

Geophysical Survey Report

LEPE COUNTRY PARK

October 2019

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Technique: Detailed magnetometry survey

National Grid Ref: SZ 509 986

Site Photo:



Sections C, D & E

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INDEX

1. SUMMARY OF RESULTS

2. INTRODUCTION

- 2.1 Background synopsis and acknowledgements
- 2.2 Site location
- 2.3 Description of site
- 2.4 Geology & soils
- 2.5 Site history & archaeological potential
- 2.6 Survey objective

3. METHODOLOGY

3.1 Survey equipment

3.2 Methods and approach employed, dates of fieldwork

4. GEOPHYSICAL RESULTS & INTERPRETATION

4.1 Introduction

4.2 Data processing, gradiometer survey results and interpretation

5. CONCLUSION & RECOMMENDATIONS

6. REFERENCES

APPENDIX A – Basic principles of magnetometry and examples of anomalies

APPENDIX B – Grid locations, layouts, images of results, historical mapping:

Figure 1 - Site location

Figure 2 - Sections within area and grid layout

Figure 3 - Approximate WW2 AA positions

Figure 4 - Composite image of data

Figure 5 - Data at 50% transparency

Figure 6 - Section B data image

Figure 7 - Sections C, D & E processed data images

Figure 8 - Sections C, D & E possible features identified

Figure 9 - 1791 map extract

Figure 10 - 1640 map extract

Figure 11 - 1759 map extract

Figure 12 - 1942 Luftwaffe aerial photo

1. SUMMARY OF RESULTS

The purpose of this survey was to identify potential remains of any Roman features in the area, which has seen considerable modern activity such as WW2 defences and preparation for D-Day alongside recent recreational activity as part of the Country Park.

There was evidence of previously identified WW2 AA gun pits at the western end of the area (section B), therefore the survey concentrated on the area to the east of this (sections C, D & E, see Annex B).

Two linear features were found running through area C, also a possible track and hints of what might be an oval feature. There were many metallic 'noise' hotspots across the area.

Section D shows evidence of a square feature, approximately 9m x 9m, with a possible ditch running northwest from this. Again there was a lot of metal 'noise', perhaps caused by WW2 activity.

Section E at the eastern end of the area showed no obvious anomalies.

The features identified in section C & D are interesting and need to be put into context with the area immediately to the north, which has yet to be surveyed.

2. INTRODUCTION

2.1 Background synopsis and acknowledgements

The survey was undertaken as a volunteer-led effort, supported by New Forest National Park Archaeology (James Brown) and was made possible due to the kind permission of the Cadland Estate and Lepe Country Park. The equipment was kindly made available through the LoCATE project supported by Bournemouth University, specifically Dr. Paul Cheetham and Dr. Kate Welham. Thanks also to Gilly Drummond, Garry Momber of the Maritime Archaeology Trust, Anna Bedford, Helen Rashbrook, Gervase Gregory, Ian West, Michael Gill and all the field team volunteers for their input and assistance, it was much appreciated.

2.2 Site location

The site is within Lepe Country Park, to the east-northeast of the upper car park, OS grid reference SZ 509 986 (**Figure 1**).

2.3 Description of site

The survey area is level grassland, crossed by closely mown paths, split for convenience into 5 survey areas (sections A, B, C, D and E) defined by short lengths of hedges which intrude from the north and south boundaries (**Figure 2**).

2.4 Geology and soils

The area is a low Pleistocene gravel terrace with a coarse loamy soil above.

2.5 Site history & archaeological potential

The area lies between the Dark Water stream and an unnamed stream running south from Stone Farm and may be the terminus of the Roman road identified by Margary (2003) as RR423, which was probably built by Legio Secunda Augusta under Vespasian in the 1st century AD (Roman wooden posts recorded by the Maritime Archaeology Trust on the

nearby foreshore at Hillhead have been dated as mid to late 1st Century AD (G Momber BA MSc MifA 2018, personal communication, 8 October).

There was a medieval mill at Lepe (recorded in the Hampshire HER ID 55276), 18th century shipbuilding (probably at the mouth of the Dark Water) and a considerable amount of WW2 activity in the immediate vicinity, including an anti tank ditch, anti glider obstacles (**Figure 12**) and an anti aircraft battery. There have been a number of Roman finds in the general area by a local amateur metal detectorist and historian, also an archaeological survey prior to the installation of a pipeline to the Isle of Wight between September 2010 and April 2011 uncovered a considerable number of finds (Ref. Southampton Archaeology Report 1054).

The nature of modern facilities and disturbances has limited the potential for geophysical surveys within the country park and the area surveyed was seen as the most promising for the detection of any Roman constructions.

2.6 Survey objective

To identify any Roman constructions relating to a possible settlement and harbour activities.

3. **METHODOLOGY**

3.1 Survey equipment

The magnetometer survey was conducted using a Geoscan FM36 fluxgate gradiometer. Data was collected at 0.25m intervals along transects spaced 1m apart with an effective sensitivity of 0.03nT, in accordance with HE guidelines (2008). Data was collected in a parallel walking pattern.

3.2 Methods and approach employed, dates of fieldwork

A GPS Total Station was not available and the grids (5 full 20m x 20m, 8 part grids), based on known points, were fitted into sections C, D and E as per the diagram in Appendix B. The areas to be surveyed were fortuitously aligned close to a north/south axis, which aided the set up of the grids (**Figure 2**).

A preliminary training survey was undertaken on 8th October 2018 in order to familiarise the volunteers with the equipment. A 20m x 20m grid was completed in the southwest corner of section B, which showed up large disturbed areas, interpreted as potential evidence of the WW2 AA gun pits and associated buildings (**Figure 3**).

It was therefore decided to work east from section C. No further surveys were done until the grass and undergrowth had been removed from the areas C, D and E. These sections were surveyed as three separate blocks: C and D on 26th November 2018, block E on 25th January 2019. All survey days were cool, bright, with little breeze.

4. **GEOPHYSICAL RESULTS & INTERPRETATION**

4.1 Introduction

The gradiometer survey has been successful in identifying and confirming anomalies of possible archaeological interest. Results are displayed as greyscale images in Annex B.

4.2 Data processing, gradiometer survey results and interpretation

The data was downloaded and processed using Snuffler freeware geophysics software.

Similar to other geophysical survey results from across the New Forest, the results were very noisy, which is attributed to superficial deposits, WW2 activity and recent use of the area as a recreational space by visitors to the country park.

There are however a number of interesting anomalies distinguishable, including a square and linear features that are not immediately and obviously linked to documented WW2 activity.

Under each image in Annex B (**Figures 4-9**) are details on the processing and filters applied for each section along with discussion of potential features.

Section C: the indications of possible ditches are reasonably clear, the circular ditch slightly less so, but there is evidence of human activity.

Section D: the item of particular interest is the 10m square feature, a building base or ditch?

An anti tank ditch running from the north, seen as a dark line crossing sections C and D was not picked up, it may pass underneath the hedges, between the survey areas (**Figure 13**).

5. CONCLUSIONS & RECOMMENDATIONS

The results of the detailed gradiometer survey have demonstrated historic activity at the site, resulting in significant magnetic disturbance across the areas surveyed. Whilst strongly magnetically 'noisy' backgrounds make interpretation challenging, it has been possible to identify several notable anomalies within the dataset that may warrant further investigation, see Appendix B.

It is recommended that the area immediately to the north of the country park is surveyed geophysically in order to set the results already discovered into a broader context before any further investigation of the anomalies identified in survey sections C and D is considered (**Figures 7 & 8**). This should be part of a wider approach to analysing the whole area: from the Bronze Age / Roman-era constructions at Hillhead, past the former inlet at Bourne Gap (which leads towards Ower, a potential Roman site) to the area west of Stone Farm, where the excavation prior to the installation of the pipeline uncovered many Roman artefacts.

6. REFERENCES

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APPENDIX A

Basic principles of magnetic survey:

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in magnetic susceptibility and permanently magnetised thermoremanent material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling.

Thermoremanent archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process. Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut.

Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement, allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer, which is a passive instrument consisting of a sensor held vertically. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature; if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.

APPENDIX B

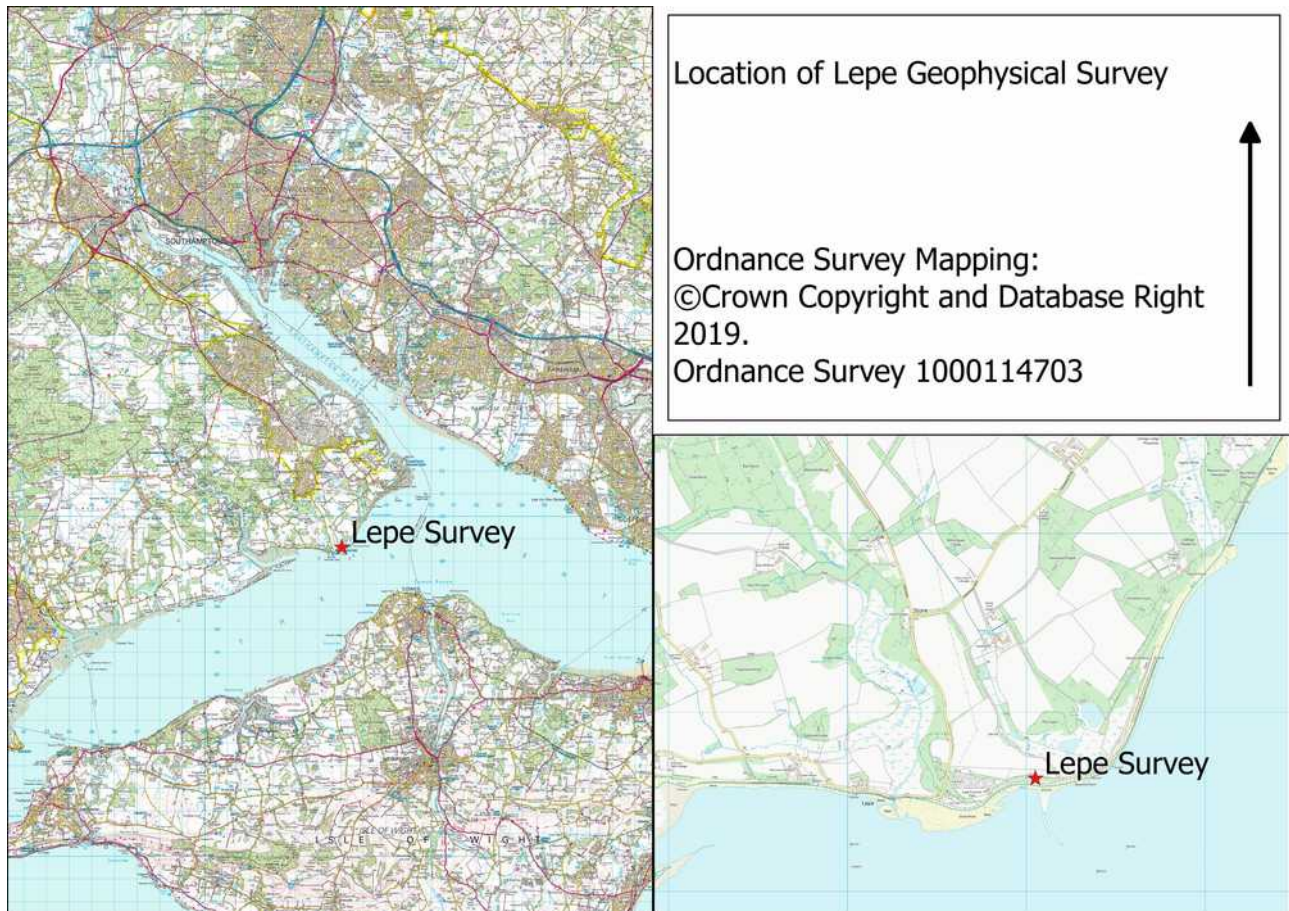


Figure 1 - Site location



Figure 2 – Sections (A-E) and magnetometry grid layout (L1 – L12)

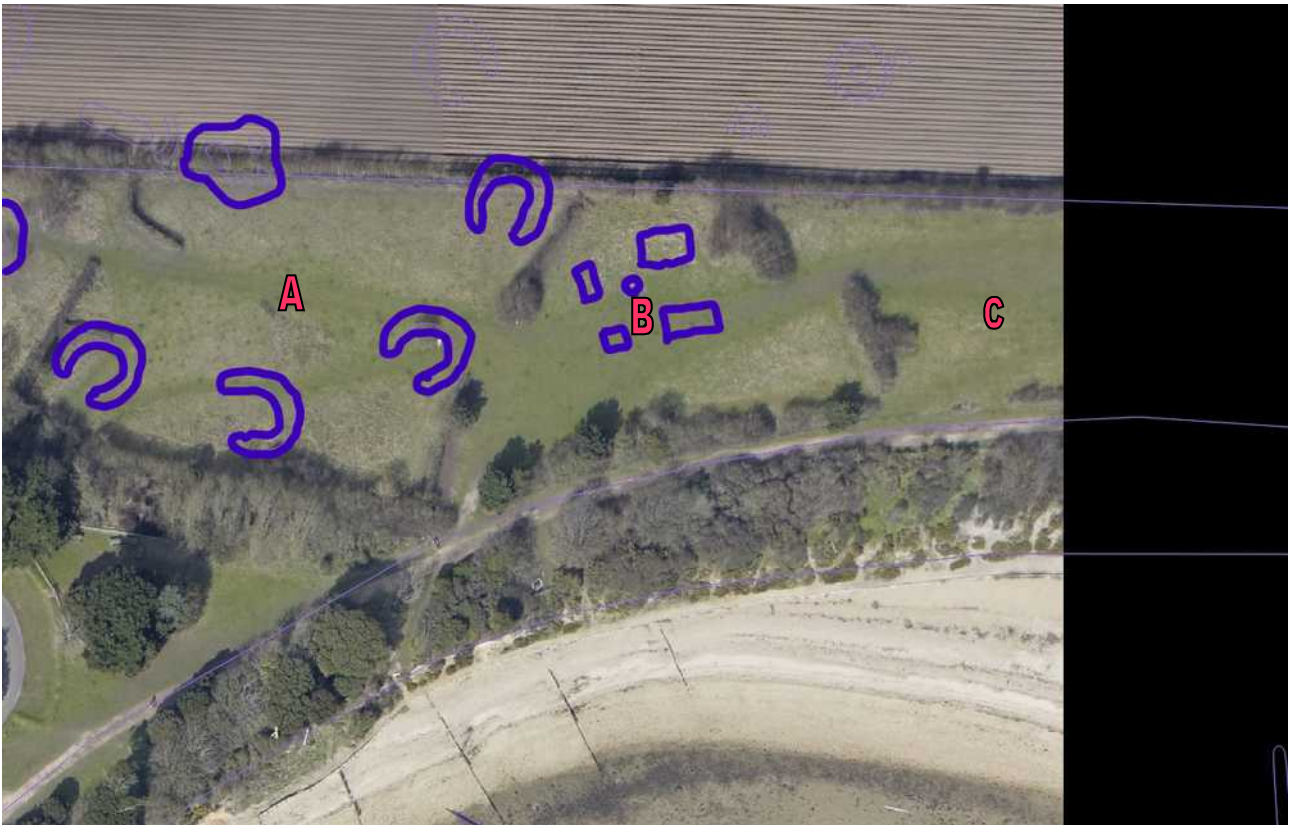


Figure 3 – Approximate location of WW2 AA gun positions in sections A & B

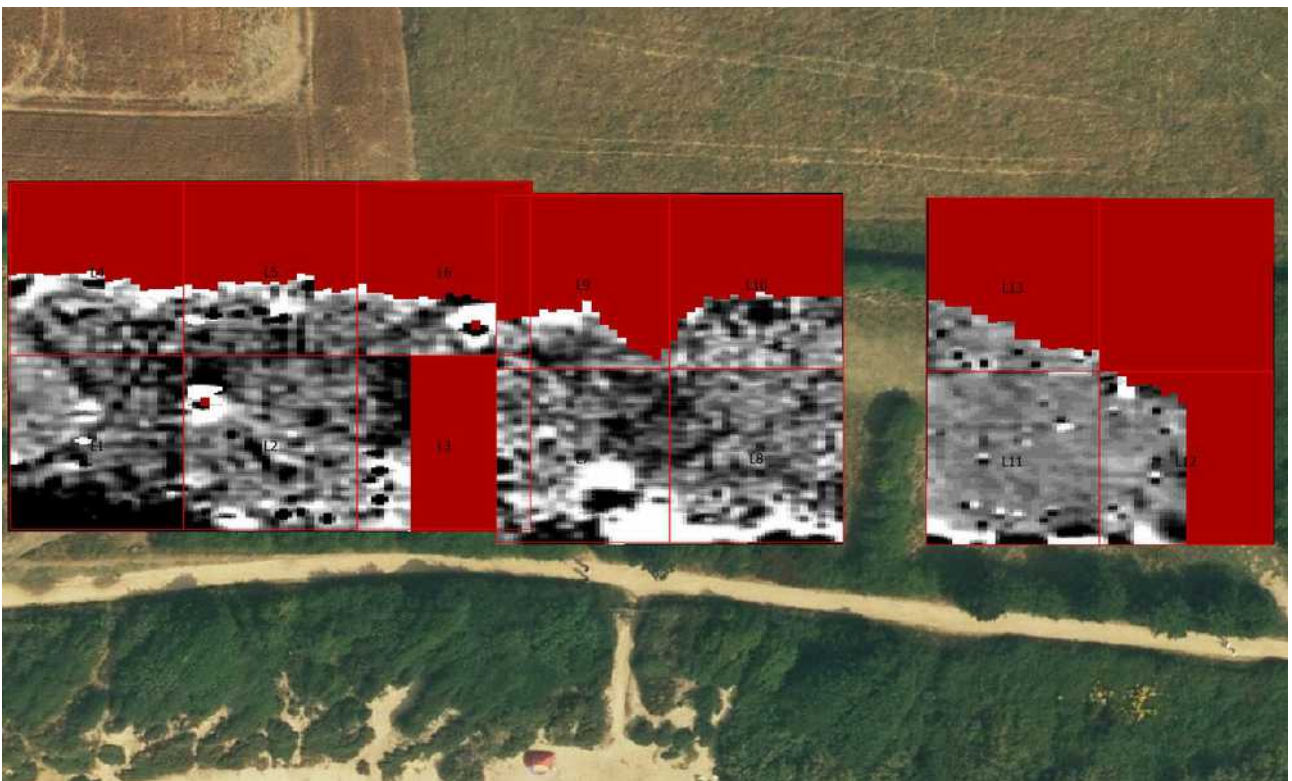
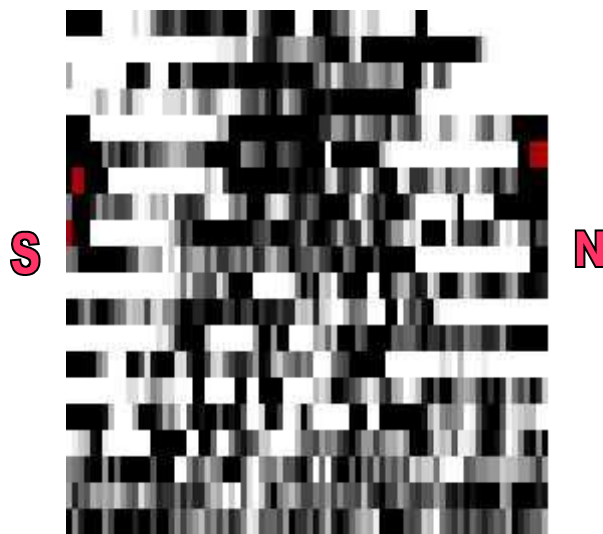


Figure 4 – Composite image of data (note that area D to right was surveyed on a different day to the others so the data image looks slightly different and was processed differently due to that fact).



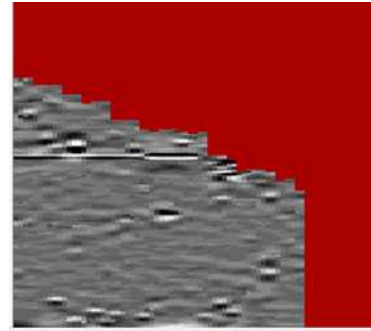
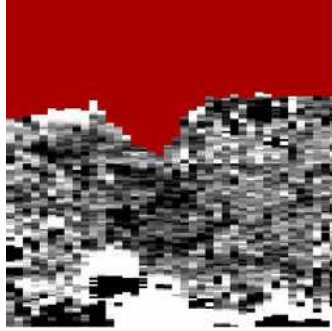
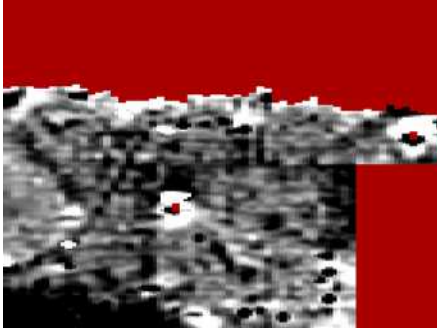
Figure 5 – Data shown at 50% transparency



Section B: magnetometry survey by Elizabeth Sharp on 08/10/2018 - unprocessed sample 20m x 20m grid showing two possible AA positions in red.

Figure 6 – Section B

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Sections C & D: processed by Mike Gill

Filters Employed: *Destripe: Vertical Affecting: Everything;*
Destripe: Vertical Affecting: Selection; Interpolate X Only.

Section E: processed by P Kelly

Filters Employed: *Remove*
Geology: Sample Radius=5;
Despike: Threshold=1.0
Action=Light; Interpolate;
Destripe: Horizontal
Affecting: Everything.

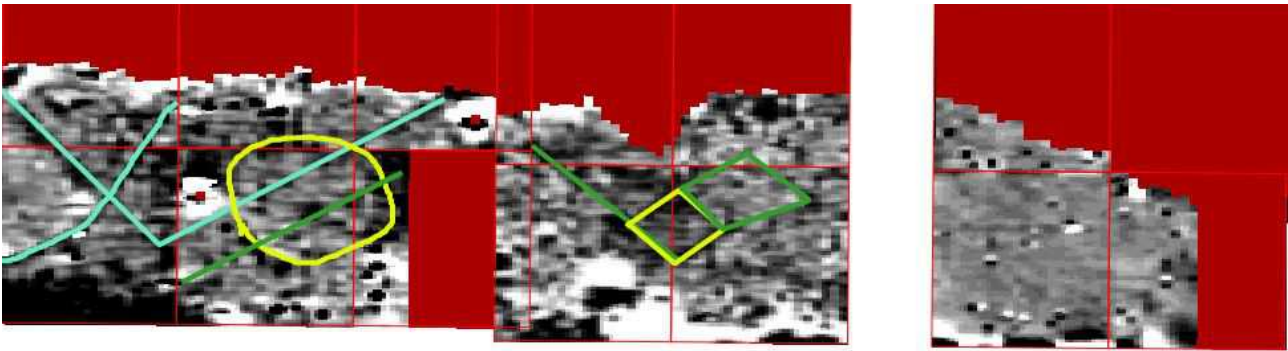
Section C magnetometry survey undertaken by Paul Kelly on 26/11/2018

Section D magnetometry survey undertaken by Jack Brown on 26/11/2018

Section E magnetometry survey undertaken by Paul Kelly on 25/01/2019

Figure 7 – Sections C, D & E showing the effect of different image processing filters

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Data Analysis:

High Confidence Features – Pale Blue

Section C: curving ditch

Section C: corner of a possible enclosure or boundary ditch

Medium Confidence Features - Yellow

Section C: possible ring ditch - 24 metre diameter

Section D: possible building base/small square ditch 10m square

Low Confidence Features – Dark Green

Features are as indicated; the dark area at the bottom left of section C was caused by magnetism of parked cars nearby.

'Halo spots' - metal features/rubbish are not highlighted.

The images above were analysed by James Brown and processed using the following filters:

Area C Filters

Destripe: Vertical Affecting: Everything

Destripe: Vertical Affecting: Selection

Despike: Threshold=1.0 Action=Normal

Interpolate X Only

Area D Filters

Destripe: Vertical Affecting: Everything

Despike: Threshold=1.0 Action=Normal

Data Clip: All Data Effect: Clip To Max/Min From: -2.0 To: 2.0

Interpolate X Only

Figure 8 – Sections C, D & E possible features highlighted



Figure 9 – Extract from Thomas Milne's map of AD 1791 (not to scale)



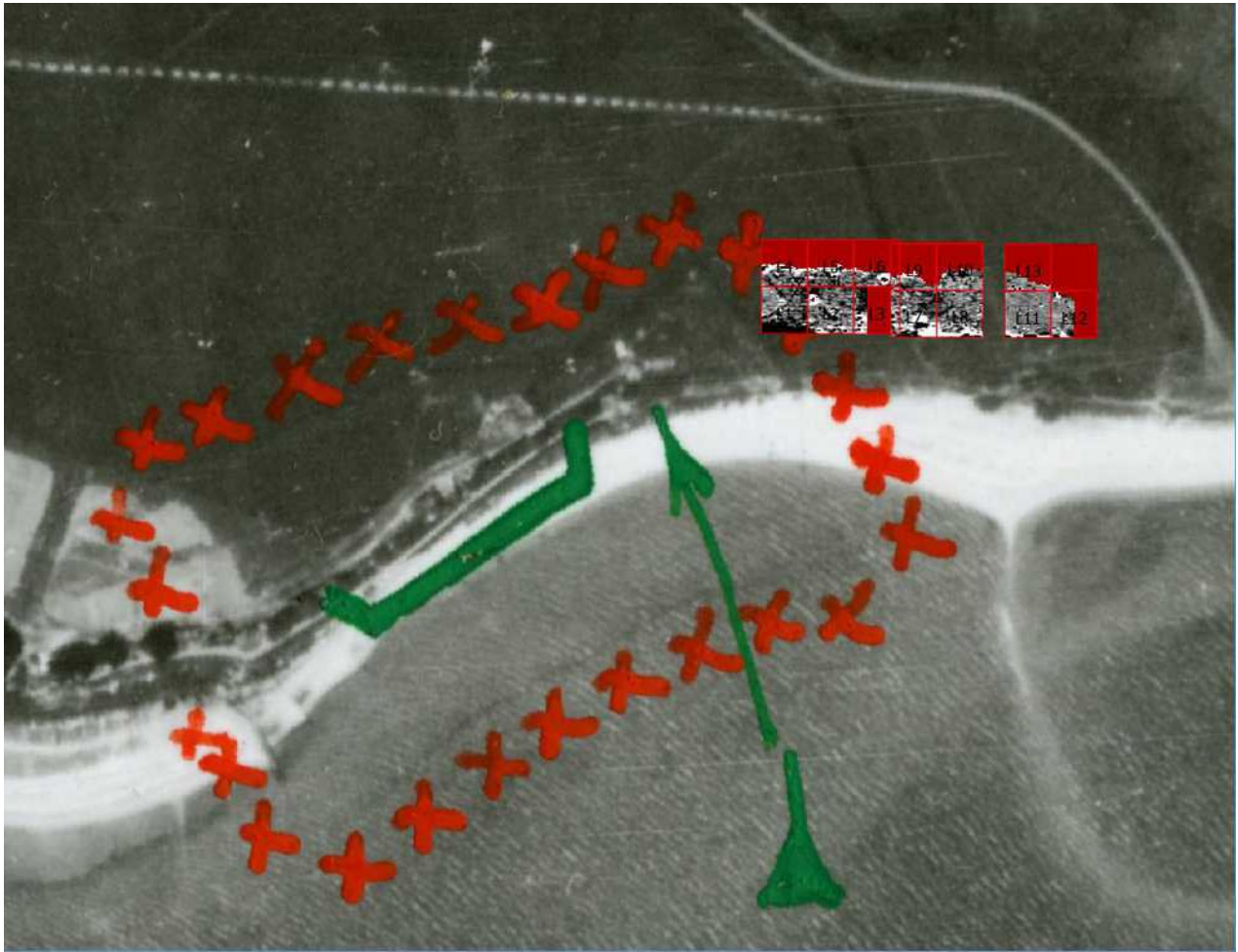


Figure 12 – Lepe magnetometry grids overlaid on a 1942 Luftwaffe photo, taken before the military hard was installed, but with the coastal battery in place (*New Forest Remembers* project). Note the anti tank ditch (the dark line running down to the area between sections C and D) and the anti glider obstacles (the line of pale dashes at the top of the photo).