



CAMBRIAN
ARCHAEOLOGICAL
PROJECTS

Middlewick Wind Farm Essex

Geophysical Survey



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Report No. 560

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Non Technical Summary

This report results from work undertaken by Cambrian Archaeological Projects Ltd (CAP) for Engena Ltd of Bury St. Edmunds, Suffolk. The work involved the undertaking of geophysical surveys on the separate locations of 9 proposed wind turbines. A dual gradiometer survey using two Geoscan Research FM256 gradiometers was undertaken in a 100 x 100 metre area centred on each proposed wind turbine. The geophysical surveys showed no features of archaeological interest.

1 Introduction

1.1 Location and scope of work

- 1.1.1 In March 2009 Cambrian Archaeological Projects (CAP) carried out a series of geophysical surveys on land to the north west of Middle Wick, Essex (NGR TQ 99865 99493 – Fig 1).
- 1.1.2 This work was carried out in respect of a proposed wind farm development on the site. The development concerns the construction of 9 wind turbines on the site with associated access tracks (Fig 2).
- 1.1.3 Geophysical surveys were requested to be carried out by Essex County Councils Archaeological representative Maria Medleycott. A specification for the work was drawn up by Chris E Smith (CAP) which was subsequently approved by Essex County Council.

1.2 Geology and topography

- 1.2.1 The topography of the area of proposed development is largely flat and un-wooded. The landscape is characterised by its flat topographical profile, drainage ditches and small nucleated village settlements.
- 1.2.2 The underlying solid geology of the Middlewick area is mainly composed of London Clay (British Geological Survey, 1979).

1.3 Archaeological and historical background

- 1.3.1 This section provides a brief description of the archaeological and historical background to the area of proposed development.
- 1.3.2 The area of proposed development lies within a larger archaeological landscape dating back to the Neolithic, Bronze and Iron Ages. As part of the Maldon District Historic Environment Characterisation Project the area of the proposed development was subject to assessment (Maldon District Historic Environment Characterisation Project, 2008,pp149-154). The following are extracts from the aforementioned report:
- 1.3.3 *The Dengie Marshes are an extensive area of present and former salt and grazing marsh. During the Roman period the area was important for salt production. In the medieval and post medieval period the marshes were a valuable resource, providing pasture for sheep, salt making sites, fisheries and hunting grounds related to the*

settlements on the gravel ridge above the marshes. Finally during the Second World War defences were built into the sea wall to protect the area from German invasion.

- 1.3.4 *Within the reclaimed marshland the remains of Late Iron Age and Roman salt working sites (Red Hills) are identified as burnt areas visible both from the ground and the air.*
- 1.3.5 *Exploitation of the wildfowl increased in the post medieval period with the construction and use of duck decoy ponds to catch wildfowl. Early examples of duck decoy ponds are thought to date from the 17th century.*
- 1.3.6 *During the Second World War a series of pill boxes were built into the sea wall. Two further WWII defences, a Minefield Control Tower and a Pill box on the southern edge of the area are protected as Scheduled Ancient Monuments.*
- 1.3.7 *The majority of the area originally formed part of the 'Dengie-form' type of coaxial, rectilinear field system, although it becomes increasingly less angular in the south due to the coastal influence. This field type is of considerable antiquity, and may have its origins in the mid-late Saxon period, if not before. However this pattern as largely been obliterated through modern farming techniques leading to boundary loss'.*

2 Aims and Objectives

2.1 Geophysical Survey

- 2.1.1 To assess the presence/absence of subterranean archaeological remains within the assessment area.
- 2.1.2 To determine the extent and location of any archaeological remains present.
- 2.1.3 To inform the approach to any possible trench locations should an evaluation phase be deemed necessary.

3 Geophysical Survey Methodology

3.1 Scope of Fieldwork

- 3.1.2 Two Fluxgate Gradiometers were used to undertake the survey. Previous research has shown that fired, or cut and backfilled archaeological features such as kilns and hearths, ditches and pits often have an anomalously higher magnetic susceptibility than the surrounding subsoil due to burning and biological processes. Differences in magnetic susceptibility within the subsoil and archaeological features can be detected as changing magnetic flux by an instrument such as a fluxgate gradiometer. Data from this may be mapped at closely spaced regular intervals, to produce an image that may be interpreted to locate buried archaeological features (Clarke 1990).
- 3.1.3 The machines used for the survey were Geoscan Research FM256 fluxgate gradiometers using the double speed dual gradiometer survey mode. Detailed surveys were carried out in grids of 50m x 50m along parallel traverses spaced at 2m intervals, recording data points spaced at 0.5m intervals to a maximum instrument sensitivity of 0.1nT in accordance with English Heritage Guidelines (EH 2008). The grids were surveyed in the 'zigzag' style (traverses walked alternately south-north/north-south). At regular intervals the data was downloaded to a laptop computer for storage and assessment.

3.1.4 The location of the survey area was then surveyed using a Topcon GTS 725 total station.

3.1.5 **Data Processing and Presentation**

Following the completion of the detailed surveys, processing and analysis took place using Geoscan Research's Geoplot v.3.00k software. The most typical method of visualising the data is as a greyscale image. In a greyscale, each data point is represented as a shade of grey, from black to white at either extreme of the data range. A number of standard operations were carried out to process the data. The gradiometer data was mathematically adjusted to account for instrument drift over time. The mean level of each traverse of data was reduced to zero and all grids matched so that there were no differences between background levels. The data was then analysed using a variety of parameters and styles and the most useful of these were saved as a *JPEG image and manipulated using Adobe Illustrator software. The results of the survey were then overlaid onto a digital map of the study area. This was then used to produce the interpretation figures.

3.1.6 All works were undertaken in accordance with both the IFA's *Standards and Guidance: for a geophysical survey* and current Health and Safety legislation.

4 Geophysical Survey Results

4.1 **Ground and Weather conditions**

4.1.1 Ground conditions varied from dry to wet throughout the survey. The weather conditions varied from sun to rain but with a consistently high wind speed.

4.2 Turbine 1 (Fig 2& 3)

4.2.1 The turbine 1 survey area measured 100x100m. The survey showed a single linear feature running on a roughly east west axis. This is likely to represent a defunct hedgerow. Parallel linear features with a significantly weaker magnetic response shown on the survey are likely to represent field drains. These are running east – west. No further features were noted. The random differences in background readings are likely to be a reflection of natural variations in geology/soils.

4.3 Turbine 2 (Fig 2& 3)

4.3.1 The turbine 2 survey area measured 100x100m. The survey showed a single linear feature running on a roughly east west axis. This is likely to represent a defunct hedgerow. Parallel linear features with a significantly weaker magnetic response shown on the survey are likely to represent field drains. These are running east – west. No further features were noted.

4.4 Turbine 3 (Fig 2& 3)

4.4.1 The turbine 3 survey area measured 100x100m. The survey showed no features of archaeological interest with the area appearing largely blank.

4.5 Turbine 4 (Fig 2& 4)

- 4.5.1 The turbine 4 survey area measured 100x50m. The size of the survey area was halved owing to the turbine being located between the course of a river and a field boundary ditch some 65m apart. The survey showed two linear features running east west. These are likely to represent field drains. No further features were noted.
- 4.6 Turbine 5 (Fig 2& 4)
- 4.6.1 The turbine 5 survey area measured 100x100m. The survey showed a single linear feature running on a roughly north south axis. This is likely to represent a defunct hedgerow. A branch coming from the field boundary at a 90 degree angle was also located on the survey. No further features were noted.
- 4.7 Turbine 6 (Fig 2& 4)
- 4.7.1 The turbine 6 survey area measured 100x100m. The survey showed no features of archaeological interest with the area appearing largely blank.
- 4.8 Turbine 7 (Fig 2& 5)
- 4.8.1 The turbine 7 survey area measured 100x100m. The survey showed no features of archaeological interest with the area appearing largely blank apart from east west running field drains and a scattering of metal objects in the north east corner of the survey area. No further features were noted.
- 4.9 Turbine 8 (Fig 2& 5)
- 4.9.1 The turbine 8 survey area measured 100x100m. The survey showed a large area of disturbance, likely metallic in origin owing to the signal strength, on the eastern edge of the survey area. The size of the feature on the survey (up to 50m wide) is likely to be false. The strength of the signal is likely to have artificially increased the size of the feature. A large metallic object, or possibly an area of intense combustion, would seem to be the best description for this feature. Parallel linear features shown on the survey are likely to represent field drains. These are running east – west. No further features were noted.
- 4.10 Turbine 9 (Fig 2& 5)
- 4.10.1 The turbine 9 survey area measured 100x100m. The survey showed a single curvilinear feature appearing to terminate in the centre of the grid. This may represent a defunct hedgerow as the nature of the magnetic response does not indicate a cut feature such as ditch. Field drains running east – west are also visible as weaker magnetic responses. The random differences in background readings, similar to those seen on Turbine 1, are likely to be a reflection of natural variations in geology/soils.
- 4.11 Anemometer (Fig 2& 5)
- 4.11.1 The Anemometer survey area measured 50x50m. The survey showed no features of archaeological interest with the area appearing largely blank.

4.12 Interpretation

- 4.12.1 The stronger linear features shown on the turbine 1, 2, 5 and 9 surveys are likely to represent defunct hedgerows. They do not appear to match up with any boundaries shown on the 19th century maps of the assessment area, so may represent pre-enclosure (early 19th century) boundaries. The intermittent, random and occasionally bipolar nature of the responses would suggest grubbed out hedgerows rather than cut ditches.
- 4.12.2 The large bipolar response on the turbine 8 survey is likely to represent a large metallic object, or objects, or an area of intense combustion. Either way the size of the feature has no doubt been artificially increased by the strength of the response.
- 4.12.3 No further features apart from field drains were noted.

5 Conclusions of the Geophysical Survey

- 5.1.1 The geophysical survey undertaken within the separate assessment areas has shown them to be of limited archaeological interest.

6 Discussion and Interpretation

- 6.1.1 The overall findings of the geophysical survey were consistent with a lack of archaeological features. The reclaimed nature of the land may suggest a limited amount of human activity has taken place here.

6.2 Overall interpretation

- 6.2.1 The survey has confirmed the presence of likely defunct field boundaries and a network of land drains.
- 6.2.2 The survey has also shown the presence of a large magnetic response approximately 30m from the proposed location of turbine 8. No further features of archaeological interest were observed.
- 6.2.3 In the cases of turbines 1, 5 and 9 the survey has shown that the proposed turbine will be located on or close to what has been interpreted as defunct hedgerow boundaries picked up by the geophysics survey.

7 Acknowledgements

- 7.1.1 Thanks are due to Tom Collie for his assistance during the geophysical survey.

8 Bibliography and references

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ARCHIVE COVER SHEET

Site Name:	Middlewick, Essex
Site Code:	MWF/09/GEO
PRN:	-
NPRN:	-
SAM:	-
Other Ref No:	Report No. 580
NGR:	TQ 99865 99493
Site Type:	Agricultural Land
Project Type:	Geophysical Survey
Project Manager:	Chris E Smith MA MIFA
Project Dates:	March 2009
Categories Present:	-
Location of Original Archive:	CAP Office
Location of duplicate Archives:	-
Number of Finds Boxes:	-
Location of Finds:	-
Museum Reference:	-
Copyright:	-
Restrictions to access:	None

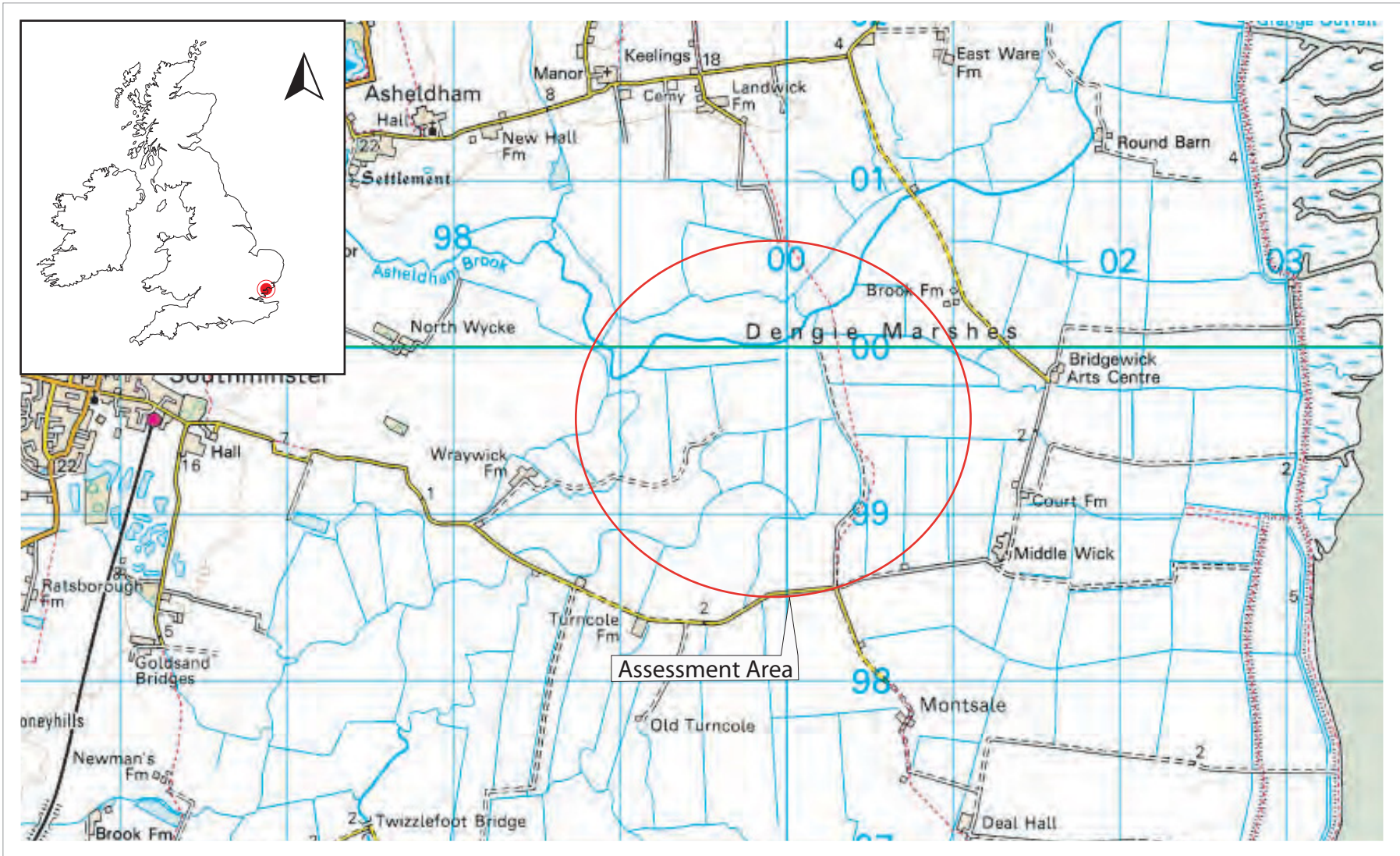


Fig 01: Map Showing Location of Assessment Area

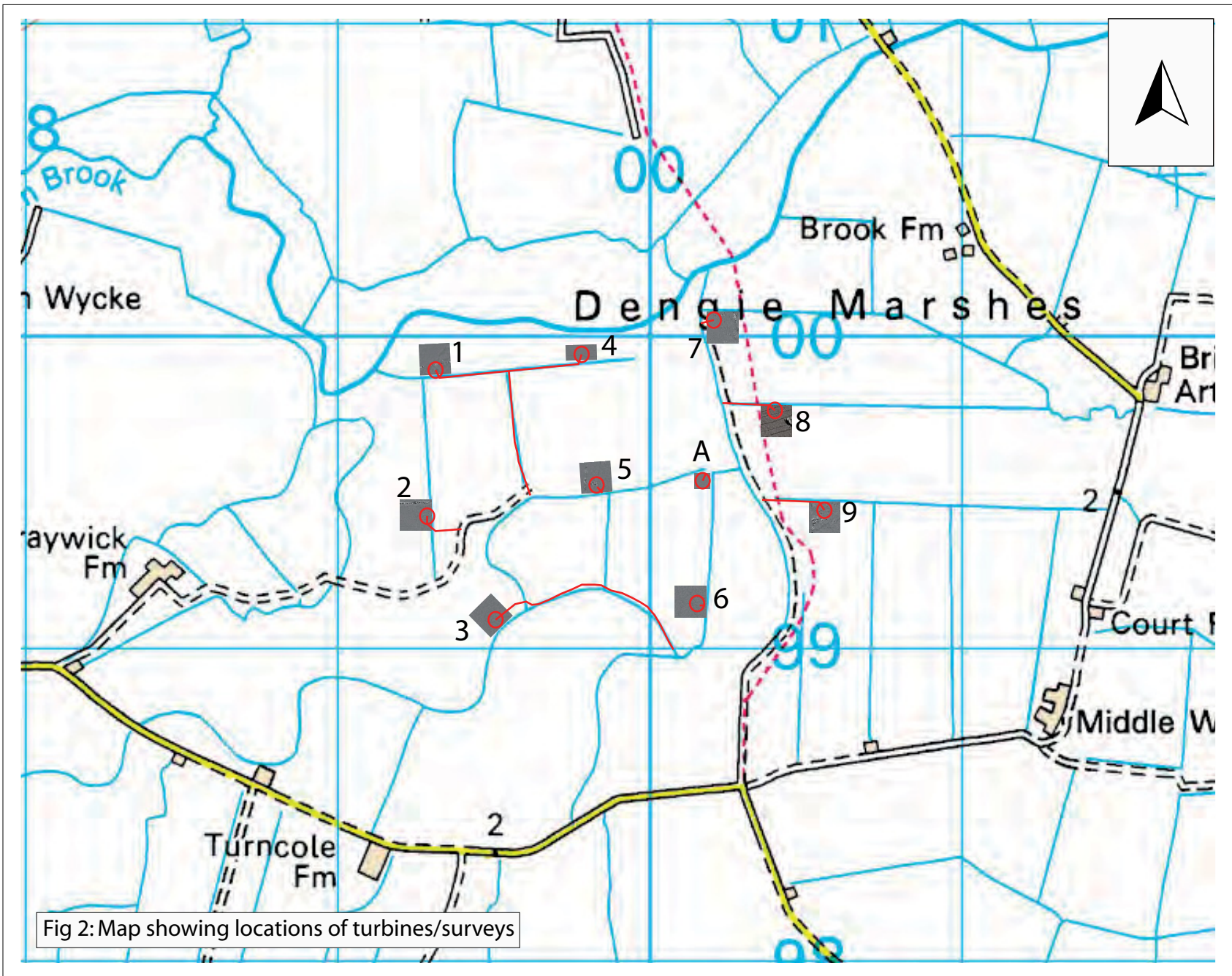


Fig 2: Map showing locations of turbines/surveys

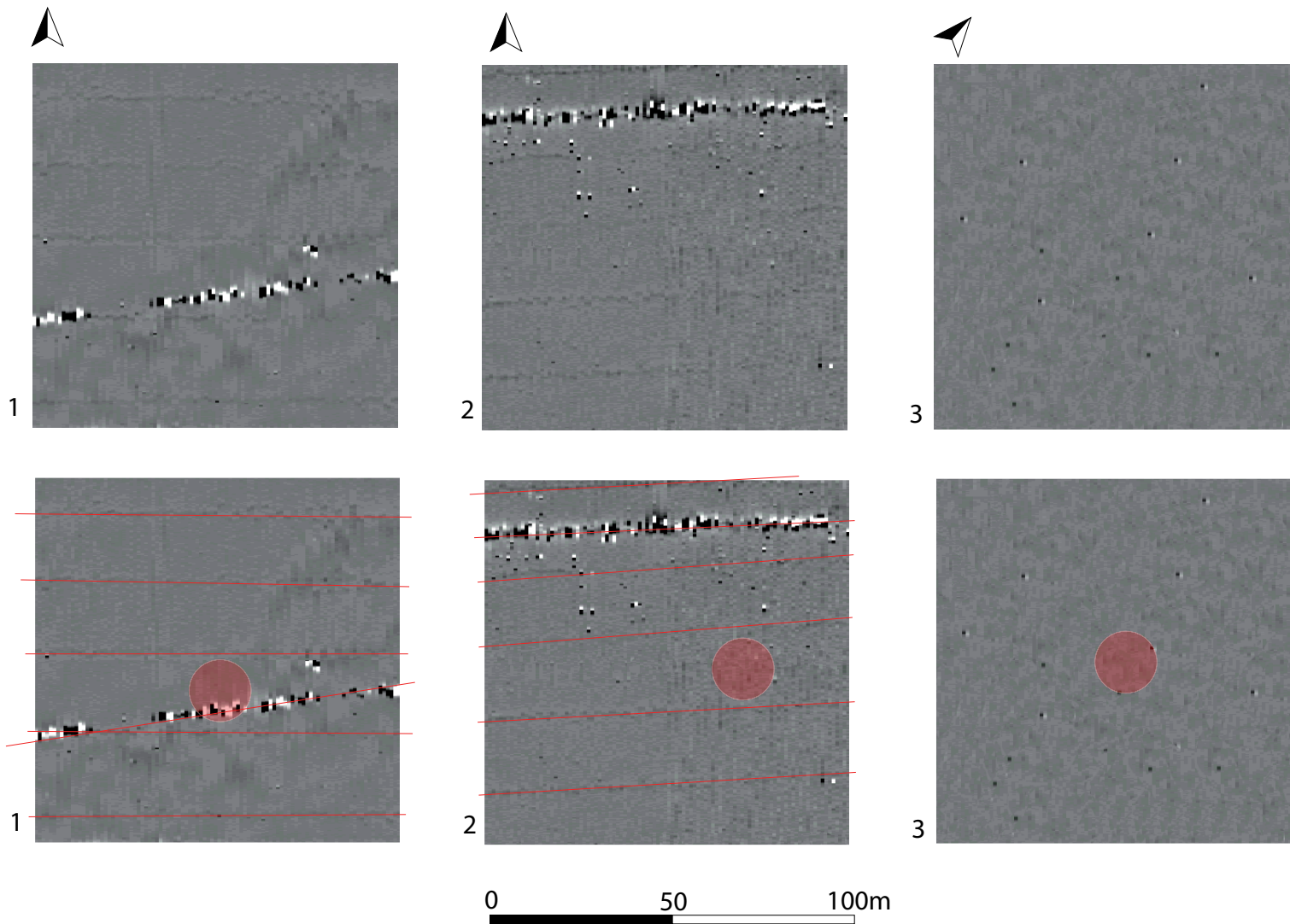




Fig 3: Survey results & Traced Interpretations

 Location of Turbine
 Traced outline of feature

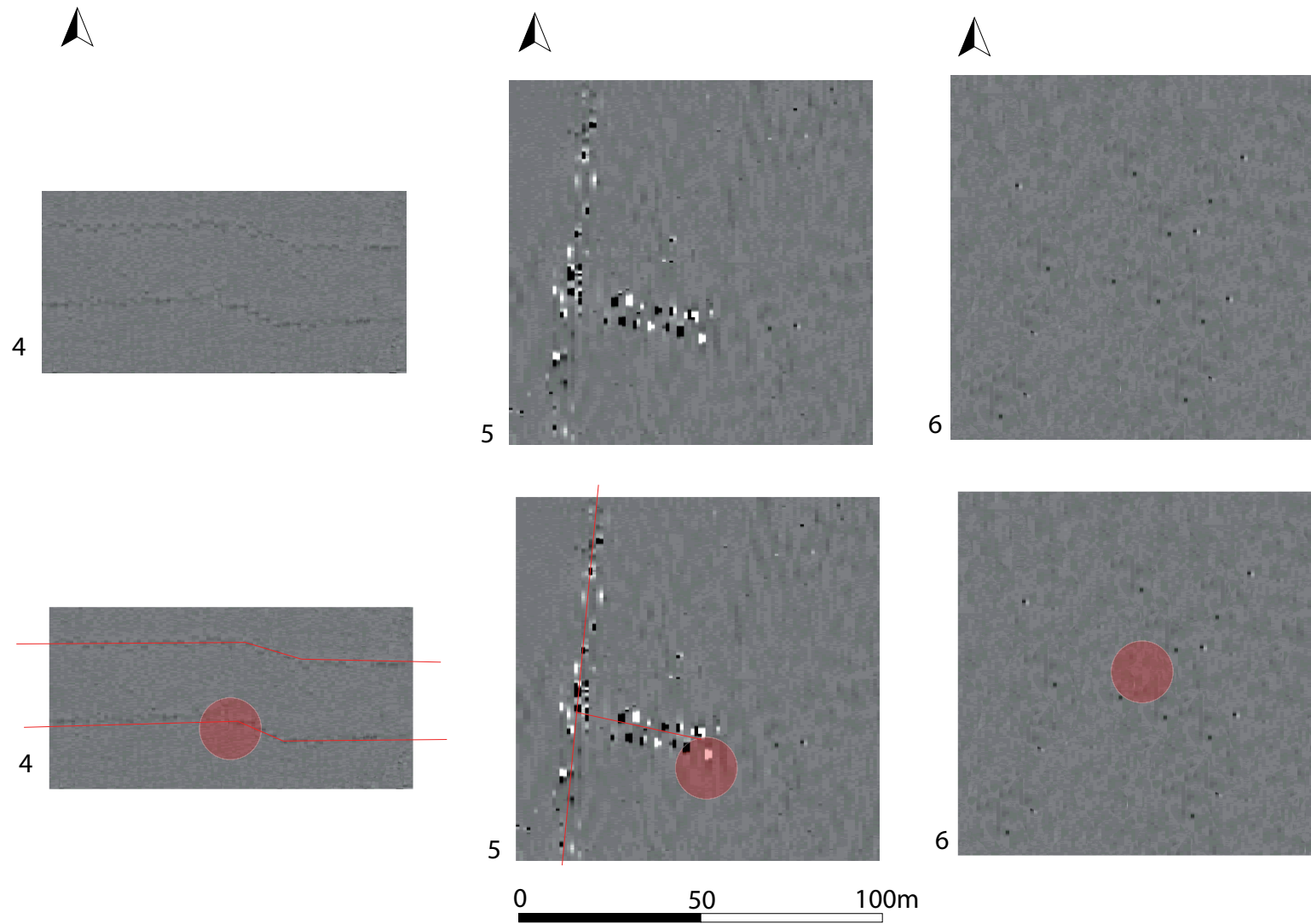


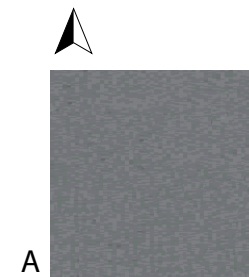
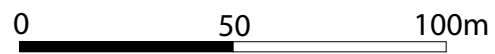
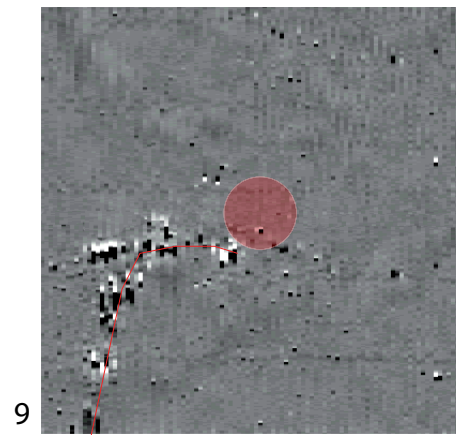
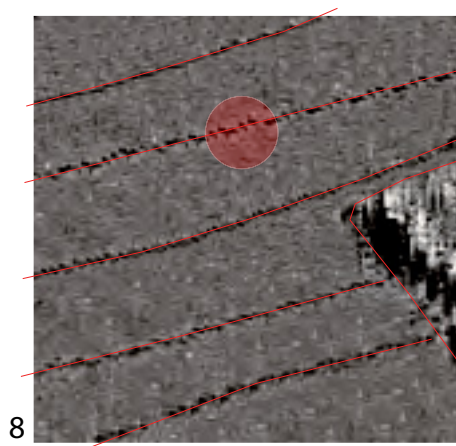
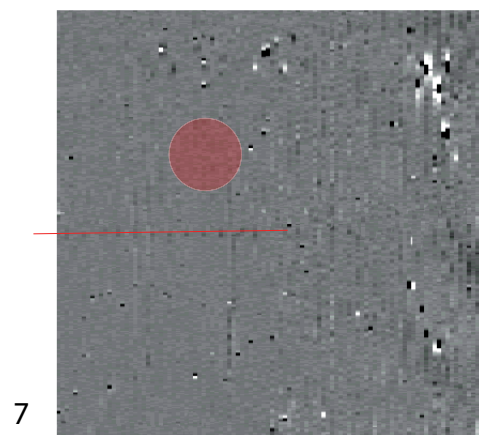
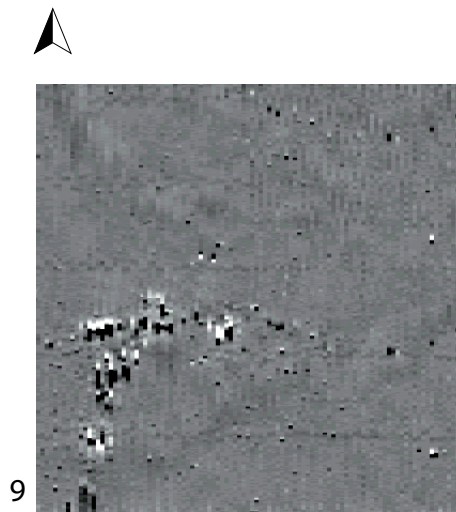
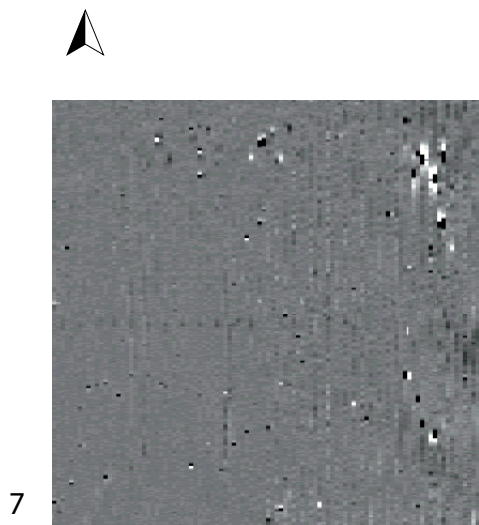


Fig 4: Survey results & Traced Interpretations

 Location of Turbine
 Traced outline of feature



Location of Turbine



Traced outline of feature

Fig 5: Survey results & Traced Interpretations



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