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LOW CARBON

BEACON FEN ENERGY PARK

GEOPHYSICAL SURVEY SUMMARY REPORT

JUNE 2023

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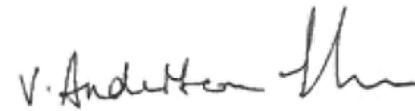
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1 INTRODUCTION

- 1.1.1 Wardell Armstong LLP (WA), a registered organisation with the Chartered Institute for Archaeologists (CifA) has been commissioned to undertake a geophysical survey at Beacon fen (hereafter referred to as the Site).
- 1.1.2 The development of the site requires a Development Consent Order (DCO) application to be made to the Secretary of State. The geophysical survey is intended to provide information to assist in determining the absence or presence of archaeology on the site as part of the DCO application.
- 1.1.3 The site is centred on National Grid Reference (NGR) TF 16415 48000 and comprises 506ha of agricultural land. The survey of the site was split, into two portions, Headland Archaeology carried out the survey on behalf of WA of Parcels A and B. The remaining portion of the northern site, Areas C and D were surveyed by Wessex Archaeology on behalf of WA. The northern site was surveyed between the 3rd and 18th April 2023 with the final areas, unable to be surveyed in April, being undertaken post-harvest in August and September; this was undertaken by Wessex Archaeology.

1.2 Geology

- 1.2.1 The underlying solid geology across both sites is mapped as Oxford Clay Formation-mudstone, A sedimentary bedrock formed during the Jurassic Period. The superficial deposits in Parcels A and B are mapped as Tidal Flat Deposits with Till, mid Pleistocene Diamicton in the southwest corner of Parcel A and the centre of Parcel B. The superficial deposits Parcels C and D are mapped as Till, Mid Pleistocene Diamicton with Tidal Flat deposits in the central eastern area of Parcel C and across the eastern extent of Parcel D.

2 METHODOLOGY

2.1.1 Headland Archaeology (Parcels A and B)

2.1.2 The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid frame. The system was programmed to take readings at a frequency of 10HZ (allowing for a 10-15cm sample interval) on roaming traverses 4m apart. The readings were stored on an external laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R8 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point (Headland Archaeology 2023).

2.1.3 Wessex Archaeology (Parcels C and D)

2.1.4 The cart based gradiometer system used a Carlson RTK GNSS instrument which received corrections from a network of reference stations operated by the Ordnance Survey. The gradiometer survey was undertaken using four SenSys FGM650/3 magnetic gradiometers spaced at 1m intervals and mounted on a nonmagnetic cart towed by an all-terrain vehicle. Data was collected at a rate of 100HZ and interpolated to 0.1m intervals along transects spaced 1m apart. The greyscale plots are displayed at -2nT to +3nT (Wessex Archaeology 2023).

3 RESULTS

- 3.1.1 As part of the proposed development, a geophysical survey of the Site was undertaken by Headland Archaeology and Wessex Archaeology in April and August 2023 to evaluate the potential for below-ground archaeology and to inform on further intrusive trial trenching.
- 3.1.2 Headland did not identify any anomalies of obvious archaeological potential. Whilst a handful of uncertain anomalies were recorded none are considered likely to be of archaeological interest. Several discrete and linear anomalies have been recorded at varying locations. The anomalies have been interpreted of being of uncertain origin; it is possible they could be of archaeological origin, although this is the least likely explanation.
- 3.1.3 Two parallel curvilinears, forming a semi-circle are noted in field N13. It is believed these are likely caused by drains, terminating on the N12/N13 boundary. Also within N13, on the southern boundary, lies a cluster of three possible inter-connected short linear anomalies at right angles to or parallel with the current boundaries; the alignment suggests a modern/agricultural origins. Within N12 a sinuous curvilinear anomaly with a negative response is recorded; the anomaly does not continue into N5, thus again suggesting it represents a drain.
- 3.1.4 Within field N15 two discrete anomalies stand out above the prevailing homogenous magnetic background. The responses may be indicative of pits, but given the lack of any other anomalies/features which would give weight to an archaeological interpretation, it is considered that localised variation in the soils or superficial deposits is a more likely cause. Within N14 a short linear anomaly aligned broadly north/south, oblique to the current field layout is recorded. Again, the absence of a supporting archaeological context led to the conclusion that an agricultural/modern origin is most likely.
- 3.1.5 Wessex Archaeology who completed the majority of the geophysical survey, identified features that are considered to be archaeological in origin. These are primarily associated with two areas containing ditch-like responses in the north-west of the Site. A series of weak and strong positive linear anomalies are located in the north-western portion of the survey area within N9. The collection of anomalies covers an area of 70m by 273m. These anomalies are within the area previously identified on the HER and within the LiDAR and aerial assessment; they are thought to be medieval field systems.

- 3.1.6 A series of conjoined linear weak and strong positive anomalies, typical of ditches have been detected in field N18. The collection of anomalies covered an area of 160m by 87m. The anomalies join a former field boundary which forms the eastern extent. Given their proximity to the medieval field systems identified above it is likely they are of a similar date, however, there is potential for these to be earlier in date.
- 3.1.7 Field N26 contains a linear weak positive anomaly which is 98mm long by 1.3m wide. It is on a similar orientation to mapped former field boundaries but does not continue from other features. Considering its typology, it is considered to be a field/enclosure boundary. At the northern extent lies a strong positive anomaly which is typical of a pit feature.
- 3.1.8 N32 retains two weak positive curvilinears which are spaced 6m apart. Given their position and the signal it is considered they likely relate to the post medieval field system. Another curvilinear anomaly was identified in this field but due to its isolation, its interpretation was difficult. It was concluded the anomaly was potentially a natural variation, modern agricultural activity or an archaeological boundary.
- 3.1.9 Surrounding the enclosures and across much of the west of the Site are various regimes of ridge and furrow orientated on a roughly east-west to north-south coaxial system. The anomalies are largely located between Ewerby Thorpe and Howell.
- 3.1.10 There is evidence of use into the post medieval period across the Site; several anomalies included former field boundaries which can be seen on the 1888 OS mapping.
- 3.1.11 The Site also contains several anomalies interpreted to be ponds. The remaining anomalies are thought to be modern or natural in origin.
- 3.1.12 Portions of Fields 7, 20, 25, 32 and 41 displayed large swathes of magnetic interference which potentially masked any underlying archaeological features.

4 DISCUSSION

- 4.1.1 The geophysical survey across the whole site has demonstrated that any substantial archaeological features are clearly defined. However, the multi directional ploughing activity across the area suggests that the land has been used extensively since at least the medieval period. This could mask any ephemeral features.
- 4.1.2 The northeast and eastern portion of the Site was clearly a wet area, the survey results indicating a series of riverine features which were likely to have attracted occupation. Settlement in areas such as these were likely temporary and would have left little imprint on the landscape which could be identified during geophysical survey, particularly during the prehistoric periods.
- 4.1.3 The alluvial deposits that predate prehistoric archaeology and were deposited as a result of the fluvial features may mask features in the north, particularly features from the late prehistoric periods.
- 4.1.4 The medieval field system recorded in the Historic Environment Record was identified during the geophysical survey; Likewise, a linear feature to the south of the Site is also identified through survey. The aerial imagery found features beyond those identified in the survey which may be due to the high water content in the soil obscuring results or the ridge and furrow masking features.
- 4.1.5 The surveys did not identify any features thought to be of national significance and therefore may preclude development.

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