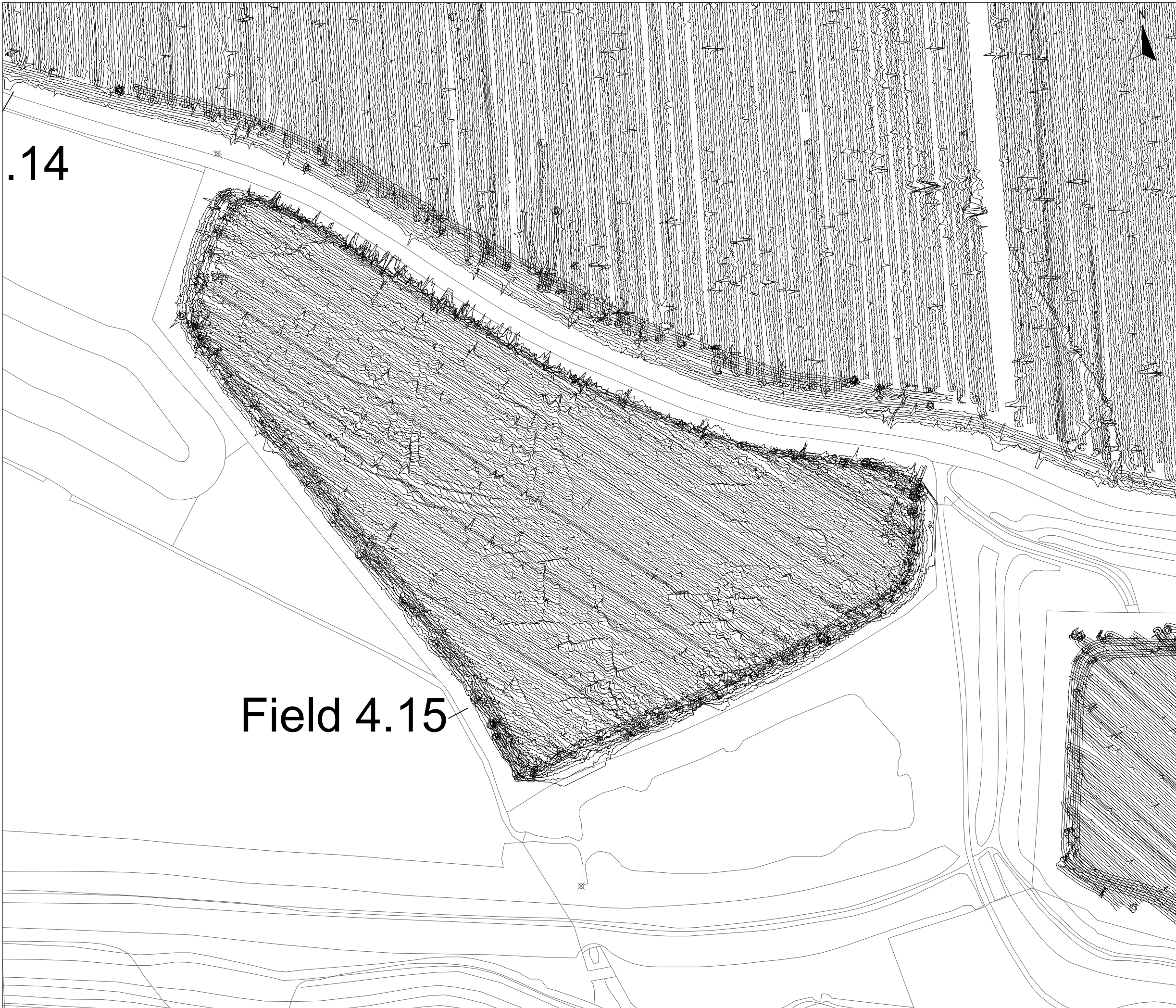
Title:  
XY Trace Plots (Field 4.14 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 125  
1:2500 @ A3

Fig No:  
64



.14

Field 4.15



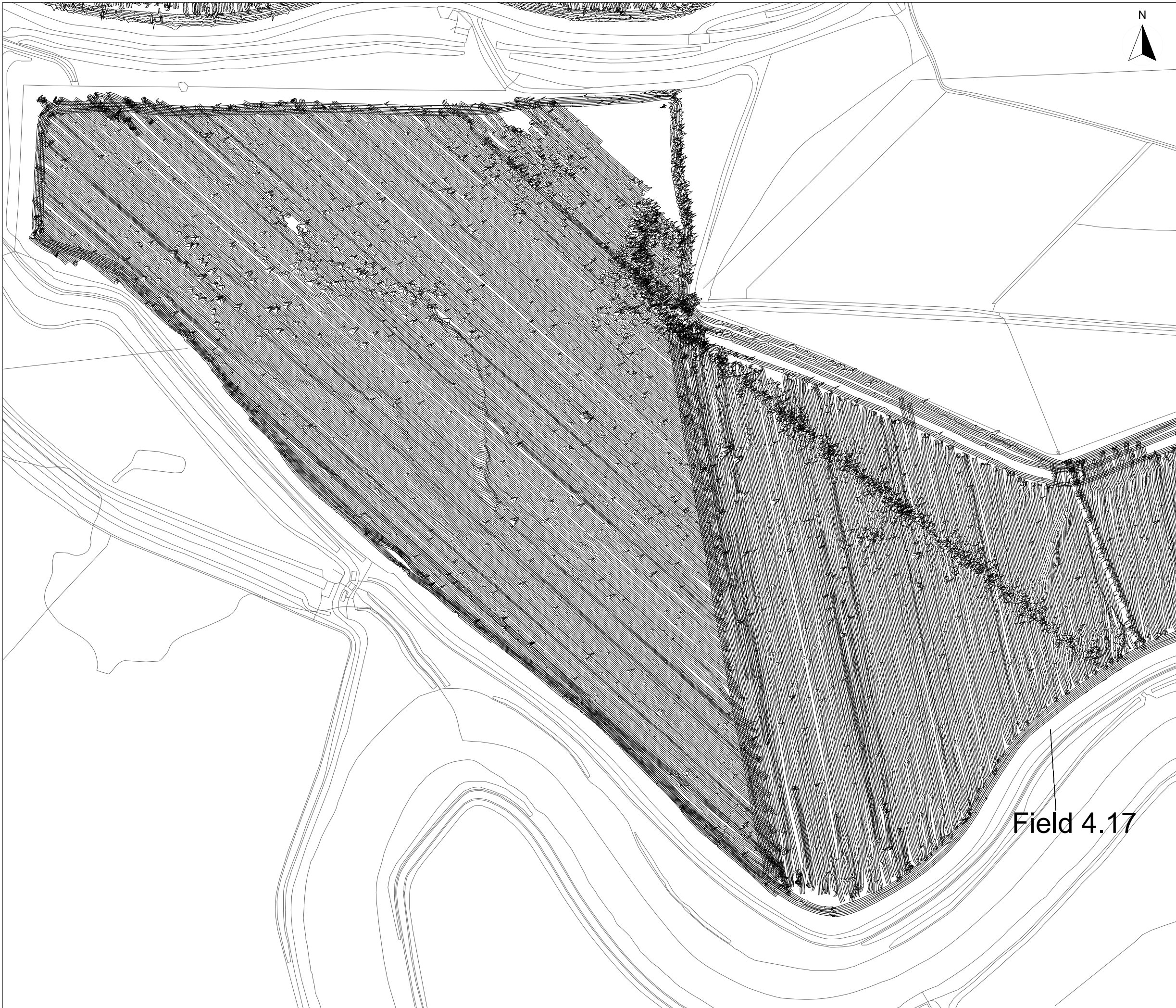
Title:  
XY Trace Plots (Field 4.15 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 75  
1:1500 @ A3

Fig No:  
65



Field 4.17



Title: XY Trace Plots (Field 4.17 clipped at +/-15nT)	
Client: Island Green Power UK Limited	
Project: 16614-4 - Light Valley Solar Project: Site 4	
Scale: 0 metres 125 1:2500 @ A3	Fig No: 66



Field 4.17



Title:  
XY Trace Plots (Field 4.17 clipped at +/-15nT)

Client:  
Island Green Power UK Limited

Project:  
16614-4 - Light Valley Solar Project: Site 4

Scale:  
0 metres 100  
1:2000 @ A3

Fig No:  
67

## 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	This process sets the background mean of each traverse within each grid to zero.
Traverse	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.

## 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.

<i>Archaeology / Probable Archaeology</i>	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.
<i>Possible Archaeology</i>	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.
<i>Industrial / Burnt-Fired</i>	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.
<i>Former Field Boundary (probable &amp; possible)</i>	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.
<i>Ridge &amp; Furrow</i>	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.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	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.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
<i>Service</i>	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.
<i>Ferrous</i>	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.

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).

## 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.



## Appendix C - OASIS Summary

<b>OASIS ID (UID)</b>	sumogeop1-531068
<b>Project Name</b>	Geophysical Survey, Magnetometry Survey at Light Valley Solar Project: Site 4
<b>Sitename</b>	Light Valley Solar Project: Site 4
<b>Sitecode</b>	16614-4
<b>Project Identifier(s)</b>	16614-4
<b>Activity type</b>	Magnetometry Survey, Geophysical Survey
<b>Planning Id</b>	
<b>Reason For Investigation</b>	Planning requirement
<b>Organisation Responsible for work</b>	SUMO Geophysics Ltd.
<b>Project Dates</b>	22-Apr-2024 - 09-Sep-2024
<b>Location</b>	<p><b>Light Valley Solar Project: Site 4</b></p> <p>NGR: SE 53698 28732  LL: 53.75219352906605, -1.187132471752088  12 Fig: 453698,428732  NGR: SE 53769 26754  LL: 53.734409744061885, -1.186391188101986  12 Fig: 453769,426754  NGR: SE 54832 26422  LL: 53.73132108113631, -1.170333332107612  12 Fig: 454832,426422  NGR: SE 52803 28286  LL: 53.74827826197537, -1.200767344635227  12 Fig: 452803,428286  NGR: SE 54189 27246  LL: 53.7387954247148, -1.179939101815985  12 Fig: 454189,427246  NGR: SE 54288 28385  LL: 53.749019964291314, -1.178235904499602  12 Fig: 454288,428385  NGR: SE 53225 28039  LL: 53.74601678560621, -1.194419743982487  12 Fig: 453225,428039</p>
<b>Administrative Areas</b>	Country: England County/Local Authority: North Yorkshire Local Authority District: North Yorkshire Parish: Birkin Parish: Hillum Parish: West Haddlesey

<b>Project Methodology</b>	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.
<b>Project Results</b>	The magnetometer survey has recorded numerous magnetic responses that have been interpreted as being of archaeological interest. In the south-east of Field 4.14 and 4.15 ditches, pits and trends have been detected which are evidence of settlement activity. These responses likely reflect trackways, enclosures, ring ditches and settlement features. The responses in Field 4.14 correspond with the location of the findspot of a Roman coffin (MNY9911). A D-shaped enclosures in Field 4.5 and a rectangular enclosure in Field 4.12 correspond with the locations of Medieval enclosures that are recorded in the HER (MNY9905 & MNY9907). Weaker and less well-defined responses in the west of Field 4.12, west of 4.14 and in the west of 4.17 could also have archaeological origins. However, some of these responses may have been caused by variations in the underlying geology or agricultural processes. Ridge and furrow cultivation has also been detected in the survey. Numerous trends, discrete anomalies and zones of increased response have been assigned to the category of uncertain which is to be expected on a survey of this size. The majority of these anomalies have probably been caused by underlying natural variations, agricultural processes or spreads of relatively modern debris. Former field boundaries, ploughing, land drains and tractor tramlines are also visible in the survey data. Bands of increased response and sinuous anomalies have been detected in Fields 4.2, 4.3 and 4.17 which have been caused by variations in the underlying geology and alluvial deposits. A zone of magnetic distance in Field 4.7 corresponds with the location of the now demolished Low Cottage (MNY9906).
<b>Keywords</b>	D Shaped Enclosure - MEDIEVAL - FISH Thesaurus of Monument Types Rectangular Enclosure - MEDIEVAL - FISH Thesaurus of Monument Types Ditched Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Pit - UNCERTAIN - FISH Thesaurus of Monument Types Enclosed Settlement - UNCERTAIN - FISH Thesaurus of Monument Types Ring Ditch - UNCERTAIN - FISH Thesaurus of Monument Types Circular Enclosure - UNCERTAIN - FISH Thesaurus of Monument Types Square Enclosure - 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 Plough Marks - 20TH CENTURY - FISH Thesaurus of Monument Types Pipeline - 20TH CENTURY - FISH Thesaurus of Monument Types
<b>Funder</b>	Private or public corporation Island Green Power UK Limited
<b>HER</b>	North Yorkshire HER - unRev - STANDARD

<b>Person Responsible for work</b>	Thomas Cockcroft
<b>HER Identifiers</b>	
<b>Archives</b>	

Report generated on: 22-01-2025:1709

## Appendix D – Data Management Plan & Archive Selection Strategy

### Data Management Plan

Project ID / OASIS ID

SUMO- 16614-4 / sumogeop1-531068

Project Name

Light Valley Solar Project: Site 4

Project Description

Detailed magnetic survey over approx.340ha

Client

Island Green Power UK Limited

Project Manager

Thomas Cockcroft

Field Leader

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

Date DMP created

26.03.2024

Date DMP last updated

22.01.2025

Version

2

Technique - data

Detailed magnetic survey.

Manual – cart - other

ATV/Cart Handheld 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**

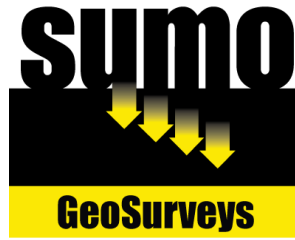
Not applicable – no archive



- 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 E Light Valley Site 6 Geophysical Survey Report



# GEOPHYSICAL SURVEY REPORT

## Light Valley Solar Project: Site 6

Client

**Island Green Power UK Limited**

Survey Report

**16614-6**

OASIS Ref. No.

**sumogeop1-533200**

Date

**17 April 2025**





## Survey Report 16614-6: Light Valley Solar Project: Site 6

<b>Survey dates</b>	20-23 Jan 2025 11-13 Feb 10-13, 21 & 31 March 01-09 April
<b>Field co-ordinator</b>	Craig Wakefield MSc Simon Lobel BSc Liam Brice-Bateman BA
<b>Field Team</b>	Gemma Asbury MA Gabriel Mazeski BA Amy Allinson MSc Darcy Hooper MSc Max Moran BA (Hons)
<b>Report Date</b>	17 April 2025
<b>CAD Illustrations</b>	Thomas Cockcroft MSc MCIfA
<b>Report Author</b>	Thomas Cockcroft MSc MCIfA
<b>Project Manager</b>	Thomas Cockcroft MSc MCIfA
<b>Report approved</b>	Dr John Gater BSc DSc(Hon) MCIfA FSA

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## 2 LIST OF APPENDICES

Appendix A	Technical Information: Magnetometer Survey Methods, Processing and Presentation
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 ClfA (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 land at Site 6 of the Light Valley Solar Project has recorded magnetic responses that have been interpreted as being of archaeological interest. In Fields 6.2, 6.3 and 6.4 numerous ditches, enclosures, ring-ditches and pits have been detected which reflect field systems and likely settlement. A probable barrow has also been marked in the south-east of Field 6.3. Ridge and furrow cultivation is visible in Fields 6.3, 6.9 and 6.10. Uncertain responses throughout the survey have probably been caused by natural or agricultural processes; however, archaeological origins for some of these anomalies cannot be discounted. Former field boundaries, land drains, modern ploughing and a service pipe have also been marked in the survey. At the time of the survey the western part of Field 6.5 was unsurveyable due to a rapeseed crop.

### 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 eight separate magnetometer survey reports.
- 5.3 Site Details

NGR / Postcode	SE 51162 31150 / LS25 5DW
Location	The site is located 7km north of Knottingley and 2.5km south-east of Sherburn in Elmet. The site is bounded to the west and north by a railway line and surrounds Milford Grange Farm.
HER	North Yorkshire HER
OASIS Ref. No.	sumogeop1-533200
District	n/a
Parish	South Milford District
Topography	Generally flat
Land Use	Arable / pasture
Geology (BGS 2025)	Bedrock:      Brotherton Formation - Limestone, dolomitic. Roxby Formation - Mudstone, calcareous. Brotherton Formation - Limestone, dolomitic Superficial:   Hemingbrough Glaciolacustrine Formation - Clay, silty.

Alluvium - Clay, silt, sand and gravel  
 Peat - Peat

Soils (CU 2025)    Soilscape 18: Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils  
                               Soilscape 22: Loamy soils with naturally high groundwater

Survey Methods    Magnetometer survey (fluxgate gradiometer)

Study Area            101 ha (13 ha unsurveyable)

#### 5.4 **Archaeological Background**

5.4.1 See Below a table of non-designated heritage assets within Site 6.

Field No.	HER Record	Summary
6.2 & 6.3	MNY10364	At least two ring ditches and possibly more, although they may be geological origin. There are also rectilinear cropmarks
6.3	MNY10359	An undated trackway is visible as a single soilmark ditch, and it may continue to the north curving west as a double ditch. possibly associated with MNY10360 (see below).
6.3	MNY10360	At least one and possibly more irregularly shaped enclosures which are probably associated with the trackway MNY10359 (see above).
6.4	MNY10365	Curving ditches associated with a vague enclosure to the north of Brooklands
6.4	MNY17143 & MNY17144	Recorded as extensive area of ditches and ring ditches, may be associated with MNY10364 (see above).
6.5	MNY39993	A medieval droveway with integrated enclosures seen as crop marks on aerial photographs.
6.6	MNY10350	Cropmark indicative of a possible enclosure, they could also be geological in origin.
6.6	MNY17137	A ring ditch south of Gascoigne wood mine
6.10	MNY17141	Irregular ditched enclosure north-west of Milford Lodge

#### 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 ten survey areas (Fields 6.1-6.10) and specific anomalies have been given numerical labels [1] [2] which appear in the text below, as well as on the Interpretation Figure(s). The majority of Field 6.5 was a rapeseed crop which rendered it unsurveyable.*

## 6.2 ***Probable / Possible Archaeology***

- 6.2.1 In Field 6.2 as number of linear trends, two pits and a semi-circular anomaly [1] have been detected and assigned to the categories of *Probable* and *Possible Archaeological* interest in accordance with their magnetic strength. These responses appear to correspond with cropmarks that are recorded in the HER (MNY10364)
- 6.2.2 The magnetometer survey has revealed an extensive network of ditches and enclosures which reflect widescale land divisions and field systems in Field 6.3. A ditch-like response [2] and an irregular shaped enclosure [3] in correspond respectively with HER records MNY10359 & MNY10360. There are several long linear ditches similar to [2] so they may indicate further trackways with appended fields. Also in Field 6.3, a discrete circular ring [4], measuring 14m in diameter, could mark the location of a barrow or possibly round house, while smaller, less clear curvilinear responses could mark the locations of further ring-ditches.
- 6.2.3 A weak ditch-like response [5] in the east of Field 6.4 could be a continuation of the ditches southwards from Field 6.3 however, there are no clear indications in the magnetic of the features recorded in the HER (MNY10365, MNY17143 & MNY17144).

## 6.3 ***Ridge and Furrow***

- 6.3.1 Widely spaced and parallel linear anomalies have been detected in Fields 6.3, 6.9 and 6.10 which have been caused by ridge and furrow cultivation. The responses in Field 6.3 are very straight which could suggest they are post-Medieval in date, though it is possible that land drains follow the same alignment.

## 6.4 ***Uncertain***

- 6.4.1 Discrete anomalies, trends and zones of increased responses have been detected across the dataset which have been assigned to the category of *Uncertain*. They generally lack the defined morphology of anomalies that would ordinarily warrant an archaeological interpretation. Some of these anomalies are probably the result of geological variations or agricultural practises. However, archaeological origins for all the uncertain responses cannot be discounted, given the HER record and responses of interest detected within the survey (see 6.2). The spreading of green waste in Fields 6.4, 6.5 and 6.6 has hindered a more confident interpretation of some of the responses.

## 6.5 ***Former Field Boundary – Corroborated / Conjectural***

- 6.5.1 Linear and curvilinear responses in most of the survey areas correspond with the routes of former field boundaries that are recorded on historic mapping (see Figure 23).
- 6.5.2 Linear anomalies in Fields 6.3, 6.4 and 6.9 have been interpreted as conjectural field boundaries as they have a similar magnetic signature to the corroborated boundaries (see 6.5.1).

## 6.6 ***Agricultural – Ploughing / Land Drains***

- 6.6.1 Closely spaced and ill-defined parallel trends in Fields 6.1, 6.3 and 6.8 have been caused by modern ploughing.
- 6.6.2 Widely spaced parallel linear anomalies, many of which form herringbone patterns, are due to land drains.

## 6.7 **Natural / Geological / Pedological / Topographic**

6.7.1 Discrete anomalies which are located within sinuous bands of increased response have been detected in the magnetic data. These anomalies have been caused by natural variation or alluvial deposits.

## 6.8 **Green waste**

6.8.1 Fields 6.4, 6.5 and 6.6 appear to have been affected by Green Waste, which has resulted in spurious anomalies or 'noise' in the data. This can have a marked effect on the results from magnetic surveys and has been recognised as a potential complicating issue for some time (Gerrard *et al* 2015). The extent of distorted data reflects the quantity of inorganic contaminants, including batteries, pieces of metal cans and other ferrous items that have been spread across the fields. Since green waste has a varying composition, it is impossible to predict in advance any potentially detrimental effects.

## 6.9 **Service**

6.9.1 A magnetically strong linear responses in the west of Field 6.8 marks the routes of a service pipe.

## 6.10 **Ferrous / Magnetic Disturbance**

6.10.1 Zones of magnetic disturbances in Fields 6.1, 6.2, 6.3, 6.8, 6.9 and 6.10 have been caused by spread of modern debris. Ferrous responses close to boundaries are due to adjacent fences, gates and buildings. 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 ditches, enclosures and at least one ring ditch; consequently, the survey is deemed to have worked well. However, the spreading of green waste over parts of the site has masked some of the magnetic responses, hindering a more confident interpretation.

## 8 **CONCLUSION**

8.1 The magnetometer survey has recorded magnetic responses that have been interpreted as being of archaeological interest. In Fields 6.2, 6.3 and 6.4 numerous ditches, enclosures, ring-ditches and pits have been detected. They probably reflect widescale land divisions and clusters of enclosures. Some of anomalies correspond with HER records. A possible barrow has also been marked in the south-east of Field 6.3. Ridge and furrow cultivation is visible in Fields 6.3, 6.9 and 6.10. Numerous responses of uncertain origin have been plotted in the data; while archaeological origins cannot be discounted for all these anomalies, some may be due to natural or agricultural processes. At the time of the survey the western part of Field 6.5 was unsurveyable due to a rapeseed crop.

8.2 Former field boundaries, land drains and modern ploughing have been recorded throughout Site 6. Discrete anomalies located within sinuous bands of increased response have been caused by natural processes. Green waste appears to have been spread across Fields 6.4, 6.5 and 6.6 which has caused increased levels of magnetic background 'noise'. The route of a service pipe is visible in the west of Field 6.8. Zones of magnetic disturbances in Fields 6.1, 6.2, 6.3, 6.8, 6.9 and 6.10 are due to the spreading of modern debris.

## 9 REFERENCES

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- EAC 2016      *EAC Guidelines for the Use of Geophysics in Archaeology*, European Archaeological  
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- 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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