GEOPHYSICAL SURVEY REPORT
FOR

Brandon Hill, Bristol.

NGR: ST 578 729

REPORT NO: ROWE 15/03

Philip R Rowe BA MA PhD PCIFA

April 2015

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ACKNOWLEDGEMENTS

In the preparation of this geophysical survey report, acknowledgment is made, with many thanks, to Richard Fletcher, Area Manager East & Central, Bristol City Council and Peter Insole Principal Historic Environment Officer, Bristol City Council for their kind permission in allowing the surveys to be conducted.

Many thanks to you both.

NOTES

Whereas great care has been taken to produce a comprehensive summary of the known and recorded archaeological evidence, no responsibility can be accepted for any omissions of fact or opinion, however caused.

ABREIVIATIONS

NGR - National Grid Reference.
ODN - Ordnance Datum Newlyn.

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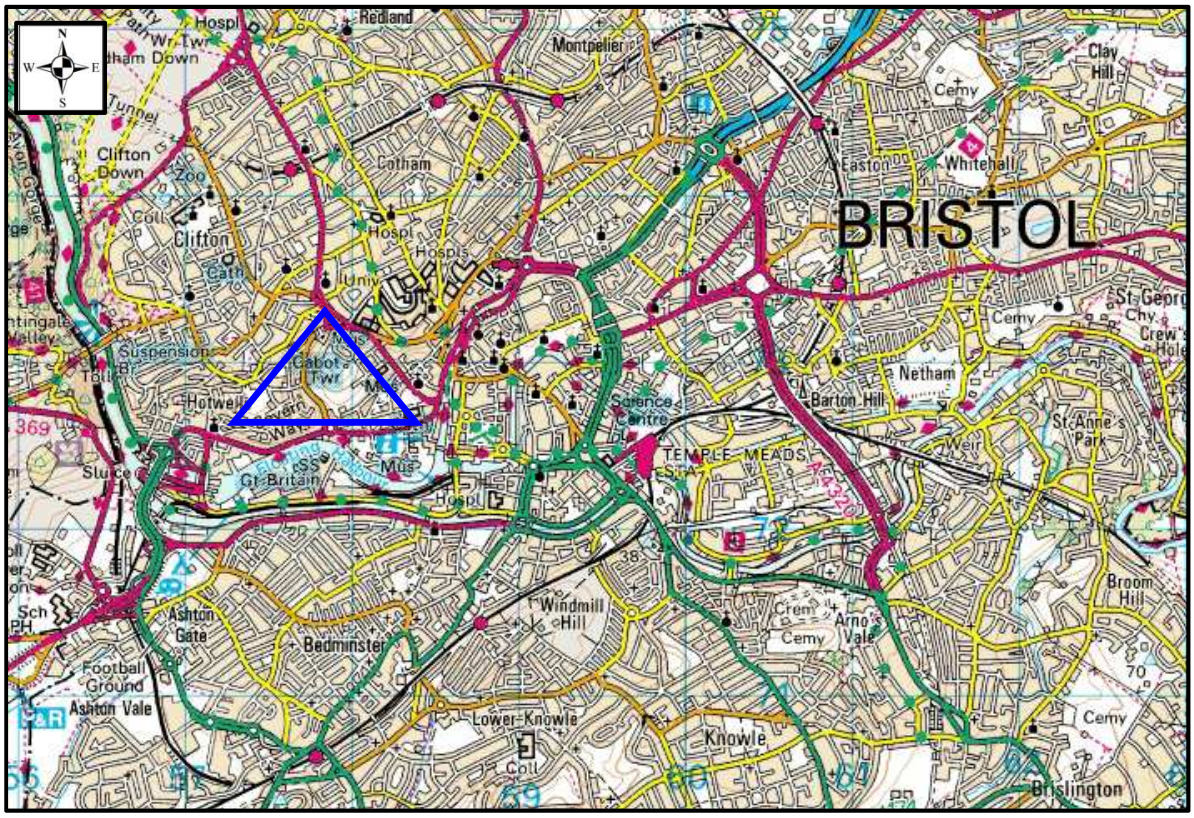
Figure 1

Location of the Study Area

Site Location △



Site Location (Red Triangle) (©Memory-Map Inc - © Crown Copyright Ordnance Survey 2009 Licence No: PU100034184). Illustration not drawn to Scale.

SITE RESULTS SUMMARY

GEOPHYSICAL SURVEY REPORT NO: Rowe15/03 **NGR**: ST 578 729

SITE NAME: Brandon Hill, Bristol.

SITE TYPE: Grassed area

DESCRIPTION: Located on recreational park land adjacent to Cabot Tower and Queen Elizabeth Hospital School, Hotwells, Bristol, *c.*750m northwest of Bristol city centre, *c.*69m ODN.

PERIOD: 17th century – 20th century.

GEOLOGY: Quartzitic Sandstone Formation from the Namurian epoch, overburden to an unknown depth by potentially colluvium / re-deposited top soil.

LAND USE: Grassed Recreational Area.

SURVEY TYPE:	Resistance	**METHOD:**	Zig – Zag
INSTRUMENT:	Geoscan RM15	**SURVEY AREA:**	60m x 120m
SAMPLE INT:	1m	**TRAVERSE INT:**	1m

RESULTS SUMMARY:

Two RM15 resistance surveys, total area 60m x 120m (7 x 30m² grid), was completed March / April 2015, providing, as a result, positive geophysical raw data that has assisted the archaeological knowledge of the site.

Suggesting the presence of buried material likely to pertain to archaeology, in particular to the construction of practice infantry trenches dug during the First World War; positive geophysical data recovered for the site has made archaeological interpretation possible.

Areas of high resistance with adjacent low resistance can clearly be identified north / northwest and west of the survey grid, and relate, in all probability, to re-deposited sub-surface material associated with the creation of the Bowling Green in the 1930s. Parallel striations of low resistance central to south of the survey area all correspond with low lying earthworks features evident in the landscape. These can be interpreted as infilled First World War practice trenches and corresponding spoil heaps as identified from documentary evidence (see WSI Rowe BH15 Report 1).

Further archaeological investigation is therefore strongly suggested to substantiate these findings.

REPORT AUTHOR: Philip R Rowe

2 - INTRODUCTION

2.1 Covering an area identified from documentary evidence (see WSI Rowe BH15 Report 1 - **Figure. 2**), seven survey grids measuring 60m x 120m in total were laid out over a grassed area c.150m southwest of Cabot Tower (**Figure. 3**).

2.2 Set out by Philip R Rowe, the survey grid was measured in using taped offsets from a 60m baseline running in a north-northwest to south-southeast direction, and was surveyed into the current Ordnance Survey mapping system using handheld GPS (+/- 3m accuracy).

2.3 The aim of the survey was to identify the possible remains of a First World War infantry practice trench system.

3 - TOPOGRAPHY, GEOLOGY AND CURRENT LAND USE

3.1 Situated c.150m southwest of Cabot Tower, the surveyed area can be found to cross several undulating linear earthwork features that run in a diagonal across the survey site.

3.2 Lying 69m ODN on a slope that suggests the potential for an overlying deposit of colluvium / made up ground (depth not known), the site can be seen to lie on a Quartzitic Sandstone Formation from the Namurian epoch.

4 - RESULTS

4.1 GEOPHYSICAL SURVEY

4.1.1 Whilst all survey reports are produced as correctly as possible, the resulting information is based on the accuracy of the equipment therefore no responsibility is taken for any errors or omissions.

4.2 INSTRUMENTATION

4.2.1 Resistance Meter – Geoscan RM15: Measuring the electrical resistance of the earth to a current being passed through it via a system of four electrodes (two current and two potential), a twin probe arrangement (0.5m interval) that involves the paring of electrodes (one current / one potential) was passed over a measured grid, with the results being compared to a back ground reading obtained from a pair of electrodes placed in a '*fixed*' position.

4.2.2 Measured in *Ohms* and calculated resistivity in *Ohm – Metres*, the effective depth of penetration is *c*.0.75m – 1m, although the nature of soil overburden as well as underlying geology will cause variations in this generality.

4.3 DISPLAY

4.3.1 Displayed as greyscale images, this visual format divides a given range of predefined arrangement of dots / shades of grey readings into a set number of classes.

4.3.2 Increasing in intensity as the value increases, the resulting image is displayed as a toned / grey scale enabling fast and accurate interpretation of any sub-surface archaeological features discovered.

4.4 COMPLICATING FACTORS

4.4.1 Overall, the topographical conditions of the site were acceptable, with the ground being under short grass.

4.4.2 Undertaking two separate surveys on differing days, the background reading of the remote probes for Survey 1 (March 2015) was recorded and matched prior to commencing Survey 2 (April 2015) in order to ensure the positive continuation of results.

4.5 RESULTS

4.5.1 Siting the survey grids based on the 1915 photographic evidence and the presence of previously unidentified linear earthworks, positive evidence was gained by the geophysical survey (**Figure. 4**), with good raw data achieved (see **Figure 5.A** and **B** - processing information).

4.5.2 Areas of high resistance [**i**] [**ii**] with adjacent low resistance [**iii**] [**iv**] can clearly be identified north / northwest and west of the survey grid, and relate, in all probability, to re-deposited sub-surface material associated with the creation of the Bowling Green in the 1930s.

4.5.3 Parallel striations of low resistance central to south of the survey area [**v**] [**vi**] [**vii**] [**viii**] [**ix**] all correspond with low lying earthworks features evident in the landscape. These can be interpreted as infilled First World War practice trenches and corresponding spoil heaps as identified from documentary evidence

5 CONCLUSION

5.1 The results of the RM15 resistance survey on the area identified by the author on Brandon Hill supports the notion that this is the location of First World practice trenches excavated by soldiers from the Gloucestershire Regiment in 1914 / 1915.

5.2 Supported by the presence of previously unidentified linear earthwork features, it is recommended that a system of controlled archaeological excavations (2 x 1m test pits) be undertaken on the site to fully establish the presence / true nature of the practice trenches.

6 - BIBLIOGRAPHY

Boucher, M (1919) *Scrapbook and notes and press cuttings relating to World War 1* (Bristol) Bristol Record Office 44859

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CIFA (2008) *Standard and Guidance for Archaeological Geophysical Survey*. Institute of Field Archaeologists (www.archaeologists.net).

Geoplot - © Geoscan Research under licence to the University of Bristol.

Memory-Map Inc. – © Crown Copyright Ordnance Survey 2009 Licence No: PU100034184.

Rowe, P R (2015) *Written Scheme of Investigation – Rowe BH15 Report No: 1. Brandon Hill, Bristol* (Bristol) University of Bristol (Unpublished Document).

Stone, G.F., and **Wells**, C. (1920) Bristol and the Great War. (Bristol) J.W.Arrowsmith Limited.

Figure 2 – The construction of practice trenches in the study area on Brandon Hill (Boucher 1919 Bristol Record Office 44859).

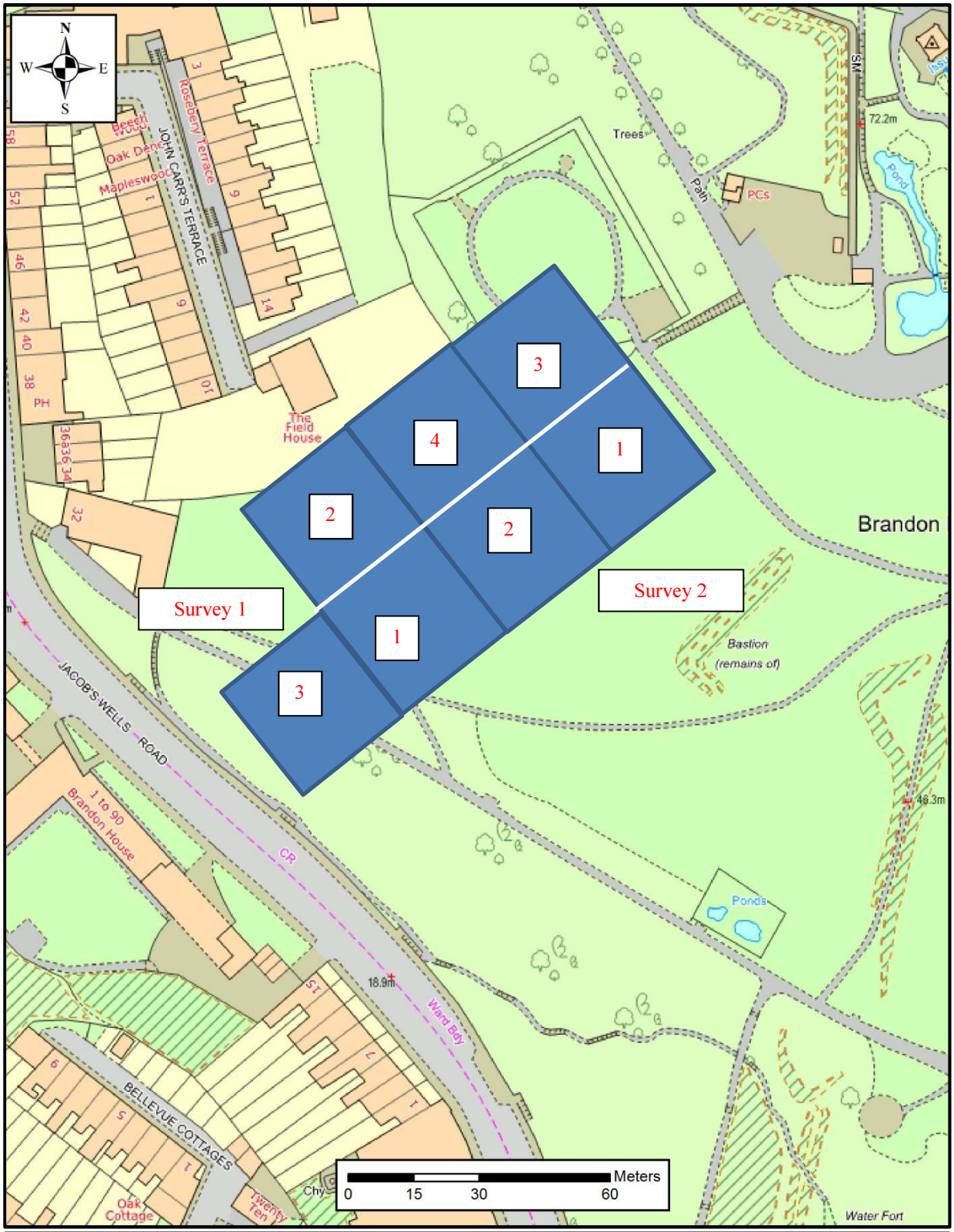


Figure 3 – Detailed map of survey area with survey grid numbers denoted (Digimap - © Crown copyright / database 2011 – Ordnance Survey / Edina Supplied Service – Generated in ArcGIS).

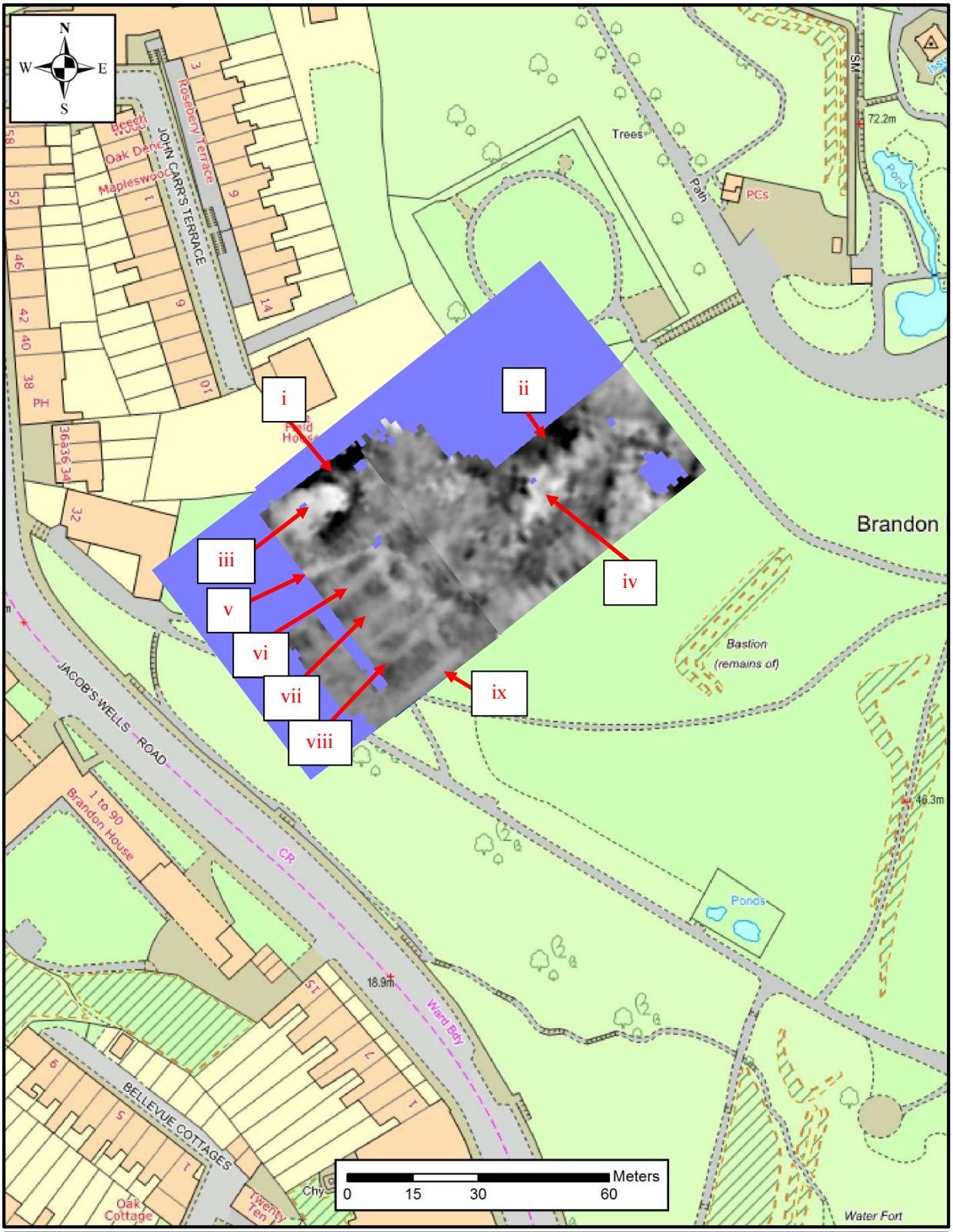


Figure 4 – Detailed map of survey area with results georeferenced
(Digimap - © Crown copyright / database 2011 – Ordnance Survey / Edina Supplied Service – Generated in ArcGIS).

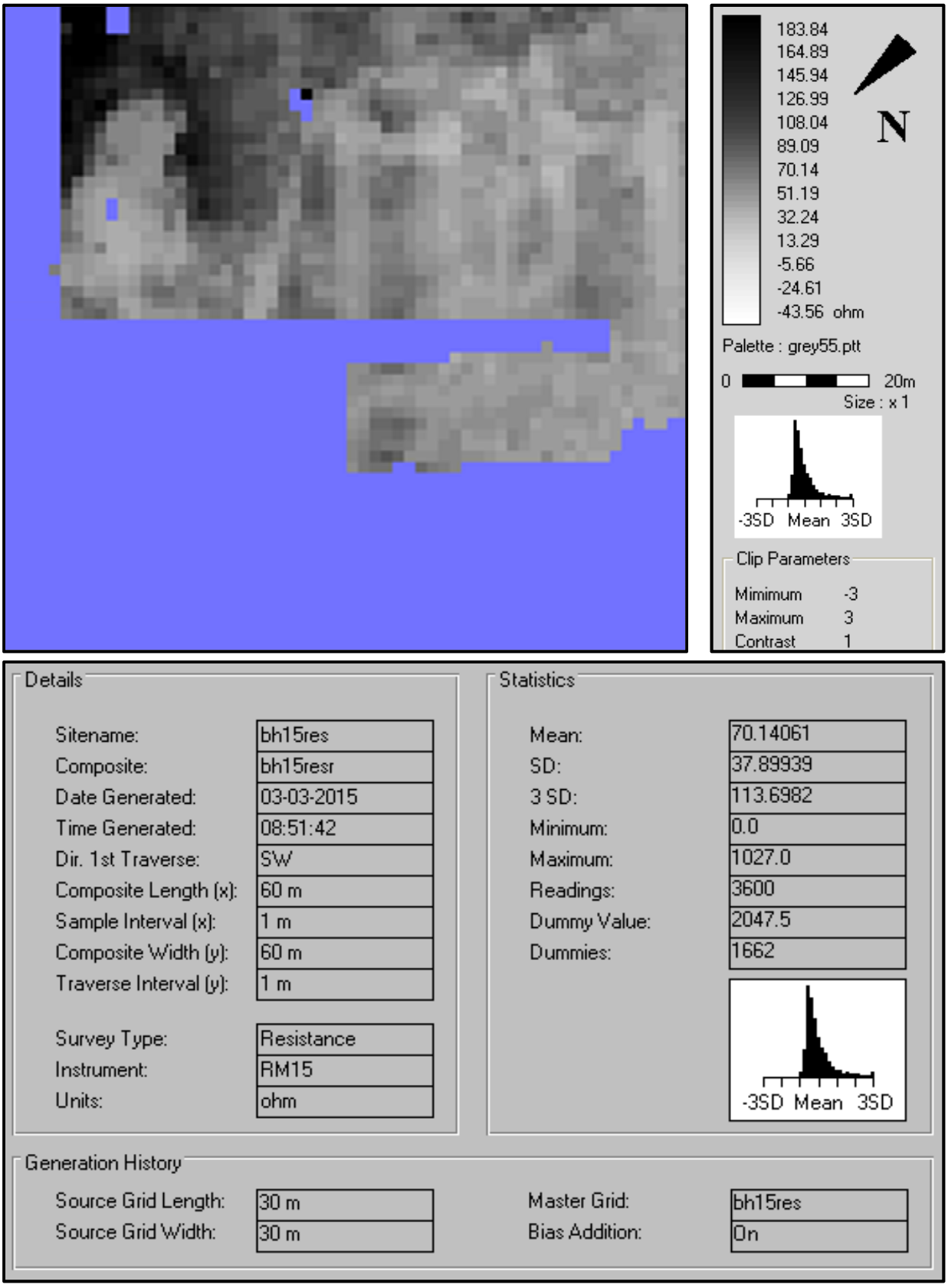
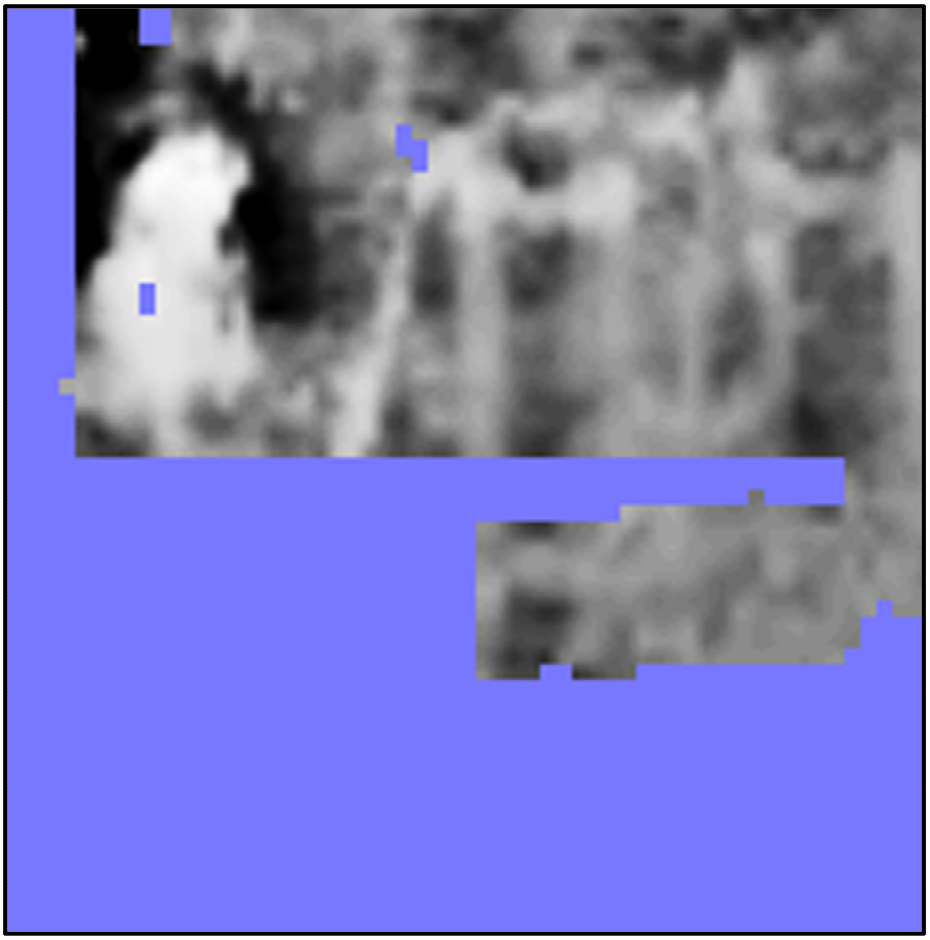
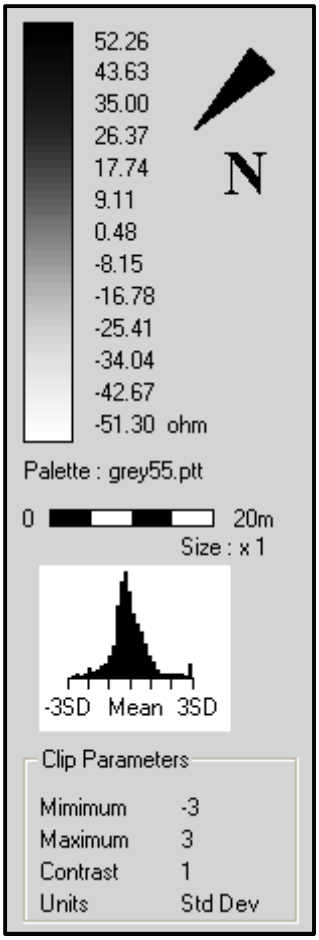
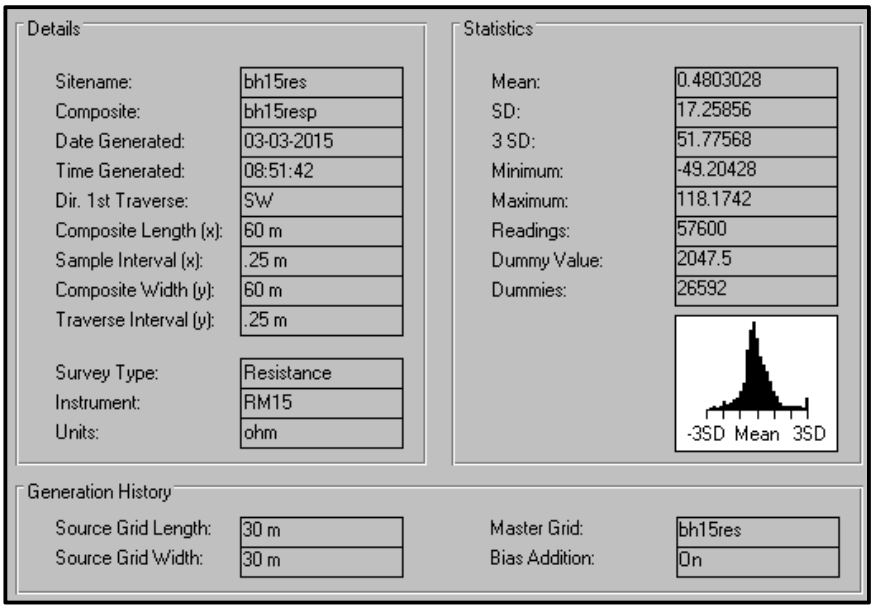


Figure 5 A – RM 15 Raw Data – Survey 1
(Geoplot - © Geoscan Research under licence to the University of Bristol.).







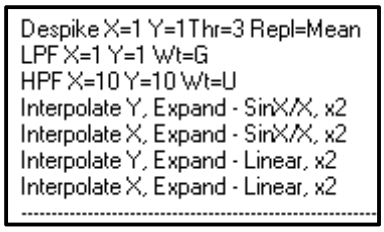


Figure 5 B – RM 15 Processed Data – Survey 1
(Geoplot - © Geoscan Research under licence to the University of Bristol.).

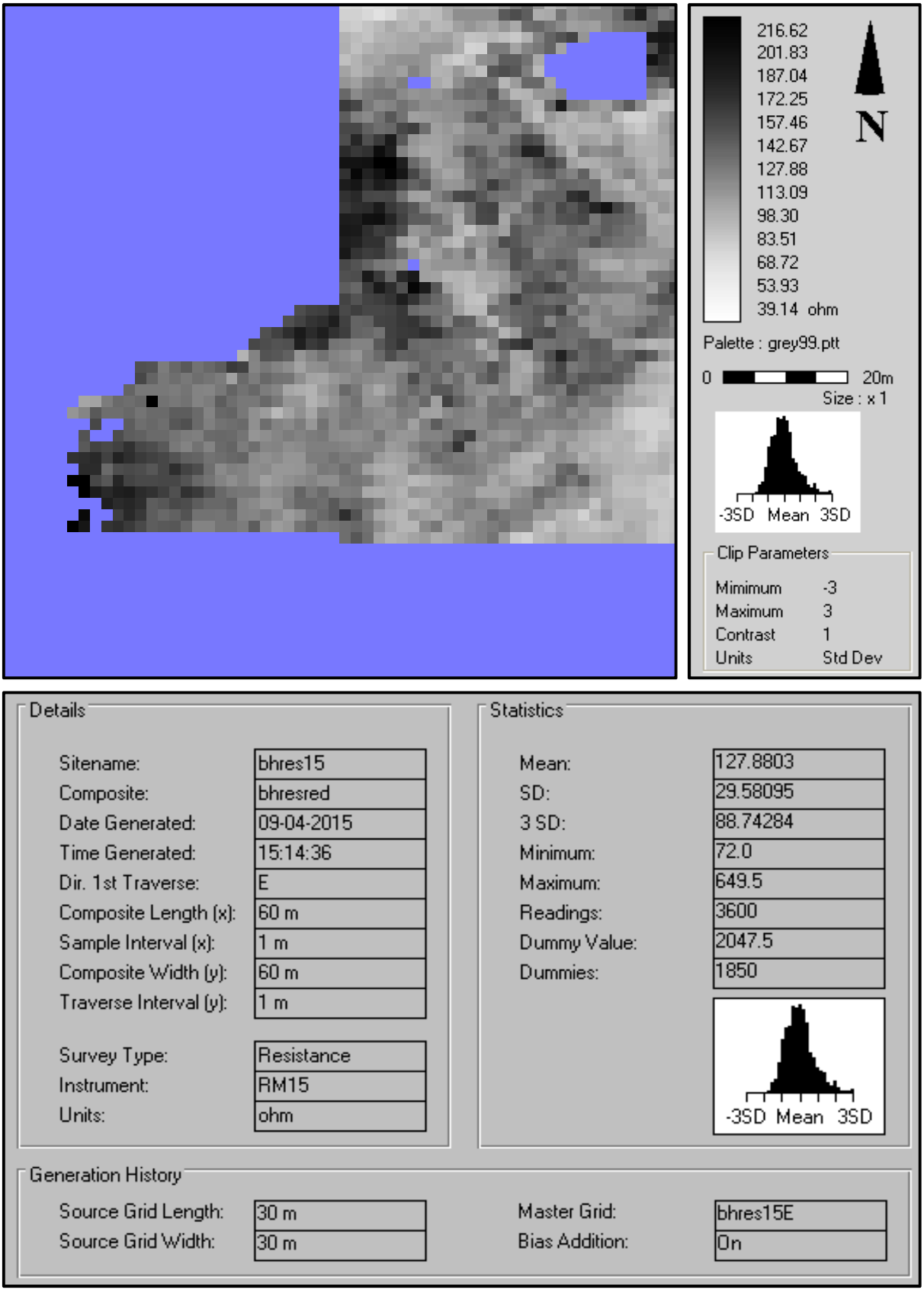


Figure 6 A – RM 15 Raw Data – Survey 2
(Geoplot - © Geoscan Research under licence to the University of Bristol.).

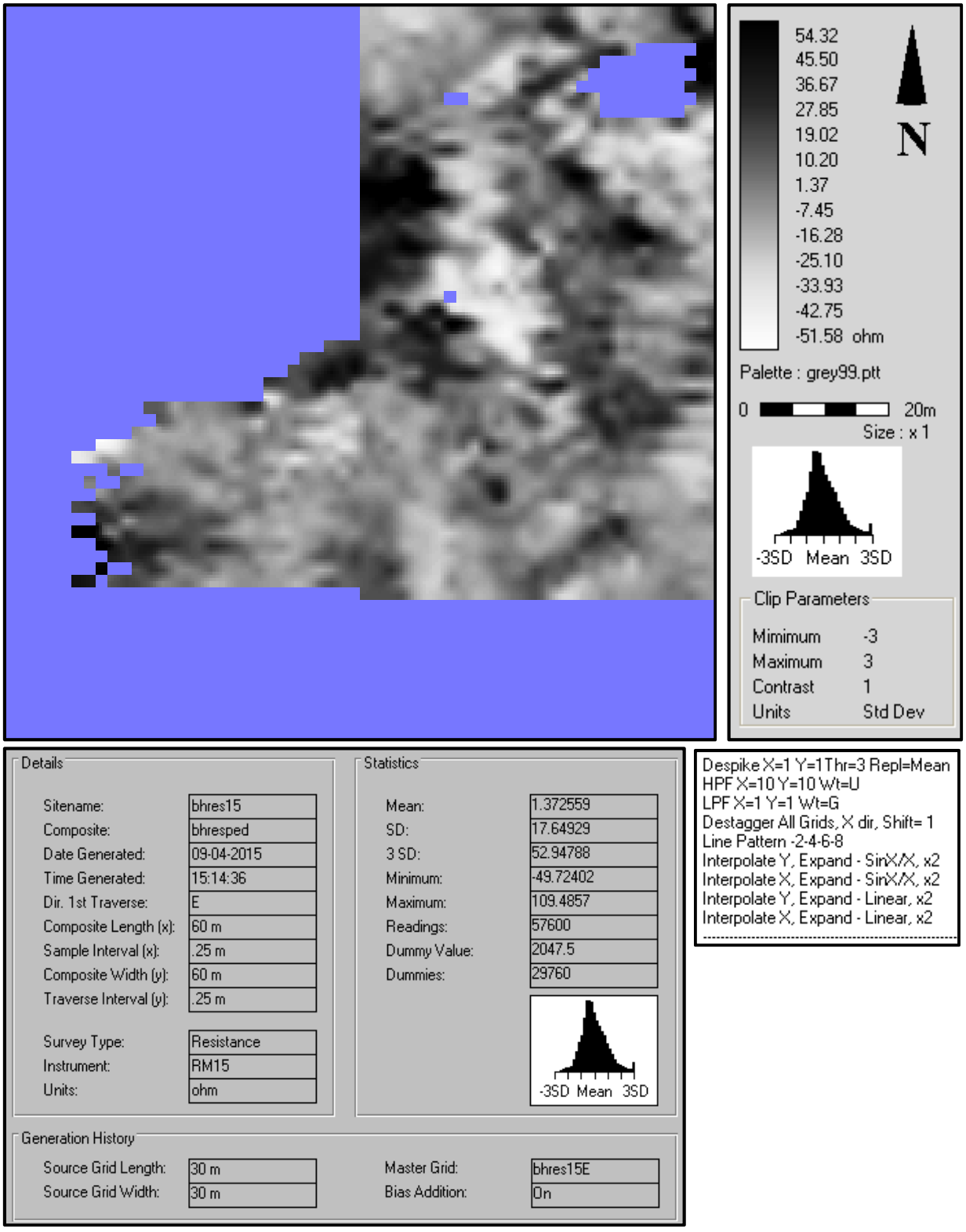


Figure 6 B – RM 15 Processed Data – Survey 2
(Geoplot - © Geoscan Research under licence to the University of Bristol.).

Summary of Data Processing (from Geoplot Manual © Geoscan Research).

Despike – Used to automatically (a) locate and remove random, spurious readings often present in resistance / gradiometer data.

High Pass Filter – Used to remove low frequency, large scale spatial detail, typically the removal of a slowly changing geological “background” response commonly found in resistance surveys.

Low Pass Filter – Removes high frequency, small scale spatial detail, and is useful for smoothing data or for enhancing larger weak features.

Interpolate – Increases / decreases the number of data points in a survey (Increasing the number can be used to create a smoother appearance to the data, whilst decreasing the number of data points using can be used to investigate the effect of different sampling strategies).