The Great Grid Upgrade

Sea Link

# Sea Link

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**November 2025**

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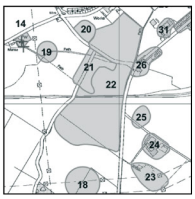
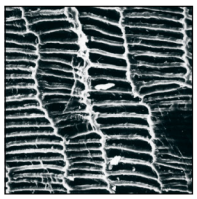
SLAS25










# SEA LINK (SUFFOLK SECTION) ADDITIONAL SURVEY

## GEOPHYSICAL SURVEY REPORT

SUFFOLK PARISH CODE FRS117

commissioned by AECOM
on behalf of National Grid Electricity Transmission

November 2025

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

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This report adheres to the quality standard of ISO 9001:2015

PROJECT INFO:

HA Project Code **SLAS25** / HA Report No **2025-138** / NGR **TM 42272 60255** / Parish **Knodishall: St Lawrence** / Local Authority **Suffolk** / Fieldwork Date **09/09/25 – 10/10/25** / OASIS Ref. **headland1-538702**

[redacted]

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an RSK company

REGISTERED ORGANISATION CIfA

# PROJECT SUMMARY

Headland Archaeology (UK) Ltd was commissioned by AECOM (the Consultant) on behalf of National Grid Electricity Transmission (the Client), to undertake a geophysical (magnetometer) survey on land east of Friston, East Suffolk that lies adjacent to the Sea Link Project Boundary (the Scheme), and forms part of the wider Sea Link Project (the Project).

The Sea Link Project is a proposal by National Grid Electricity Transmission plc (NG) to reinforce the transmission network in the South-East of England and East Anglia. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400kV overhead line close to Richborough in Kent. The Project is required to accommodate additional power flows generated from renewable and low carbon energy generation, as well as additional new interconnection with mainland Europe.

This survey has been requested based on archaeological features identified during trial trench evaluations of the proposed Scheme route. The results of the survey will be used to determine the requirement for further archaeological evaluation, the scope of which will be determined in consultation with the Planning Archaeologist for Suffolk County Council.

The current phase of survey has recorded a range of magnetic anomalies of agricultural, geological, modern and archaeological origin identified against a relatively homogenous magnetic background. The results are consistent with the findings of a previous phase of survey within the Sea Link Corridor Order Limits and surrounding fields.

The most conspicuous result is the confirmation of the extent and morphology of an irregular G-shaped enclosure. The morphology suggests the feature to be an enclosure of Late Bronze Age date rather than a Late Neolithic henge monument as previously hypothesised. It is worth noting however that one of five pits identified during the trial trenching, between 50m and 100m to the south-east of the enclosure, contained

substantial amounts of Early Neolithic pottery, charcoal and struck and burnt flints, confirming early prehistoric activity in the area. No magnetic anomalies have been recorded in the vicinity of these pits although three pit-like responses within the enclosure have been identified by this survey.

The survey has also recorded several linear anomalies confirming the extent of enclosures and ditch features partially defined by the previous phase of surveys towards the western edge of the survey area as well as two small square enclosures in the north of the survey area.

The magnitude and resolution of the magnetic anomalies allied with the results of the trial trenching evaluation indicates that there was sufficient magnetic contrast, for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify certain types, sizes and periods of archaeological features.

It is therefore considered that the results give a good indication of the archaeological potential of the survey area. Based on the results of the geophysical survey, the archaeological potential of the survey area is assessed as moderate, except in the localised area around the D-shaped enclosure, where it is assessed as high.

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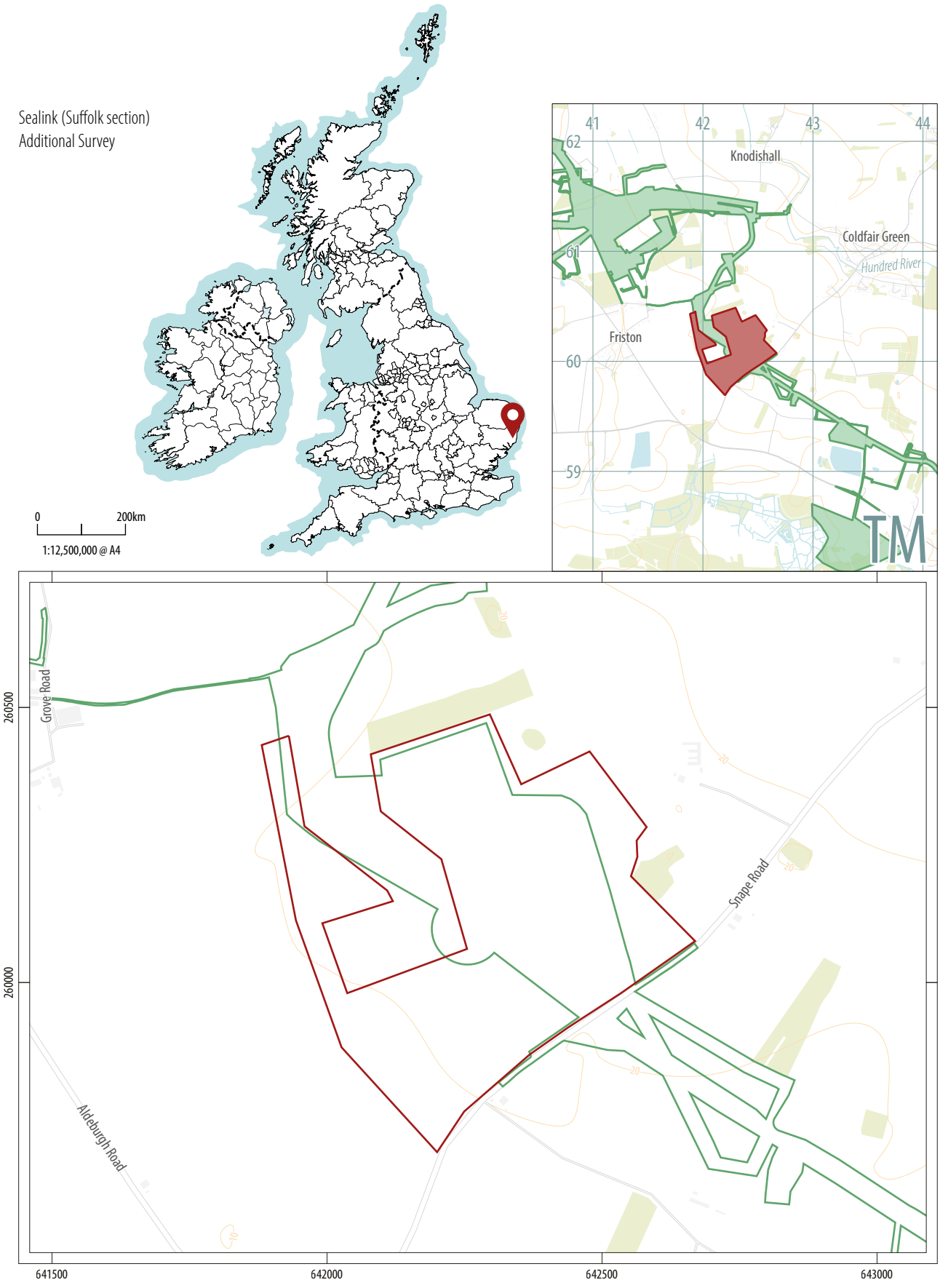


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**ILLUS 1** Site location

# SEA LINK (SUFFOLK SECTION) ADDITIONAL SURVEY

## GEOPHYSICAL SURVEY REPORT

## 1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by AECOM (the Consultant) on behalf of National Grid Electricity Transmission (the Client), to undertake a geophysical (magnetometer) survey on land east of Friston, East Suffolk that lies adjacent to the Sea Link Project Boundary (the Scheme), and forms part of the wider Sea Link Project (the Project) (see Illus 1).

The Sea Link Project is a proposal by National Grid Electricity Transmission plc (NG) to reinforce the transmission network in the south-east of England and East Anglia. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400kV overhead line close to Richborough in Kent. The Project is required to accommodate additional power flows generated from renewable and low carbon energy generation, as well as additional new interconnection with mainland Europe.

This survey of an additional 29 hectares (ha) (Geophysical Survey Area – GSA) surrounding the original Sea Link Cable Corridor Order Limits was requested based on archaeological features identified during intrusive excavations along part of the proposed Scheme route (Oxford Archaeology 2025). The results of the geophysical survey will be used to determine the requirement for further archaeological evaluation, the scope of which will be determined in consultation with the Planning Archaeologist for Suffolk County Council (SCC).

Previous phases of geophysical (magnetometer) survey for the wider Project have been reported on separately (Headland Archaeology 2023 and 2024). In addition, areas immediately north of the GSA were surveyed as part of the archaeological evaluation of the East Anglia One North and East Anglia Two Windfarm Cable Corridor (Illus 5 to Illus 7, Headland Archaeology 2020).

The scheme of work was undertaken in accordance with the requirements for Geophysical Survey set by Suffolk County Council Archaeological Service (SCCAS 2023), with the National Planning Policy Framework (Ministry of Housing, Communities & Local Government, MHCLG 2024) and with the Written Scheme of Investigation for Geophysical Survey (WSI) (AECOM 2023) and Method Statement (MS) for Geophysical Survey (Headland Archaeology 2025).

The WSI and MS were produced to the standards laid down in the European Archaeological Council's guideline publication, EAC Guidelines for the Use of Geophysics in Archaeology (Europae Archaeologia Consilium 2016) and the Chartered Institute for Archaeologists' (ClfA) Standard and Guidance for Archaeological Geophysical Survey (ClfA 2020) The survey was carried out in line with the same best practice guidelines.

Due to the presence of a maize crop over the eastern part of the GSA, the survey was carried out in two phases on September 10th and September 11th, 2025 and after the harvest of the crop between October 7th and October 9th, 2025.

### 1.1 SITE LOCATION, TOPOGRAPHY AND LAND-USE

The Scheme corridor in Suffolk is approximately 10 kilometres (km) in length, extending in a north-westerly direction from just south of Thorpeness to north-east of Saxmundham. The geophysical survey area (GSA) is situated within and immediately adjacent to the Scheme Corridor Order Limits, between the villages of Friston and Coldfair Green, at NGR TM 42272 60255 (Illus 1). The GSA comprises six fields planted with various arable crops (Illus 2 to Illus 4), covers approximately 29.5 ha and is situated on relatively flat ground at

**ILLUS 2** F41, looking west

approximately 20 metres (m) Above Ordnance Datum (AOD) sloping gently down to 16m AOD towards the northern GSA boundary.

The GSA is bounded by Snape Road to the south, and further arable fields to all sides except where it is bordered by a small area of woodland along the northern boundary.

## 1.2 GEOLOGY AND SOILS

The underlying solid bedrock geology in the south of the area comprises sand of the Chillesford Church Sand Member, a sedimentary bedrock formed between 2.1 and 2 million years ago during the Quaternary period. The northern part of the GSA comprises sand of the Crag Group sedimentary bedrock formed between 5.333 million and 11.8 thousand years ago during the Neogene and Quaternary periods.

The GSA is overlain by Diamicton of the Lowestoft Formation, a sedimentary superficial deposit formed between 480 and 423 thousand years ago during the Quaternary period. Clay and silt of the Lowestoft Formation is recorded on the northern edge of the GSA, and small areas of sand and gravel sedimentary superficial deposits of the Lowestoft Formation are also mapped on the western boundary of the site. These superficial deposits were formed between 480 and 423 thousand years ago during the Quaternary period.

The soils covering the GSA are recorded as freely draining slightly acid but base-rich classified in the Soilscape 7 Association (Cranfield University 2025).

# 2 ARCHAEOLOGICAL BACKGROUND

A detailed historical and archaeological background of the Scheme is set out in a cultural heritage baseline report included as part of the Environmental Statement for the Proposed Project (National Grid 2025).

Most relevant to the present work are the results of previous geophysical (magnetometer) surveys (Headland Archaeology 2025) undertaken across parts of the GSA included within the Sea Link Scheme Corridor Order Limits and to a lesser extent immediately outside the GSA (Headland Archaeology 2020) and the subsequent trial trench evaluations across the Sea Link Corridor Order Limits (Oxford Archaeology 2025).

The extents of the earlier surveys are shown in Illus 5, Illus 6 and Illus 7. Some parts of the GSA were initially unsuitable for survey due to cropping and access issues. Where geophysics was undertaken, anomalies indicative of parallel ditches, extraction as well as enclosures and a segment of a curvilinear ditch were identified. Subsequent trial trenching (Oxford Archaeology 2025) identified five Early Neolithic pits and a very large ditch thought to form part of a circular enclosure 90m in diameter which was interpreted as a probable henge monument of Late Neolithic date. The primary fills of the suspected henge monument were only augered and no secure dating evidence was recovered. Two shallow pits were recorded in the interior of the feature.

An earlier magnetometer survey (Headland Archaeology 2020) undertaken as part of the archaeological evaluation of the East Anglia

**ILLUS 3** F25.1, looking north-west

One North and East Anglia Two Windfarm Cable Corridor, covered multiple fields located immediately north of the GSA. Three separate clusters of ditches and enclosures were identified approximately 250m north, north-east and east of the GSA respectively (Illus 6).

The results of the preceding magnetometer surveys indicate that the prevailing geological and pedological conditions are conducive to magnetometer survey and the methodology is therefore suitable for assessing the archaeological potential of the GSA.

# 3 AIMS, METHODOLOGY & PRESENTATION

## 3.1 AIMS AND OBJECTIVES

The principal objectives of the geophysical survey were to gather information to establish the presence/absence, character, and extent of any archaeological remains within the GSA, and thereby support any forthcoming planning application and inform any further investigation strategies.

The general objectives of the geophysical survey were: -

- to further investigate the archaeological potential of the Scheme,
- to assess the presence / absence of potential archaeological anomalies,
- to determine the level of risk that the archaeological resource would present to the Scheme,
- to inform the emerging design; and
- to inform the scope of further evaluation.

The aims of the survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified,
- to therefore determine the likely presence/absence and extent of any buried archaeological features, and
- to produce a comprehensive site archive and report.

## 3.2 METHODOLOGY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the earth's magnetic field. In mapping these slight variations detailed plans of sites can be obtained, as buried features often produce reasonably characteristic anomaly

**ILLUS 4** F20.2, looking south-east

shapes and strengths (Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

Magnetometry is the most widely used geophysical survey technique in archaeology as it can quickly evaluate large areas and, under favourable conditions, identify a wide range of archaeological features including infilled cut features such as large pits, gullies and ditches, hearths, and areas of burning, and kilns and brick structures. It is therefore good at locating settlements of all periods, prehistoric field systems and enclosures, and areas of industrial or modern activity, amongst others. It is less successful in identifying smaller features such as post-holes and small pits (except when using a non-standard sampling interval), unenclosed (prehistoric) settlement sites and graves or burial grounds. However, magnetometry is by far the single most useful technique and was assessed as the best non-intrusive evaluation methodology for this site.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10 Hertz (Hz) on roaming traverses (swaths) 1 metre (m) apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R12 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Anomaly GeoSurvey v1.12.3 (Lichenstone Geoscience) and QGIS v.3.34.6 software was used to process and present the data respectively.

## 3.3 DATA PRESENTATION AND TECHNICAL DETAIL

A general site location plan is shown in Illus 1 at a scale of 1:10,000. Illus 2, Illus 3 and Illus 4 are site condition photographs. Illus 5 shows the location and direction of the site condition photographs and the extent of previous geophysical surveys and trial trench positions and at a scale of 1:5,000. Illus 6 and Illus 7 present overviews of the processed greyscale data including of the previous surveys and interpretation of the present data, also at 1:5,000. Illus 8 to Illus 13 inclusive show the fully processed (greyscale) data, minimally processed (XY trace plot) data and interpretative plans, by Sector, at a scale of 1:2,500.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information. Appendix 3 describes the composition and location of the site archive. Data processing details are presented in Appendix 4. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 5.

The survey methodology, report and any recommendations comply with the Written Scheme of Investigation (AECOM 2023) and Method Statement (Headland Archaeology 2025), and guidelines outlined by Europae Archaeologia Consilium (EAC 2016) and by the Chartered Institute for Archaeologists (CIfA 2020).

All illustrations using Ordnance Survey (OS) mapping are reproduced with the permission of the controller of His Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' (minimally processed) and processed formats and over a range of different display levels. All illustrations are presented to display and interpret the data to best effect. The interpretations are based on the experience and knowledge of Headland Archaeology management and reporting staff.

# 4 RESULTS & DISCUSSION

## 4.1 SITE CONDITIONS AND ANOMALY RECOGNITION AND INTERPRETATION

Magnetometer survey is generally recommended over any sedimentary geology (English Heritage 2008; Table 4), however, responses can be variable depending on the depth, distribution and constitution of overlying superficial deposits, with undifferentiated diamicton and clay, silt, sand and gravel recorded across the GSA.

The magnetic background is relatively homogenous across the site with no discernible difference in the magnetic background between the different bedrock and superficial geologies.

Against this magnetic background, anomalies of agricultural, modern, geological and archaeological origin have been recorded.

The magnitude and resolution of the anomalies allied with the results previous surveys and trial trenching evaluation indicates that there was sufficient magnetic contrast, for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify certain types, sizes and periods of archaeological features. It is therefore considered that the results give a good indication of the archaeological potential of the GSA.

Surface conditions at the time of survey were good (Illus 2 to Illus 4) and consequently data quality was also good with only minimal post-processing required. No problems were encountered during the survey.

The anomalies recorded by the survey are discussed below according to their interpreted origin.

## 4.2 ANOMALIES OF FERROUS AND MODERN ORIGIN

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is common on most sites, often being introduced into the topsoil during manuring or tipping/infilling. There is no obvious clustering of the 'spike' responses, so these anomalies are likely to be indicative of a random distribution of modern ferrous debris in the plough-soil.

An extensive concentration of high magnitude response in field F25.1 (Illus 7 and Illus 13 - CP1) in the south-west of the GSA corresponds to the location of an old clay pit documented on historic OS mapping. The anomaly response is a result of the strongly enhanced material used to infill the pit.

Several discrete areas of amorphous low magnitude response identified across the GSA are typical anomaly responses identifying former sites of probable post-medieval quarrying. This interpretation is supported by the results of the trial trenching evaluation (Oxford Archaeology 2025). However, the quarrying closest to enclosure E4 at the centre of the GSA is poorly dated, although it demonstrably post-dates the enclosure ditches.

Several faint negative linear trend responses oriented in a herringbone type pattern from north-west to south-east in F25.2 locate the backfilled trial trenches (Illus 5 and Illus 13) from the 2025 Oxford Archaeology evaluation.

## 4.3 ANOMALIES OF AGRICULTURAL ORIGIN

Linear trend anomalies of agricultural origin identified within the GSA are a result of modern cultivation and boundary clearance. The densest clustering of cultivation trends is evident across F20.2 (Illus 8 to Illus 10).

Former boundaries documented on historic mapping have been identified by the survey in F25.2 and F41, (Illus 7 - FB1, FB3 and FB5). Two additional faint linear anomalies perpendicular to FB3 are considered likely to record further former boundaries not documented on historic maps (Illus 7 - FB2 and FB4).

## 4.4 ANOMALIES OF GEOLOGICAL ORIGIN

Anomalies of geological origin, likely a result of natural variations in the overlying superficial deposits and upper soil horizons, are limited to ephemeral and vague curvilinear and sinuous negative responses located in the southern halves of F25.2 and F41 (Illus 7).

## 4.5 ANOMALIES OF POSSIBLE OR PROBABLE ARCHAEOLOGICAL ORIGIN

Several anomalies of possible and probable archaeological origin have been recorded by the survey. The most conspicuous feature is the irregular enclosure situated towards the centre of the GSA at NGR 642250, 260100 (Illus 11 to Illus 13 - E4). The current survey completes the mapping of this feature part of which was recorded during the previous phase of survey (Headland Archaeology 2024) and which was subsequently confirmed by evaluation trenching (Oxford Archaeology 2025; Figure 9; Trenches 826–833). The survey has revealed E4 to be a G-shaped enclosure, measuring approximately 80m by 95m, of possible Late Bronze Age date based on its morphology, rather than a Late Neolithic henge monument as previously postulated. The enclosure is defined by a single continuous outer curving ditch with a gap on the south-eastern side indicative of an entrance.

The current survey has also confirmed the northern edge of a rectilinear enclosure measuring 31m by 24m recorded by the previous survey at the north-west corner of F25.1 (Illus 11–13 – E1).

A clear ditch anomaly (Illus 8–10 - D1), parallel with the western edge of the GSA in F20.2, defines the continuation of a ditch (Illus 6) identified by the 2020 survey.

Other linear anomalies (Illus 10 - D2) with much weaker response have been identified in the southern part of F20.2 immediately east of D1. Given their proximity a possible archaeological interpretation has been ascribed.

Faint linear and curvilinear responses located predominantly at the western limits of the GSA in F25.1 (Illus 13 - D3 to D7) likely identify further ditches and possible enclosures of archaeological origin. Their proximity to E1, approximately 40m to the north-east, strengthens this interpretation however their location at the edge of the GSA limits a more confident interpretation.

Two small square enclosures and a possible ditch have also been tentatively identified in the north of the GSA (Illus 10 – E2, E3 and D8).

# 5 CONCLUSION

The current phase of survey has identified a range of anomalies of agricultural, geological, modern and archaeological origin identified against a relatively homogenous magnetic background. The results are consistent with the findings of a previous phase of survey within the Sea Link Corridor Order Limits and surrounding fields.

The most conspicuous result is the confirmation of the extent and morphology of an irregular G-shaped enclosure. The morphology suggests the feature to be an enclosure of Late Bronze Age date rather than a Late Neolithic henge monument as previously hypothesised. It is worth noting however that one of five pits identified during the trial trenching, between 50m and 100m to the south-east of the enclosure, contained substantial amounts of Early Neolithic pottery, charcoal and struck and burnt flints, confirming early prehistoric activity in the area. No magnetic anomalies have been recorded in the vicinity of these pits although three pit-like responses within the enclosure have been identified by this survey.

The survey has also recorded several linear anomalies confirming the extent of enclosures and ditch features partially defined by the previous phase of surveys towards the western edge of the survey area as well as two small square enclosures in the north of the survey area.

The magnitude and resolution of the magnetic anomalies allied with the results of the trial trenching evaluation indicates that there was sufficient magnetic contrast, for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify certain types, sizes and periods of archaeological features.

It is therefore considered that the results give a good indication of the archaeological potential of the survey area. Based on the results of the geophysical survey, the archaeological potential of the survey area is assessed as moderate, except in the localised area around the G-shaped enclosure, where it is assessed as high.

# 6 REFERENCES


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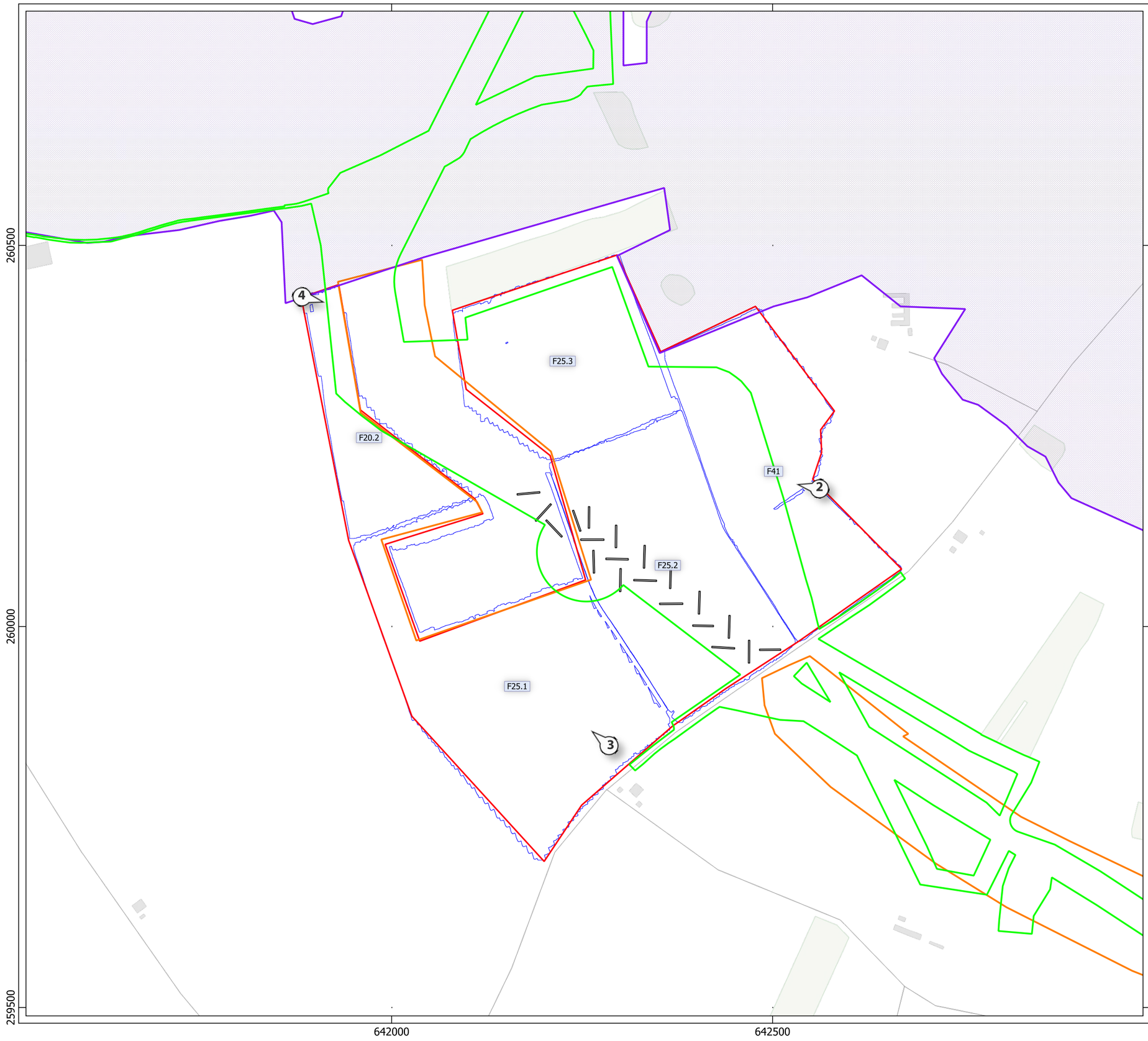


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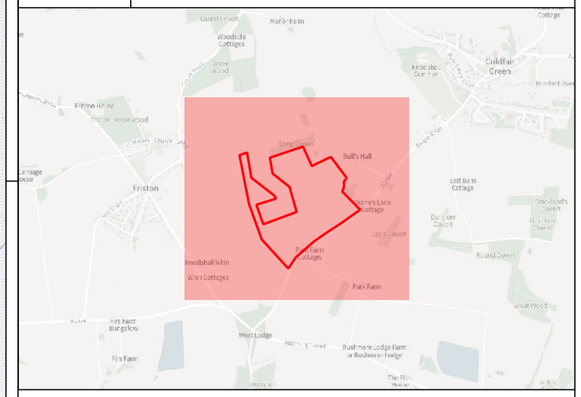

## Key

- Geophysical Survey Area
- Location and Directtion of Illus 2 to 4
- Sea Link Corridor Order Limits
- OA 2025 Trench locations
- Previous Survey (East Anglia 1N/2, Headland 2020)
- Previous Survey (Sea Link, Headland 2025)
- SLAS25 Survey Extent

0 90 180 m



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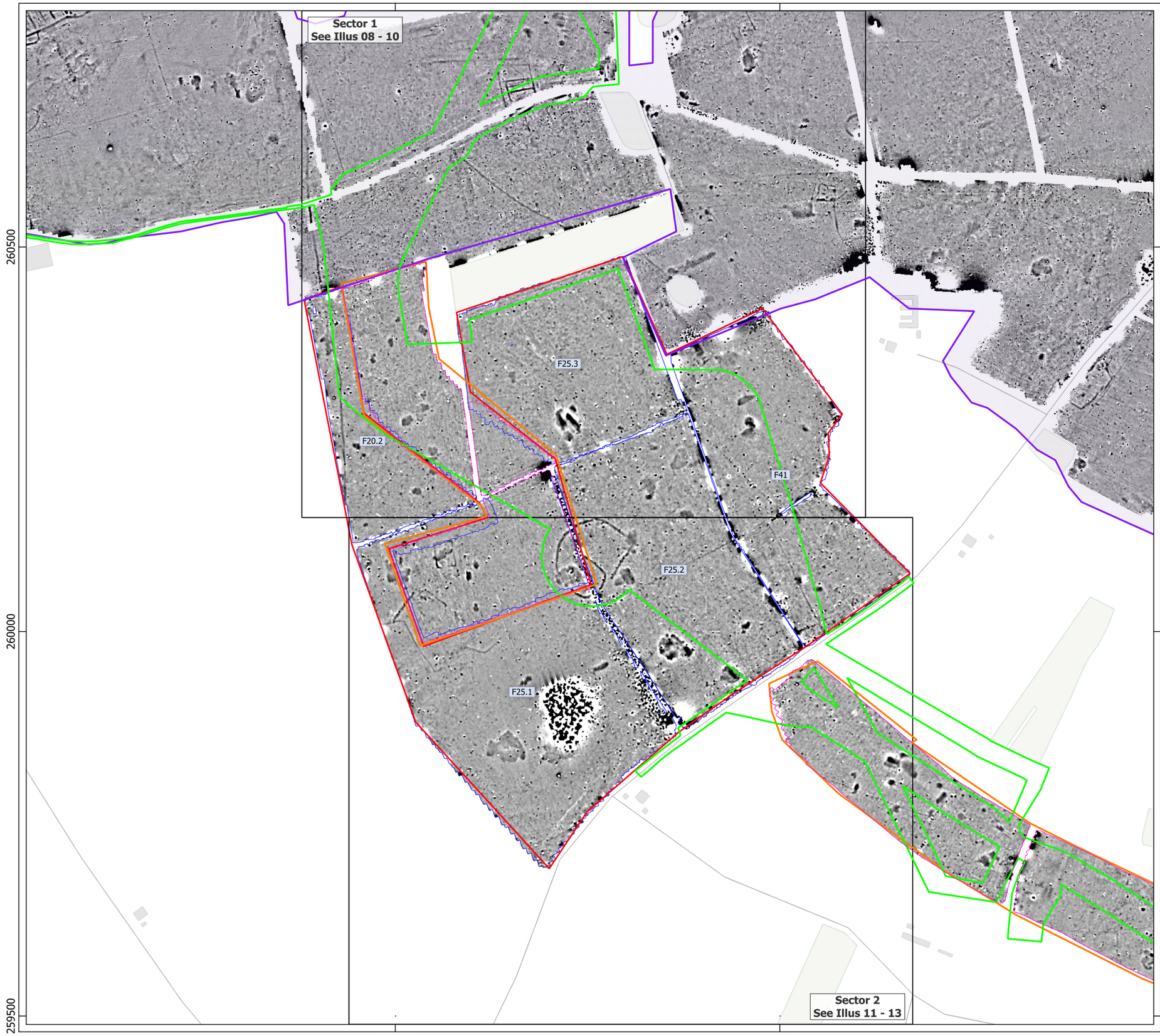
Illus 05 - Survey location and photograph locations

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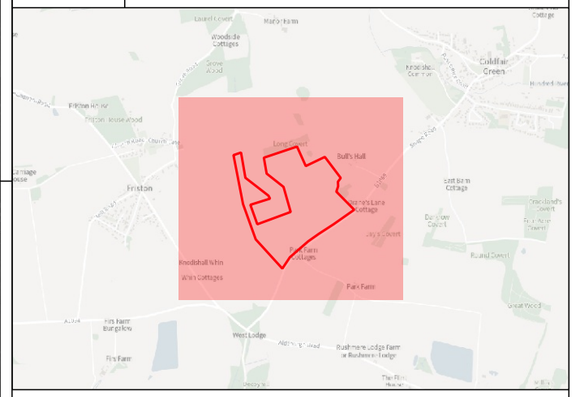


## Key

- Geophysical Survey Area
- Sea Link Corridor Order Limits
- Previous Survey (East Anglia 1N/2, Headland 2020)
- Previous Survey (Sea Link, Headland 2025)
- Area for Illus 8 to 13
- SLAS25 Survey Extent
- SSSK23 Survey Extents

+2nT
-1nT

0 90 180 m



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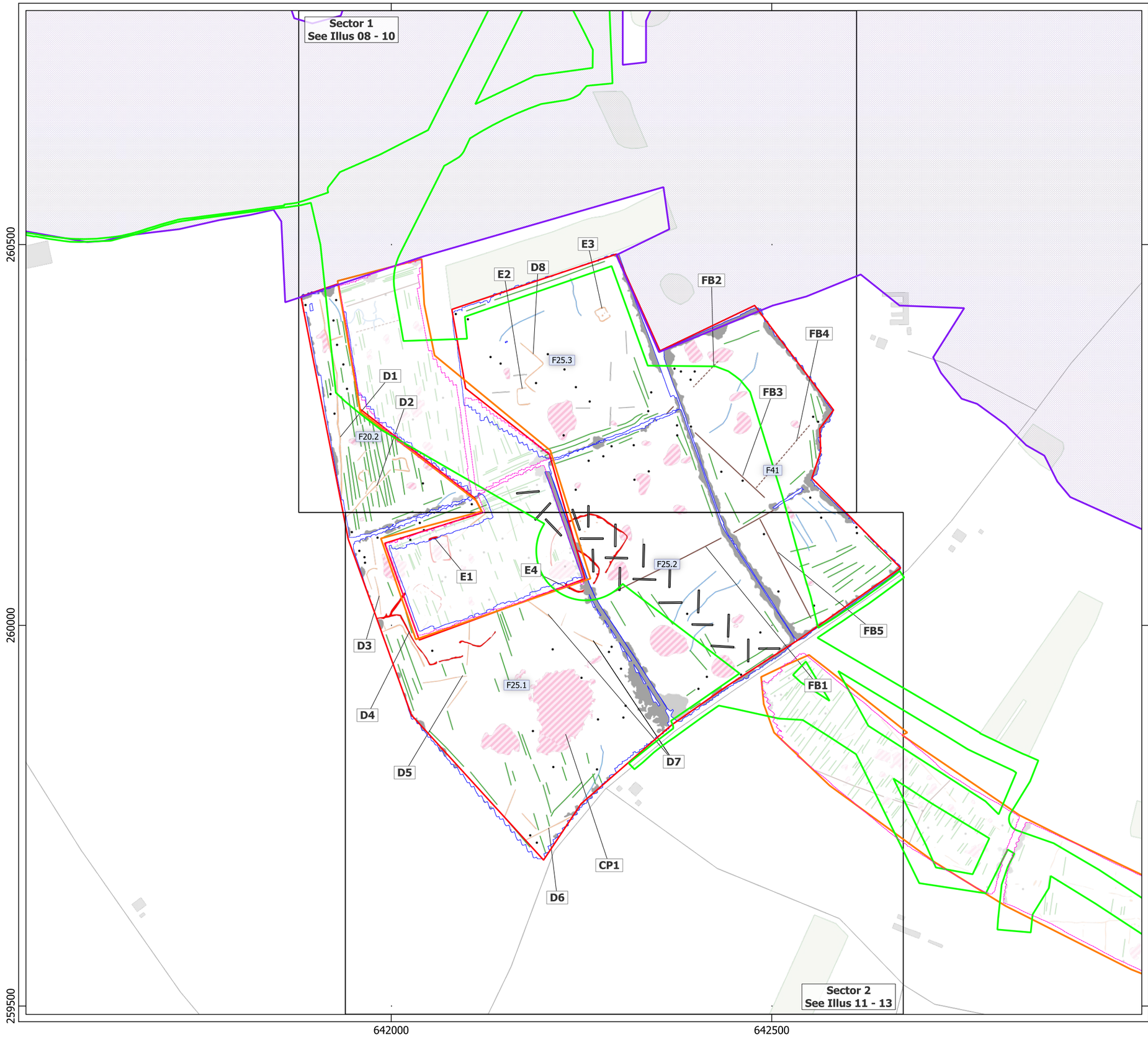
Illus 06 - Overall greyscale plot of processed magnetometer data

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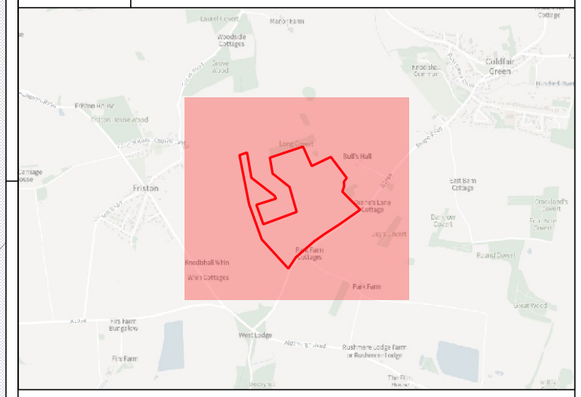


## Key

- Geophysical Survey Area
- Sea Link Corridor Order Limits
- OA 2025 Trench locations
- Previous Survey (East Anglia 1N/2, Headland 2020)
- Previous Survey (Sea Link, Headland 2025)
- Area for Illus 8 to 13
- SLAS25 Survey Extent
- SSSK23 Survey Extents

SLAS25 Interpretation

- Ferrous Objects
- Agriculture
- Trench Location
- Field Boundary
- Possible Field Boundary
- Natural
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

SSSK23 Interpretation

- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

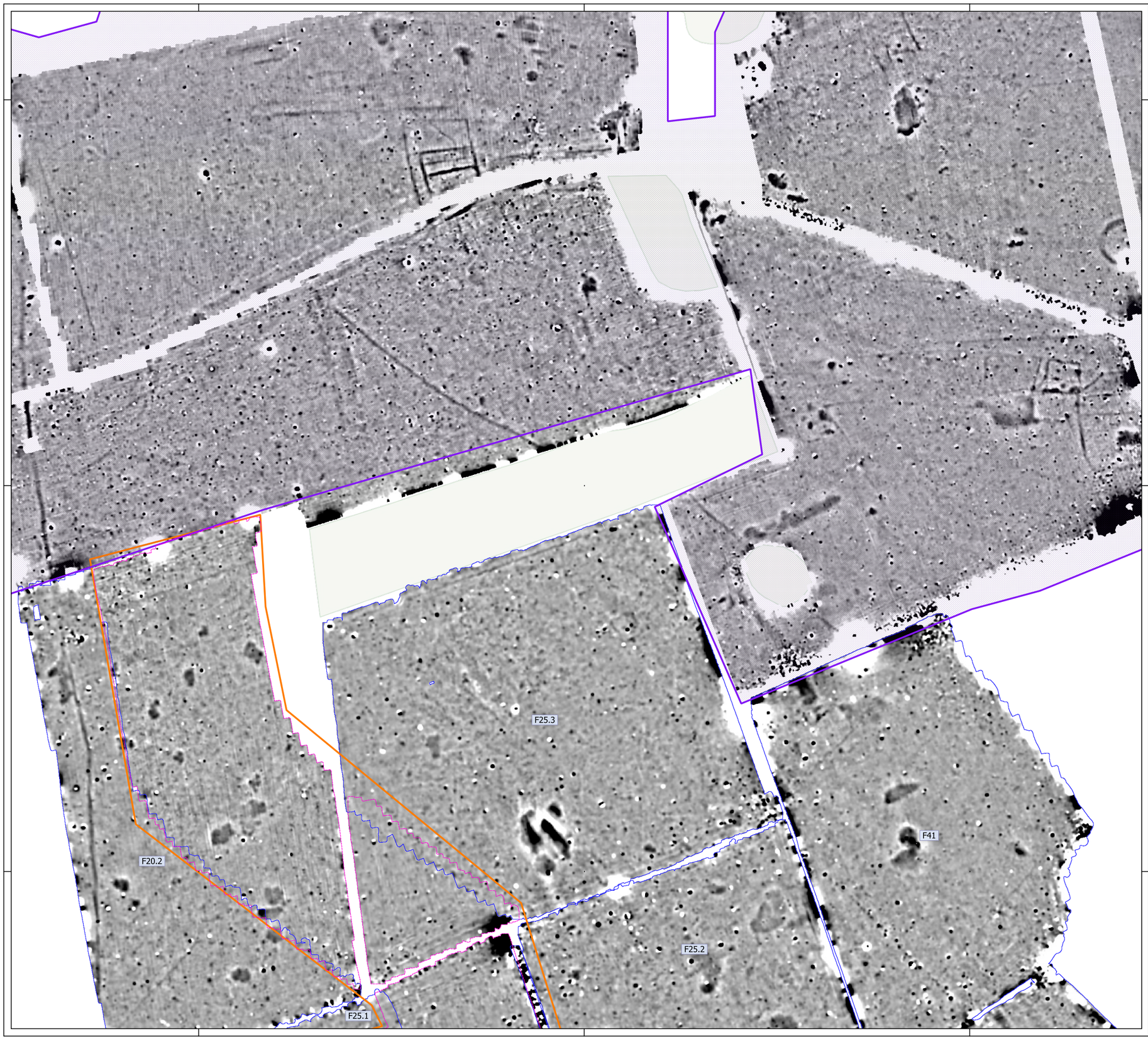
| | Abbreviation |
|---|---|
| CP | Former Clay Pit |
| D | Ditch |
| E | Enclosure |
| FB | Former Field Boundary |

0 90 180 m



| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:5,000 @ A3 |

Illus 07 - Overall interpretation of magnetometer data

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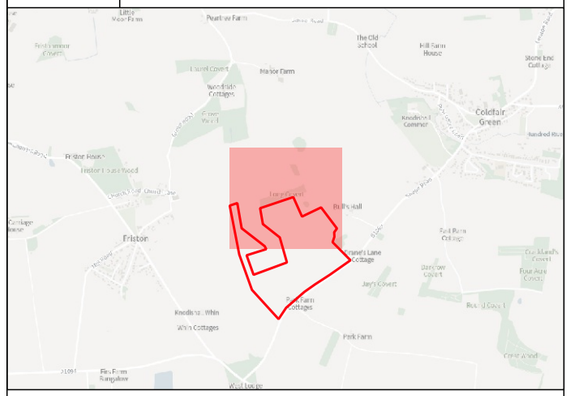


Key

- Previous Survey (East Anglia 1N/2, Headland 2020)
- Previous Survey (Sea Link, Headland 2025)
- SLAS25 Survey Extent
- SSSK23 Survey Extents

+2nT
-1nT

0 40 80 m



| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:2,500 @ A3 |

Illus - 08 Processed greyscale magnetometer data; Sector 1


N

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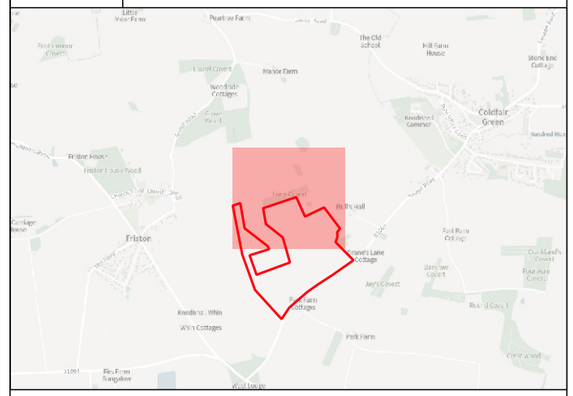



Key

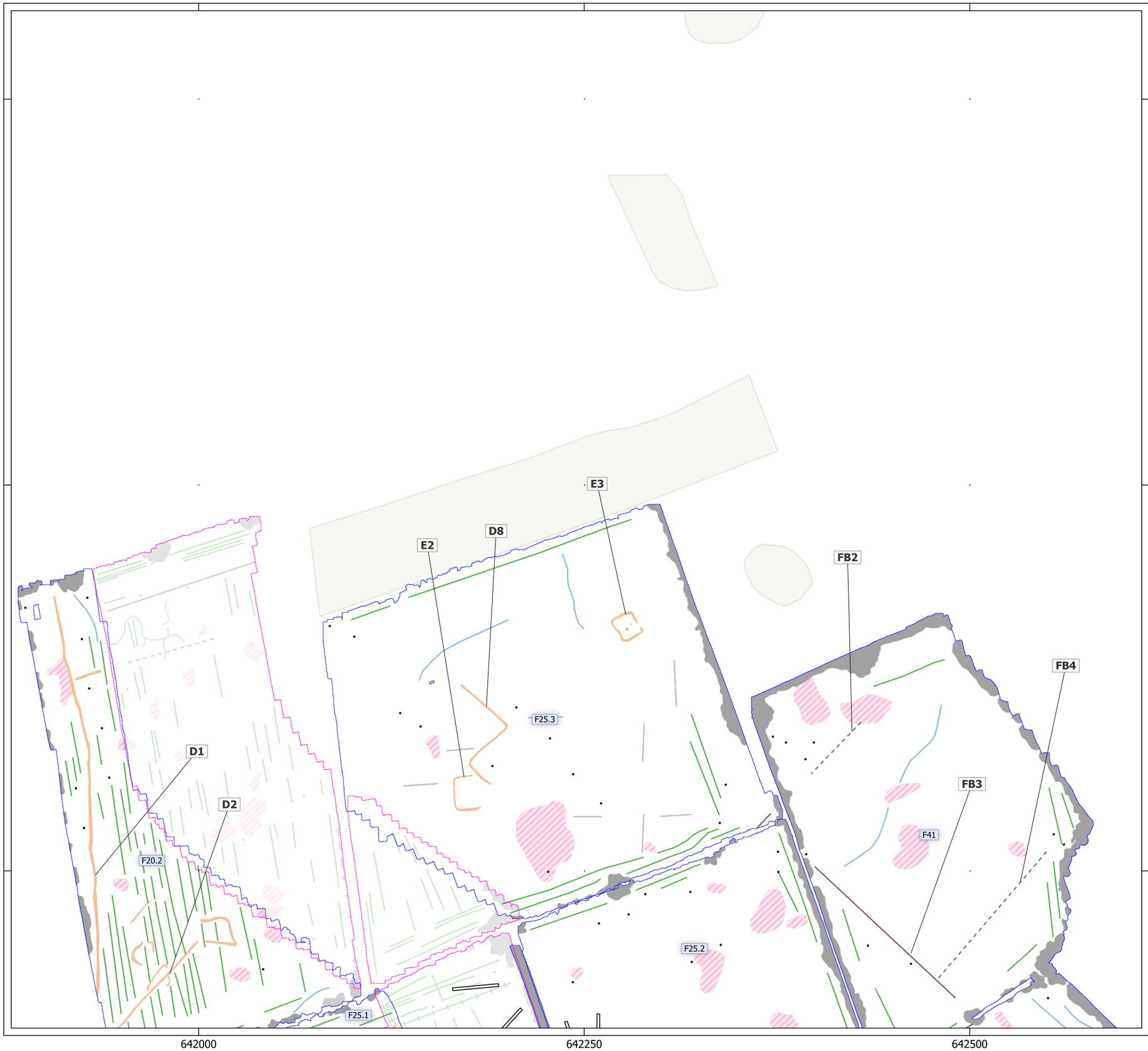
- SLAS25 Survey Extent
- XY Trace (25nT/cm)

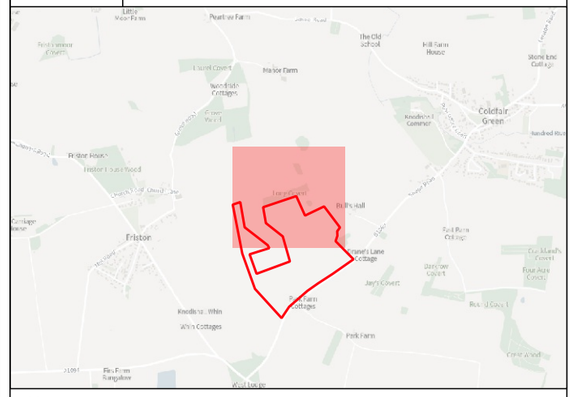
0 40 80 m



| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:2,500 @ A3 |

Illus - 09 XY trace plot of minimally processed magnetometer data; Sector 1




## Key

- OA 2025 Trench locations
- SLAS25 Survey Extent
- SSSK23 Survey Extents

**SLAS25 Interpretation**

- Ferrous Objects
- Agriculture
- Trench Location
- Field Boundary
- Possible Field Boundary
- Natural
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

**SSSK23 Interpretation**

- Ferrous Objects
- Agriculture
- Field Boundary
- Possible Field Boundary
- Field Drain
- Natural
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Quarry

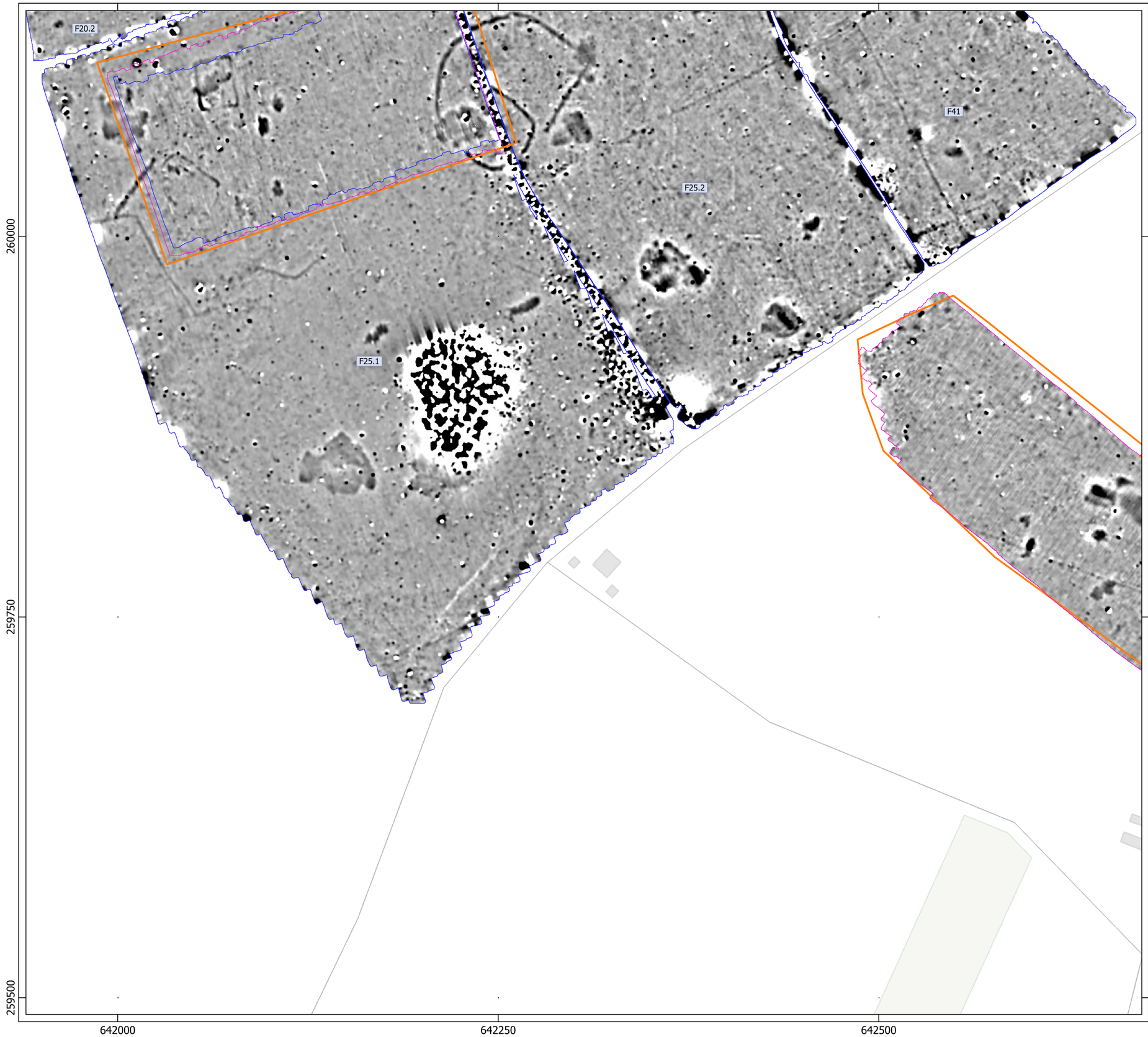
| | Abbreviation |
|---|---|
| D | Ditch |
| E | Enclosure |
| FB | Former Field Boundary |

0 40 80 m



| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:2,500 @ A3 |

Illus - 10 Interpretation of magnetometer data; Sector 1

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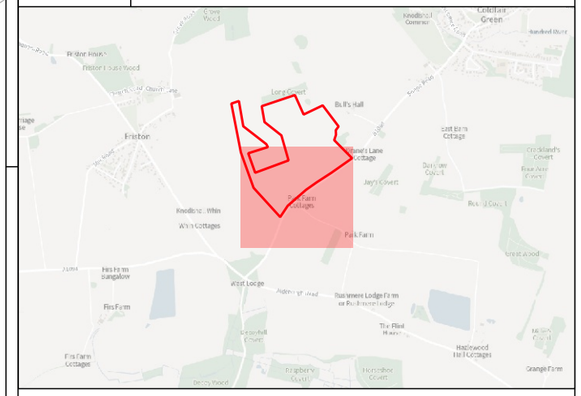


Key

- Previous Survey (Sea Link, Headland 2025)
- SLAS25 Survey Extent
- SSSK23 Survey Extents

+2nT

-1nT

0 40 80 m



| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:2,500 @ A3 |

Illus - 11 Processed greyscale magnetometer data; Sector 2

F20.2

F41

F25.2

F25.1

260000

259750

259500

642000

642250

642500

N

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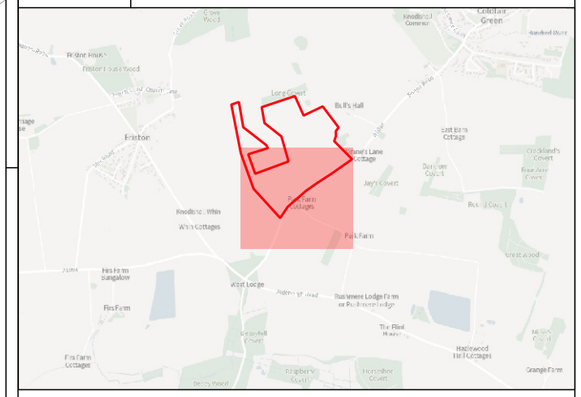



Key

SLAS25 Survey Extent

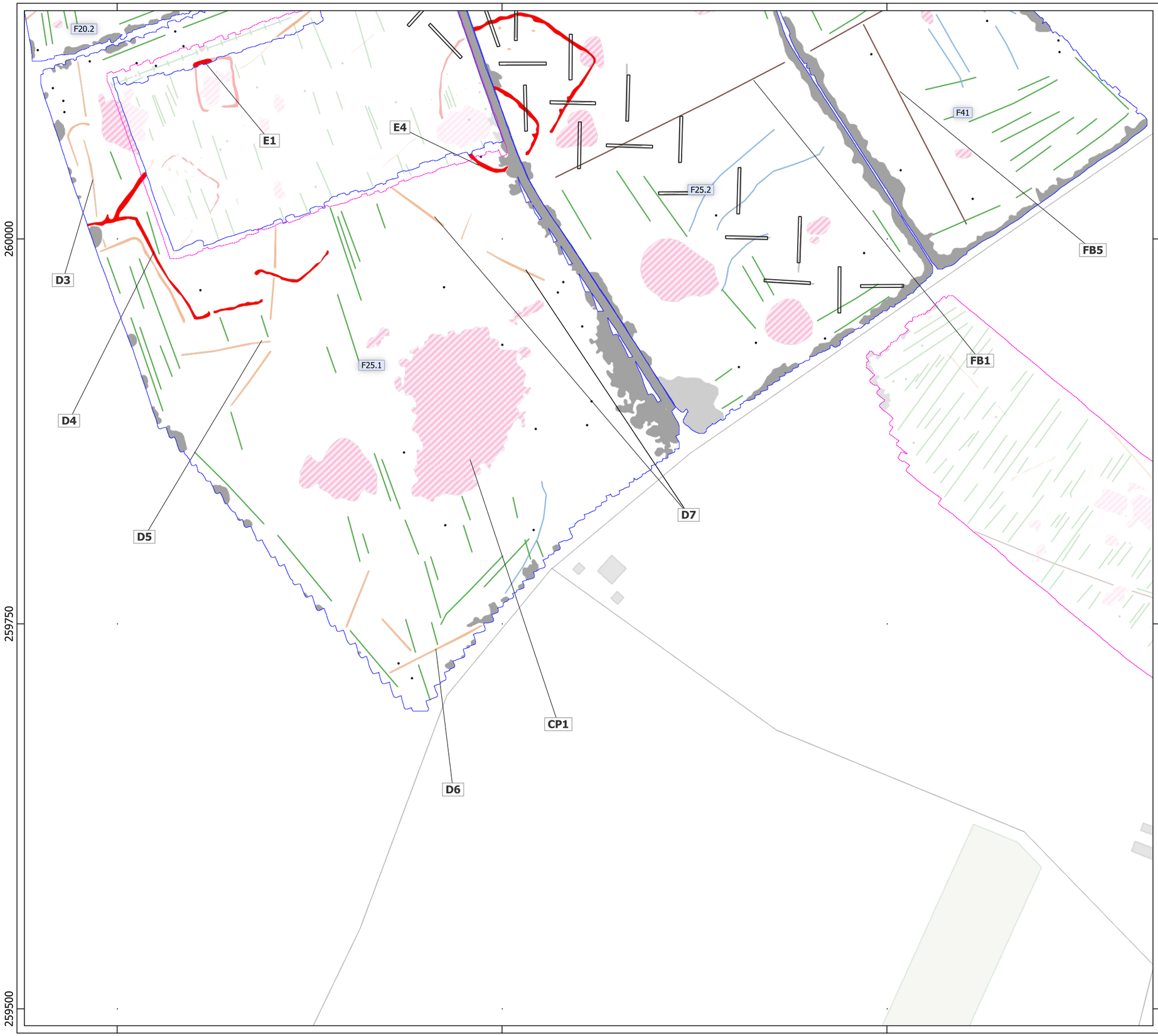
XY Trace (25nT/cm)

0 40 80 m



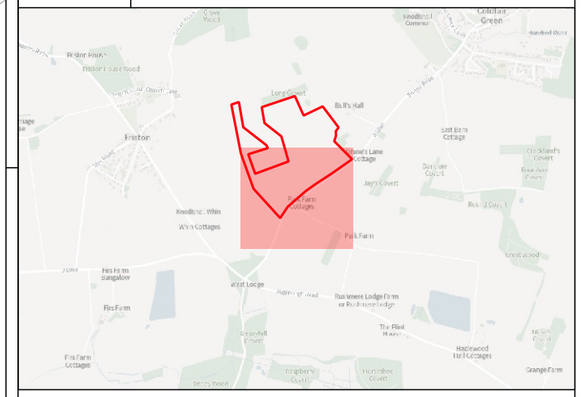
| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:2,500 @ A3 |

Illus - 12 XY trace plot of minimally processed magnetometer data; Sector 2




N

HEADLAND ARCHAEOLOGY
an RSK company



## Key

- OA 2025 Trench locations
- SLAS25 Survey Extent
- SSSK23 Survey Extents

SLAS25 Interpretation
- Ferrous Objects
- Agriculture
- Trench Location
- Field Boundary
- Natural
- Archaeology
- Magnetic Disturbance (Above Ground)
- Magnetic Disturbance (Below Ground)
- Possible Archaeology
- Quarry

SSSK23 Interpretation
- Ferrous Objects
- Agriculture
- Field Boundary
- Field Drain
- Archaeology
- Magnetic Disturbance (Above Ground)
- Possible Archaeology
- Quarry

| | Abbreviation |
|---|---|
| CP | Former Clay Pit |
| D | Ditch |
| E | Enclosure |
| FB | Former Field Boundary |

0 40 80 m



| | |
|---|---|
| Site: | SLAS25 |
| Created by: | JH |
| Checked by: | CA |
| Version: | v1.2 |
| Date: | 21/11/2025 |
| Scale: | 1:2,500 @ A3 |

Illus - 13 Interpretation of magnetometer data; Sector 2

# 7 APPENDICES

## APPENDIX 1 MAGNETOMETER SURVEY

### *Magnetic susceptibility and soil magnetism*

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of the topsoil, subsoil, and rock, into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns, or areas of burning.

### *Types of magnetic anomaly*

In most instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However, some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

**Isolated dipolar anomalies (iron spikes)** These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being introduced into the topsoil during manuring.

**Areas of magnetic disturbance** These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

**Lightning-induced remnant magnetisation** LIRM anomalies are thought to be caused in the near surface soil horizons by the flow of an electrical current associated with lightning strikes. These observed anomalies have a strong bipolar signal which decreases with distance from the spike point and often appear as linear or radial in shape.

**Linear trend** This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

**Areas of magnetic enhancement/positive isolated anomalies** Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

**Linear and curvilinear anomalies** Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

# APPENDIX 2 SURVEY LOCATION INFORMATION

The magnetometer data was collected and is geo-located based on survey grade Real Time Kinetic (RTK) differential Global Positioning System (dGPS) used on both hand-carried and towed systems. The accuracy of this dGPS equipment is better than 0.01m. The GPS systems output in NMEA mode in real time, with a visual guide of survey tracks and any survey area boundaries displayed on a tablet device in view of the survey operator to ensure full coverage. Any survey area boundaries are uploaded as a string of co-ordinates or shapefile to the tablet prior to the commencement of survey.

# APPENDIX 3 GEOPHYSICAL SURVEY ARCHIVE

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_3). The data will be stored in an indexed archive and migrated to new formats when necessary.

# APPENDIX 4 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift, heading errors and any other artificial data.

The XY data has been clipped to remove extreme values and to improve the interpretability of the data.

# APPENDIX 5 OASIS DAA COLLECTION FORM: ENGLAND

## *OASIS ID (UID): headland1-538702*

| | |
|---|---|
| **Project Name:** | Geophysical Magnetometry Survey at Sea Link (Suffolk Section) Additional Survey |
| **Activity type:** | Magnetometry Survey, Geophysical Survey, MAGNETOMETRY SURVEY |
| **Sitecode(s):** | SLAS25 |
| **Project Identifier(s):** | p25-281 |
| **Planning Id:** | [no data] |
| **Reason for Investigation:** | Planning: Between application and determination |
| **Organisation Responsible for work:** | Headland Archaeology (UK) Ltd |
| **Project Dates:** | 09-Sep-2025 - 10-Oct-2025 |
| **HER:** | Suffolk HER |
| **HER Identifiers:** | [no data] |
| **Project Methodology:** | The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10 Hertz (Hz) on roaming traverses (swaths) 1 metre (m) apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R12 Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point. MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Anomaly GeoSurvey v1.12.3 (Lichenstone Geoscience) and QGIS v.3.34.6 software was used to process and present the data respectively. |
| **Project Results:** | This survey has been requested based on archaeological features identified during trial trench evaluations of the proposed Scheme route. The results of the survey will be used to determine the requirement for further archaeological evaluation, the scope of which will be determined in consultation with the Planning Archaeologist for Suffolk County Council. The current phase of survey has recorded a range of magnetic anomalies of agricultural, geological, modern and archaeological origin identified against a relatively homogenous magnetic background. The results are consistent with the findings of a previous phase of survey within the Sea Link Corridor Order Limits and surrounding fields. The most conspicuous result is the confirmation of the extent and morphology of an irregular G-shaped enclosure. The morphology suggests the feature to be an enclosure of Iron Age date rather than a Late Neolithic henge monument as previously hypothesised. It is worth noting however that one of five pits identified during the trial trenching, between 50m and 100m to the south-east of the enclosure, contained substantial amounts of Early Neolithic pottery, charcoal and struck and burnt flints, confirming early prehistoric activity in the area. No magnetic anomalies have been recorded in the vicinity of these pits although three pit-like responses within the enclosure have been identified by this survey. The survey has also recorded several linear anomalies confirming the extent of enclosures and ditch features partially defined by the previous phase of surveys towards the western edge of the survey area as well as two small square enclosures in the north of the survey area. The magnitude and resolution of the magnetic anomalies allied with the results of the trial trenching evaluation indicates that there was sufficient magnetic contrast, for the detection of sub-surface archaeological features, if present, notwithstanding the limitations of magnetometer survey to identify certain types, sizes and periods of archaeological features. It is therefore considered that the results give a good indication of the archaeological potential of the survey area. Based on the results of the geophysical survey, the archaeological potential of the survey area is assessed as moderate, except in the localised area around the D-shaped enclosure, where it is assessed as high. |
| **Keywords:** | |
| **Subject/Period:** | Curvilinear Enclosure: UNCERTAIN |
| | FISH Thesaurus of Monument Types |
| **Subject/Period:** | Rectangular Enclosure: UNCERTAIN |
| | FISH Thesaurus of Monument Types |
| **Subject/Period:** | Ditch: UNCERTAIN |
| | FISH Thesaurus of Monument Types |
| **Subject/Period:** | Extractive Pit: UNCERTAIN |
| | FISH Thesaurus of Monument Types |
| **Subject/Period:** | Pit: UNCERTAIN |
| | FISH Thesaurus of Monument Types |
| **Subject/Period:** | Clay Pit: UNCERTAIN |
| | FISH Thesaurus of Monument Types |
| **Archive** | – |

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