Geophysical Survey Report

Of

Fair Oaks Renewable Energy Park,

Ruddington, Nottinghamshire

For

Orion Heritage

On behalf of

Engena LTD/Ridge Clean Energy Ltd

Magnitude Surveys Ref: MSSK1206

HER Event Number: N/A

OASIS Number: TBC

April 2022

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Abstract

Magnitude Surveys were commissioned to assess the subsurface archaeological potential of c. 97.8ha of land at Ruddington, Rushcliffe, Nottinghamshire. A fluxgate gradiometer survey was successfully carried out across the survey area and identified a range of anomalies with agricultural, modern and natural origins. In addition, anomalies of an undetermined origin have been identified. Agricultural anomalies have been detected throughout the survey area, these are in the form of drainage features, agricultural trends representative of modern ploughing, and historical field boundaries that collocate with previous land usage of the survey area. Anomalies with a natural origin are recorded across the survey area, these are likely due to changes in superficial deposits. Anomalies of an undetermined origin have been identified also, and while these are most likely a result of agricultural, modern or industrial features, an archaeological origin cannot be ruled out.

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1. Introduction

1.1. Magnitude Surveys Ltd (MS) was commissioned by Orion Heritage on behalf of Engena LTD and Ridge Clean Energy Ltd to undertake a geophysical survey over a c. 97.8ha area of land at Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire (SK 55785 31428).

1.2. The geophysical survey comprised quad-towed, cart-mounted and hand-carried GNSS-positioned fluxgate gradiometer survey. Magnetic survey is the standard primary geophysical method for archaeological applications in the UK due to its ability to detect a range of different features. The technique is particularly suited for detecting fired or magnetically enhanced features, such as ditches, pits, kilns, sunken featured buildings (SFBs) and industrial activity (David *et al*., 2008).

1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David *et al*., 2008), the Chartered Institute for Archaeologists (CIfA, 2020) and the European Archaeological Council (Schmidt *et al.,* 2015).

1.4. It was conducted in line with a WSI produced by MS (Chmielowska, 2022).

1.5. The survey commenced on 24 March 2022 and took three weeks to complete.

2. Quality Assurance

2.1. Magnitude Surveys is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, and a corporate member of ISAP (International Society for Archaeological Prospection).

2.2. The directors of MS are involved in cutting edge research and the development of guidance/policy. Specifically, Dr Chrys Harris has a PhD in archaeological geophysics from the University of Bradford, is a Member of CIfA and is the Vice-Chair of the International Society for Archaeological Prospection (ISAP); Finnegan Pope-Carter has an MSc in archaeological geophysics and is a Fellow of the London Geological Society, as well as a member of GeoSIG (CIfA Geophysics Special Interest Group); Dr Paul Johnson has a PhD in archaeology from the University of Southampton, is a Fellow of the Society of Antiquaries of London and a Member of CIfA, has been a member of the ISAP Management Committee since 2015, and is currently the nominated representative for the EAA Archaeological Prospection Community to the board of the European Archaeological Association.

2.3. All MS managers, field and office staff have degree qualifications relevant to archaeology or geophysics and/or field experience.

3. Objectives

3.1. The objective of this geophysical survey was to assess the subsurface archaeological potential of the survey area.

4. Geographic Background

4.1. The survey area was located c. 1.7km northeast of Gotham (Figure 1). Gradiometer survey was undertaken across three fields under arable cultivation. The survey area was bordered by farmland to the north and west with a stream cutting though the area and along the western border. The stream then runs through the survey area between Areas 2 and 3. To the south and east there was a continuation of the farmland with a rail track running at a north to south orientation and parallel to the southeast border. Additionally, there was a track running along the east boundary of the survey area (Figure 2).

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	The survey area consisted of a flat arable field with winter barley.	The field was bordered by a ditch to the west and south. The field continues to the north and east.
2	The survey area consisted of a flat arable field with young crop.	The field was bordered on all sides by drainage ditches. Along parts of the eastern border was a section of rough terrain.
3	The survey area consisted of a flat arable field with winter barley.	The field was bordered by a ditch to the north, by hedges to the west and south and by a farm track to the east.

4.3. The underlying geology comprises of mudstone from the Branscombe Mudstone Formation in Area 3 and the south of Area 2, as well as sandstone from the Arden Sandstone Formation in the north of Area 2. In Area1, to the north, there is mudstone form the Edwalton Member. Superficial deposits comprise of Alluvium (British Geological Survey, 2022).

4.4. The soils consist of loamy and clayey floodplain soils with naturally high groundwater (Soilscapes, 2022).

5. Archaeological Background

5.1. The following is a summary of a Historic Environment Desk Based Assessment produced and provided by Orion Heritage (Goacher and Sheehan, 2022).

5.2. There are no statutory designations within the study site or wider study area. There is one undesignated scatter of medieval and post medieval pottery recorded along the centre of the east border of the survey area.

5.3. Geophysical survey, fieldwalking and metal detecting within the wider study area have identified small areas of agricultural crop marks and a scatter of artefacts from all periods with a slightly higher quantity from the Medieval Period. A series of archaeological finds are located c. 850m southwest of Area 3, around Paradise. These include a Bronze Age axe and socketed palstave, a Roman finger ring and Medieval belt chape and brooch. Another location, c. 150m to the west of Area 1 contained finds such as two Neolithic stone axes as well as Roman and Medieval pottery. A square enclosure, with no definitive age was located c. 560m to the east.

5.4. These are indicative of landscape use throughout history but there is no definitive evidence of settlement or more concentrated activity within the site. Furthermore, the documentary and map evidence suggest a longstanding agricultural use.

5.5. Assessment therefore suggests that there is low potential for finds or features from all archaeological periods and low potential for remains that would be considered of National Significance and therefore be a design or planning constraint.

6. Methodology

6.1. Data Collection

6.1.1. Magnetometer surveys are generally the most cost effective and suitable geophysical technique for the detection of archaeology in England. Therefore, a magnetometer survey should be the preferred geophysical technique unless its use is precluded by any specific survey objectives or the site environment. For this site, no factors precluded the recommendation of a standard magnetometer survey. Geophysical survey therefore comprised the magnetic method as described in the following section.

6.1.2. Geophysical prospection comprised the magnetic method as described in the following table.

6.1.3. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

6.1.4. The magnetic data were collected using MS' bespoke quad-towed cart system and hand-carried GNSS-positioned system.

6.1.4.1. MS' cart and hand-carried system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a multi-channel, multi-constellation GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The RTK GPS is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.

6.1.4.2. Magnetic and GPS data were stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.

6.1.4.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data were collected by traversing the survey

area along the longest possible lines, ensuring efficient collection and processing.

6.2.Data Processing

6.2.1. Magnetic data were processed in bespoke in-house software produced by MS. Processing steps conform to the EAC and Historic England guidelines for 'minimally enhanced data' (see Section 3.8 in Schmidt *et al.*, 2015: 33 and Section IV.2 in David *et al.,* 2008: 11).

Sensor Calibration – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen *et al*. (2003).

Zero Median Traverse – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

Projection to a Regular Grid – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

6.3.Data Visualisation and Interpretation

6.3.1. This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the lower sensors. The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, some features can be clearer in the respective gradient or total field datasets. Multiple greyscale images of the gradient and total field at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figures 9, 12, 15, 18, 21, 24, 27, 30 and 33). XY trace plots visualise the magnitude and form of the geophysical response, aiding anomaly interpretation.

6.3.2. Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historical maps, LiDAR data, and soil and geology maps. Google Earth (2022) was also consulted, to compare the results with recent land use.

6.3.3. Geodetic position of results – All vector and raster data have been projected into OSGB36 (ESPG27700) and can be provided upon request in ESRI Shapefile (.SHP) and Geotiff (.TIF) respectively. Figures are provided with raster and vector data projected against OS Open Data.

7. Results

7.1.Qualification

7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible, an anomaly source will be identified along with the certainty of the interpretation. MS actively seek feedback on their reports, as well as reports from further work, in order to constantly improve our knowledge and service.

7.2.Discussion

7.2.1. The geophysical results are presented in combination with satellite imagery and historical maps (Figures 4 and 6).

7.2.2. A fluxgate gradiometer survey has been successfully undertaken across the survey area and has primarily identified anomalies of an agricultural, modern and natural origin. Anomalies of an undetermined origin have also been identified across the survey area. Modern interference has been recorded surrounding buried services, overhead cables and pylons and may have obscured weaker anomalies, if they were present.

7.2.3. Anomalies of agricultural origin have been identified in the form of modern ploughing trends running approximately east to west, and north to south across the survey area. These correspond with ploughing trends seen on satellite images and crop trends visible at the time of the survey (Figures 17, 20, 26 and 29).

7.2.4. Drainage features have been identified in the centre of the survey area, running approximately north to south, and east to west (Figures 8, 11, 14, 17, 20, 23, 26, 29 and 32). These could be related to the modern drainage system seen bordering the survey area (Figures 4 and 6).

7.2.5. Throughout the survey area, there are very strong anomalies that are representative of variations in the natural background. These are likely to occur due to changes in the superficial deposits and are most prominent in the Total Field data (Figures 3 and 5). Due to the strength of these anomalies, any weaker anomalies that may be present are obscured.

7.2.6. Weak linear and curvilinear anomalies have been recorded in the southern regions of the survey area (Figure 29). These do not match any mapped features and do not form an obvious pattern. Because of this, they have been

classified as undetermined, however an archaeological origin cannot be ruled out.

7.3.Interpretation

7.3.1. General Statements

7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.

7.3.1.2. **Ferrous (Spike)** – Discrete dipolar anomalies are likely to be the result of isolated pieces of modern ferrous debris on or near the ground surface.

7.3.1.3. **Ferrous/Debris (Spread)** – A ferrous/debris spread refers to a concentration of multiple discrete, dipolar anomalies usually resulting from highly magnetic material such as rubble containing ceramic building materials and ferrous rubbish.

7.3.1.4. **Magnetic Disturbance** – The strong anomalies produced by extant metallic structures, typically including fencing, pylons, vehicles and service pipes, have been classified as 'Magnetic Disturbance'. These magnetic 'haloes' will obscure weaker anomalies relating to nearby features, should they be present, often over a greater footprint than the structure causing them.

7.3.1.5. **Undetermined** – Anomalies are classified as Undetermined when the origin of the geophysical anomaly is ambiguous and there is no supporting contextual evidence to justify a more certain classification. These anomalies are likely to be the result of geological, pedological or agricultural processes, although an archaeological origin cannot be entirely ruled out. Undetermined anomalies are generally distinct from those caused by ferrous sources.

7.3.2. Magnetic Results - Specific Anomalies

7.3.2.1. **Drainage Features** – In Areas 1 and 2, several linear anomalies have been identified (Figures 7, 8, 10, 11, 13, 14, 16, 17, 19, 20, 22, 23, 25, 26, 28, 29, 31 and 32). Majority of these drains have an orientation approximately north-south and west-east, with a few running perpendicular to the major trend. These anomalies exhibit dipolar anomalies, with alternating positive and negative signals, indicative of fired clay drains. The pattern of the linear anomalies suggests a grid like drainage system, most likely related to the modern-day drainage ditches that surround the survey area.

7.3.2.2. **Agricultural (Strong/Weak)** – In Areas 2 and 3, a series of weak anomalies are identified (Figures 6, 17, 26, 29 and 32). Many of these anomalies correlate with known historical field boundaries (Figures 4 and 6), however, there are others that are not represented on maps. Due to their proximity to these features, they are likely to be representative of tracks that run away from the anomalies identified on historical maps.

7.3.2.3. **Agricultural (Trends)** – In Area 2, weak linear anomalies can be seen running parallel to each other at an orientation of west to east. A selection of these anomalies have been digitised to reflect the trends. The orientation of these weak anomalies correspond with modern ploughing regimes seen on satellite images (Figures 17, 20 and 26). In Area 3, similar weak linear anomalies do not collocate with visible ploughing regimes but likely relate to past ploughing regimes (Figure 29).

7.3.2.4. **Natural (Zone)** – Across the survey area, variations in the natural background can be seen as significant spreads of anomalies. These variations can be seen most strongly in the Total Field data (Figure 3 and 5). They can be seen forming a pattern which collocates with ground conditions seen in past satellite images. These are most likely a result of the subtle changes in superficial deposits seen in the area (see Section 4.4).

7.3.2.5. **Undetermined (Strong/Weak)** - In the south of Area 2, a series of parallel, linear and curvilinear weak anomalies have been identified each with a length c. 20m (Figure 29). In the west of Area 3, a similar anomaly can be seen that had a weak signal, however, was much longer, c. 130m in length. Due to their ambiguous origin, and the fact that these anomalies do not form a coherent shape, they have been categorised as Undetermined. However, an archaeological or agricultural cannot be ruled out.

8. Conclusions

8.1. A fluxgate gradiometer has successfully been carried out across the survey area. Anomalies of agricultural and natural origins have been detected along with anomalies of an undetermined origin. Modern disturbance had been detected in the survey area around pylons and overhead cables that run through the centre of Area 2, along the field boundaries and surrounding buried services detected.

8.2. The survey primarily identified an extensive drainage network across the centre of the survey area, along with anomalies of an agricultural origin in the form of modern ploughing trends and historical mapped and unmapped field boundaries.

8.3. There was a significant distribution of anomalies that are likely related to the natural background of the survey area, along with the variations of the changes due to the environmental settings. These anomalies covered large portions of the survey area and due to the strong responses may obscure weaker anomalies, if they were present.

8.4. Anomalies of an undetermined origin have also been identified in the north and south of the survey area. These do not collocate to any features identified on historical and satellite imagery, therefore, are unable to have a more concise interpretation.

9. Archiving

9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and un-georeferenced images, XY traces and a copy of the final report.

9.2. MS contributes reports to the ADS Grey Literature Library upon permission from the client, subject to any dictated time embargoes.

10. Copyright

10.1. Copyright and intellectual property pertaining to all reports, figures and datasets produced by Magnitude Services Ltd is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

11. References

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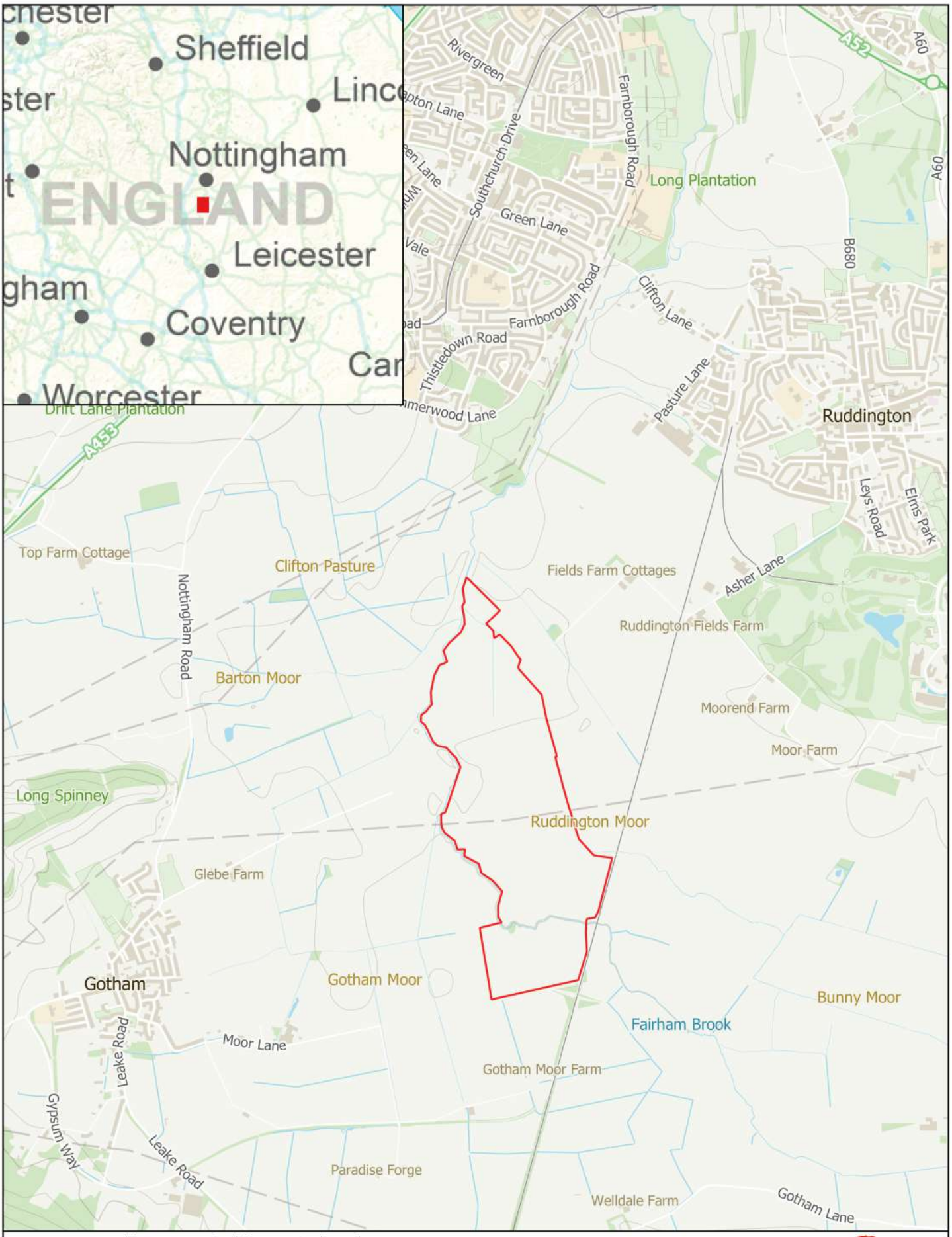
12. Project Metadata

MS Job Code	MSSK1206
Project Name	Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Client	Orion Heritage
Grid Reference	55785 31428
Survey Techniques	Magnetometry
Survey Size (ha)	97.8
Survey Dates	2022-03-24 to 2022-03-30
Project Lead	Dr. Anna Chmielowska PCIfA
Project Officer	Dr. Anna Chmielowska PCIfA
HER Event No	N/A
OASIS No	N/A
S42 Licence No	N/A
Report Version	1.1

13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Lead to Review	ED, LH, CL	AL	21 April 2022
0.2	Corrections from Project Lead, draft for Director Approval	ED, CL	PSJ	27 April 2022
1.0	Report Issued as Final	N/A	AC	29 April 2022
1.1	Report Issued as Final after Client's corrections	AC	PSJ	12 July 2022



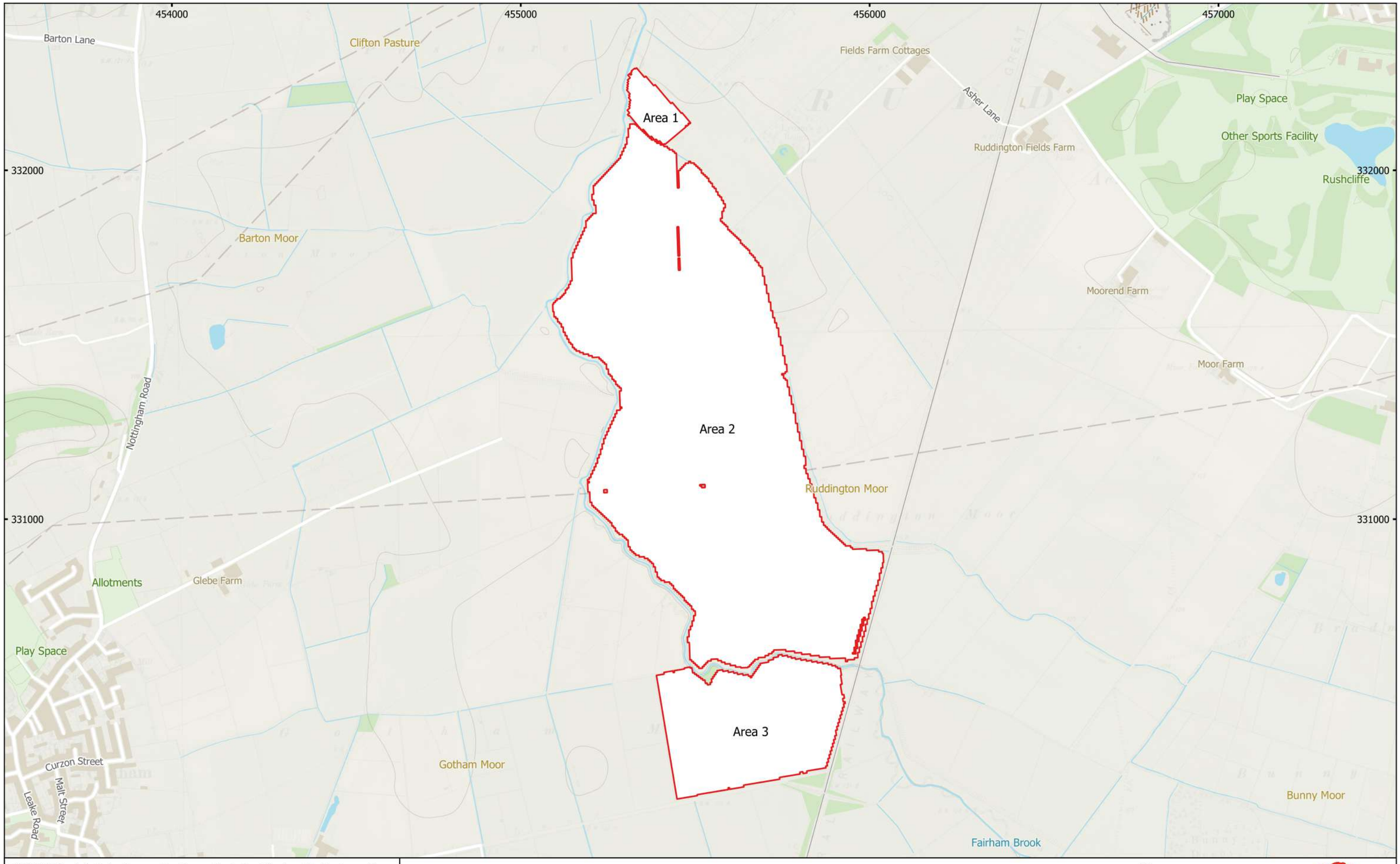
MSSK1206 - Ruddington, Rushcliffe, Nottinghamshire
Figure 1 - Site Location
1:25,000 @ A4

Site Boundary

N

0 0.5 1 km

magnitude surveys



MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 2 - Location of Survey Area
1:10,000 @ A3

Survey Extent

N

0 250 500 750 m

magnitude surveys

331200

331700

332200

455200

455200

455700

Area 1

Area 2

Asher Lane

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 3 - Magnetic Total Field (Lower Sensor) (North) (Overview)
1:3,500 @ A3

48,997 nT 49,005

N

0 80 160 240 m

magnitude surveys

331200

331700

332200

455200

455200

455700

455700

Area 1

Area 2

98

F.B.

B.M. 95·9

B.M. 96·6

100

99

101

Fish Pond

Lynam's Rough

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 4 - Magnetic Interpretation over Historical and Satellite Imagery (North) (Overview)
1:3,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Undetermined (Weak)
Overhead Cables
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N

0 80 160 240 m

magnitude surveys

455200

455700

456200

330700

330700

Area 2

Area 3

330200

330200

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 5 - Magnetic Total Field (Lower Sensor) (South) (Overview)
1:3,500 @ A3

48,997 nT 49,005

N

0 80 160 240 m

magnitude surveys

455200
455700
456200
330700
330200
Area 2
Area 3
F.P.
F.B.
S.P
102
100
△101
B.M. 121·8
B.M. 106·4
B.M. 108
RAILWAY
F.P.

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 6 - Magnetic Interpretation over Historical and Satellite Imagery (South) (Overview)
1:3,500 @ A3

- Agricultural (Strong)
- Agricultural (Weak)
- Agricultural (Spread)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Natural (Weak)
- Natural (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Agricultural (Trend)
- Data Artefact (Trend)
- Service
- Drainage Feature
- Ferrous (Spike)

N

0 80 160 240 m

magnitude surveys

455200

455400

455600

Area 1

332200

332200

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 7 - Magnetic Gradient (Area 1)
1:1,500 @ A3

-1 nT 2

N

0 25 50 75 m

magnitude surveys

455200

455400

455600

Area 1

332200

332200

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 8 - Magnetic Interpretation (Area 1)
1:1,500 @ A3

Magnetic Disturbance
Natural (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N

0 25 50 75 m

magnitude surveys

455200

455400

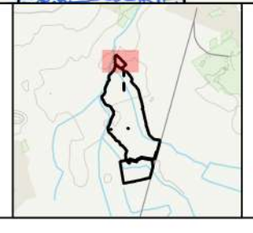
455600

Area 1

332200

332200

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 9 - XY Trace Plot (Area 1)
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

331600

331800

332000

Area 2

455200

455200

455400

455400

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 10 - Magnetic Gradient (Area 2 (Northwest))
1:1,500 @ A3

-1 nT 2

N

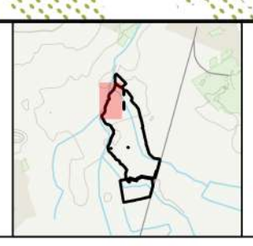
0 25 50 75 m

magnitude surveys

331600
331800
332000
Area 2
455200
455200
455400
455400

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 11 - Magnetic Interpretation (Area 2 (Northwest))
1:1,500 @ A3

Magnetic Disturbance
Natural (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)



N

0 25 50 75 m

magnitude surveys

331600

331800

332000

Area 2

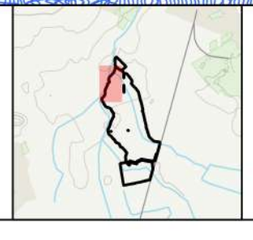
455200

455200

455400

455400

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 12 - XY Trace Plot (Area 2 (Northwest))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

331600

331800

332000

455400

455400

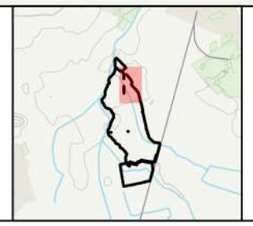
Area 2

455600

455600

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 13 - Magnetic Gradient (Area 2 (Northeast))
1:1,500 @ A3

-1 nT 2



N

0 25 50 75 m

magnitude surveys

331600
331800
332000
455400
455400
Area 2
455600
455600

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 14 - Magnetic Interpretation (Area 2 (Northeast))
1:1,500 @ A3

Magnetic Disturbance
Natural (Spread)
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

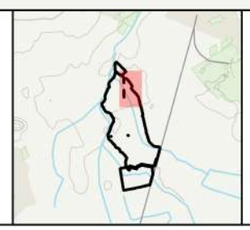
N

0 25 50 75 m

magnitude surveys

331600
331800
332000
455400
455400
Area 2
455600
455600

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 15 - XY Trace Plot (Area 2 (Northeast))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

331200

331400

331600

455200

455200

Area 2

455400

455400

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 16 - Magnetic Gradient (Area 2 (West))
1:1,500 @ A3

-1 nT 2

N

0 25 50 75 m

magnitude surveys

331200
331400
331600
455200
455200
Area 2
455400
455400

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 17 - Magnetic Interpretation (Area 2 (West))
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Overhead Cables
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N

0 25 50 75 m

magnitude surveys

331200

331400

331600

455200

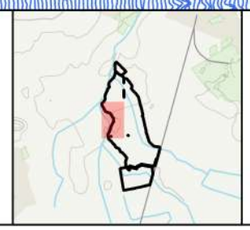
455200

Area 2

455400

455400

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 18 - XY Trace Plot (Area 2 (West))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

331200

331400

331600

455600

455600

Area 2

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 19 - Magnetic Gradient (Area 2 (East))
1:1,500 @ A3

-1 nT 2

N

0 25 50 75 m

magnitude surveys

331200

331400

331600

455600

455600

Area 2

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 20 - Magnetic Interpretation (Area 2 (East))
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Undetermined (Weak)
Overhead Cables
Agricultural (Trend)
Drainage Feature
Ferrous (Spike)

N

0 25 50 75 m

magnitude surveys

331200

331400

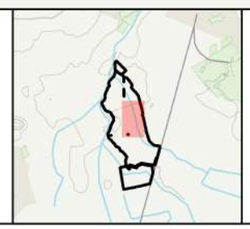
331600

455600

455600

Area 2

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 21 - XY Trace Plot (Area 2 (East))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

455200
455400
455600
331000
331000
Area 2
330800
330800

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 22 - Magnetic Gradient (Area 2 (Southwest))
1:1,500 @ A3

-1 nT 2

N

0 25 50 75 m

magnitude surveys

455200
455400
455600
331000
331000
Area 2
330800
330800

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 23 - Magnetic Interpretation (Area 2 (Southwest))
1:1,500 @ A3

Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Spread)
Undetermined (Weak)
Overhead Cables
Agricultural (Trend)
Data Artefact (Trend)
Drainage Feature
Ferrous (Spike)

N
0 25 50 75 m

magnitude surveys

455200

455400

455600

331000

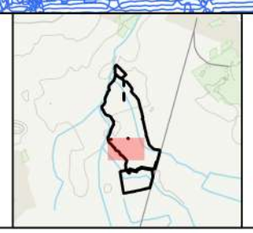
331000

Area 2

330800

330800

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 24 - XY Trace Plot (Area 2 (Southwest))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

330800
331000
331200
455800
455800
Area 2
Ruddington Moor
456000
456000

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 25 - Magnetic Gradient (Area 2 (Southeast))
1:1,500 @ A3

-1 nT 2

N

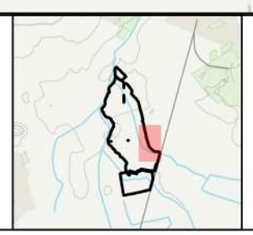
0 25 50 75 m

magnitude surveys

330800
331000
331200
455800
455800
Area 2
Ruddington Moor
456000
456000

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 26 - Magnetic Interpretation (Area 2 (Southeast))
1:1,500 @ A3

- Agricultural (Weak)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Natural (Spread)
- Undetermined (Weak)
- Overhead Cables
- Agricultural (Trend)
- Drainage Feature
- Ferrous (Spike)



N

0 25 50 75 m

magnitude surveys

330800

331000

331200

455800

455800

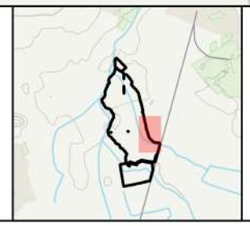
Area 2

Ruddington Moor

456000

456000

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 27 - XY Trace Plot (Area 2 (Southeast))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

330200

330400

330600

455400

455400

Area 3

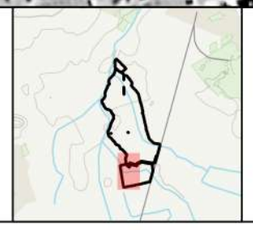
Area 2

455600

455600

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 28 - Magnetic Gradient (Area 3 (West))
1:1,500 @ A3

-1 nT 2



N

0 25 50 75 m

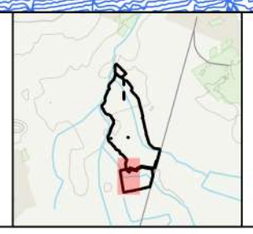
magnitude surveys

330200
330400
330600
455400
455400
Area 3
Area 2
455600
455600
MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 29 - Magnetic Interpretation (Area 3 (West))
1:1,500 @ A3

Agricultural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Natural (Weak)
Natural (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Data Artefact (Trend)
Service
Drainage Feature
Ferrous (Spike)
N
0
25
50
75 m
magnitude surveys

330200
330400
330600
455400
455400
Area 3
Area 2
455600
455600

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 30 - XY Trace Plot (Area 3 (West))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys

330200
330400
330600
455800
455800
Area 3
Area 2
456000
456000
MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 31 - Magnetic Gradient (Area 3 (East))
1:1,500 @ A3

-1 nT 2
N
0 25 50 75 m
magnitude surveys

330200
330400
330600
455800
455800
Area 3
Area 2
456000
456000

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 32 - Magnetic Interpretation (Area 3 (East))
1:1,500 @ A3

Agricultural (Strong)
Agricultural (Weak)
Agricultural (Spread)
Magnetic Disturbance
Natural (Weak)
Natural (Spread)
Undetermined (Weak)
Agricultural (Trend)
Service
Drainage Feature
Ferrous (Spike)

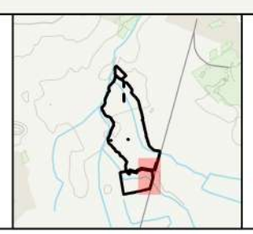
N

0 25 50 75 m

magnitude surveys

330200
330400
330600
455800
455800
Area 3
Area 2
456000
456000

MSSK1206 - Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire
Figure 33 - XY Trace Plot (Area 3 (East))
30nT/cm at 1:1,500 @ A3



N

0 25 50 75 m

magnitude surveys