West Burton Solar Project

Environmental Statement

Appendix 13.2: Archaeological Geophysical Survey Report (Part 4 of 6)

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West Burton
SOLAR PROJECT

Appendix 3

West Burton 3 Solar Site Geophysics Report (NAA 2022b)

NAA

GEOPHYSICAL SURVEY REPORT

WEST BURTON THREE

WEST BURTON SOLAR SCHEME

LINCOLNSHIRE

prepared for
West Burton Solar Project Ltd

NAA 21/54
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WEST BURTON 3 SOLAR SCHEME, LINCOLNSHIRE
GEOPHYSICAL SURVEY REPORT

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Disclaimer

The results of geophysical survey may not reveal all potential archaeology and do not provide a comprehensive map of the sub-surface, but only responses relative to the environment. Geological, agricultural and modern responses may mask archaeological features. Short-lived features may not give strong responses. Only clear features have been interpreted and discussed in this report.

WEST BURTON 3 SOLAR SCHEME, LINCOLNSHIRE
GEOPHYSICAL SURVEY REPORT

Summary

Northern Archaeological Associates (NAA) was commissioned by West Burton Solar Project Ltd to undertake a geophysical (gradiometer) survey over c. 353ha of land belonging to the proposed West Burton 3 Solar Scheme, which is centred on Stow Park Farm, Lincolnshire (NGR: SK 85407 80186).

The survey was required to assess the archaeological potential of the site and help inform subsequent archaeological mitigation, in support of the West Burton Solar Scheme.

The survey was carried out between August 2021 and April 2022 and covered a mixture of pasture and arable fields.

The results of the geophysical survey identified several concentrations of magnetic anomalies that are plausibly indicative of buried archaeological deposits. These include a possible roadside settlement in Q9, and possible ladder settlements in Area Q6, Q7, Q8, Q15 and Q16. Rectilinear and linear anomalies were also identified in Areas Q1, Q11 and P4 that possibly denote infilled features, but lacked the necessary patterning to be conclusively interpreted as being of an archaeological origin. An area of magnetic disturbance was identified in the south of Area Q26 that is caused by debris associated with the former brick yard recorded on the 1885 Ordnance Survey map.

Anomalies associated with agricultural activity were common across the site. There are numerous linear anomalies that are likely to be caused by former field boundaries, many of which are recorded on 18th- and 19th-century maps. Ridge and furrow occurred frequently in the survey results, as well as evidence of modern ploughing and land drains.

Several anomalies were caused by modern activity, including linear bipolar anomalies that are likely to be indicative of buried utilities, and dipolar and bipolar anomalies that are caused by material/objects with a high magnetic susceptibility in the topsoil and periphery of the site. Broad areas of magnetic disturbance are caused by natural pedological and geological changes in the substrata.

1.0 INTRODUCTION

1.1 Northern Archaeological Associates (NAA) was commissioned by West Burton Solar Project Ltd to undertake a geophysical (gradiometer) survey on land within the proposed West Burton 3 Solar Scheme, which is centred on Stow Park Farm, Lincolnshire (NGR: SK 85407 80186).

1.2 The geophysical survey was carried out sporadically between August *2021 and April 2022*, and covered 33 fields totalling c.353ha.

1.3 The report details the setting (location, topography, geology) and archaeological background of the scheme and sets out the methodology used for the geophysical survey. The interpretation of the geophysical survey is achieved through the analysis of identified anomalies and is aided by a rapid examination of supporting information. The results of the geophysical survey are discussed below, and the interpretations are supported by appropriate illustrations. Where feasible, a detailed synopsis of anomalies is provided and, if possible, the features that the anomalies are likely to relate to are suggested.

2.0 LOCATION, TOPOGRAPHY AND GEOLOGY

Location and land use

2.1 The proposed development area (PDA) comprises 33 fields directly to the south of Stow Park Road and Till Bridge Road (A1500) (Fig. 1). The site is divided by a railway line running between Lincoln to the south and Gainsborough to the north. Six fields—totalling 65.9ha—are located to the east of the railway and are labelled P1 – P6; 27 fields—totalling 287.1ha—lie west of the railway and are labelled Q1 – Q27. The majority of the fields were arable land comprising various crops, Field P3, in the east of the scheme was pasture.

2.2 The site lies within agricultural lands between the villages of Marton, Torksey and Sturton-by-Stow. The site is framed to the north by Stow Park Road and Till Bridge Road (A1500), Cowdale Lane to the south and the A156 to the west. Lincoln Golf Club lies

to the south-west of the site and two small tributaries of the River Trent run roughly north-south to the west of the site.

Topography

2.3 The topography across the PDA is generally level. There is a gentle downward slope towards the centre of the western half of the site (Areas Q1 – Q27). The highest point in the north-west of the site is recorded at 22m above Ordnance Datum (aOD), Area Q23 lies at 5m aOD, and the highest point in the south of the site is 18m aOD. In north-east of WB3 (Areas P1 – P6), there is a gradual downward slope to the north-west. The lowest height is in Area P1 and is recorded at 8m aOD; the highest points are in the south and north-east and recorded at 17m aOD.

Geology

2.4 There are two geological formations recorded across the site and numerous variations of superficial deposits. Table 1 shows the bedrock geology and superficial deposits recorded in each Field (BGS 2021).

Table 1: bedrock geology and superficial deposits recorded in the PDA

Area	Bedrock geology	Superficial deposits
P1	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
P2	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
P3	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
P4	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
P5	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
P6	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded

Q1	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Sand and gravel mid-Pleistoscene Glacialfluvial deposits
Q2	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q3	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q4	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q5	East: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded West: Penarth group – mudstone	East: None recorded West: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q6	East: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded West: Penarth group – mudstone	East: None recorded West: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q7	East: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded West: Penarth group – mudstone	East: None recorded West: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q8	East: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded West: Penarth group – mudstone	East: None recorded West: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q9	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q10	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q11	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q12	West: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	West: none recorded

	East: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	East: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q13	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q14	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q15	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q16	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q17	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q18	West: Penarth group – mudstone East: Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q19	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded
Q20	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	West: none recorded East: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q21	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q22	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q23	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q24	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	West: Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin) East: none recorded

Q25	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q26	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Q27	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded	None recorded

3.0 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 The following archaeological background summarises the supplied archaeological background information (Lanpro, 2021).

Designated Heritage Assets

3.2 One designated heritage asset lies partially within the PDA and comprises the Scheduled remains of the medieval bishop's palace and deer park at Stow Park (NHLE: 1019229).

Prehistoric and Roman

3.3 A Neolithic polished stone axe found on the northern edge of the PDA near Till Bridge Lane is the only Historic Environment Record (HER) record dated to the prehistoric period within the site. Likewise, there is scant evidence of prehistoric activity in the wider area surrounding the site: a Neolithic axe was found c.1km to the west of the site, cropmarks relating to possible prehistoric boundaries and linear features are recorded c.750m to the south of the site and peat deposits dated to the late Bronze Age and early Roman periods were identified c.650m to the south-west of the site during the construction of Lincoln Golf club.

3.4 Three records within the HER relate to Roman activity. Two records detail a series of finds—including a ring, strap ends, disc brooch and 17 coins—that were found to the north-east of Stow Park farm. The third record comprises a series of cropmarks that run to the west of the PDA and extend into Areas Q5 and Q13, which were interpreted as relating to a Roman trackway and field boundaries.

3.5 Stow Park Road and Till Bridge Road follow the line of a Roman Road linking Ermine Street Roman Road, which runs north from Lincoln to a crossing of the River Trent in Marton. A Romano-British roadside settlement was identified c. 800m to the west of the PDA to the north-west of Marton. Aerial photographs suggest the settlement is composed of a series of small rectangular enclosures or possible buildings with internal divisions and pits. A high quantity of Roman pottery and roof tiles have been recovered from the plough soil since the 1950s. An archaeological excavation was undertaken in 2013 that recorded a range of Roman features, as well as pottery that was of a 2nd and 3rd century date. Although outside of the 1km search area, a Roman Fort and Roman town, Segelocum, lie to the south of the site and further demonstrate the level and type of Roman settlement activity in the wider area surrounding the PDA.

3.6 Cropmarks of a possible Roman date that plausibly demonstrate settlement activity have also been identified to the north of Stow Park Road and to the north-west of the site.

Medieval and Post Medieval

3.7 No evidence of early medieval activity has been recorded within the site.

3.8 It is likely that the modern pattern of villages surrounding the site broadly resembles the general layout of Late Anglo-Saxon settlement. The Viking Great Army overwintered at Torksey in AD 872-73; the site of the camp is located c.480m to the west of the West Burton 3 site. The Universities of York and Sheffield undertook a five-year research programme focusing on the Viking camp between 2011 and 2015 called the 'The Viking Torksey Project'. The camp was likely to have been occupied by several thousand individuals and extensive scatters of metal work and coins have been recovered. Evidence of Anglo-Saxon activity has also been recorded in Torksey. Several sherds of pottery were found on Torksey common, Anglo-Saxon urns were discovered to the south-east of Torksey, c.950m to the west of the site, and a 10th – 11th century kiln was excavated along with pits, postholes, ditches and boundaries to the north of Torksey. The etymology of Brampton and Marton is suggestive of Anglo-Saxon origins. 'Marton' can be derived from old English meaning 'farmstead by a pool' or farmstead near a boundary' and plausibly reflects the village's proximity next to the River Trent.

3.9 Torksey, Brampton and Marton are all recorded in the Domesday Book of 1086 demonstrating their continued occupation into the medieval period.

3.10 The east of the site lay within the medieval deer park of Stow Park, which was first documented in the 12th century. Vestiges of the deer park survive in the modern landscape. The eastern and western boundaries of the deer park—first documented as *'East Lawn'* and *'West Lawn'* in the 13th century—are clearly visible as tree covered banks up to 1m high and 8m across with associated water-filled dykes. Earthwork remains of a substantial moated enclosure known as Bishop's Palace lies in the north-east of the survey area, between Areas P1, P2, P4, P5 and P6. Although the centre of the Bishop's Palace is occupied by 19th and 20th century farm buildings, numerous medieval finds have been found in the vicinity of the site including a jetton, a heraldic badge, a short cross half-penny and a seal-matrix. Both the deer park boundaries and the Bishop's Palace form a designated Schedule Monument (NHLE 1019229).

3.11 A settlement is recorded at Stow Park from at least the early 14th century. The size and extent of the settlement is not known, nor is its relationship with the nearby Bishop's Palace.

3.12 Following its use as a deer park, it is likely that land within the site took on an agricultural function. This is evidenced by the ridge and furrow cropmarks that occur commonly across the site that are caused by medieval or post-medieval agricultural practices. By the post-medieval period the site formed agricultural lands administered by a series of dispersed farmsteads. The field pattern within the site is the result of 18th- and 19th- century Enclosure Acts.

3.13 The 1838 Tithe Map of the Stow Park township covers the east of the West Burton 3 site. The PDA is shown as being divided into numerous fields, with field boundaries in the south having a curved form likely to reflect medieval furlongs. The wooded line of the former western boundary of the deer park appears to extend beyond the current Scheduled Area to the north. The Bishop's Palace is depicted as comprising a square shaped moat with two ponds on its northern side. A track is shown running between these two ponds linking the Bishops Palace to Till Bridge Lane to the north. Also present on the map is the site of Stow Park House and Stow Park farm. Subsequent Ordnance Survey (OS) Maps show the evolution of the site during the 19th and 20th centuries.

The most significant changes to the landscape include the construction of the Great Northern and Great Eastern Joint Railway which joined Gainsborough and Lincoln and was opened in 1849. Numerous field boundaries and ponds were removed to create larger fields that are better suited to modern intensive farming techniques. Also of note is a brick yard recorded to the south-west of Area Q26 which is first recorded on the 1885 OS map but by the 1922 OS map had transitioned into scrubland.

4.0 AIMS AND OBJECTIVES

4.1 The aim of the geophysical survey was to map and record potential buried features located within the PDA. Through analysis of the results of the geophysical survey, NAA aims to provide a detailed interpretation of the archaeological potential of the site that will inform subsequent archaeological mitigation strategies.

4.2 The objectives of the project were to:

- carry out a geophysical survey across areas deemed suitable for data collection within the PDA;
- attempt to identify, record and where possible characterise any subsurface remains within the survey boundary;
- assess the archaeological potential of identified anomalies; and
- identify possible concentrations of past activity in order to inform the requirement for any further archaeological investigation at the site.

5.0 METHODOLOGY

5.1 All survey work was completed to appropriate standards set out in current guidelines (CIfA 2014; Schmidt *et al.* 2015). The gradiometer survey used Bartington Grad601-2 dual magnetic gradiometer systems with data loggers. Readings were recorded at a resolution of 0.01nT and data was collected with a traverse interval of 1m and a sample interval of 0.25m. A cart system was used to collect data in Areas P3 – P5. The survey data in all other Areas was collected with reference to a site survey grid comprised of individual 30m x 30m squares. All data was located using Real Time Kinematic (RTK) differential GPS equipment with a positional accuracy of at least 0.1m.

5.2 The processing was undertaken using Geoplot 3.0 and Terrasurveyor version 3.0.37 software and consisted of standard processing procedures. Details of processing steps applied to collected data are given in Appendix B.

5.3 On the greyscale plots positive readings are shown as increasingly darker areas and negative readings are shown as increasingly lighter areas (even numbered from Figs 4 – 32).

5.4 Interpretation of identified anomalies is generally achieved through analysis of anomaly patterning and increases in magnetic response and is often aided by examining supporting information. The interpreted data uses colour coding to highlight specific readings in the survey area (odd numbered Figs 5 – 33). Appendix C details the terminology and characterisation of anomalies used for interpreting data.

Surface conditions and other mitigating factors

5.5 Field boundaries comprised hedgerows and metal fencing; there were occasional areas of high vegetation along field edges.

5.6 Survey works began following harvest in August and several breaks were taken to avoid ploughed fields.

5.7 There were several periods of storms at the end of 2021 that resulted in fields becoming waterlogged.

5.8 Attempts were made to avoid areas affected by above-ground features that were likely to have a high magnetic susceptibility, such as metal fencing, to minimise the potential for their magnetic responses to impinge on the survey results and mask potential buried features.

6.0 RESULTS

6.1 This section provides a general discussion of anomalies identified across the site, followed by a detailed interpretation of each area surveyed.

General anomalies across the whole site (Figs 4 and 5)

6.2 There are numerous weak isolated anomalies with an amorphous form across the survey area. Those with a coherent patterning or broader form have been identified in the interpretation. Although a tentative interpretation applies, those located near anomalies considered likely to have an archaeological origin have a higher potential of relating to archaeological features.

6.3 There are several weak and diffuse linear trends. Generally, these fail to produce the necessary patterning or increases in magnetic response in order to be interpreted fully, and consequently their origin is unknown.

6.4 There are numerous alignments of regularly spaced linear anomalies considered most likely to relate to agricultural activity. Those with a broad spacing and a reverse 'S' curve are indicative of earlier ridge and furrow, while those with a narrow spacing and straight form are likely to denote post medieval steam ploughing or modern ploughing. Linear anomalies with a very broad spacing and straight form are likely to represent land drains. Isolated linear anomalies with weak increases in magnetic strength are likely to be agricultural in origin, but their exact cause is unknown.

6.5 Several bipolar responses have been identified. Isolated bipolar anomalies are considered to be modern and caused by material with a high magnetic susceptibility, such as ferrous objects. Linear bipolar anomalies are likely to denote buried utilities. It should be noted that the strength and size of the anomaly associated with the buried utility reflect the highly magnetic responses of the ferrous material of the buried pipe rather than actual feature dimensions.

6.6 Dipolar anomalies often relate to ferrous or modern objects buried in the topsoil. Consequently, these anomalies are generally considered to be of a modern nature and have not been depicted on interpretation plots.

6.7 Concentrations of dipolar anomalies have been identified that are likely to be caused by modern magnetic debris in the topsoil or near the surface; concentrations of bipolar anomalies—predominately located along the edges of the survey area—relate to above-ground features external to the survey area, such as metal fencing, gates and electricity poles.

6.8 There are several broad responses that are considered likely to be caused by geological or pedological changes in the substrata. Many of these correspond with topographic changes and cropmarks identified on Google Earth satellite imagery, as well as variations in geological formations and superficial deposits recorded across the site.

Area P1 (Figs. 6 and 7)

6.9 Three field boundaries were identified that are on the 1885 OS map (**P1a**). A linear anomaly (**P1b**) was identified that also possibly denotes a former field boundary but is not recorded on historic maps.

6.10 Linear anomalies running on an east-west alignment with a curved form denote ridge and furrow. Several regimes of land drain were identified within Area P1. It is possible that land drains running east-west have reused earlier furrows. Linear anomalies running parallel with the western boundary of P1 are likely to denote agricultural activity, but it is not possible to ascertain if they are caused by a headland, land drains or modern ploughing.

6.11 The bipolar anomaly (**P1c**) in the east of Area P1 is caused by a buried utility.

6.12 Areas of magnetic disturbance are considered to be modern and caused by debris and objects in the topsoil and periphery of the site with a high magnetic susceptibility.

Area P2 (Figs. 8 and 9)

6.13 Three former field boundaries were identified that are on the 1885 OS map (**P2a**), linear anomalies near the current northern field boundary appear to be part of the same former boundary system but predating 1885.

6.14 Three areas of magnetic disturbance (**P2b**) were identified in the north-east of Area P2. Although **P2b** don't appear on historic maps it is plausible they denote infilled features such as ponds.

6.15 Area P2 contains a high level of broadly spaced linear anomalies that are caused by land drains, many of which are composed of strong increases in magnetic value. Regularly spaced linear anomalies occur on an east-west orientation and are adjacent

with the northern edge of the site. It is likely that they are caused by agricultural activity, but it is not known if they denote ridge and furrow, modern ploughing or land drains.

6.16 Isolated bipolar anomalies (**P2c**) are caused by an overhead power line. Several bipolar anomalies (**P2d**) appear on the same alignment as anomalies in Areas P1 and P3 that are caused by a buried utility (**P1c** and **P3c**).

Area P3 (Figs. 8 and 9)

6.17 A field boundary was identified that is on the 1885 OS map (**P3a**). A second linear anomaly (**P3b**) runs on the same orientation as a field boundary identified in Area P2 and so also possibly denotes a former field boundary but is not recorded on historic maps.

6.18 Several regimes of land drains were identified in Area P3. Linear anomalies were also identified that are likely to be of an agricultural nature, but it is unclear if they relate to land drains, plough activity, headlands or former field boundaries.

6.19 A bipolar anomaly (**P3c**) occurs in the west of Area 3 that is caused by a buried utility. It is unclear if **P3c** is the continuation of **P1c** as although both linear bipolar anomalies run on the same alignment, there is an absence of linear bipolar anomalies in Area P2 (which is located between Areas P1 and P3).

6.20 The isolated bipolar anomaly (**P3d**) in the north of the area is caused by an overhead power line that runs through Areas P2 and P3. The bipolar anomaly (**P3e**) in the south of P3 corresponds with the location of a pond recorded on historic maps and so is likely to relate to modern material used to infill the pond. Other isolated bipolar anomalies and areas of magnetic disturbance are likely to be modern material with a high magnetic susceptibility in the topsoil and periphery of the site.

Area P4 (Figs. 10 and 11)

6.21 A series of fragmented linear anomalies and trends (**P4a**) occur in the west of Area P4. Interpretation of **P4a** is tentative as although they appear to have a patterning that is indicative of infilled features, they are on the same alignment as nearby trends caused by agricultural activity. Consequently, it is unknown if **P4a** denote infilled features or relate to agricultural activity.

6.22 Area P4 is dominated by the numerous overlapping regimes of land drains. Possible curving ridge and furrow occurs in the east of Area P4 and runs on a north-east to south-west orientation.

6.23 Three linear bipolar anomalies (**P4b**) were identified that are caused by buried utilities.

6.24 Isolated bipolar anomalies and areas of disturbance are caused by ferrous material in the topsoil and periphery of the site.

Area P5 (Figs. 10 and 11)

6.25 Three field boundaries were identified that are on the 1885 OS map (**P5a**).

6.26 Several linear anomalies (**P5b**) were identified to the west of **Q5a** that don't occur on historic maps but are likely to be of an agricultural nature and are plausibly caused by former field boundaries.

6.27 A linear anomaly (**P5c**) runs parallel with the western edge of Area P5. It is likely that **P5c** denotes an agricultural feature, but is exact origin is unknown. Although tentative, it is possible that **P5c** either relates to a former route of the culvert that forms the field boundary between Areas P5 and P6 or denotes a headland or a track that runs along the edge of the field.

6.28 Several regimes of land drain are present in Area P5. A series of regularly spaced linear anomalies were identified on a north-northwest to south-southeast orientation in the north of the field that are of an unknown origin and either denote land drains or modern ploughing.

6.29 Isolated bipolar anomalies and areas of disturbance are caused by ferrous material in the topsoil and periphery of the site.

Area P6 (Figs. 10 and 11)

6.30 Two field boundaries were identified that are on the 1885 OS map (**P6a**).

6.31 Modern ploughing runs on a north-northeast to south-southwest orientation. Numerous regimes of land drain were identified with varying orientations.

6.32 The bipolar anomaly (**P6b**) is caused by a pylon. An area of magnetic disturbance was identified in the centre of the field that is likely to be caused by ferrous material in the topsoil.

Area Q1 (Figs. 12 and 13)

6.33 Several trends were identified in Area Q1 that are composed of weak increases in magnetic value and poor patterning and so their origin is unknown. Of particular note are the weak and diffuse trends (**Q1a**) in the east of Area Q1 that appear on similar orientations to anomalies suggested to be agricultural in nature and anomalies in Area Q9 that are likely to be of an archaeological origin (**Q9a**). Interpretation of **Q1a** is very tentative and it is not possible to ascertain if they denote infilled features of an archaeological nature or relate to agricultural activity.

6.34 A field boundary was identified that is on the 1885 OS map (**Q1b**).

6.35 Linear anomalies running on a west-northwest to east-south-east orientation relate to modern ploughing. Field drains were identified running on a north-east to south-west orientation. Several regularly spaced anomalies were identified running on an east-west orientation that are plausibly of an agricultural origin.

6.36 The area of magnetic disturbance in the south-west of Area Q1 is caused by modern material in the topsoil and periphery of the site. The linear bipolar anomaly (**Q1c**) in the south of Area Q1 is plausibly caused by a buried utility.

Area Q2 (Figs. 12 and 13)

6.37 Numerous weak linear trends of an unknown origin were identified that lacked the necessary patterning and increases in magnetic value to be conclusively interpreted.

6.38 Ridge and furrow occurs on an east-west orientation. Regularly spaced linear anomalies running north-west to south-east possibly denote land drains.

6.39 Areas of magnetic disturbance (**Q2a**) in the west of Area Q2 correspond with the location of field boundaries and buildings recorded on the 1885 OS map to the south of Rectory Farm. Other areas of magnetic disturbance were considered to be of a

modern origin and caused by material with a high magnetic susceptibility in the topsoil and periphery of the site.

6.40 The linear bipolar anomalies (**Q2b**) running along the eastern edge of Area Q2 are possibly caused by a buried utility.

Area Q3 (Figs. 12 and 13)

6.41 Ridge and furrow present in Area Q3 runs on an east-west orientation. Land drains are visible on a north-west to south-east orientation.

6.42 The bipolar anomalies (**Q3a**) running along the western edge of Area Q3 are possibly caused by a buried utility.

6.43 Areas of magnetic disturbance occur along the eastern and southern edges of Area Q3 and relate to modern objects in the topsoil and periphery of the area.

Area Q4 (Figs. 14 and 15)

6.44 A number of weak linear trends of unknown origin were identified.

6.45 A field boundary was identified that is on the 1885 OS map (**Q4a**).

6.46 Regularly spaced anomalies running broadly east-west denote ridge and furrow. Linear anomalies on a north-south orientation are likely to denote modern ploughing.

6.47 Several isolated bipolar anomalies and areas of magnetic disturbance were identified that are indicative of modern ferrous material.

Area Q5 and Q13 (Figs. 14, 15, 20 and 21)

6.48 Several trends were identified that lacked the necessary increase in magnetic value or patterning to be conclusively interpreted, and so are of an unknown origin. Although tentative, it is plausible that they are either modern or agricultural in nature.

6.49 Six field boundaries were identified that are on the 1885 OS map (**Q5a** and **Q13a**). A linear anomaly (**Q13b**) was identified that also possibly denotes a former field boundary but is not recorded on historic maps.

6.50 Possible evidence of ridge and furrow occurs on north-south and east-west orientations. Numerous regimes of broadly spaced linear anomalies were identified that are likely to be indicative of land drains but lacked the necessary increases in magnetic values for conclusive interpretation. An isolated linear anomaly was identified running parallel with the eastern edge of Q13 that is likely to be of an agricultural nature, but it is not possible to ascertain if it denotes a headland or a land drain.

6.51 The linear bipolar anomalies (**Q5b and Q13c**) are the continuation of a modern utility running through Areas Q9 (**Q9c**) and Q12 (**Q12b**).

Area Q6 (Figs. 14 and 15)

6.52 Several rectilinear, linear and amorphous anomalies and trends (**Q6a**) were identified in the Area Q6 that are likely to be caused by infilled archaeological features. Given their patterning and relationships with nearby anomalies—such as ridge furrow and a former field boundary (**Q6b**)—it can be postulated that the anomalies are suggestive of settlement activity predating the medieval period.

6.53 A field boundary was identified that is on the 1885 OS map (**Q6b**).

6.54 A linear anomaly (**Q6c**) was identified to the west of **Q6b** that doesn't occur on historic maps but is likely to be of an agricultural nature and either denotes a former field boundary or a headland.

6.55 Broadly spaced linear anomalies run on an east-west orientation and are caused by ridge and furrow. Regularly spaced linear anomalies with weak increases in magnetic value run on a north-northwest to south-southeast orientation and are of an unknown agricultural origin.

6.56 The bipolar anomaly (**Q6d**) in the north-east of the site is likely to be caused by a buried utility running along the southern field boundaries of Areas Q5 (**Q5b**) and Q13.

6.57 The area of broad magnetic disturbance (**Q6e**) in the south-east of Area Q6 is caused by geological or pedological changes in the substrata.

Area Q7 (Figs. 16 and 17)

6.58 Several linear anomalies, amorphous anomalies and trends (**Q7a**) are present in the south of Area 7 that are likely to denote infilled archaeological features. **Q7a** continues to the south and plausibly relates to the same archaeological features as **Q8a**. Given the patterning of **Q7a** and **Q8a** it is probable that they denote a series of enclosures, possibly associated with a ladder settlement.

6.59 Further linear anomalies and trends (**Q7b**) were identified in the east of Area 7 but are composed of incomplete patterning and weak increases in magnetic value. Consequently, interpretation is tentative, and it is unclear whether they are of an archaeological origin or are caused by agricultural activity such as ploughing or nearby land drains.

6.60 One field boundary was identified that is on the 1885 OS map (**Q7c**).

6.61 Ridge and furrow appears on an east-west orientation and linear anomalies associated with modern ploughing run north-south. Several bipolar anomalies occur in the east of Area Q7 that are likely to be associated with land drains.

6.62 The bipolar anomaly (**Q7d**) in the west of Area Q7 is caused by a pond and the bipolar anomaly (**Q7e**) is caused by a pylon.

6.63 The areas of broad magnetic disturbance (**Q7f**) are caused by geological or pedological changes in the substrata.

Area Q8 ((Figs. 16 and 17)

6.64 A series of rectilinear anomalies, amorphous anomalies and trends (**Q8a**) were identified that are the continuation of anomalies (**Q7a**) identified in Area Q7. **Q8a** and **Q7a** are likely to be indicative of infilled archaeological features and plausibly denote a series of enclosures belonging to a ladder settlement.

6.65 One field boundary was identified that is on the 1885 OS map (**Q8b**).

6.66 Ridge and furrow appears clearly in Area Q8 running on an east-west orientation. Linear anomalies caused by modern ploughing are composed of weak increases in magnetic value and run north-south. The bipolar linear anomalies in the east of Area Q8 are likely

to relate to land drains. Possible land drains also occur in the west of Area Q8 and run on a north-west to south-east orientation.

6.67 The area of broad magnetic disturbance (**Q8c**) in the west of Area Q8 is caused by geological or pedological changes in the substrata.

Area Q9 (Figs. 18 and 19)

6.68 Several rectilinear, linear and amorphous anomalies and trends (**Q9a**) were identified in the north of Area Q9 that are likely to be caused by infilled archaeological features. It can be postulated that anomalies are suggestive of a roadside settlement to the south of a Roman Road linking Ermine Street to a crossing at the River Trent in Marton.

6.69 One field boundary was identified that is on the 1885 OS map (**Q9b**).

6.70 Regularly spaced linear anomalies occur on an east-west orientation that possibly denote ridge and furrow. Generally, these anomalies are composed of weak increases in magnetic value and so a tentative interpretation applies. Several regimes of land drain occur in Area Q9 and follow a herring bone pattern.

6.71 The linear bipolar anomaly (**Q9c**), is caused by a buried utility and continues to both the north-east (**Q10a**) and south-west (**Q12b** and **Q13c**).

Area Q10 (Figs. 18 and 19)

6.72 Possible ridge and furrow occurs on an west-northwest to east-southeast orientation.

6.73 Two bipolar linear anomalies (**Q10a** and **Q10b**) in the north of Area Q10 are caused by buried utilities that continue through Areas Q9, Q12 and Q11.

6.74 Areas of magnetic disturbance running adjacent to field boundaries are caused by modern material with a high magnetic susceptibility in the topsoil and periphery of Area Q10.

Area Q11 (Figs. 18 and 19)

6.75 Several linear anomalies and trends (**Q11a**) are located in the south-east of Area Q11 that are composed of weak increases in magnetic value and incomplete patterning.

Consequently, it is not possible to ascertain if **Q11a** is caused by infilled features, agricultural activity or denote geological or pedological changes in substrata.

6.76 One field boundary was identified that is on the 1885 OS map (**Q11b**).

6.77 Land drains occur within Area Q11 on north-south and east-west orientations.

6.78 The bipolar linear anomaly (**Q11c**) denotes a buried utility.

Area Q12 (Figs. 18 and 19)

6.79 Several trends were identified that lacked the necessary increase in magnetic value or patterning to be conclusively interpreted, and so are of an unknown origin. Although tentative, it is plausible that they are either modern or agricultural in nature.

6.80 One field boundary was identified that is on the 1885 OS map (**Q12a**).

6.81 Ridge and furrow is present in the east of Area Q12 that was possibly enhanced with land drains. Other linear anomalies were identified as relating to agricultural activity—running north-west to south-east and north-northwest to south-southeast—but lacked the necessary increases in magnetic value to be conclusively interpreted.

6.82 The bipolar linear anomaly (**Q12b**) denotes a buried utility.

Area Q14 (Figs. 20 and 21)

6.83 Four field boundaries were identified that are on the 1885 OS map (**Q14a**).

6.84 Ridge and furrow occurs on an east-west orientation and land drains are visible running north-west to south-east. Although tentative, it is possible ridge and furrow running east-west in the north of the site has had land drains inserted in the furrows.

6.85 Several bipolar anomalies were identified that are likely to relate to ferrous objects. Areas of magnetic disturbance running adjacent to field boundaries are caused by modern material with a high magnetic susceptibility in the topsoil and periphery of Area Q14 (**Q14b**).

6.86 The broad areas of magnetic disturbance (**Q14c**) in the west of Area Q14 are caused by geological or pedological changes in the substrata.

Area Q15 (Figs. 22 and 23)

6.87 A series of rectilinear anomalies and trends (**Q15a**) with weak increases in magnetic value and fragmented patterning occur in the west of Area Q15. It is possible that these anomalies are of an archaeological origin and denote a small cluster of ditches associated with a probable enclosure system identified to the south in Area Q16 (**Q16a**).

6.88 Four field boundaries were identified that are on the 1885 OS map (**Q15b**).

6.89 Ridge and furrow runs on an east-west orientation in Area Q15. Land drains occur in the north of Area Q16 that are on the same orientation as ridge and furrow. This may suggest former furrows were enhanced to aid land drainage.

6.90 The bipolar anomaly (**Q15c**) in the south of Area Q15 is caused by a pylon.

6.91 The broad changes (**Q15d**) in background reading in the west of Area Q15 are caused by geological or pedological changes in the substrata.

Area Q16 (Figs. 22 and 23)

6.92 A series of rectilinear anomalies and trends (**Q16a**) occur in the west of Area Q16. It is likely that these anomalies are of an archaeological origin and denote a small cluster of enclosures. It is possible that **Q16a** continue to the north into Area Q15 (**Q15a**), and although tentative, their orientation could suggest that they belong to a similar phase of activity as anomalies identified to the west in Areas Q7 (**Q7a**) and Q8 (**Q8a**).

6.93 Two field boundaries were identified that are on the 1885 OS map (**Q16b**).

6.94 Ridge and furrow and land drains both occur within Area Q16 and run on the same east-west orientation, which may suggest that furrows were enhanced with land drains to aid land drainage.

6.95 The bipolar anomaly (**Q16c**) in the north of Area Q16 is caused by a pylon.

6.96 The origin of the areas of magnetic disturbance (**Q16d**) located in the direct vicinity of **Q16a** are unknown. Generally, areas containing a high level of dipolar anomalies are considered to be of a modern origin, however the proximity of these anomalies to probable archaeological features means the potential for them to be contemporary cannot be completely dismissed.

6.97 The area of magnetic disturbance in the centre of the field (**Q16e**) corresponds with the location of an overhead power line.

6.98 The area of magnetic disturbance along the southern edge of the field is of modern origin and caused by material with a high magnetic susceptibility in the topsoil and periphery of the site.

Area Q17 (Figs. 24 and 25)

6.99 One field boundary was identified that is on the 1885 OS map (**Q17a**). A further linear anomaly (**Q17b**) was identified running perpendicular to **Q17a** that is not recorded on historic maps. Although tentative it is probable that **Q17b** also denotes a former field boundary. **Q17c** is likely to relate to agricultural activity but its exact origin is less certain. **Q17c** runs parallel to the south of **Q17a** and has a similar signature to **Q17b**, which may be suggestive that it also caused by a former field boundary.

6.100 Ridge and furrow and land drains both occur within the survey data and run on the same east-west orientation.

6.101 The area of magnetic disturbance (**Q17d**) in the south-west of the field is caused by modern debris in the topsoil.

6.102 The broad changes in background reading in the north of Area Q17 are caused by geological or pedological changes in the substrata.

Area Q18 (Figs. 24 and 25)

6.103 Two field boundaries were identified that are on the 1885 OS map (**Q18a**).

6.104 Broadly spaced linear anomalies running east-west are likely to be caused by ridge and furrow. Regularly spaced linear anomalies with a narrow spacing are likely to relate to

modern ploughing. Numerous broadly spaced linear anomalies running east-west were identified in the east of Area Q18 that are likely to denote land drains.

6.105 The areas of magnetic disturbance that run parallel with the southern and western edges of the field are likely to be caused by a build-up of modern debris in the topsoil.

6.106 The broad areas of magnetic disturbance are likely to relate to geological or pedological changes within the substrata.

Area Q19 and Q22 (Figs. 26 and 27)

6.107 A subcircular trend (**Q19a**) was identified in Area Q19 that is composed of weak increases in magnetic value and so its origin is unknown. Although tentative it is considered likely to either be of an agricultural or modern nature.

6.108 One field boundary was identified that is on the 1885 OS map (**Q19b**).

6.109 An area of magnetic disturbance (**Q19c**) corresponds with the location of a pond recorded on the 1885 OS map.

6.110 Possible ridge and furrow and modern plough appear in Area Q19 on an east-west orientation. Land drains run on a north-west to south-east orientation.

6.111 Bipolar anomalies (**Q19d**) in the north of the field are caused by a pylon.

Area Q20 (Figs. 24 and 25)

6.112 Two field boundaries were identified that are on the 1885 OS map (**Q20a**).

6.113 The bipolar linear anomaly (**Q20b**) relates to a buried utility that also runs through Areas Q23 (**Q23b**) and Q24 (**Q24d**).

6.114 Broadly spaced linear anomalies running east-west are likely to be caused by ridge and furrow, while those with a narrow spacing running north-south are considered to relate to modern ploughing. Numerous broadly spaced linear anomalies running east-west and north-south were also identified that are likely to denote land drains, as well as linear anomalies that are of an unknown agricultural origin.

6.115 An area of magnetic disturbance runs along the southern edge of the field and is likely to relate to a build-up of modern debris in the topsoil.

6.116 An area of broad magnetic disturbance was identified that is likely to relate to geological or pedological changes within the substrata.

Area Q21 (Figs. 22 and 23)

6.117 Several trends were identified that lacked the necessary increase in magnetic value or patterning to be conclusively interpreted, and so are of an unknown origin. Although tentative, it is plausible that they are either modern or agricultural in nature.

6.118 Two field boundaries were identified that are on the 1885 OS map (**Q21a**).

6.119 Two linear anomalies (**Q21b**) were identified that don't occur on historic maps but are likely to be of an agricultural nature and possibly denote field boundaries.

6.120 Four regimes of land drains occur in Area Q21. Modern ploughing is visible on a north-south orientation. Regularly spaced linear anomalies also occurred parallel to the northern edge of the field and are also caused by modern ploughing.

Area Q23 (Figs. 26 and 27)

6.121 Two field boundaries were identified that are on the 1885 OS map (**Q23a**).

6.122 The bipolar linear anomaly (**Q23b**) relates to a buried utility that runs through Areas Q20 (**Q20b**) and Q24 (**Q24d**).

6.123 A bipolar anomaly (**Q23c**) corresponds with the location of modern pylon and a pond recorded on the 1885 OS map.

6.124 Weak narrowly spaced linear anomalies running north-south denote modern ploughing. Numerous broadly spaced linear anomalies were identified that are likely to denote land drains – their variation in magnetic value is likely to relate to the composition, material and depth that comprises the drain.

6.125 Two areas of magnetic disturbance (**Q23d**) were identified that are likely to relate to a build-up of modern debris in the topsoil.

Area Q24 (Figs. 28 and 29)

6.126 Five field boundaries were identified that are active on the 1885 OS map (**Q24a**) with one former north-south boundary also shown. One field boundary was identified that is on the 1906 OS map (**Q24b**).

6.127 Five isolated linear anomalies (**Q24c**) were also identified that are likely to be of an agricultural nature. It is plausible that **Q24c** in part relates to field boundaries, but a tentative interpretation applies as they do not correspond with features recorded on historic maps.

6.128 Two areas of magnetic disturbance (**Q24d**) correspond with the location of ponds recorded on the 1885 OS map.

6.129 Weak narrowly spaced linear anomalies denote modern ploughing. There are four regimes of land drains that follow a classic herring bone patterning.

6.130 Five bipolar linear anomalies (**Q24e**) were identified that denote buried utilities.

6.131 An area of magnetic disturbance (**Q24f**) runs parallel to the south-west edge of Area Q24. Although tentative, it is possible that **Q24f** denotes a track running along the edge of the field. Conversely it should be noted that the former boundary of the medieval deer park 'West Lawn' runs directly to the west of Area Q24 and so it also possible that **Q24f** in part relates to an activity associated with the construction of the deer park embankment and ditch. Although very tentative a linear trend (**Q24g**) composed of weaker increases in magnetic value could be the continuation of **Q24f** along the north-west edge of the site. Interpretation of **Q24g** is difficult as although it is on the same alignment as **Q24f**, it also runs on the same alignment as anomalies relating to modern ploughing. Consequently, it is not possible to determine if they relate to ploughing, a headland or the same feature as **Q24f**.

6.132 Two areas of magnetic disturbance (**Q24h**) are located next to farm buildings and are likely to relate to a build-up of modern debris.

Area Q25 (Figs. 30 and 31)

6.133 Two field boundaries were identified that are on the 1885 OS map (**Q25a**).

6.134 Land drains run on an east-west orientation and modern ploughing appears commonly across the field on a north-south orientation.

6.135 The area of magnetic disturbance running along the western edge of Area Q24 (**Q24f**) continues into Area Q25 (**Q25b**). Although tentative, it is possible that **Q24f** and **Q25b** either denote a track running along the edge of the fields or are associated with the former boundary of the medieval deer park 'West Lawn'.

6.136 Two areas of magnetic disturbance (**Q25c**) were identified that are likely to relate to a build-up of modern debris in the topsoil.

Area Q26 (Figs. 30 and 31)

6.137 One field boundary was identified that is on the 1885 OS map (**Q26a**).

6.138 There is an area of strong magnetic disturbance in the south of Area Q26 that corresponds with the location of a former Brick Yard. The brick yard was first recorded on the 1885 OS map but had transitioned into scrubland by the 1922 OS map.

6.139 Land drains run on a rough north-south orientation in the east of Area Q26 and modern ploughing appears commonly across the field also on a north-south orientation.

Area Q27 (Figs. 32 and 33)

6.140 Four field boundaries were identified that are on the 1885 OS map (**Q27a**).

6.141 Ten isolated linear anomalies (**Q27b**) were also identified that are likely to be of an agricultural nature. It is plausible that **Q27b** in part relates to field boundaries but as they do not correspond with features recorded on historic maps, a tentative interpretation applies.

6.142 A bipolar anomaly (**Q27c**) corresponds with the location of a pond recorded on the 1885 OS map.

6.143 Possible ridge and furrow runs roughly east-west in the west of Area Q27. Weak narrowly spaced linear anomalies run north-south and correspond with the direction of modern ploughing. There are seven regimes of land drains, several of which follow a classic herring bone pattern. In the centre east of Area Q27, land drains appear on the

same alignment as ridge and furrow and plausibly signify the reworking of former furrows to aid land drainage.

6.144 The bipolar linear anomaly (**Q27d**) running through the east of the site denotes a buried utility.

7.0 CONCLUSIONS

7.1 NAA was commissioned to undertake a geophysical (gradiometer) survey on land proposed for the West Burton Solar Scheme, Lincolnshire.

7.2 The results of the geophysical survey have identified several concentrations of magnetic anomalies that are plausibly indicative of buried archaeological deposits. These include a possible roadside settlement in Area Q9, and possible ladder settlements in Areas Q6, Q7, Q8, Q15 and Q16. Rectilinear and linear anomalies were also identified in Areas Q1, Q11 and P4 that possibly denote infilled features, but lacked the necessary patterning to be conclusively interpreted as being of an archaeological origin. An area of magnetic disturbance was identified in the south of Area Q26 that is caused by debris associated with the former brick yard recorded on the 1885 OS map.

7.3 Other anomalies, as well as trends, were identified across the PDA but were composed of weak increases in magnetic response or poor patterning. Consequently, their origin is unknown, and it is uncertain if they are of an archaeological origin or are related to agricultural or modern activity.

7.4 The results have identified anomalies associated with agricultural activity (including former field boundaries, possible former trackways, ridge and furrow, modern ploughing and land drains), as well as several isolated bipolar anomalies, linear bipolar anomalies (indicative of buried utilities), and areas of modern disturbance.

7.5 Several areas of broad magnetic disturbance were identified as relating to geological or pedological changes in the substrata.

8.0 STORAGE AND CURATION

8.1 The records of the geophysical survey are currently held by NAA. All material will be appropriately packaged for long-term storage in accordance with national guidelines

(CIfA 2014; Schmidt *et al*. 2015). An OASIS form will be completed on the results of the works within three months of the completion of the project. This will include submission of a PDF version of the final report to the Archaeology Data Service via the OASIS form.

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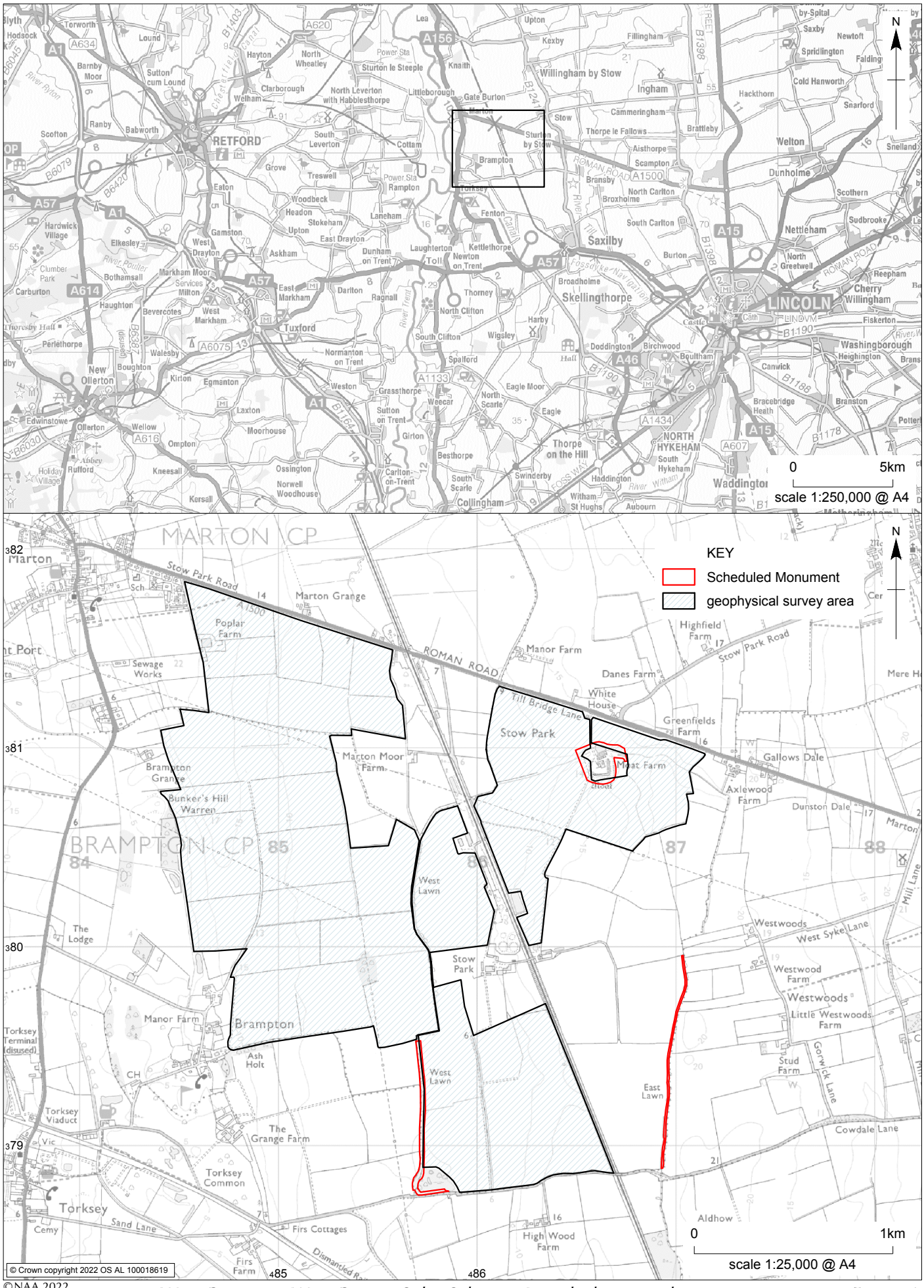

West Burton 3, West Burton Solar Scheme, Lincolnshire: site location *Figure 1*

NAA
HERITAGE & ARCHAEOLOGY

KEY
Scheduled Monument
geophysical survey baseline
geophysical survey area
proposed development area
N
0 500m
scale 1:12,500 @ A3

gpA
gpB
Area Q1
Area Q2
Area Q3
Area Q4
Area Q5
Area Q6
Area Q7
Area Q8
Area Q9
Area Q10
Area Q11
Area Q12
Area Q13
Area Q14
Area Q15
Area Q16
Area Q17
Area Q18
Area Q19
Area Q20
Area Q21
Area Q22
Area Q23
Area Q24
Area Q25
Area Q26
Area Q27
Area P1
Area P2
Area P3
Area P4
Area P5
Area P6

West Burton 3, West Burton Solar Scheme, Lincolnshire: location of geophysical survey areas

Figure 2

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 500m

scale 1:12,500 @ A3

N

5nT

-4nT

Q1 Q2 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q25 Q26 Q27

P1 P2 P3 P4 P5 P6

West Burton 3, West Burton Solar Scheme, Lincolnshire: unprocessed greyscale plots of gradiometer survey results

Figure 3

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 500m

scale 1:12,500 @ A3

N

2nT

-1nT

Q1 Q2 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q25 Q26 Q27

P1 P2 P3 P4 P5 P6

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results

Figure 4

NAA
HERITAGE & ARCHAEOLOGY

Q1 Q2 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q25 Q26 Q27

P1 P2 P3 P4 P5 P6

KEY

- linear anomaly (archaeology) (greater / lesser)
- amorphous anomaly (archaeology) (greater / lesser)
- field boundary
- field boundary?
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- magnetic disturbance (geological)
- edge of geophysical survey
- proposed development area

N

0 500m

scale 1:12,500 @ A3

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results

Figure 5

NAA
HERITAGE & ARCHAEOLOGY

KEY
proposed development area
0 100m
scale 1:2,500 @ A3

N

2nT
-1nT

P1

P2

P4

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Area P1

Figure 6

NAA
HERITAGE & ARCHAEOLOGY

KEY

- linear anomaly (archaeology) (greater / lesser)
- amorphous anomaly (archaeology) (greater / lesser)
- field boundary
- field boundary?
- trends
- ridge and furrow
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- edge of geophysical survey
- proposed development area

N

0 100m

scale 1:2500 @ A3

P1
P1a
P1a
P1b
P1a
P1c
P1c
P2
P2b
P2d
P2a
P4
P4b
P4b
P4b
P4a
P6a

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Area P1

Figure 7

NAA
HERITAGE & ARCHAEOLOGY

P1

P2

P3

KEY
proposed development area
0 100m
scale 1:2,500 @ A3

N

2nT
-1nT

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas P2 and P3 *Figure 8*

NAA
HERITAGE & ARCHAEOLOGY

P1
P2
P2a
P2b
P2c
P2d
P2a
P2d
P2c
P2a
P2d
P2c
P2c
P3c
P3d
P3b
P3
P3a
P3e
P6a
P6b
Q24b
Q24c
Q24e

KEY
field boundary
field boundary?
trends
ridge and furrow
land drains
agriculture (unknown)
bipolar anomaly (modern)
magnetic disturbance (modern)
edge of geophysical survey
proposed development area

N

0 100m
scale 1:2500 @ A3

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas P2 and P3 *Figure 9*

NAA
HERITAGE & ARCHAEOLOGY

P4

P5

P6

KEY
proposed development area
0 100m
scale 1:2,500 @ A3

N

2nT
-1nT

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas P4, P5 and P6

Figure 10

NAA
HERITAGE & ARCHAEOLOGY

P4b
P4b
P4b
P4a
P1c
P1a
P1c
P4b
P4
P2b
P2d
P5b
P5c
P5a
P2a
P6a
P5a
P5b
P5a
P5
P5b
P6a
P6b
P6

KEY

- linear anomaly (archaeology)
- field boundary
- field boundary?
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- edge of geophysical survey
- proposed development area

N

0 100m

scale 1:2500 @ A3

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas P4, P5 and P6

Figure 11

NAA
HERITAGE & ARCHAEOLOGY

KEY
proposed development area
0 100m
scale 1:2,500 @ A3
N

2nT
-1nT

Q1
Q2
Q3
Q4
Q9

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q1, Q2 and Q3

Figure 12

NAA
HERITAGE & ARCHAEOLOGY

KEY

- linear anomaly (archaeology) (greater / lesser)
- field boundary
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- edge of geophysical survey
- proposed development area

N

0 100 m

scale 1:2500 @ A3

Q1
Q1a
Q1b
Q1b
Q1c
Q2
Q2a
Q2b
Q3
Q3a
Q4
Q9
Q9a
Q9b
Q9c

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Area Q1, Q2 and Q3

Figure 13

NAA
HERITAGE & ARCHAEOLOGY

Q2

Q4

Q5

Q13

Bunker's Hill Warren

Q6

Q7

KEY

proposed development area

N

0 100m

scale 1:2,500 @ A3

2nT

-1nT

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q4, Q5 and Q6

Figure 14

NAA
HERITAGE & ARCHAEOLOGY

Q2
Q2a
Q2b
Q3a
Q4
Q4a
Q5
Q5a
Q5a
Q5a
Q5b
Q13a
Q13a
Q13b
Q13c
Q13
Q6
Q6a
Q6b
Q6c
Q6d
Q6e
Q7
Q7f
Q14b
Q14c
Bunker's Hill Warren

KEY

linear anomaly (archaeology) (greater / lesser)
amorphous anomaly (archaeology) (greater / lesser)
field boundary
field boundary?
trends
ridge and furrow
agriculture
land drains
agriculture (unknown)
bipolar anomaly (modern)
magnetic disturbance (modern)
magnetic disturbance (geological)
edge of geophysical survey
proposed development area

N

0 100m
scale 1:2500 @ A3

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas Q4, Q5 and Q6

Figure 15

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 100m

scale 1:2,500 @ A3

N

2nT

-1nT

Q6

Q7

Q8

Q15

Q16

Q17

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas P7 and P8 *Figure 16*

NAA
HERITAGE & ARCHAEOLOGY

KEY

linear anomaly (archaeology) (greater / lesser)
amorphous anomaly (archaeology) (greater / lesser)
field boundary
field boundary?
trends
ridge and furrow
agriculture
land drains
agriculture (unknown)
bipolar anomaly (modern)
magnetic disturbance (modern)
magnetic disturbance (geological)
edge of geophysical survey
proposed development area

N

0 100 m

scale 1:2500 @ A3

Q5b
Q6a
Q6
Q6c
Q6b
Q6e
Q14c
Q7f
Q7f
Q7e
Q7
Q15b
Q7c
Q7d
Q15a
Q15c
Q15
Q7a
Q7b
Q16
Q16a
Q16d
Q8a
Q8c
Q8
Q8b
Q17a
Q17
Q17b

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas P7 and P8 *Figure 17*

NAA
HERITAGE & ARCHAEOLOGY

KEY
proposed development area
0 100m
scale 1:2,500 @ A3
N

2nT
-1nT

Q3
Q9
Q10
Q11
Q4
Q12

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q9, Q10, Q11 and Q12

Figure 18

NAA
HERITAGE & ARCHAEOLOGY

KEY

- linear anomaly (archaeology) (greater / lesser)
- amorphous anomaly (archaeology) (greater / lesser)
- field boundary
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- magnetic disturbance (geological)
- edge of geophysical survey
- proposed development area

N

0 100m

scale 1:2500 @ A3

Q9
Q10
Q3
Q9a
Q10b
Q9b
Q10a
Q3a
Q9c
Q11
Q11b
Q11b
Q4a
Q12b
Q12a
Q11a
Q11c
Q4
Q12

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas Q9, Q10, Q11 and Q12

Figure 19

NAA
HERITAGE & ARCHAEOLOGY

Q12

Q13

Q14

Q15

2nT

-1nT

KEY

proposed development area

0 100m

scale 1:2,500 @ A3

N

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Area Q13 and Q14

Figure 20

NAA
HERITAGE & ARCHAEOLOGY

Q13a
Q5a
Q13a
Q5a
Q13a
Q12
Q13b
Q13c
Q13
Q5b
Q6d
Q14a
Q6a
Q14b
Q14
Q6e
Q14a
Q14a
Q14c
Q14a
7f
Q15

KEY

linear anomaly (archaeology) (greater / lesser)
amorphous anomaly (archaeology) (greater / lesser)
field boundary
field boundary?
trends
ridge and furrow
land drains
agriculture (unknown)
bipolar anomaly (modern)
magnetic disturbance (modern)
magnetic disturbance (geological)
edge of geophysical survey
proposed development area

N

0 100 m
scale 1:2500 @ A3

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Area Q13 and Q14

Figure 21

NAA
HERITAGE & ARCHAEOLOGY

Q14

Q15

Q21

Q16

Q19

Q22

KEY

proposed development area

0 100m

scale 1:2,500 @ A3

N

2nT

-1nT

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q15, Q16 and Q21

Figure 22

NAA
HERITAGE & ARCHAEOLOGY

Q14a
Q14
Q15
Q15d
Q15b
Q21
Q21a
Q21b
Q15b
Q15b
Q15b
Q15a
Q15c
Q24g
Q21a
Q21b
Q7b
Q16
Q16c
Q16b
Q16a
Q16d
Q16b
Q16e
Q16c
Q19
Q22
Q19b
Q19a
Q17a

KEY

- linear anomaly (archaeology) (greater / lesser)
- field boundary
- field boundary?
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- magnetic disturbance (geological)
- edge of geophysical survey
- proposed development area

N

0 100 m

scale 1:2500 @ A3

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas Q15, Q16 and Q21

Figure 23

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 100m

scale 1:2,500 @ A3

N

2nT

-1nT

Q8

Q17

Q18

Q19

Q20

Q22

Q23

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q17, Q18 and Q20

Figure 24

NAA
HERITAGE & ARCHAEOLOGY

KEY

- linear anomaly (archaeology) (greater / lesser)
- field boundary
- field boundary?
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- magnetic disturbance (geological)
- edge of geophysical survey
- proposed development area

N

0 100m

scale 1:2500 @ A3

Q8b
Q8
Q17
Q17a
Q17b
Q17c
Q17d
Q19c
Q19
Q22
Q18
Q18a
Q18a
Q20a
Q20a
Q20b
Q20
Q23c
Q23d
Q23

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas Q17, Q18 and Q20

Figure 25

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 100 m

scale 1:2,500 @ A3

N

2nT

-1nT

Q18

Q19

Q20

Q22

Q23

Q24

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Area Q19, Q20, Q22 and Q23

Figure 26

NAA
HERITAGE & ARCHAEOLOGY

KEY

- field boundary
- field boundary?
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- magnetic disturbance (geological)
- edge of geophysical survey
- proposed development area

N

0 100m

scale 1:2500 @ A3

Q16c
Q19a
Q19d
Q19b
Q19c
Q17c
7b
Q19
Q22
Q24d
Q2
Q24a
Q24d
Q24c
Q24
Q23a
Q23b
Q23c
Q23d
Q20a
Q20a
Q20b
Q23d
Q23a
Q25b
Q25a
Q20
Q18
Q23
Q25c

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Area Q19, Q20, Q22 and Q23

Figure 27

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 100m

scale 1:2,500 @ A3

N

2nT

-1nT

Q24

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Area Q24 *Figure 28*

NAA
HERITAGE & ARCHAEOLOGY

KEY

- field boundary
- field boundary?
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- edge of geophysical survey
- proposed development area

N

0 100 m

scale 1:2500 @ A3

Q24e
Q24e
P3d
P3c
P3b
Q24h
Q24a
Q24a
P3a
Q21a
Q24g
Q24b
Q24
Q24c
Q24c
Q24e
Q24e
Q24c
Q24a
Q24c
Q24f
Q24e
Q24d
Q24h
Q24a
Q24d
Q24c

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Area Q24

Figure 29

NAA
HERITAGE & ARCHAEOLOGY

KEY
proposed development area
0 100m
scale 1:2,500 @ A3

N

2nT
-1nT

Q23
Q25
Q26
Q27

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q25 and 26 *Figure 30*

NAA
HERITAGE & ARCHAEOLOGY

KEY

- field boundary
- trends
- ridge and furrow
- agriculture
- land drains
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- edge of geophysical survey
- proposed development area

N

0 100 m

scale 1:2500 @ A3

23a
Q25b
Q25a
Q23
Q25c
Q27b
Q25a
Q27b
Q25
Q25c
Q27a
Q27d
Q27a
Q26a
Q27b
Q26b
Q26
Q27

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Areas Q25 and 26 *Figure 31*

NAA
HERITAGE & ARCHAEOLOGY

KEY

proposed development area

0 100 m

scale 1:2,500 @ A3

N

2nT

-1nT

Q27

West Burton 3, West Burton Solar Scheme, Lincolnshire: processed greyscale plots of gradiometer survey results - Areas Q27 *Figure 32*

NAA
HERITAGE & ARCHAEOLOGY

KEY

- field boundary
- trends
- ridge and furrow
- agriculture
- land drains
- agriculture (unknown)
- bipolar anomaly (modern)
- magnetic disturbance (modern)
- edge of geophysical survey
- proposed development area

N

0 100 m

scale 1:2500 @ A3

Q27c
Q27b
Q27b
Q27b
Q27a
Q27b
Q27a
Q27d
Q27
Q27b
Q27b
Q27b
Q27a
Q27a
Q27b
Q27b

West Burton 3, West Burton Solar Scheme, Lincolnshire: interpretation of gradiometer survey results - Area Q27

Figure 33

APPENDIX A:
TECHNICAL INFORMATION

GRADIOMETER SURVEY

Magnetic surveys measure distortions in the earth's magnetic field caused by small magnetic fields associated with buried features (Gaffney and Gater 2003, 36) that have either remanent or induced magnetic properties (Aspinal *et al*. 2008, 21–26). Human activity and inhabitation often alters the magnetic properties of materials (Aspinal *et al*. 2008, 21) resulting in the ability for numerous archaeological features to be detected through magnetic surveys. Intensive burning or heating can result in materials attaining a thermoremanent magnetisation; examples of which include kilns, ovens, heaths and brick structures (Gaffney and Gater 2003, 37; Aspinal *et al*. 2008, 27). When topsoil rich with iron oxides, fills a man-made depression in the subsoil, it creates an infilled feature, such as a pit or ditch, with a higher magnetic susceptibility compared to the surrounding soil (Gaffney and Gater 2003, 22–26; Aspinal *et al*. 2008, 37–41). Magnetic surveys can also detect features with a lower magnetically susceptibility than the surrounding soil, an example of which is a stone wall.

LIMITATIONS

Poor results can be due to several factors including short lived archaeological occupation/use or sites with minimal cut or built features. Results can also be limited in areas with soils naturally deficient in iron compounds or in areas with soils overlying naturally magnetic geology, which will produce strong responses masking archaeological features.

Overlying layers, such as demolition rubble or layers of made ground, can hide any earlier archaeological features. The presence of above ground structures and underground services containing ferrous material can distort or mask nearby features.

Particularly uneven or steep ground can increase the processing required, or distort results beyond the capabilities of processing. It is also possible in areas containing dramatic topographical changes that natural weathering, such as hillwash, often in combination with intensive modern ploughing, will reduced the topsoil on slopes and towards the peaks of hills and possibly destroy or truncate potential archaeological features. Conversely, features at the bottom of slopes may be covered by a greater layer of topsoil and so if buried features are present, they appear faint within the results, if at all.

Over processing of data can also obscure or remove features, especially if there are on the same orientation as the direction of data collection. Consequently, where possible, attempts are made to ensure data is not collected on the same orientation as known potential features and that data quality is sufficient to minimise the required data processing.

INSTRUMENTATION

The data was collected using handheld Bartington Grad 601-2 fluxgate gradiometers. The Bartington 601-2 is a single axis, vertical component fluxgate gradiometer comprising a data logger battery cassette and two sensors. The sensors are Grad-01-1000L cylindrical gradiometer sensors mounted on a rigid carrying frame; each sensor contains two fluxgate magnetometers with 1m vertical separation.

The difference in the magnetic field between the two fluxgates in each sensor is measured in nanoTesla (nT). NAA gradiometer data is recorded with a range of ±100nT, which equates to a resolution of 0.01nT. It should be noted that the actual resolution is limited to 0.03nT as a consequence of internal instrumental noise (Bartington Instruments n.d., 23).

The gradiometer records two lines of data on each traverse, the grids are walked in a zig-zag pattern amounting to 15 traverses. The gradiometers are calibrated at the start of every day and recalibrated whenever necessary.

SURVEY DETAILS

Table A1: survey summary.

	Survey
Grid size	30m x 30m
Traverse interval	1m
Reading interval	0.25m
Direction of 1st traverse	N
Area covered	353ha

Table A2: baseline co-ordinates (baseline is shown on Fig. 2)

Grid point (gp) A	Grid point (gp) B
NGR: 484632.696 381696.0527	NGR: 484712.4123 381702.784

Table A3: Site information and conditions

Item	Detail
Geology	Scunthorpe Mudstone Formation – mudstone and limestone, interbedded Penarth group – mudstone
Superficial deposits	Sand and gravel mid-Pleistoscene Glacialfluvial deposits Holme Pierrepont Sand and Gravel Member (sediments with a fluvial origin)
Topography	6m aOD to 22m aOD
Land use	Arable and Pasture
Weather/conditions prior to and during survey	Sunny, overcast, heavy rain

APPENDIX B:

DATA PROCESSING INFORMATION

Gradiometer survey data is downloaded using the Bartington Grad 601 software and the processing was undertaken using Geoplot 3.0 software.

Table B1: commonly applied techniques.

Process	Effect
Zero mean traverse	Removes stripping which can occur as a consequence of using multi sensor arrays or a zig-zag data collection method by setting the mean reading for each traverse to zero.
Destagger	Removes stagger in the data introduced through inconsistence data collection pace and often exacerbated through the zig-zag methodology.
Clip	Clips data above or below a set value to potentially enhance potential weaker anomalies.
Despike	Removes random spikes or high readings to reduce the appearance of dominant readings, often created by modern ferrous objects that can distort the results.
Low pass filter	Removes low frequency waves or broad anomalies such as those caused by strong or large gradual variations in the soil's magnetic susceptibility often caused by geological or natural changes in the substrata.
Interpolation	Used to smooth or reduce the blocky appearance of data by improving the spatial density and balance the quantity of data points in the X and Y directions.

Table B2: processing steps.

Minimal processing	Increased processing
• Zero mean traverse +5/-5 • Destagger:	• Low Pass Filter • Interpolate Y, Expand – Linear

APPENDIX C:
DATA VISUALISATION INFORMATION

FIGURES

The data from the surveys were used to produce a series of images to represent the results. The terminology is detailed below:

- Greyscale/Colourscale Plot: this visualised the results as a shaded drawing with highest readings showing as black, running through to lowest shade showing as white.

- XY-trace Plot: this creates a line drawing showing the peaks and troughs of the readings as vertical offset from a centreline.

- Interpreted Plot: through detailed analysis, anomalies have been interpreted and possible features identified. Interpretation drawings are used to show potential features and to reinforce and clarify the written interpretation of the data. Anomalies have been characterised using the terminology detailed in the following section, and have been assigned colour coding outlined in keys found on the relevant figures associated with this report.

MAGNETIC ANOMALIES AND TERMINOLOGY

Table C1: lexicon of terminology.

Terminology	Detail
Anomaly	Any outstanding high or low readings forming a particular shape or covering a specific area with the survey results.
Feature	A man-made or naturally created object or material that has been detected through investigation works and has sufficient characteristics or supporting evidence for positive identification.
Magnetic susceptibility	The ability of a buried feature to be magnetically induced when a magnetic field is applied.
Magnetic response	The strength of the changes in magnetic values caused by a buried feature with either a greater or lesser ability to be magnetised compared with the soil around it. Anomalies are considered to either have strong/weak or positive/negative responses. The strength of magnetic response (along with patterning) can be essential in determining the nature of an anomaly, but it should be noted that the size or strength of the magnetic response does not correlate with the size of the buried feature.
Patterning of an anomaly	The shape or form of an individual anomaly.

Different anomalies can represent different features created by human, agricultural or modern activity, or natural pedological or geological changes in the substrata.

Anomalies interpreted with a 'greater' categorisation are considered more likely to be of the interpreted characterisation, whereas a more tentative interpretation is applied to those with a

'lesser' categorisation as a consequence of weaker increases in magnetic response or the anomalies incomplete patterning or irregular form.

The strength and size of anomalies can vary depending on the magnetic properties of the feature, the magnetic susceptibility of the soil, the depth to which the feature is buried, and the state of preservation.

Table C2: characterisation of anomalies.

Characterisation	Detail
Archaeology	
Linear anomaly (archaeology)	Linear anomalies with a positive or negative magnetic response, and composed of a patterning or shape that is suggestive of a buried archaeological feature. These are often indicative of structural remains or infilled features such as ditches. The strength of anomaly signal can be suggestive of the properties of the feature. Negative linear anomalies represent upstanding or infilled features that are less magnetically susceptible than background readings, for example structures or ditches composed of a non-igneous stone material. Bipolar linear anomalies considered to be of an archaeological nature are indicative of material with a high magnetic susceptibility, such as a brick wall.
Amorphous anomaly (archaeology)	Isolated anomalies or anomalies with a more amorphous form possibly represent infilled features or thermomagnetic features such as areas of heating/burning of an archaeological origin. Unless associated with conclusively identified archaeological remains, such as linear anomalies, absolute identification of positive responses can be problematic as it is often not possible to decipher if they are of an archaeological, modern or agricultural origin. Consequently, isolated positive responses are not shown within the interpretation unless composed of a broad form or belonging to a series of isolated positive responses. Bipolar responses considered likely to be of an archaeological are also interpreted as isolated anomaly (archaeology). These are considered to relate to material with a very strong magnetic susceptibility or thermoremanent magnetisation.
Trends	Weak and diffuse anomalies with an uncertain origin are denoted by trends. It is possible that these belong to archaeological features, but given their weak signatures or incomplete patterning it is equally plausible that they relate to agricultural features or natural soil formations.
Agriculture	
Field boundary	Isolated linear anomalies that are likely to be indicative of former land divisions. A more conclusive interpretation is given to linear anomalies that correspond with the location of field boundaries recorded on historic maps, Aerial photos or LiDAR coverage of the site.
Ridge and furrow	Broadly spaced linear anomalies that are likely to be indicative of earlier forms of agriculture, such as ridge and furrow. These often correspond with the location of earthworks visible on the ground or identified on aerial photos or LiDAR survey coverage.

Characterisation	Detail
Agriculture (plough)	Regularly spaced linear anomalies, often with a narrower spacing, that conform with ploughing regime at the time of survey, or a recent regime recorded on aerial photos of the site.
Agriculture (land drain)	The response and distribution of land drains varies depending on the composition of the land drain and associated ditch or channel. Consequently, land drains can be composed of weak/strong positive/negative magnetic responses and are identified as a product of either their variance in magnetic values or positioning compared with regularly spaced linear anomalies considered to relate to modern ploughing. Land drains can be located within former agricultural regimes, such as ridge and furrow.
Agriculture?	Weak, irregularly spaced or isolated linear anomalies that possibly relate to agricultural activity. Given the tentative interpretation, the agricultural process they are caused by is also likely to unknown.
Modern	
Bipolar response (modern)	Positive anomalies with associated negative 'halo' (bipolar) denote features with a strong magnetic response are likely to be of a modern origin. Isolated bipolar responses of a modern nature are likely to relate to buried ferrous material or objects, such as metallic agricultural debris. If a trend is noted in the alignment or spacing of isolated bipolar responses, it is possible that they are indicative of ferrous fittings or connectors used on buried non-magnetic buried utilities. Linear bipolar anomalies are likely to be indicative of modern services.
Dipolar anomaly	Dipolar anomalies relate to individual spike within the data and tend to be caused by ferrous objects. These responses have only been shown when located near to archaeological features. When the site is located in a mining landscape it is possible that identified dipolar anomalies relate to mining activity and are indicative of further pits or mine shafts.
Magnetic disturbance (modern)	Areas of increased magnetic response denote areas of disturbance containing a high concentration of dipolar and / or bipolar responses. These are generally considered to be caused by modern debris in the topsoil, although it is possible that the disturbance is in part also caused by isolated archaeological material or geological or pedological changes in the substrata. Areas of magnetic disturbance, often along the edges of survey areas are caused by standing metal structures such as fencing and buildings.
Natural	
Magnetic disturbance (geology)	Broad isolated responses that have an irregular patterning that may be indicative of geological or pedological changes in the substrata. It should be notes that ground water can naturally dissolve or erode porous or permeable bedrock, such as limestone, and create fissures and cracks. Depending on the magnetic susceptibility of the soil it is possible for these fissures to appear as a series of contiguous rectilinear anomalies, often having a similar appearance to archaeological enclosures.