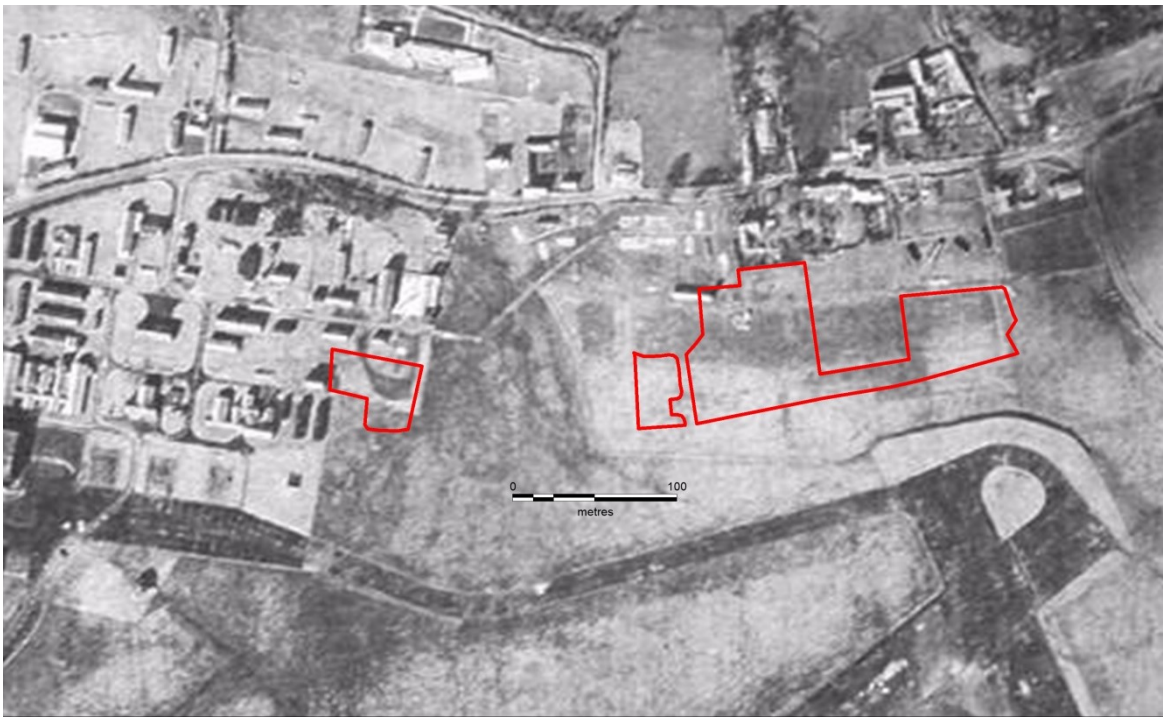
SAGESTON FIELDS, PEMBROKESHIRE: ARCHAEOLOGICAL GEOPHYSICAL SURVEY



Detail from a 1955 aerial photograph (Meridian Airmaps) showing approximate locations of the proposed development areas.

DAT Archaeological Services

Prepared by Dyfed Archaeological Trust
For: Sealand Pembroke Ltd.

REGISTERED ORGANISATION CIfA

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SAGESTON FIELDS, PEMBROKESHIRE: ARCHAEOLOGICAL GEOPHYSICAL SURVEY

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SAGESTON FIELDS, PEMBROKESHIRE:
ARCHAEOLOGICAL GEOPHYSICAL SURVEY

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SAGESTON FIELDS, PEMBROKESHIRE: ARCHAEOLOGICAL GEOPHYSICAL SURVEY

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DAT Archaeological Services were commissioned to undertake a geophysical survey on land at Sageston Fields, Pembrokeshire, where residential development is proposed.

The purpose of the survey was to provide a better indication of the archaeological potential of the site and, if required, enable targeting of any further archaeological mitigation before or during the development.

The general quality of the geophysical survey results was good, with anomalies detected that may represent former buildings associated with RAF Carew Cheriton Airfield that closed in 1945.

CRYNODEB GWEITHREDOL

Comisiynwyd Gwasanaethau Archeolegol YAD i gynnal arolwg geoffisegol ar dir ar Gaeau Sageston, Sir Benfro lle mae cynnig ar gyfer datblygiad preswyl.

Pwrpas yr arolwg oedd rhoi arwydd gwella o botensial archeolegol y safle ac, os oes angen, galluogi targedu unrhyw liniaru archeolegol pellach cyn neu yn ystod y datblygiad.

Roedd ansawdd cyffredinol canlyniadau'r arolwg geoffisegol yn dda, gydag anghysondebau wedi'u canfod a allai gynrychioli cyn adeiladau sy'n gysylltiedig â Maes Awyr RAF Carew Cheriton a gaeodd ym 1945.

SAGESTON FIELDS, PEMBROKESHIRE: ARCHAEOLOGICAL GEOPHYSICAL SURVEY

SUMMARY

DAT Archaeological Services were commissioned by Sealand Pembroke Ltd to undertake a geophysical survey on land proposed for residential development at Sageston Fields.

A condition regarding archaeology (Condition 17) was placed on the planning permission (Planning Application No: 19/0706/PA*) and following discussions with the archaeological advisors to the planning authority it was decided that in the first instance geophysical survey was required. This would provide a better indication of the archaeological potential of the development area and allow for an informed decision on any further mitigation required.*

An area measuring 1.78ha was surveyed using a Bartington Fluxgate Gradiometer which detects subtle variations in the earth's magnetic field. Readings were taken at a medium resolution on traverses 1.0m wide and every 0.25m within a 30m x 30m grid.

Generally, the survey data was of good quality, with little interference from external influences. Features detected through the survey included subsurface utilities, a former field boundary possibly associated with a medieval field strip system and buildings associated with RAF Carew Cheriton Airfield that closed in 1945.

1. INTRODUCTION

1.1 Project Commission

1.1.1 DAT Archaeological Services were commissioned by Sealand Pembroke Ltd to undertake a geophysical survey on land proposed for residential development (Planning Application No. 19/0706/PA) at Sageston Fields, Sageston, Pembrokeshire (Centred on NGR SN 05716 03162); figures 1 and 2).

1.1.2 An archaeological condition had been attached to the planning decision that stated that:

No development shall take place until a qualified and competent archaeologist has submitted a written scheme of investigation (WSI) for approval in writing by the local planning authority. This WSI will describe the different stages of the work and demonstrate that it has been fully resourced and given adequate time. On behalf of the local planning authority, their archaeological advisors (DAT DM) will monitor all aspects of this work through to the final discharging of the condition. This work will not be deemed complete until all aspects of the WSI have been addressed and the final report submitted and approved. Reason: to protect historic environment interests whilst enabling development and to accord with Policy GN.38 (Protection and Enhancement of the Historic Environment) of the Local Development Plan for Pembrokeshire (adopted 28 February 2013).

1.1.3 Following discussions with the archaeological advisor to Pembrokeshire Planning Authority, Dyfed Archaeological Trust–Development Management (DAT-DM) it was understood that a geophysical survey was required within the areas proposed for residential development.

1.1.4 The geophysical survey was undertaken using a fluxgate gradiometer which detects subtle variations in the earth's magnetic field, which can indicate the presence of buried features such as ditches, pits, walls or postholes, which are not visible on the ground surface. The purpose of the geophysical survey was to provide a better indication of the archaeological potential of the site through the identification of subsurface features which could be indicative of archaeology. This would allow for an informed decision on whether any further archaeological mitigation was required or not before or during the development programme.

1.1.5 Planning Application No 19/0706/PA relates to the construction of 12 dwellings (Areas 2 and 3a, Figure 2) but the area that was subjected to geophysical survey encompassed a larger area, where it is intended that further dwellings will be built as part of future planning applications.

1.1.6 The history of the area is dominated by the construction of RAF Carew Cheriton Airfield during World War II. The 1946 Air Ministry map (Figure 3), based on Ordnance Survey, shows RAF Carew Cheriton Airfield soon after it had closed in December 1945. All the domestic and ancillary buildings of the airfield are depicted and named in a schedule included with the map.

1.1.7 Area 1 on the western side of existing development appears to lie in an area where no buildings or structures associated with the former airfield were located. Directly to the west of the area lies Structure 182, recorded as a Squash Court. Directly to the south a gun post (Structure 195) is recorded.

1.1.8 The majority of Areas 2, 3a and 3b do not lie within the area of the former airfield, as shown in Figure 3.

1.1.9 However, a number of structures do just protrude onto the northern edge of Area 3a. The structures comprise Structure 232 (Barrack Hut) and part of 239 (Sergeants Ablutions) and Structure 245 (Latrine).

1.1.10 A Meridian Airmap aerial photograph taken in 1955 clearly shows that most of the RAF Carew Cheriton domestic and ancillary buildings appeared to have survived some ten years after the airfield had been abandoned in December 1945 (Figure 4).

1.1.11 The construction of the Carew Cheriton Airfield has removed strip fields recorded on historic mapping the east of the development areas and south of Sageston seen, although faint linear crop marks are visible that may represent the former field boundaries (Figure 4).

1.1.12 At the time of the 1955 Meridian Airmap aerial photograph Structures 232 (Barrack Hut), 239 (Sergeants Ablutions) and 245 (Latrine) appear to be extant.

1.2. Scope of the Project

1.2.1 The aim of the project was:

- To identify the presence/absence of any potential archaeological deposits through an initial gradiometer survey;
- To establish the character and extent of any potential archaeological remains within the site area that could be affected by the proposed works;
- To prepare a report and archive on the results of the geophysical survey.

1.3 Report Outline

1.3.1 This report provides a summary and discussion of the geophysical survey and its results and puts those results within their regional and national context.

1.4 Abbreviations

1.4.1 Sites recorded on the regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Sites recorded on the National Monument Record (NMR) held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Altitude is expressed to Ordnance Datum (OD). References to cartographic and documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section at the rear of the report.

1.5 Illustrations

1.5.1 Printed map extracts are not necessarily produced to their original scale.

1.6 Timeline

1.6.1 The following timeline (Table 1) is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text.

Table 1: Archaeological and Historical Timeline for Wales

Period	Approximate date	
Palaeolithic –	*c*.450,000 – 10,000 BC	**Prehistoric**
Mesolithic –	*c*. 10,000 – 4400 BC	
Neolithic –	*c*.4400 – 2300 BC	
Bronze Age –	*c*.2300 – 700 BC	
Iron Age –	*c*.700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – *c.* AD 410	**Historic**
Post-Roman / Early Medieval Period –	*c*. AD 410 – AD 1086	
Medieval Period –	1086 – 1536	
Post-Medieval Period[1] –	1536 – 1750	
Industrial Period –	1750 – 1899	
Modern –	20th century onwards	

[1] The post-medieval and industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust

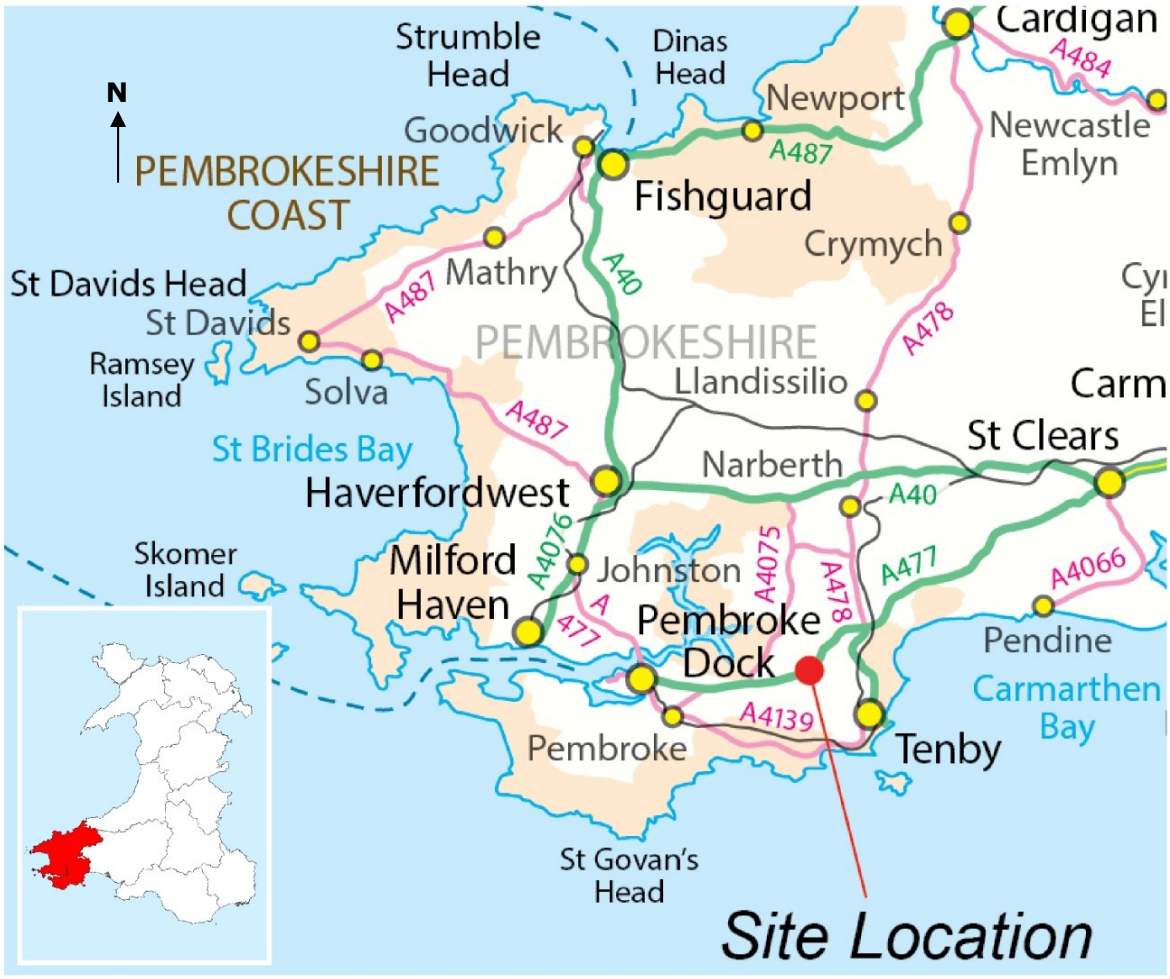


Figure 1: Site location.

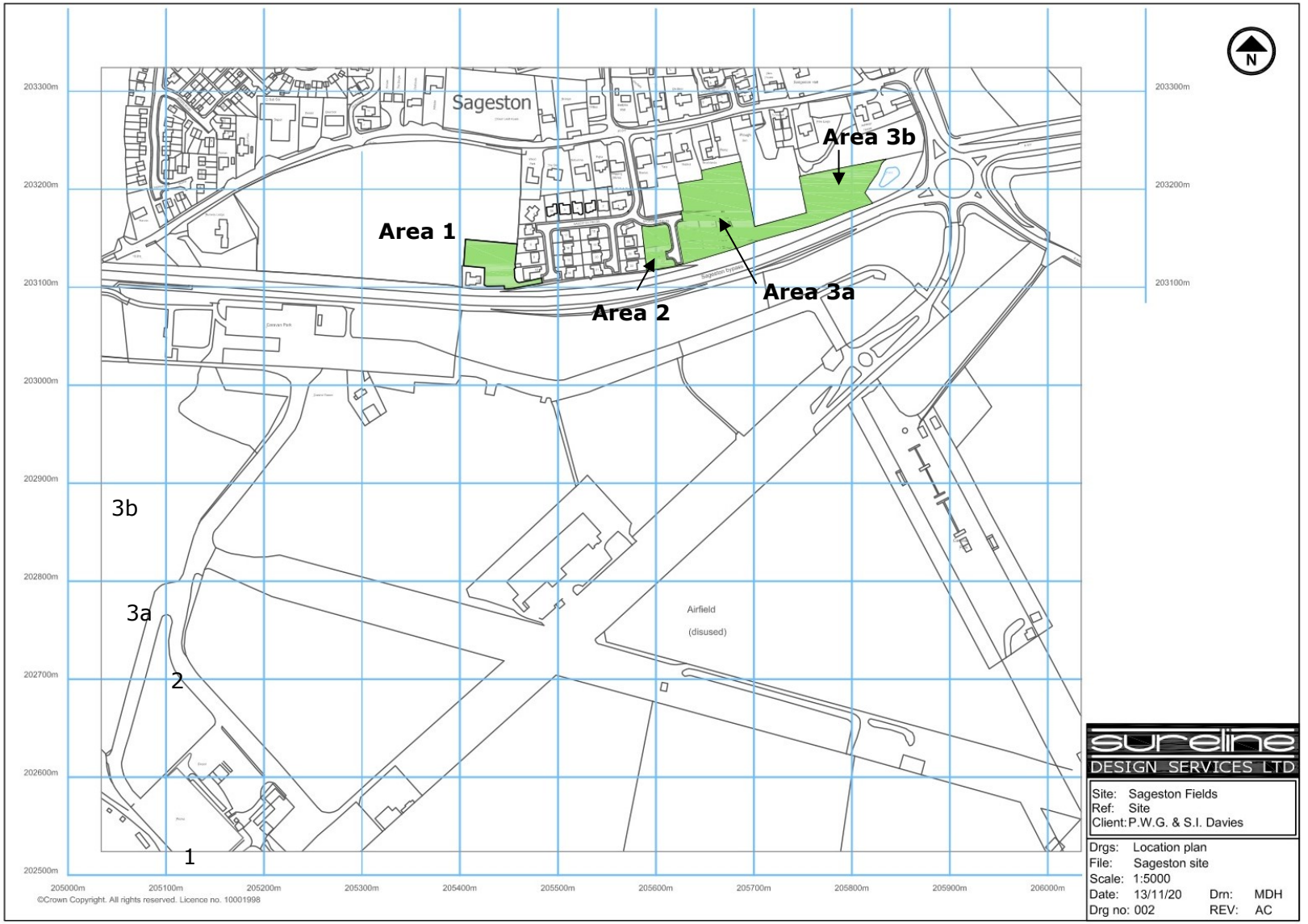


Figure 2: Detailed site plan with proposed development areas marked in green (Provided by client)(Not to scale).

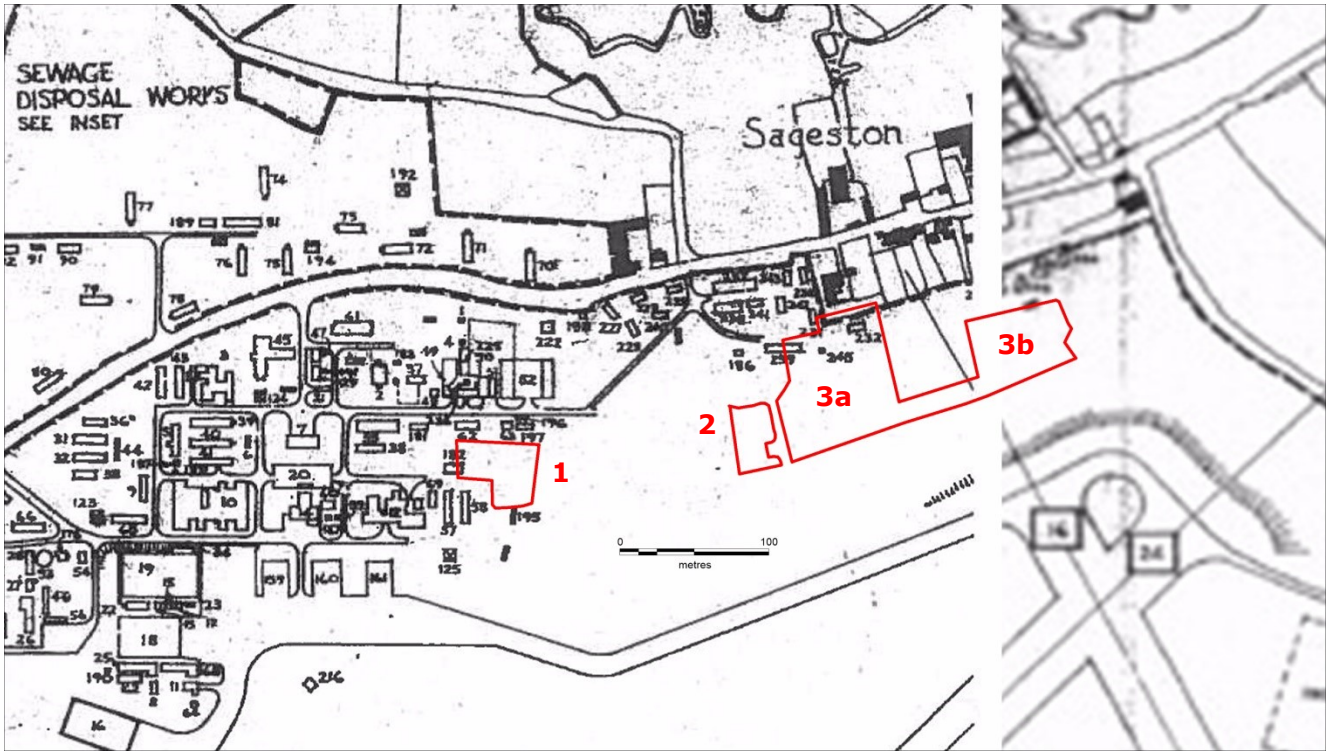


Figure 3: Detail of 1946 Air Ministry Plan of Carew Cheriton Airfield showing the development areas and surrounding airfield buildings.

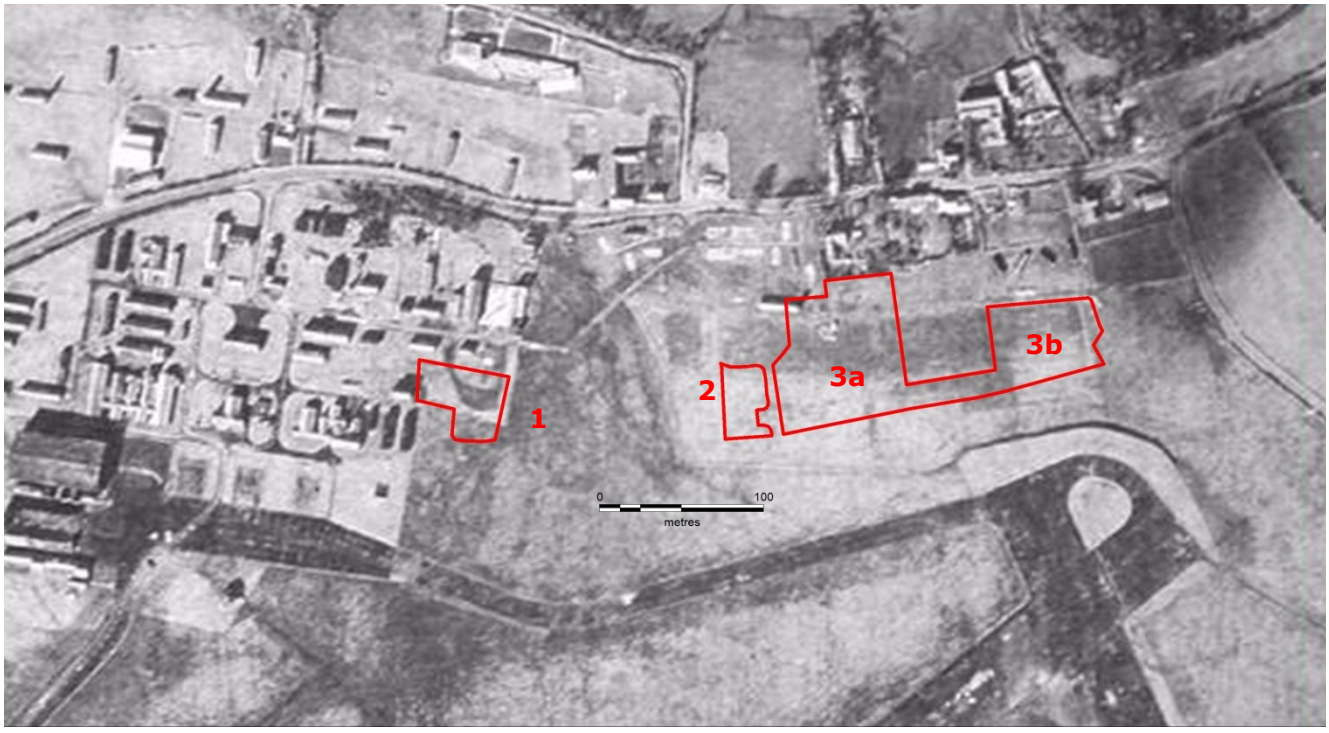


Figure 4: Detail from an 1955 aerial photograph (Meridian Airmaps) showing approximate locations of the proposed development area

2. THE SITE

2.1 Location

2.1.1 The Sageston Fields residential area lies directly to the south of the village of Sageston, on the northern side of the A477 in South Pembrokeshire. It is located 6.3km east-northeast of Pembroke.

2.1.2 An access road presently projects from the existing Sageston Fields residential development on its eastern side, and it is intended that further residential development will be built in the areas shown in Figure 2.

2.1.3 Areas 2, 3a and 3b on the eastern side of Sageston Fields are centred on SN 05716 03162. The combined area (including access roads) measured roughly 1ha.

2.1.4 In addition, Area 1 on the western side of Sageston Fields is centred on SN 05431 03124, and comprised an area of roughly 0.18ha.

2.1.5 The majority of the development area was laid to grass at the time of the survey The largest area to be surveyed was divided into two areas; Area 3a (Photograph 1) and Area 3b. The narrow corridor connecting the two areas was not surveyed because of interference from a metal wire fence in the vicinity of the narrow strip of land. Area 2 (Photograph 2) was a small area enclosed by modern structures and was littered with modern detritus. Area 1, located on the western edge of the development was a small parcel of land, the northern part of which was covered in long rough grass that impeded the survey (Photograph 3).

Photograph 1: View northeast across Area 3a in the general direction of the former RAF Carew Cheriton buildings.

Photograph 2: View southwest across Area 2.

Photograph 3: View northwest across Area 1. Note the rough grass in the background that impeded geophysical survey.

2.2 Archaeological Potential

2.2.1 The development area has been subjected to a desk-based assessment (Meek 2017) whose conclusions were summarised as:

Overall the archaeological potential within the site area is considered highest for remains associated with the former airfield. These could include remains of the former barrack blocks, latrine defence post, as well as artefacts associated with the original airship airfield and that of RAF Carew Cheriton.

There is also a high potential for remains of medieval date associated with the former strip field system to the south of Sageston. Such remains could include ditches associated with field boundaries as well as artefacts associated with manuring scatters. The potential that these boundaries may have had Iron Age origins should not be discounted.

It is possible that further archaeological works may be required within the site area. The nature of such works is uncertain, but could entail geophysical survey. Such a survey could identify any potential below ground archaeological features associated with medieval and modern remains, including the locations of former strip field boundaries.

It would be also useful to ascertain the date of the strip field boundaries to the south of Sageston where they run through the site area. This could be done through targeted trial trenching prior to development, or by way of a watching brief during the development programme, with a specific target of excavating at least one section through each identified boundary.

3. METHODOLOGY

3.1 Data Collection

3.1.1 The survey was conducted by an experienced geophysical survey using a Bartington-601 fluxgate gradiometer with two sensors at 1m spacing and with a DL601 data logger. The gradiometers sensitivity was set to detect a magnetic variation in the order of 0.1 nanoTesla (nT).

3.1.2. Data was collected within a controlled grid that was physically marked out on the ground to within 0.1m+/- accuracy. The survey grid was tied into the local Ordnance Survey (OS) grid using a Trimble R8s integrated GNSS system with TSC3 controller.

3.2 Ground Coverage

3.2.1 In each area an attempt was made to survey as large of an area as possible. In most instances this was constrained by external influences that would have an adverse effect on the survey data (typically modern features such as metal chain-linked fences, roads, etc). To minimise the impact such features would have on the survey results it was necessary to keep a distance of up to 5m away from them.

3.3 Resolution

3.3.2 Data was collected in 30m x 30m grids using the zigzag traverse method with a sample interval (x-axis) of 0.25m (four readings per metre) and a line separation (y-axis) of 1m.

3.4 Data Processing

3.4.1 The data was processed using *Terrasurveyor 3.0.36.1* and is presented with a minimum of processing.

3.4.2 Typically the data is "de-striped" to remove any striping effect that is caused by an imbalance between the two sensors. It is then "clipped" to remove the presence of high values caused by ferrous objects which tend

to hide fine details and obscure archaeological features, allowing finer details to show through.

3.4.3 Other processing functions may include "de-staggering" the data. This is to correct line displacement errors caused by variations in the traversal rate resulting in the sensors being in the incorrect position when taking a reading. Finally, the data may be "interpolated" followed by a "low pass filter". The gradiometer collects readings every 0.25m along the transect (x-axis) and 1.0m (or 0.25m in the higher resolution surveys), this results in an imbalanced grid, so by interpolating the data and choosing to match the x and y-axis by an increased factor the grid becomes more balanced. The "low pass filter" is used cautiously to smooth the data without removing any archaeology

3.5 Data Presentation and Interpretation

3.5.1 Data is presented with a minimum of processing as a grey-scale plot overlaid on local topographical features. The main magnetic anomalies have been identified using a combination of the grey-scale plots at different stages of processing and XY traces which aid in interpretation by allowing for visualisation of the magnitude and form of a geophysical anomaly.

3.5.2 The results have been compared to available sources (satellite imagery, aerial photographs, historic maps etc.) to increase confidence levels and an interpretation of the results has been formulated. In some instances it is possible to provide a very specific interpretation to geophysical anomalies i.e. where its character or form is well documented, its existence was known about before the survey, or corroborative evidence can be found. In other cases, a broader categorisation of interpretation is required (outlined in Table 2). Often, looking at the results as a whole and the environs within which they sit provides greater context and aids in the interpretation of individual features.

3.5.3 The processed data plot is included in the body of this report and minimally processed, minimally enhanced and XY trace plots for each survey can be found in the appendix.

Table 2: Categories of interpretation for geophysical anomalies.

Archaeological features	
Archaeology	Where the character and form of response are clearly archaeological in origin or corroborative evidence exists (i.e. historical sources, excavation, etc.) . These are typically made up of linear/curvilinear/rectilinear anomalies. This category also includes pits that have a discernible arrangement, grouping or association with an archaeological feature to suggest an archaeological origin.
Industrial/area of burning	Where an anomaly has a strong magnetic response that could be evidence of kilns, heaths etc. Their shape, form and context may aid interpretation. Caution should be observed as often, a similar response can be produced from modern ferrous

	material.
Possible archaeological feature	
Possible archaeology	Where an archaeological response is favoured but the response is weak or incomplete and lacks any distinguishing characteristics akin to an archaeological feature. This category also includes possible pits that have no discernible pattern, grouping or association with an archaeological feature. They may be of archaeological origin but it is also just as likely that they represent natural features such as a tree throws (former root bole of a tree shrub).
Area of enhanced magnetic activity	An area that exhibits increased magnetic variations with no discernible pattern or cause. This may have an archaeological origin or a result of the geological variation.
Agricultural features	
Former field boundary	Typically a linear anomaly often seen as a positive response (bank) flanked either side by a negative (response) ditches There can usually be attributed to former boundaries depicted on historic maps.
Ridge and furrow	A series of regular linear anomalies with consistent broad spacing. If they run parallel with existing field boundaries this might suggest a recent activity.
Plough lines	A series of regular linear anomalies with consistent narrow spacing. If they run parallel with existing field boundaries this might suggest a recent activity.
Field drains	A series of regularly spaced linear anomalies.
Non-archaeological features	
Magnetic interference	Typically an external source that affects the survey data. Usually occurs along the edges of surveys near fences containing ferrous material or around pylons and from subsurface utilities.
Ferrous	These may be associated with an artefact of archaeological interest but generally unless they form a pattern or a part of a larger feature they are regarded as not significant. They are usually the result of miscellaneous modern ferrous-rich debris, such as brick and tile fragments as well as objects such as horseshoes or broken

	ploughshares, which lie within the topsoil and result in a dipole response.
Natural / Geology	Usually amorphous in shape these natural variations can cause significant variations in magnetic readings.

3.6 Quality of Results

3.6.1 The survey results and interpretation diagrams should not be seen as a definitive model of what lies beneath the ground surface, not all buried features will provide a magnetic response that can be identified by the gradiometer. In interpreting those features that are recorded the shape is the principal diagnostic tool, along with a comparison with known features from other surveys. The intensity of the magnetic response could provide further information, a strong response for example indicates burning, high ferric content or thermoremnancy in geology. The context may provide further clues but the interpretation of many of these features is still largely subjective.

3.6.2 All measurements given will be approximate as accurate measurements are difficult to determine from fluxgate gradiometer surveys. The width and length of the identified features can be affected by their relative depth and magnetic strength.

4. RESULTS and DISCUSSION

4.1 The geophysical survey results are presented as a grey-scale plot in Figure 5. Each area's geophysical greyscale plot and associated interpretation diagrams are shown in Figures 7-10. Individual geophysical anomalies are referred to by a unique number in ().

4.2 In total, an area of 1.78ha was surveyed. In general, the quality of the survey results was good.

4.3 In Area 3b a single linear feature (1) aligned roughly north-south was observed. The feature bows slightly to the east and measures approximately 43m in length but appears to extend beyond the survey area to the north and south. This feature correlates to a field boundary visible on the 1st edition OS 1:2500 map published in 1865 (Figure 6).

4.4 Numerous discrete possible pit features in various shapes and sizes were observed across all survey areas (coloured in purple). Although there is some possibility they are archaeological in origin there is no evidence to support this and it is just as likely that they represent natural features or geology.

4.5 A single linear anomaly (2) exhibiting a negative response is located in the southern half of Area 3a and it is likely that it represents a post-medieval/modern field drain.

4.6 Subsurface utilities were detected in Areas 1, 3a and 3b. (3, 4 and 5 respectively). The service recorded in Areas 3a and 3b is likely to be a continuation of a single service pipe. Other sources of magnetic interference included modern ferrous chain-linked fences that enclosed the fields. The closer the survey approached the fence the greater the interference recorded.

4.7 Evidence of ferrous scatters (dark pink) was seen in all survey areas. Most of these responses were discrete and typically this can be attributed to modern ferrous debris that lay on the surface or just below it and are not of archaeological interest. However, larger concentrations evident in Area 3a (6 and 7) did correlate with the locations of former structures associated with RAF Carew Cheriton Airfield. These structures are depicted on the 1946 Air Ministry map and are labelled as 232 (Barrack Block), 239 (Sergeants Ablutions) and 245 (Latrine).

4.8 During the survey, at the location of Structure 232 (7) in Area 3a, a raised rectangular earthwork was noticeable on the ground and exposed concrete was visible protruding through the grass in this area.

Figure 5: Geophysical survey greyscale plots.

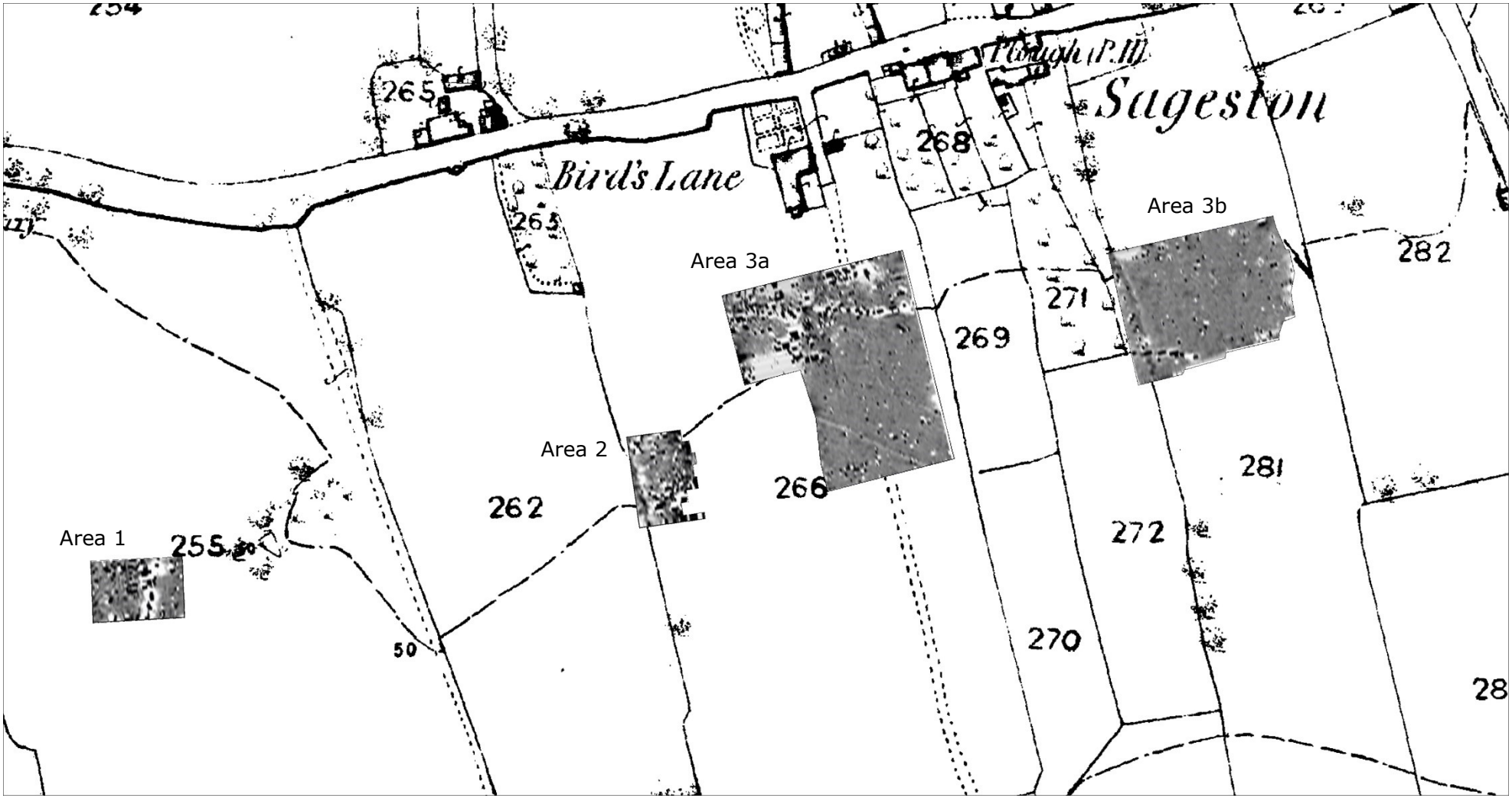


Figure 6: Geophysical survey greyscale plots overlaid on an extract of the 1st edition OS 1:2500 map published in 1865.

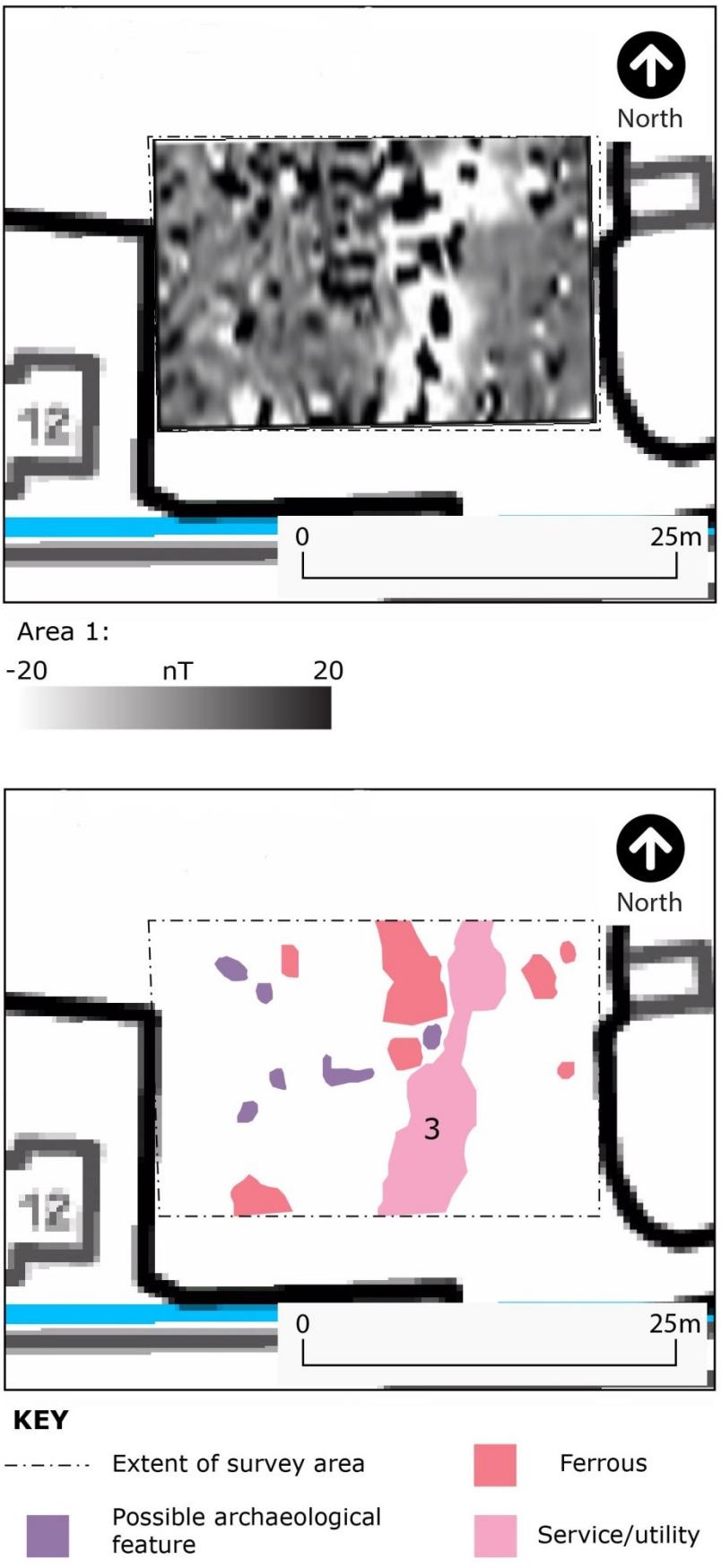
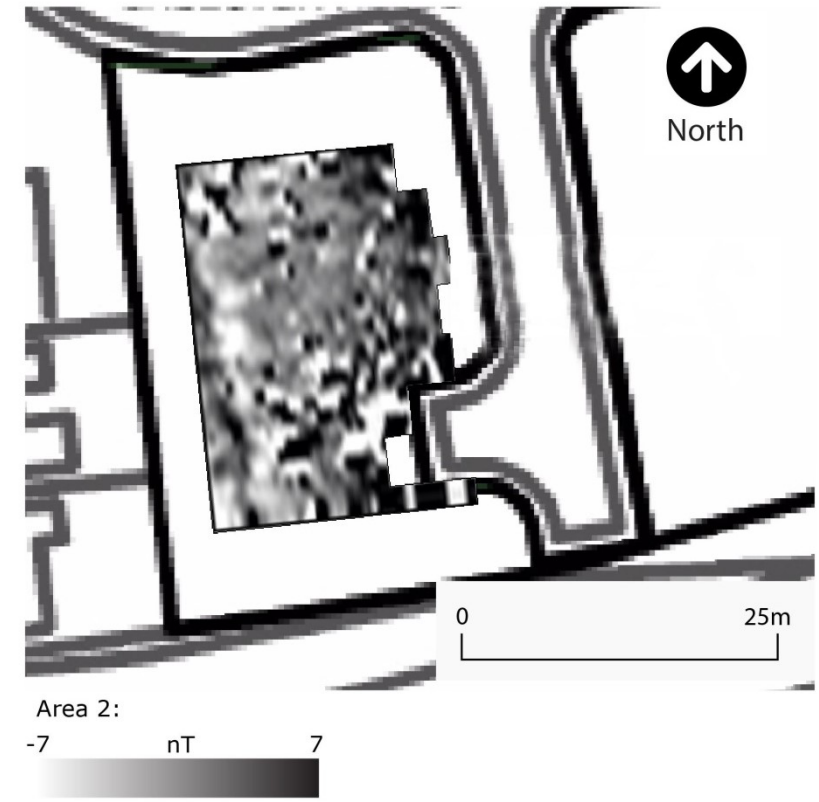


Figure 7: Area 1 geophysical greyscale plot and interpretation.



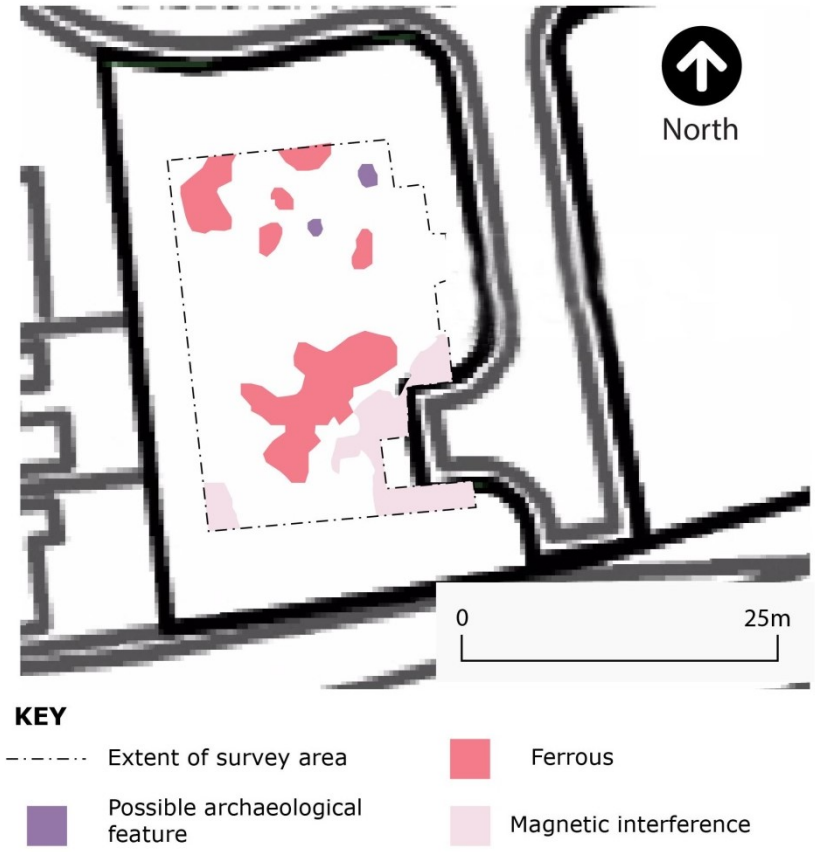


Figure 8: Area 2 geophysical greyscale plot and interpretation.

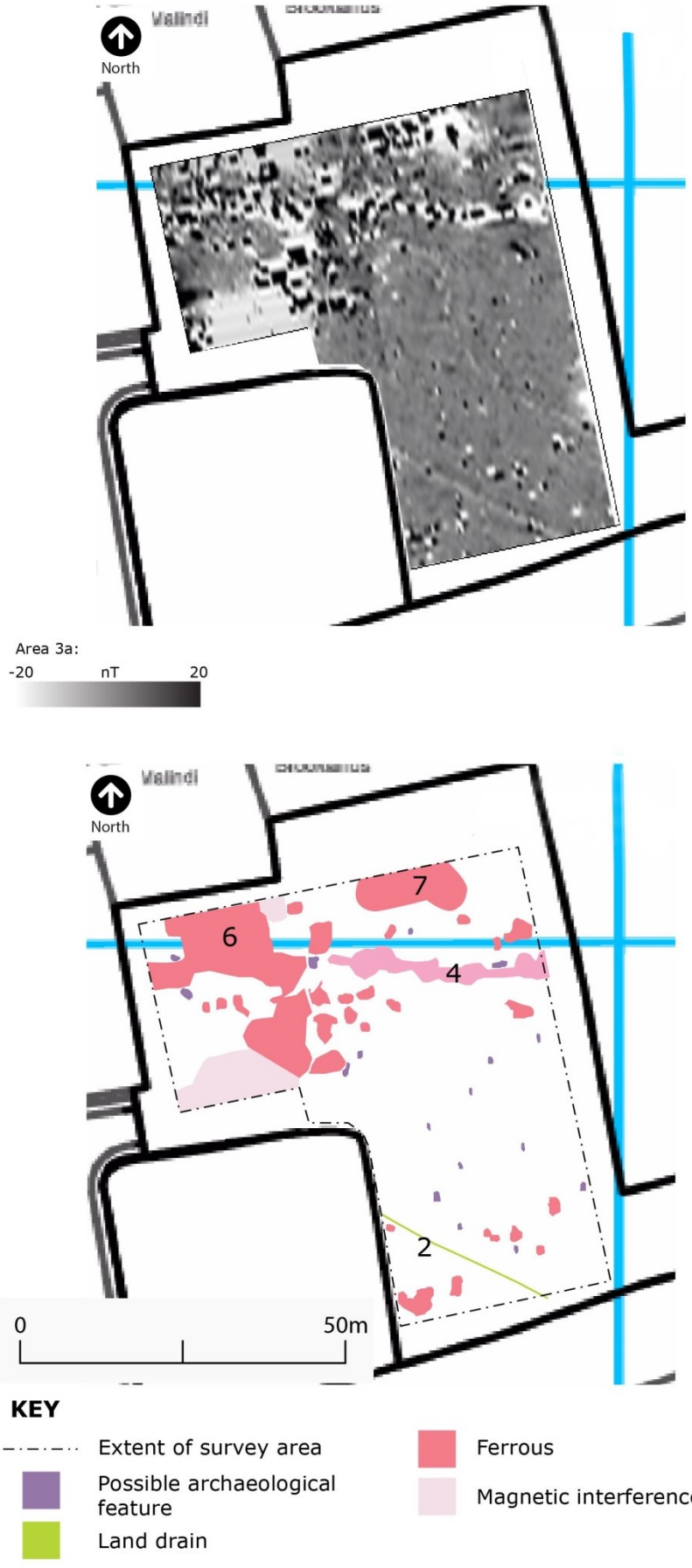
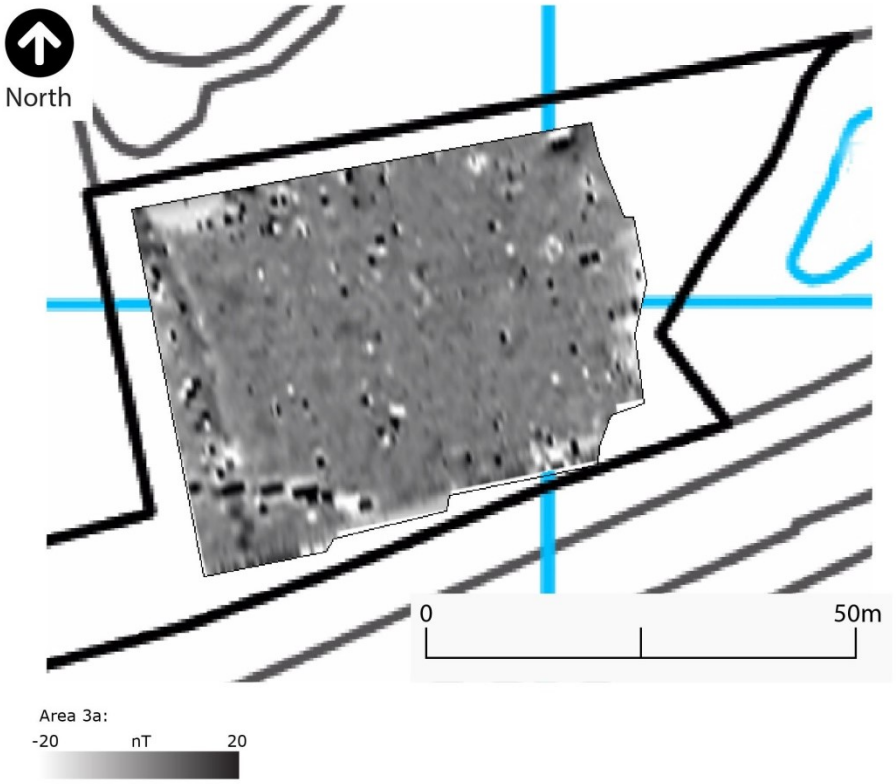


Figure 9: Area 3a geophysical greyscale plot and interpretation.



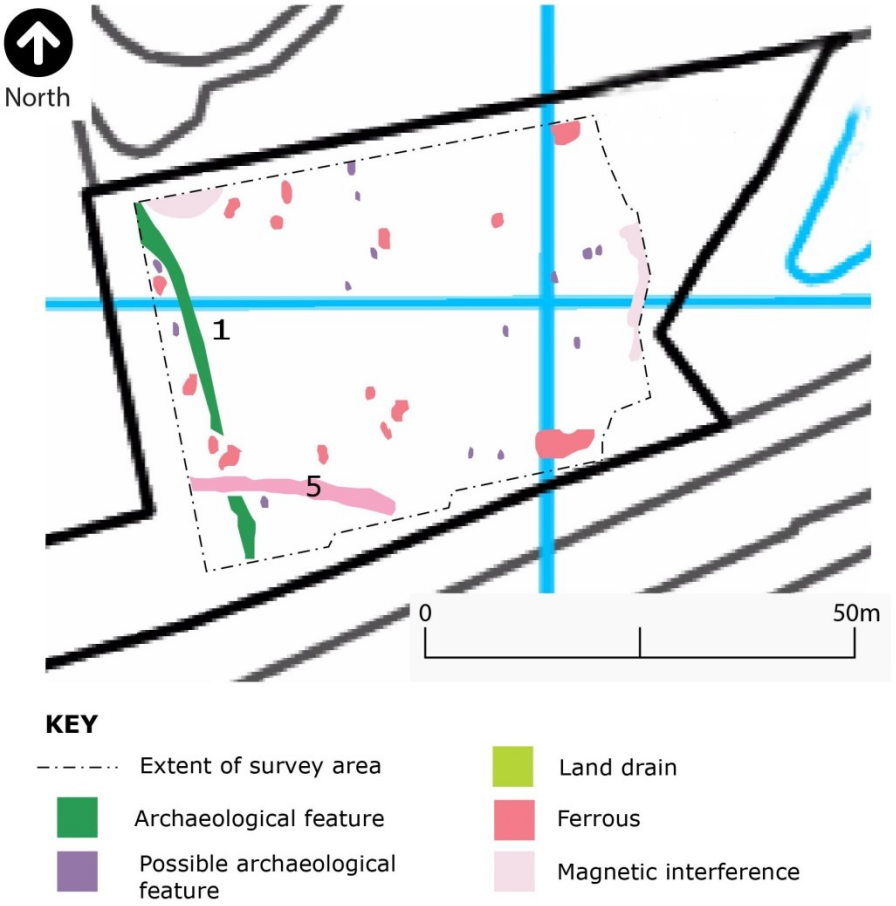


Figure 10: Area 3b geophysical greyscale plot and interpretation.

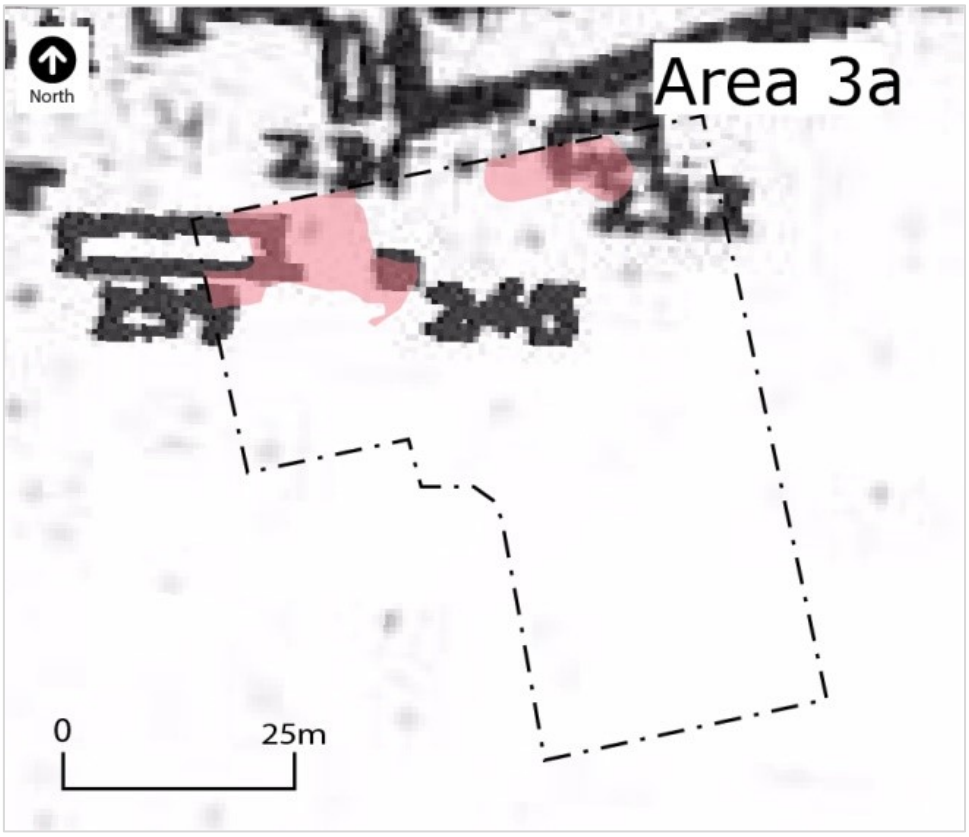


Figure 11: Extract of the 1946 Air Ministry map with geophysical anomalies overlaid (pink).

5. CONCLUSIONS

5.1 Generally, the quality of the survey data was good and aside from Areas 1 and 2 good ground coverage was possible to enable geophysical features to be defined. Surveys within Areas 1 and 2 were restricted by the small size of the areas, and Area 2 in particular, was littered with modern metallic debris.

5.2 In Area 3b evidence of a former field boundary was recorded. It is possible that this boundary was part of an enclosed medieval field strip system (PRN 30125; Meek 2017). It has been argued that, in south Pembrokeshire, some of these fields may have developed in the Iron Age as co-axial field systems (*ibid*). These field boundaries were removed by the development of the airfield in 1938.

5.3 Historic map evidence suggests that anomalies detected on the northern edge of Area 3a represent the remains of Structures 232, 239 and 245 that formed part of WWII RAF Carew Cheriton Airfield. The schedule associated with the map lists these buildings as a barrack hut, sergeants ablutions and a latrine (respectively).

5.4 There was some evidence on the ground that the concrete bases of these buildings may still survive just below the ground surface.

6. SOURCES

CIfA, 2014 *Chartered Institute of Field Archaeologists Standards and Guidance for Archaeological Geophysical Survey*

Meek, J. 2017. Sageston Fields, Sageston, Pembrokeshire: Historic Environment Appraisal. *DAT Unpublished Report No. 2017/03.*

National Standard and Guidance for Collecting and Depositing Archaeological Archives in Wales 2017

http://www.welshmuseumsfederation.org/en/news-archive/resources-landing/Collections/national-standard-and-guidance-for-collecting-and-depositing-archaeological-archives-in-wales-2017.html

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