Geophysical Survey Report

Sellindge Solar Farm,

Kent

For

Orion Heritage

On Behalf Of

Engena Ltd.

Magnitude Surveys Ref: MSTR967

November 2021

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Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c. 102ha area of land at Sellindge Solar Farm, Kent. A fluxgate gradiometer survey was successfully completed across the survey area, and has detected anomalies of an archaeological origin, with possible rectilinear enclosures, ring ditch and field systems identified in the centre and east, and more disjointed linear and curvilinear anomalies identified in the southeast and east. A zone of more enhanced material has been identified surrounding the archaeology in the centre, related to the weathering of the underlying geology, with natural banding possibly obscuring any further archaeology. Further geological variations were present in the north, east and southeast, as a result of the topographic changes across the area. Three areas of possible extraction and natural infilling have been identified in the centre of the area. Further anomalies representing former field boundaries and watercourses have been identified on historical mapping. Drainage features follow the topography of the survey area. Anomalies of an undetermined origin have also been detected, and whilst these may relate to modern, natural or agricultural features, an archaeological origin cannot be ruled out. The impact of modern activity on the results is present around field edges, and surrounding pylons, overhead cables and a buried service, which may have obscured any weaker anomalies, if present, along with an area of made ground in the north and a former radio station in the centre.

Contents

List of Figures

1. Introduction

1.1. Magnitude Surveys Ltd (MS) was commissioned by Orion Heritage to undertake a geophysical survey over a c. 102ha area of land at Sellindge Solar Farm, Kent (TR 0785 3785).

1.2. The geophysical survey comprised hand-pulled and 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 (Adams, 2021).

1.5. The survey commenced on 15/06/21 and took nine days 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 Kayt Armstrong has a PhD in archaeological geophysics from Bournemouth University, is a Member of CIfA, the Editor of ISAP News, and is the UK Management Committee representative for the COST Action SAGA; Dr Paul Johnson has a PhD in archaeology from the University of Southampton, is a Fellow of the Society of Antiquaries of London, 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. 1.5km south of Brabourne Lees (Figure 1). Gradiometer survey was undertaken across four arable and two pasture fields. The survey area was bordered by the M20 road to the north, a substation and agricultural fields to the east, Hungry Down to the southeast and Backhouse Wood to the southwest. The East Stour River and a railway ran across the centre of the survey area (Figure 2).

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	The area consisted of an arable field, with slopes down to the east and southeast.	The area was bordered by trees and hedges on all sides, with a track running along the northern boundary, and across the centre of the area.
2	The area consisted of an arable field, with a slope down to the north.	The area was bordered by trees and a ditch to the south, west and north, and by a dirt track to east. Pylons were present in the northwest and centre of the area, with overhead cables running northeast to southwest and east to west across the northwest.
3	The field consisted of an arable field, with slopes down to the northwest and west.	The area was bordered to the north, east and south by trees, hedges and a metal fence, and to the west by a grass bank.
4	The area consisted of a pasture field, with slopes down to the northeast and south.	The area was bordered by metal fencing on all sides, with trees noted to the east. Farm equipment and a sheep pen were present on the western and northern boundaries.
5	The area consisted of an arable field, with steep slopes down to the north, east, west and southwest from the centre.	The area was bordered by trees, hedges and metal fencing to the north and west, and by hedges and trees to the east and south. Pylons were present across the north and the centre of the area, with overhead cables running east to west in the north and northeast to southwest across the centre.
6	The area consisted of a pasture field. The area was predominantly flat, slightly sloping towards east and north.	The area was bordered by metal fencing and trees in all directions.

4.3. The underlying geology comprises mudstone of the Weald Clay Formation across Area 2, the majority of Areas 4 and 6, and the southwest of Area 3. Bands of sandy mudstone of the Atherfield Clay Formation have been recorded in the south of Area 1, northeast of Area 3, north, east and south of Area 5, and the centre of Area 6. Interbedded sandstone and limestone of the Hythe Formation have also been identified in the northwest of Area 1, and the centre of Area 5. Superficial deposits consist of clay, silt, sand and gravel alluvium in the east of Area 1 (British Geological Survey, 2021).

4.4. The soils consist of slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils across much of the survey area, with an area of freely draining slightly acid but base-rich soils in the northwest of Area 1 (Soilscapes, 20212021).

5. Archaeological Background

5.1. The following is a summary of a Historic Environment Desk-Based Assessment produced and provided by Orion Heritage (Lock, 2021).

5.2. A previous archaeological excavation was undertaken in the west of Area 1 in 1967 and identified what was believed to be either a round barrow or a medieval windmill mound and residual prehistoric lithic material from under the mound. A further excavation was undertaken partly across the south of Area 1 in 1999 and identified a late Iron Age/early Roman field system immediately to the south of Area 1 and a medieval ditch along with four Bronze Age ditches identified c. 50m east of Area 1.

5.3. Approximately 950m to the north of the survey area, numerous dateable artefacts were identified, indicating Neolithic, early/middle Bronze Age, late Iron Age, Roman and medieval activity. Possible sub-rectangular settlement enclosures were also identified in the same area and were dated from the late Bronze Age to late Iron Age. A further excavation was carried out to the east of Station Road, c.650m west of the survey area, which revealed field systems dating from the Iron Age to the medieval period. A late Iron Age/early Roman field system recorded during an archaeological excavation immediately adjacent to the eastern boundary of Area 1.

5.4. The location of a potential Roman to medieval iron working site was recorded c. 120m northeast of Area 6. Several areas of dark soil and one of iron slag occur in a field north of the road from Harringe Lane to Partridge Farm, to the east of the survey area. Associated with them are coarse-ware sherds dating from the Roman to the medieval period.

5.5. An outfarm adjacent to Backhouse Wood was located immediately adjacent to the west of Area 5, and is shown on historical mapping from 1842 onwards, until it was demolished, around or before 1960. The London and Dover Railway was completed by 1844 and now forms part of the Channel Tunnel Rail Link (CTRL), which was constructed in the 1990s/2000s and is located between the survey area's northern and southern parts, at c. 50m distance respectively. The crash site of a Supermarine Spitfire I was recorded c. 600m west of the Area 1. An aerial photograph from 1945 shows a radio station installed roughly in the centre of Area 5, on the top of the hill. The M20 was constructed in 1989 and runs northwest to southeast, c. 30 northeast of Area 1. Sellindge Converter Station has been constructed c. 90m northeast of Area 2.

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 hand-pulled/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. 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. Greyscale images should be viewed alongside the XY trace plot (Figures 13, 16, 19, 22, 25, 28 & 31, 34, 37, 40 & 43). 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 (2021) 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. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. 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, 6, 8 & 10).

7.2.2. The fluxgate gradiometer survey was completed across the area and has responded well to the environment. Anomalies of possible archaeological origin have been identified in the centre, southwest and east of the survey area, along with anomalies of an agricultural and undetermined origin. The impact of modern activity on the survey area is generally limited to field edges and surrounding buried services, pylons and overhead cables. However, disturbance has been recorded in the north where an area of made ground has been identified, possibly due to the construction of the motorway. Natural variation in the geological background is evident in the north, east and southeast of the survey area that follow the contours of the topography.

7.2.3. In the same location as the possible archaeology in Area 5, a zone of more enhanced material has been identified, probably related to the differential weathering of the underlying limestone and sandstone (Section 4.3) (Figures 5 & 7). Sinuous and curvilinear anomalies have also been identified, that are likely to have been caused by the movement of sediments down the slopes present in that area (Section 4.2). These natural bands appear to intersect the identified archaeology, and it is possible that some of the identified natural bands may obscure any further archaeology, if present (Figures 6 & 8). Overlying the natural zone are a series of anomalies of possible archaeological origin, with weak linear anomalies forming 90-degree returns (Figures 6 & 8). They appear to represent partial rectilinear enclosures, with possible subdivisions which are similar in magnetic signal to the curvilinear bands of natural, although they are more pronounced and better defined than the natural.

7.2.4. In the south of the zone of natural anomalies, weak linear and curvilinear anomalies, along with stronger discrete anomalies have also been identified. Given their location within the zone of natural enhancement, it is possible that these anomalies are natural in origin. However, their morphology suggests a possible anthropogenic origin, as they

are straighter, with better-defined edges. They have been classified as Undetermined, due to the difference in magnetic strength and shape when compared to the archaeology close by, although an archaeological provenance cannot be ruled out.

7.2.5. Further evidence of archaeological activity has been identified in the east and centre of Area 5, including a sub circular anomaly, which possibly forms a partial ring ditch, along with adjacent linear and curvilinear anomalies. These linear and curvilinear anomalies could form a possible field system, extending towards the west and north (Figures 7 & 8), although the disturbance caused by the overhead cables prevents closer interpretation in the west. The anomalies appear to extend up to and enclose an amorphous natural anomaly, with two other similar amorphous anomalies located to the north and south. These amorphous anomalies have more defined edges than the surrounding natural and are characteristic of areas of possible extraction that have been infilled with material of a similar magnetic signal to the natural background, suggesting natural processes (Figures 5 & 6). It is possible that the linear anomalies of possible archaeological origin are related to the possible extraction activity, as they surround the middle anomaly, and appear to lead away from it to the east, although it is not possible to be more confident of the relationships of the anomalies through magnetometer data alone.

7.2.6. In Area 2, a series of weaker more fragmentary anomalies of possible archaeological origin have been detected in the centre of the area (Figure 6). These include possible sub-rectilinear enclosures, and subcircular and curvilinear anomalies, along with linear anomalies extending out to the east and south from them. These anomalies could be related to the archaeology in Area 5 to the west, although their magnetic signal is much weaker. Due to their weaker signal it is difficult to be certain of the exact extent and relationship to the other anomalies.

7.2.7. Former field boundaries and a watercourse have been identified in Areas 1, 5 and 6, with linear anomalies and spreads of more magnetically enhanced material detected, some of which align with features marked on 2nd Edition OS mapping (Figures 4, 6, 8 & 10). The more magnetically enhanced anomalies are likely to represent former field boundaries that have been infilled with ferrous material. Those that do not collocate with known former boundaries present a similar magnetic signal, or follow a similar alignment to those that do, and it is likely that these are unmapped former field boundaries or similar. Numerous linear anomalies have been identified in the east and southeast, on varying orientations, and are characteristic of field drains. Across the survey area, ploughing trends have been identified. These appear to correlate with the recent ploughing regime visible on satellite imagery (Figures 4, 6, 8 & 10).

7.2.8. In the north, south, east and southeast of the survey area, linear and curvilinear anomalies were identified, along with stronger small discrete anomalies (Figures 4, 6, 8 & 10). Because of the lack of any diagnostic morphology or signal, they have been classified as undetermined, and agricultural, natural, or modern origins are considered possible, though an archaeological interpretation cannot be entirely 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. **Data Artefact** – Data artefacts usually occur in conjunction with anomalies with strong magnetic signals due to the way in which the sensors respond to very strong point sources. They are usually visible as minor 'streaking' following the line of data collection. While these artefacts can be reduced in post-processing through data filtering, this would risk removing 'real' anomalies. These artefacts are therefore indicated as necessary in order to preserve the data as 'minimally processed'.

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

7.3.1.4. **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.

7.3.1.5. **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.

7.3.1.6. **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. **Possible Archaeology (Area 5) –** In the north of Area 5, weak linear anomalies have been identified against the natural background at [**5a**] (Figure 21). These anomalies appear to form a partial rectilinear enclosure measuring c. 100m wide, with a possible internal subdivision. They appear similar in signal strength compared to the bands of natural variation that they appear to overlie but due to their straighter edges and the 90 degree returns they form, they have been classified as Possible Archaeology. Similar weak linear anomalies [**5b**], with some stronger enhancement, have been identified c. 405m to the south of [**5a**] (Figure 27). These also appear to form partial enclosures and present a similar morphology to the larger northern enclosure, although several of the linear anomalies appear more diffuse than those to the north.

7.3.2.2. **Possible Archaeology (Area 5) –** A weak curvilinear anomaly has been identified in the southeast of Area 5 [**5c**] (Figure 24) and could possibly indicate part of a ring ditch. This anomaly appears to be connected to further linear and curvilinear anomalies that extend to the northwest and north [**5d**] (Figure 24), as they all share a similar magnetic signal and morphology. It is difficult to be certain of the exact extent of these anomalies, as the magnetic interference from the pylon and overhead cables bisects these anomalies and may obscure their full extent and any further anomalies, if present. The easternmost anomalies of [**5d**] appear to respect an area of possible extraction [**5e**] (Figures 23 & 24) and may be related to the latter.

7.3.2.3. **Possible Archaeology (Area 2)** – In the centre of Area 2, weak linear and curvilinear anomalies, with some stronger enhancement along their lengths have been identified [2a] (Figure 30). These anomalies appear to form fragmented partial enclosures, with possible internal features, along with weaker linear anomalies extending out to the east and south. Further linear and curvilinear anomalies [2b] have been identified c. 20m to the south of these (Figures 30 & 33). While they present a different shape, with more curved, sub circular anomalies when compared to [2a], the weak signal strength and fragmentary morphology is similar, and it is possible that these anomalies are all related, especially considering their proximity.

7.3.2.4. **Natural (Zone, Strong & Weak) –** Across much of Area 5, a zone of more enhanced material related to the weathering of the limestone in the underlying geology has been identified, most visible in the gradient data (Figures 5 & 7). Within this zone, weak linear and curvilinear anomalies have been identified, following the topography of the field (Section 4.2). Several of the bands appear similar in magnetic strength to the archaeology, especially in the north of the area, and could possibly indicate further archaeological activity. However, they have been classified as Natural due to the difference in their form, with the natural anomalies appearing less straight and with slightly more diffuse edges.

7.3.2.5. **Possible Extraction –** In the east of Area 5, three amorphous anomalies have been identified [**5e**] (Figures 23 & 24). These anomalies have clearly defined edges, when compared to surrounding natural anomalies. This suggests areas of localised extraction that have been infilled with material of a similar magnetic signal to the natural background, possibly suggesting natural processes. While these anomalies do not collocate with any mapped quarries or secondary evidence of extraction (Figure 6), it is still possible that they could be evidence of extraction activity not depicted on available historical OS mapping.

7.3.2.6. **Agricultural (Spread, Strong & Weak) –** In the east of Area 1, the centre and north of Area 5, and the northwest of Area 6, weak linear anomalies with some stronger enhancements have been identified, along with spreads of more magnetically enhanced material (Figures 15, 21, 24, 27 & 39). Many of these anomalies appear to collocate with former field boundaries or channels of a watercourse visible on 2nd Edition OS mapping (Figures 4, 6 & 8). The anomalies

that do not collocate with former boundaries appear similar in appearance and strength to those that do, and are likely to be unmapped former field boundaries, or similar.

7.3.2.7. **Agricultural (Trend)** – In the east of Area 6, weak linear anomalies have been identified (Figures 38 & 39). These anomalies appear weaker than the drainage immediately to the west, and present a less pronounced signal, as well as being on a slightly different alignment. While it is possible that these anomalies are a continuation of the drainage in a different orientation, it is possible that they indicate an area of other agricultural cultivation, and they have therefore been given a broader agricultural categorisation. Across the survey area, regularly spaced, weak linear anomalies have been identified (Figures 4, 6, 8 & 10). Many of these anomalies collocate with ploughing trends recorded at the time of survey, and with previous regimes identified on satellite imagery.

7.3.2.8. **Drainage Features** – Across Areas 2, 3, 4 and 6, a significant number of weak and dipolar linear anomalies have been identified on multiple orientations (Figures 30, 33, 36, 39 & 42), most clearly identifiable in the gradient data (Figures 29, 32, 35, 38 & 41). The form of these anomalies, and their orientation with regard to the field layout, is suggestive of drainage, with the dipolar anomalies likely to be fired ceramic drains.

7.3.2.9. **Modern/Industrial (Spread)** – Across the centre and northeast of Area 1, high concentrations of strong ferrous anomalies have been detected, indicative of an area of made ground (Figures 11-16). This area may be linked to the construction of the adjacent motorway, as a possible area used for a compound or similar, and collocates with an area of cropmarks visible on satellite imagery (Figure 4).

7.3.2.10. **Modern/Industrial** – In the centre of Area 5, at the top of Bested Hill (Figure 6), a strongly enhanced cross-shaped anomaly has been identified [**5f**] (Figure 24). This anomaly collocates with the position of the former radio station positioned on Bested Hill (Section 5.5).

7.3.2.11. **Undetermined (Strong & Weak)** – In the east of Area 2, two strong parallel linear anomalies with areas of weaker enhancement along the lengths have been identified [**2c**] (Figure 30). These anomalies appear stronger, with a better-defined shape than the surrounding archaeology and other anomalies of an undetermined origin. Due to their position running parallel to the edge of the survey area, and the very straight nature of these anomalies, it is likely that they are modern in origin, although an archaeological origin cannot be ruled out entirely.

7.3.2.12. **Undetermined (Strong & Weak)** – Across the survey area, weak linear and curvilinear anomalies have been detected, with some areas of stronger enhancement along their lengths, along with stronger discrete anomalies (Figures 12, 15, 18, 21, 24, 27, 30, 33, 36 & 42). They do not collocate with any features marked on historical OS maps or satellite imagery (Figures 4, 6 & 10).

Due to their ambiguous origin, and the fact that these anomalies do not form coherent layouts and present a different magnetic signal to the identified archaeology, they have been categorised as Undetermined. However, an archaeological, agricultural or natural origin cannot be ruled out.

8. Conclusions

8.1. A fluxgate gradiometer survey has successfully been completed across the survey area. The geophysical survey has detected a range of different anomalies of archaeological, natural and agricultural origins. Anomalies of an undetermined provenance have also been detected. Modern interference was generally limited to the edges of the survey area, although pylons, overhead cables and a buried service have all created magnetic interference which could have obscured weaker anomalies if present. An area of made ground has been identified in the north of the area, along with more magnetically enhanced background, both of which are likely to have been caused by the construction of the motorway, immediately to the northeast. A modern radio station was constructed in the centre of the survey area, on the top of the hill, and its location can be seen in the data.

8.2. A zone of more enhanced material has been identified across the centre of the survey area, with possible archaeological anomalies overlying it, caused by the weathering of the underlying geology. Natural bands following the topography of the survey area have been identified both within the zone, where they appear similar in magnetic signal to the identified archaeology and possibly obscure further archaeology within the zone, and in the north, east and southeast. Three possible examples of areas of extraction that have probably been infilled with local material have been identified in the centre of the survey area; they are surrounded by archaeological anomalies, to which they are potentially related.

8.3. Archaeological activity has been identified in the centre and southeast. These include partial rectilinear enclosures with internal subdivisions, along with a possible sub circular enclosure or ring ditch and associated linear and curvilinear anomalies forming a possible field system extending to the west and north. Further, more fragmentary, disjointed linear and curvilinear anomalies have been detected in the east of the area, and while they form less coherent forms than the archaeology in the centre and southeast, they still present a signal indicative of anthropogenic activity.

8.4. The survey also identified further former field boundaries or watercourses, along with possible unmapped field boundaries in the north centre and east of the survey area. Drainage features were identified in the east and southeast of the area, on varying orientations. Evidence of modern ploughing was also identified across the survey area.

8.5. Several linear, curvilinear and discrete anomalies of an Undetermined classification have been detected across the survey area; these are likely to be related to an agricultural, modern or natural process, although an archaeological provenance cannot be ruled out.

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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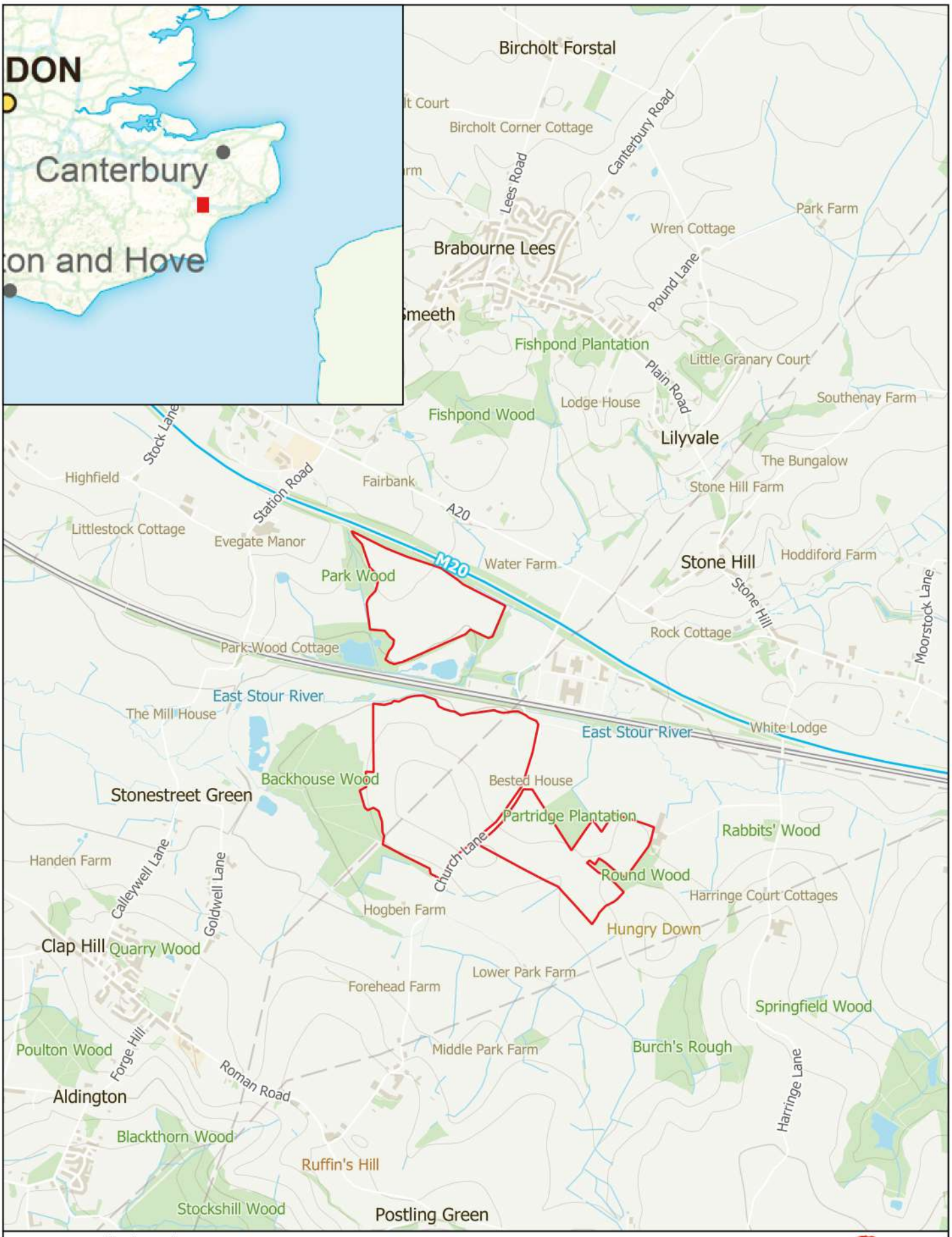
12. Project Metadata

MS Job Code	MSTR967
Project Name	Geophysical Survey Report Sellindge Solar Farm,Kent
Client	Orion Heritage
Grid Reference	TR 0785 3785
Survey Techniques	Magnetometry
Survey Size (ha)	102ha (Magnetometry)
Survey Dates	2021-06-15 to 2021-09-28
Project Lead	Christian Adams BA MSc ACIfA
Project Officer	Christian Adams BA MSc ACIfA
HER Event No	N/A
OASIS No	N/A
S42 Licence No	N/A
Report Version	1.0

13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Lead to Review	AL	WR	6th October 2021
0.2	Corrections from Project Lead	AL	WR	7th October 2021
0.3	Draft for Director Approval	AL	HB	8th October 2021
1.0	Report Issued as Final	CA	CA	15th November 2021



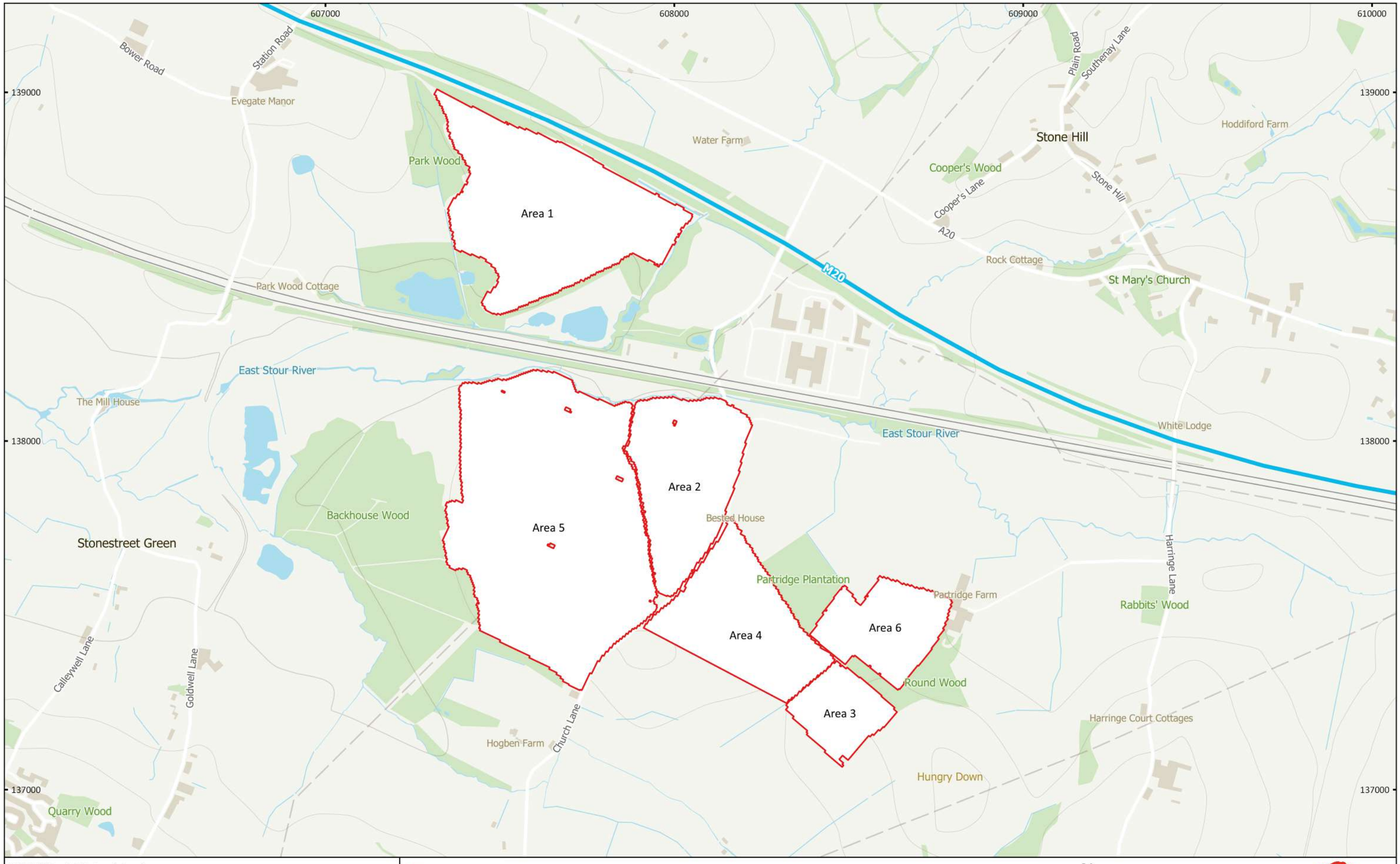
MSTR967 - Sellindge Solar Farm
Figure 1 - Site Location
1:25,000 @ A4

Site Boundary

N

0 0.5 1 km

magnitude surveys



MSTR967 - Sellindge Solar Farm
Figure 2 - Location of Survey Areas
1:10,000 @ A3

Survey Extent

N

0 200 400 600 m

magnitude surveys

607200
607400
607600
607800
608000
608200
139000
138800
138600
138400
M20
A20
Park Wood
Water Farm
Area 1
Church Lane

MSTR967 - Sellindge Solar Farm
Figure 3 - Magnetic Gradient (North)
1:3,000 @ A3

-1 nT 2

N

0 50 100 150 m

magnitude surveys

607200 607400 607600 607800 608000 608200

139000 138800 138600 138400

B.M. 188

Park Wood

F.P. F.P. F.P.

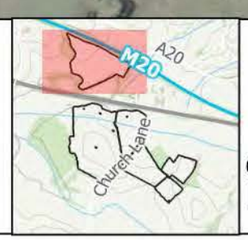
165

Area 1

MSTR967 - Sellindge Solar Farm
Figure 4 - Magnetic Interpretation Over Historical Maps and Satellite Imagery (North)
1:3,000 @ A3

Contains historical maps: Ordnance Survey, 6" 2nd edition c. 1882-1913.

Agricultural (Spread)
Industrial/Modern (Spread)
Natural (Strong)
Natural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)



N

0 50 100 150 m

magnitude surveys

607400 607600 607800 608000 608200 608400

138200 138000 137800 137600

Area 5

Area 2

Church Lane

Bested House

Partridge Plantation

MSTR967 - Sellindge Solar Farm
Figure 5 - Magnetic Gradient (Centre)
1:3,000 @ A3

-1 nT 2

M20 A20 Church Lane

N

0 50 100 150 m

magnitude surveys

607400
607600
607800
608000
608200
608400
138200
138000
137800
137600
Area 5
Area 2
B.M. 167
M.P.
239
Bested Hill
187
Partridge Plantation
A20
M20
Church Lane
N
0
50
100
150 m

MSTR967 - Sellindge Solar Farm
Figure 6 - Magnetic Interpretation Over Historical Maps and Satellite Imagery (Centre)
1:3,000 @ A3

Contains historical maps: Ordnance Survey, 6" 2nd edition c. 1882-1913.

- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Spread)
- Possible Extraction
- Industrial/Modern
- Natural (Strong)
- Natural (Weak)
- Natural (Zone)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Overhead Cables
- Agricultural (Trend)
- Data Artefact
- Service
- Drainage Feature
- Ferrous (Spike)

magnitude surveys

MSTR967 - Sellindge Solar Farm
Figure 7 - Magnetic Gradient (South)
1:3,000 @ A3

-1 nT 2

N

0 50 100 150 m

magnitude surveys

607400 607600 607800 608000 608200 608400

137800 137600 137400 137200

239 Bested Hill

200 178 227 187

Area 2 Area 3 Area 4 Area 5

Partridge Plantation

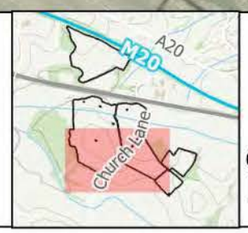
F.P.

Hogben Farm

MSTR967 - Sellindge Solar Farm
Figure 8 - Magnetic Interpretation Over Historical Maps and Satellite Imagery (South)
1:3,000 @ A3

Contains historical maps: Ordnance Survey, 6" 2nd edition c. 1882-1913.

- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Strong)
- Agricultural (Weak)
- Agricultural (Spread)
- Possible Extraction
- Industrial/Modern
- Natural (Strong)
- Natural (Weak)
- Natural (Zone)
- Magnetic Disturbance
- Undetermined (Strong)
- Undetermined (Weak)
- Overhead Cables
- Agricultural (Trend)
- Data Artefact
- Drainage Feature
- Ferrous (Spike)



N

0 50 100 150 m

magnitude surveys

607800
608000
608200
608400
608600
608800
137600
137400
137200
Bested House
Partridge Plantation
Partridge Farm
Church Lane
Area 4
Area 5
Area 6
Area 3
Round Wood

MSTR967 - Sellindge Solar Farm
Figure 9 - Magnetic Gradient (Southeast)
1:3,000 @ A3

-1 nT 2

A20
M20
Church Lane

N

0 50 100 150 m

magnitude surveys

607800
608000
608200
608400
608600
608800
137600
137400
137200
Partridge Plantation
Round Wood
F.P.
187
227
78
Area 3
Area 4
Area 5
Area 6
MSTR967 - Sellindge Solar Farm
Figure 10 - Magnetic Interpretation Over Historical Maps and Satellite Imagery (Southeast)
1:3,000 @ A3

Contains historical maps: Ordnance Survey, 6" 2nd edition c. 1882-1913.

Archaeology Possible (Strong)
Archaeology Possible (Weak)
Agricultural (Strong)
Agricultural (Weak)
Agricultural (Spread)
Possible Extraction
Industrial/Modern
Natural (Strong)
Natural (Weak)
Natural (Zone)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Overhead Cables
Agricultural (Trend)
Data Artefact
Drainage Feature
Ferrous (Spike)
A20
M20
Church Lane
N
0
50
100
150 m
magnitude surveys

607200
607400
607600
139000
139000
M20
Area 1
Park Wood
138800
138800

MSTR967 - Sellindge Solar Farm
Figure 11 - Magnetic Gradient (Area 1)
1:1,500 @ A3

-1 nT 2

A20
M20
Churchlane

N

0 25 50 75 m

magnitude surveys

607200
607400
607600
139000
139000
M20
Area 1
Park Wood
138800
138800

MSTR967 - Sellindge Solar Farm
Figure 12 - Magnetic Interpretation (Area 1)
1:1,500 @ A3

Industrial/Modern (Spread)
Natural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

N
0
25
50
75 m

magnitude surveys

607200
607400
607600
139000
139000
M20
Area 1
Park Wood
138800
138600

MSTR967 - Sellindge Solar Farm
Figure 13 - XY Trace Plot (Area 1)
30nT/cm at 1:1,500 @ A3

N
0 25 50 75 m

magnitude surveys

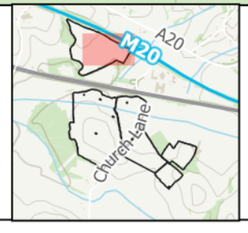
607600
607800
608000
138800
138600
M20
Area 1
A20
Church Lane
-1
nT
2
0
25
50
75 m
N
MSTR967 - Sellindge Solar Farm
Figure 14 - Magnetic Gradient (Area 1)
1:1,500 @ A3

magnitude surveys

607600
607800
608000
138800
138600
M20
Area 1

MSTR967 - Sellindge Solar Farm
Figure 15 - Magnetic Interpretation (Area 1)
1:1,500 @ A3

Agricultural (Spread)
Industrial/Modern (Spread)
Natural (Strong)
Natural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

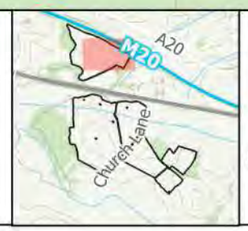


N
0 25 50 75 m

magnitude surveys

607600
607800
608000
138800
138600
M20
Area 1

MSTR967 - Sellindge Solar Farm
Figure 16 - XY Trace Plot (Area 1)
30nT/cm at 1:1,500 @ A3



N
0 25 50 75 m

magnitude surveys

607400

607600

607800

138600

138600

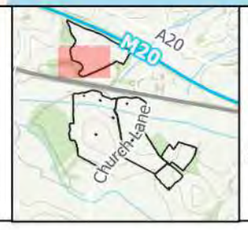
Area 1

138400

138400

MSTR967 - Sellindge Solar Farm
Figure 17 - Magnetic Gradient (Area 1)
1:1,500 @ A3

-1 nT 2



N

0 25 50 75 m

magnitude surveys

607400
607600
607800
138600
138800
138400
138400
Area 1

MSTR967 - Sellindge Solar Farm
Figure 18 - Magnetic Interpretation (Area 1)
1:1,500 @ A3

Agricultural (Spread)
Industrial/Modern (Spread)
Natural (Weak)
Magnetic Disturbance
Ferrous/Debris (Spread)
Undetermined (Strong)
Undetermined (Weak)
Agricultural (Trend)
Ferrous (Spike)

N
0
25
50
75 m

magnitude surveys

607400

607600

607800

138600

138600

Area 1

138400

138400

MSTR967 - Sellindge Solar Farm
Figure 19 - XY Trace Plot (Area 1)
30nT/cm at 1:1,500 @ A3

N

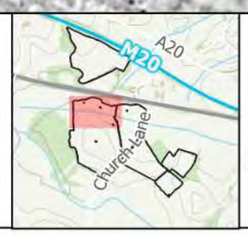
0 25 50 75 m

magnitude surveys

607400
607600
607800
138200
138200
Area 5
138000
138000

MSTR967 - Sellindge Solar Farm
Figure 20 - Magnetic Gradient (Area 5)
1:1,500 @ A3

-1 nT 2



N

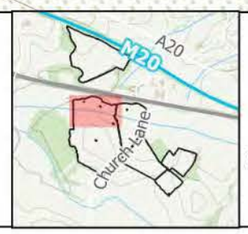
0 25 50 75 m

magnitude surveys

607400
607600
607800
138200
138200
138000
138000
Area 5
5a
5e

MSTR967 - Sellindge Solar Farm
Figure 21 - Magnetic Interpretation (Area 5)
1:1,500 @ A3

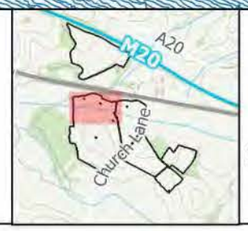
- Archaeology Possible (Weak)
- Agricultural (Spread)
- Possible Extraction
- Natural (Strong)
- Natural (Weak)
- Natural (Zone)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Overhead Cables
- Agricultural (Trend)
- Service
- Drainage Feature
- Ferrous (Spike)



N
0 25 50 75 m

magnitude surveys

607400
607600
607800
138200
138200
Area 5
138000
138000
MSTR967 - Sellindge Solar Farm
Figure 22 - XY Trace Plot (Area 5)
30nT/cm at 1:1,500 @ A3

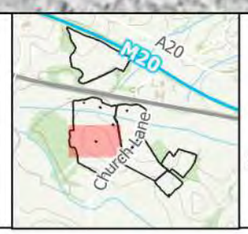


N
0
25
50
75 m
magnitude surveys

607400
607600
607800
137800
137600
Area 5

MSTR967 - Sellindge Solar Farm
Figure 23 - Magnetic Gradient (Area 5)
1:1,500 @ A3

-1 nT 2



N

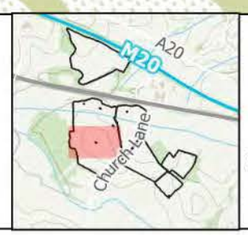
0 25 50 75 m

magnitude surveys

607400
607600
607800
137800
137600
Area 5
5e
5f
5d
5c

MSTR967 - Sellindge Solar Farm
Figure 24 - Magnetic Interpretation (Area 5)
1:1,500 @ A3

- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Spread)
- Possible Extraction
- Industrial/Modern
- Natural (Strong)
- Natural (Weak)
- Natural (Zone)
- Magnetic Disturbance
- Undetermined (Weak)
- Overhead Cables
- Agricultural (Trend)
- Data Artefact
- Ferrous (Spike)



N

0 25 50 75 m

magnitude surveys

607400

607600

607800

137800

137800

137600

137600

Area 5

MSTR967 - Sellindge Solar Farm
Figure 25 - XY Trace Plot (Area 5)
30nT/cm at 1:1,500 @ A3

N

0 25 50 75 m

magnitude surveys