

GEOPHYSICAL SURVEY REPORT
FOR

**Royal Fort Gardens,
Clifton, Bristol.**

NGR: ST 582 733

REPORT NO: ROWE 15/01 - 15/02



Philip R Rowe BA MA PhD PCIFA

March 2015

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ACKNOWLEDGEMENTS

In the preparation of this geophysical survey report, acknowledgment is made, with many thanks, to the assistance given by Richard Israel during the survey, Peter Insole, Historic Environment Record Assistant, Bristol City Council, and Alan Stealey, Head of External Estates, for their kind permission in allowing the surveys to be conducted.

Many thanks to you all.

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.

ABBREVIATIONS

CBM - Ceramic Building Material (Bricks etc.)

HER - Historic Environment Record.
NGR - National Grid Reference.
aDN - (above) Ordnance Datum Newlyn.

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).

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FIGURE 2

Location of the Study Area

Site Location



Plans and maps based on the Ordnance Survey Great Britain
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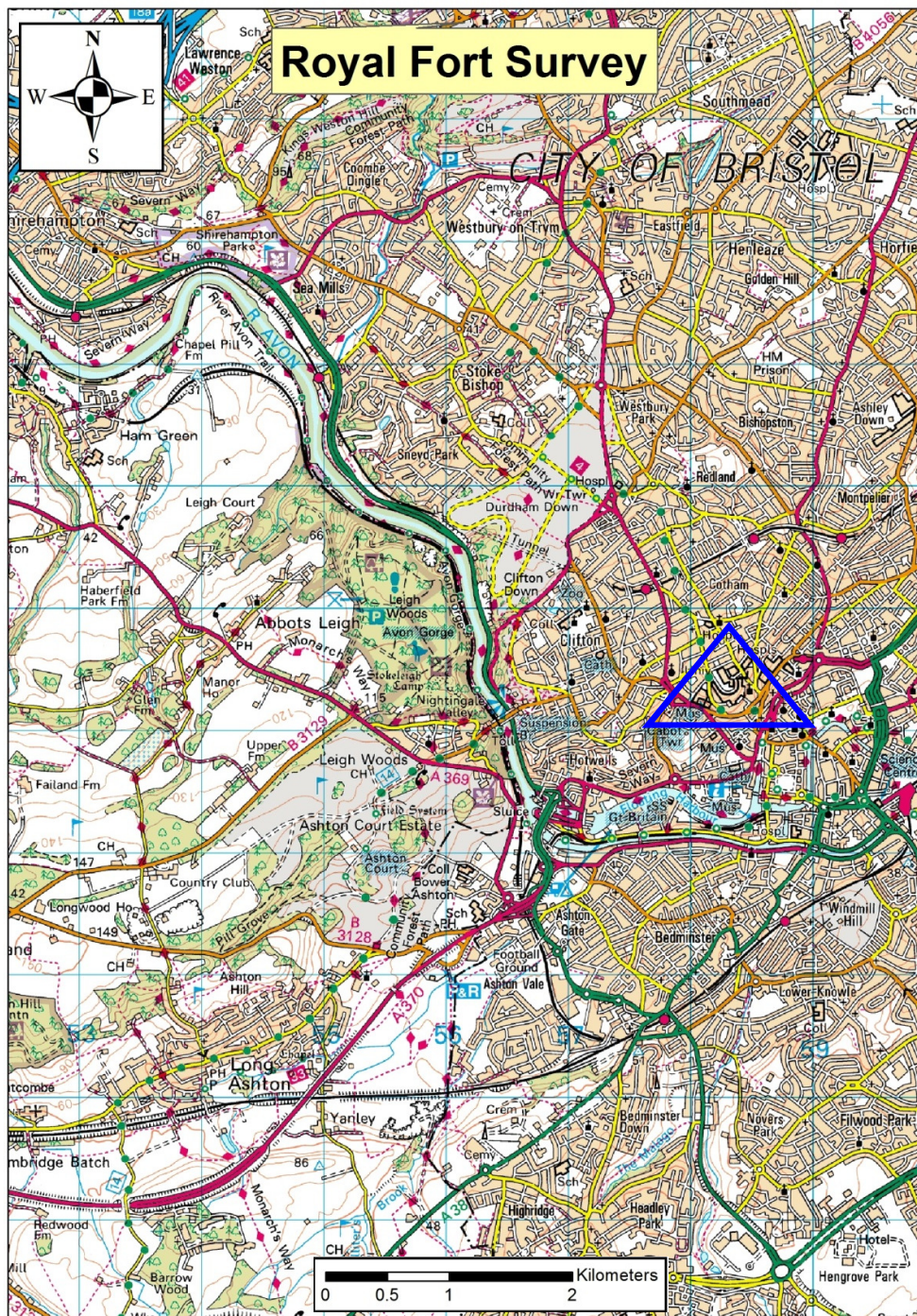
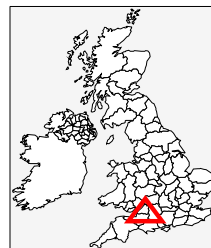


FIGURE 3

Boundary of Survey Areas (Shaded in Red)



Plans and maps based on the Ordnance Survey Great Britain 1936 –
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1 - INTRODUCTION

1.1 Detailed to undertake a geophysical survey in the vicinity of Royal Fort House, Clifton, Bristol (ST 582 733) ahead of a proposed installation of a garden feature, two resistance surveys, total area 20m x 40m (one x two 20m² grids) per survey, were completed late February 2015 on behalf of the External Estates Department, University of Bristol.

1.2 Historical documentation and cartographic evidence (Israel: 2008) denote this parcel of land as being the site of the Royal Fort, an English Civil War fortification constructed in 1643 (*ibid*: 2008: 6). Partially demolished between 1655-6, the site has further experienced quarrying (c.1792) and landscaping on it during the latter part of the 18th Century (*ibid*: 2008: 30 – 31).

1.3 Producing a resistance survey report summary, the subsequent findings will be used to enhance the archaeological knowledge of the site.

2 - METHODOLOGY

2.1 Using a Geoscan RM15 resistance meter, a geophysical survey (Rowe 15/01 (**Figure 4** and **5**) and 15/02 (**Figure 6** and **7**) was subsequently made of the area identified by Alan Stealey, Head of External Estates. Indices and collections within the Public Records Office, National Monuments Records and Local Historic Environment(s) (HER) were consulted, with all the information collated, summarized and presented in the report below. Photocopies, manuscript copies and notes, including still photographs, are preserved in the project archive, stored at University of Bristol, Department of Archaeology & Anthropology.

3 - TOPOGRAPHY, GEOLOGY AND CURRENT LAND USE

3.1 Located on a rising spur of land that continues in a northerly direction towards Gloucester, the geophysical study area can be found situated adjacent to Royal Fort House, c.550m north-west of Bristol City Centre, c.72m aDN.

3.2 Consisting of re-deposited soil overburden to an unknown depth from possible site re-landscaping, the underlying geological soil association for the study area is Sandstone of the Quarzitic Sandstone Formation (QSG), Namurian Epoch.

3.3 The site of Royal Fort Gardens is a mixture of open grass with areas of shrubbery that can be accessed by the student / community for recreational purposes.

4 - GEOPHYSICAL SURVEY (Figure 8)

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.

4.1 INSTRUMENTATION

4.1.1 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 separation) that involves the pairing 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.

4.1.2 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.

4.1.3 Set out by Philip R Rowe, with the assistance of Richard Israel, the grids were measured in using taped offsets from a baseline running in a south-west to north-east direction parallel to Royal Fort House and west-south-west to east-north-east direction adjacent to the walled courtyard.

4.2 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.

4.3 COMPLICATING FACTORS

4.4.1 Various complicating factors were encountered during the geophysical survey. These include uneven, sloping ground level, ceramic building material sub-surfaces (brick / concrete) and shrubs / bushes.

5 - INTERPRETATIONS / CONCLUSION

5.1 RESULTS – Rowe 15/01 – RM15 Resistance Meter (Figure 9 and 10).

5.1.1 Located central of the survey grid (south-south-west of Royal Fort House) can be seen an area of high resistance (i) surrounded by areas of medium (ii) to low resistance (iii).

5.1.2 Suggesting sub surface CBM (Ceramic Building Material) material associated with a demolished 17th Century building (sited during / post English Civil War) OR natural geology (Sandstone) exposed when the area was landscaped for formal gardens during the 18th / 19th Century; areas of medium (iv) to low resistance (v) running central to east-north-east, central to south-east, central to south and central to north-west correspondingly suggest the presence of buried linear features that demonstrate potential right angles relating to possible building foundations / wall lines (dummy readings denote extant trees).

5.1.3 With positive geophysical data recovered for the site, in order to establish the exact nature of these features it is recommended that further archaeological investigation is made (evaluation trenches) to substantiate these findings.

5.2 RESULTS – Rowe 15/02 – RM15 Resistance Meter (Figure 11 and 12).

5.2.1 Located south-east of the survey grid can be seen two areas of high (i) to medium (ii) resistance interpreted as material associated with the garden path, whilst the area of low resistance situated at the south-west end of the survey area can be attributed to water collection at the base of a slight slope / flower bed feature (iii).

5.2.2 Distributed throughout the survey area can be seen several linear features / areas of high /medium (iv) to medium resistance (v) with potential right angles running in a north-west to south-east / south-west to north-east direction,

interspersed by areas of medium / low resistance interpreted as probable dispersed sub surface CBM material / robbed out footings (vi).

5.2.3 Potentially associated with a demolished order to establish the exact nature of these features it is recommended that further archaeological investigation is made (evaluation trenches) to substantiate these findings.

6 - BIBLIOGRAPHY

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Supplied Service to the University of Bristol.

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

Israel, R. (2008) The Royal Fort: An archaeological study of its siting within the English civil war landscape of Bristol (1642-45) (Bristol), Unpublished BA Dissertation.



Figure 4 – Survey Site A (North-West view towards Royal Fort House).



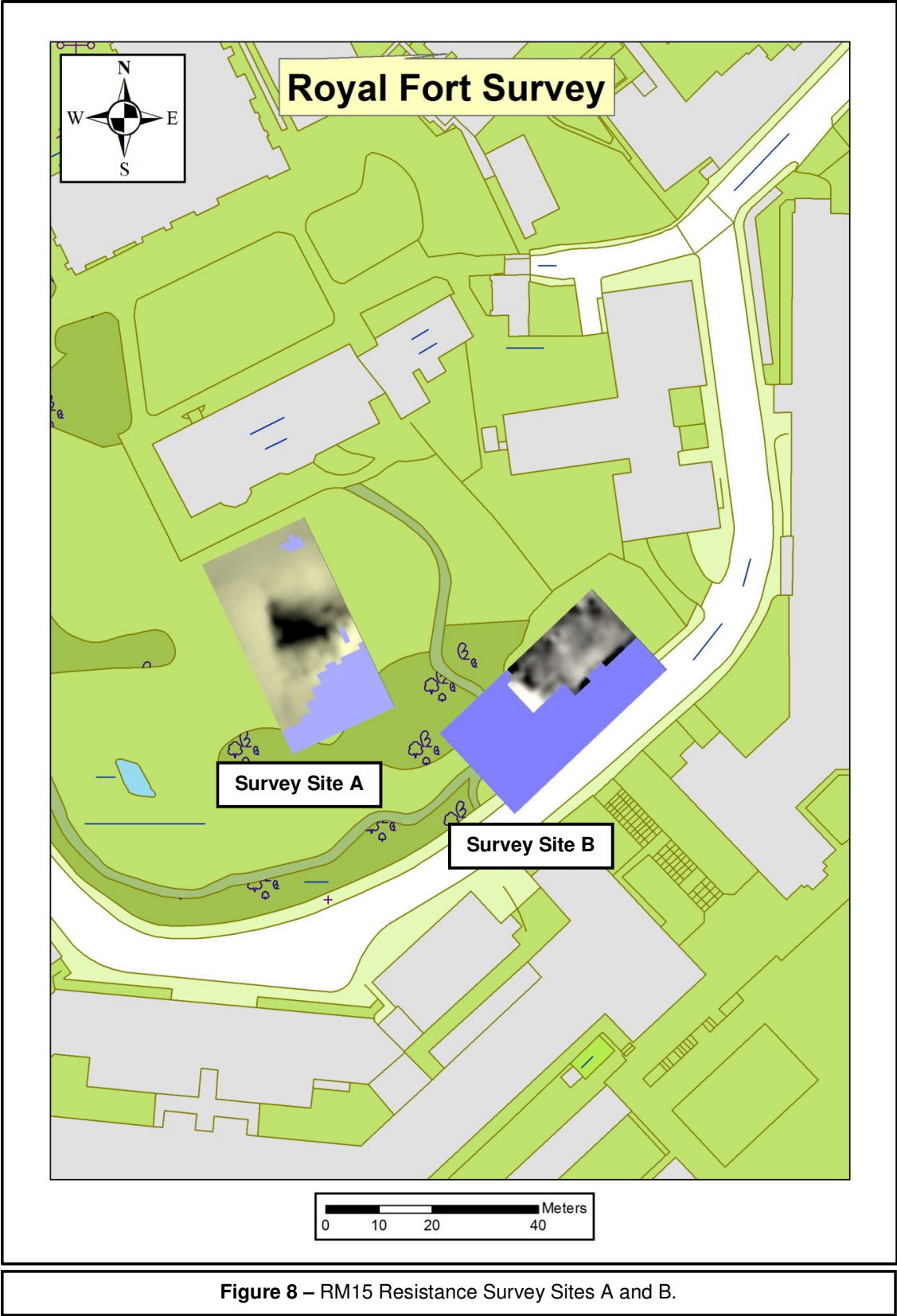
Figure 5 – Proposed Art Installation (South-East view from Royal Fort House).



Figure 6 – Alternative Location (Survey Site B) North – East View.



Figure 7 – Survey Site B Grid Area.



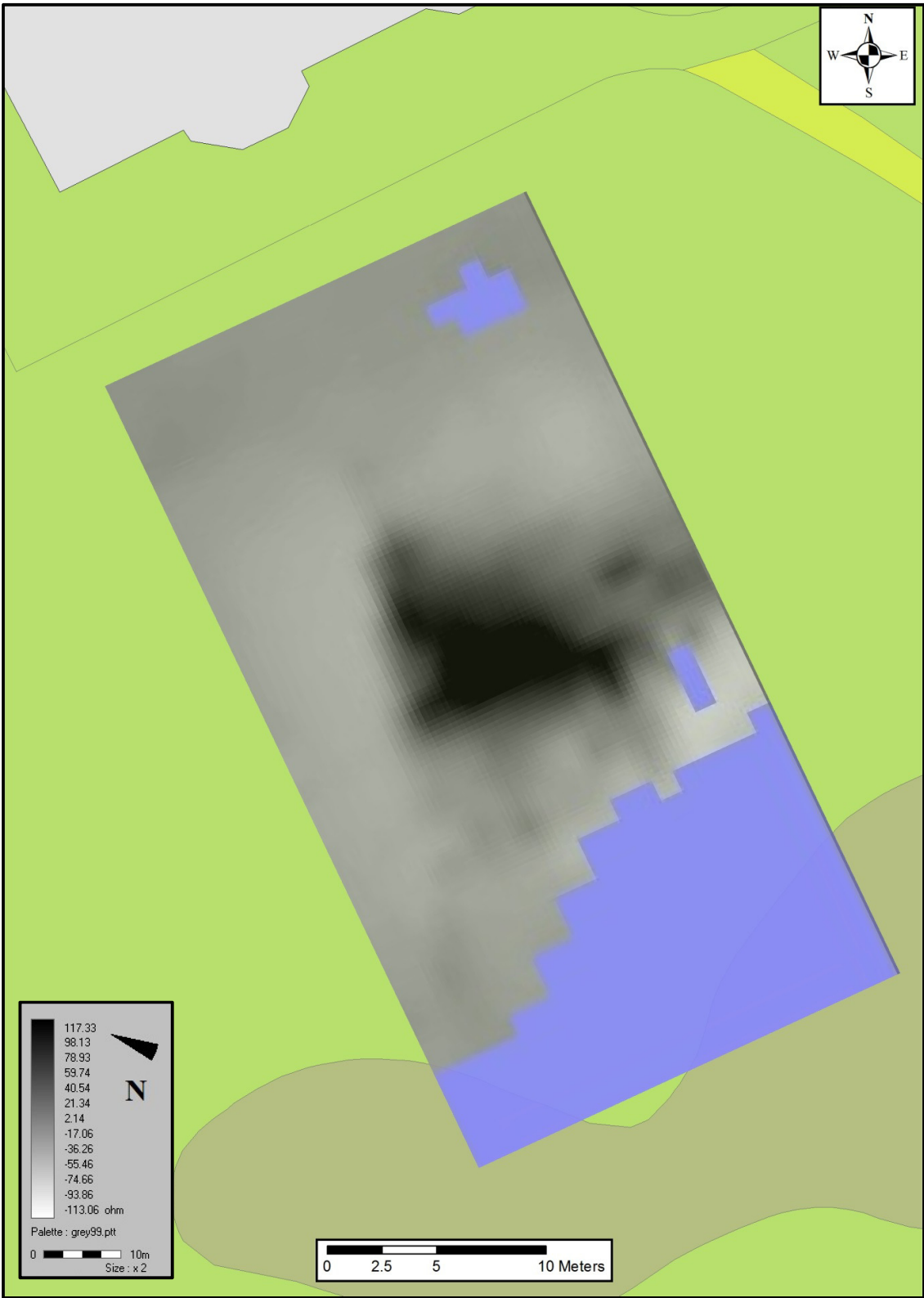


Figure 9 – Survey Site A Results (Processed).

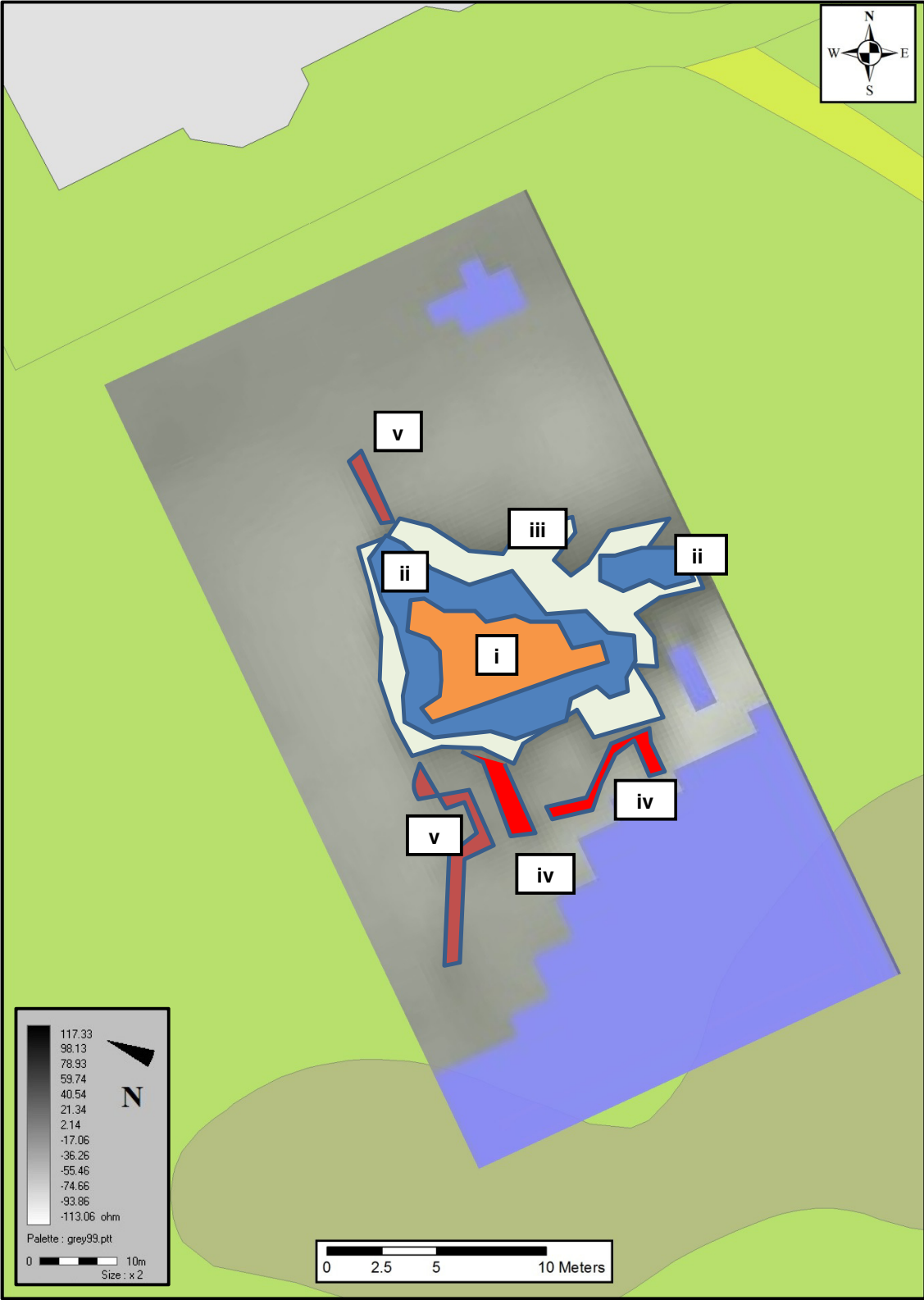


Figure 10 – Survey Site A Interpretation.

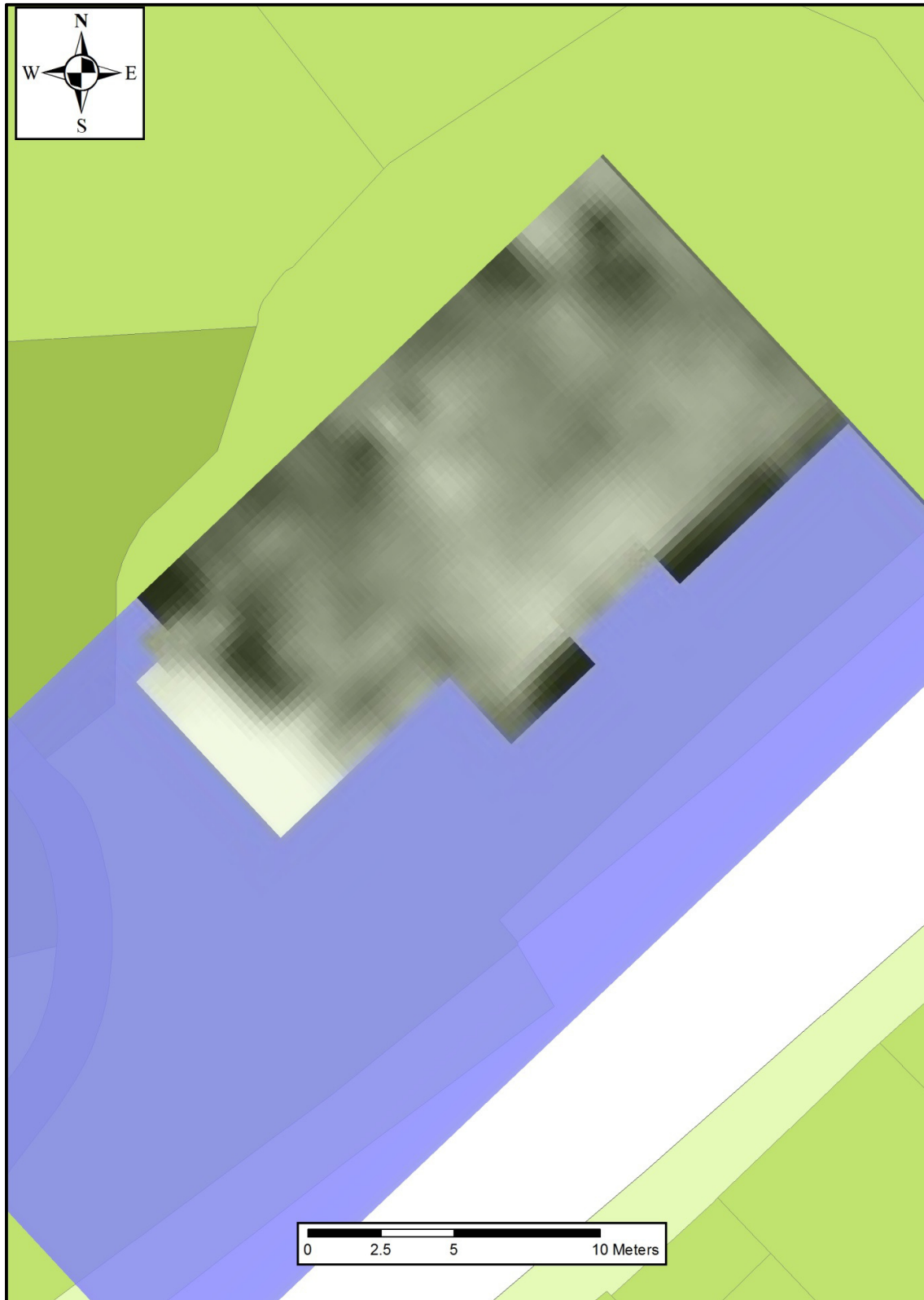


Figure 11 – Survey Site B Results (Processed).

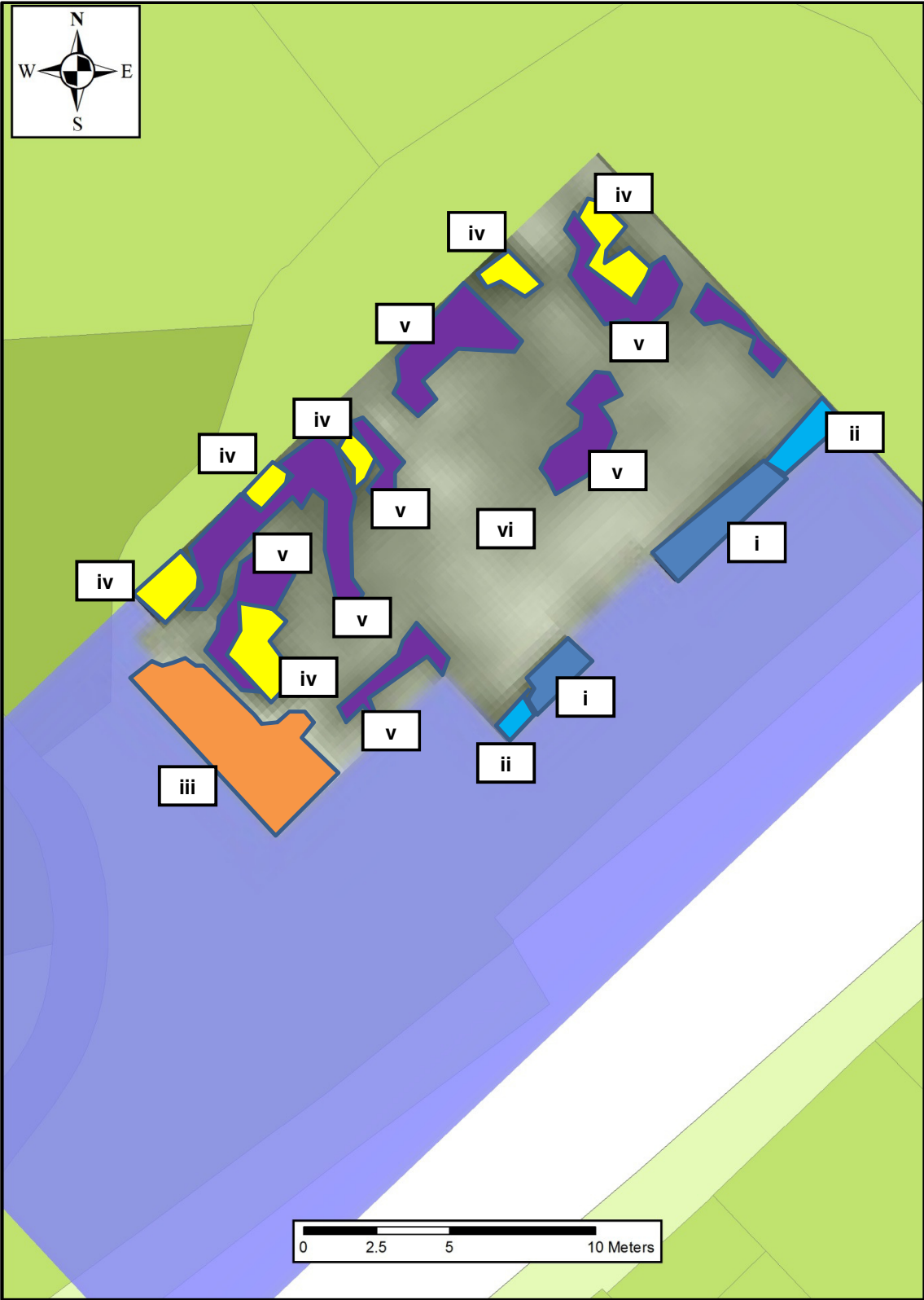
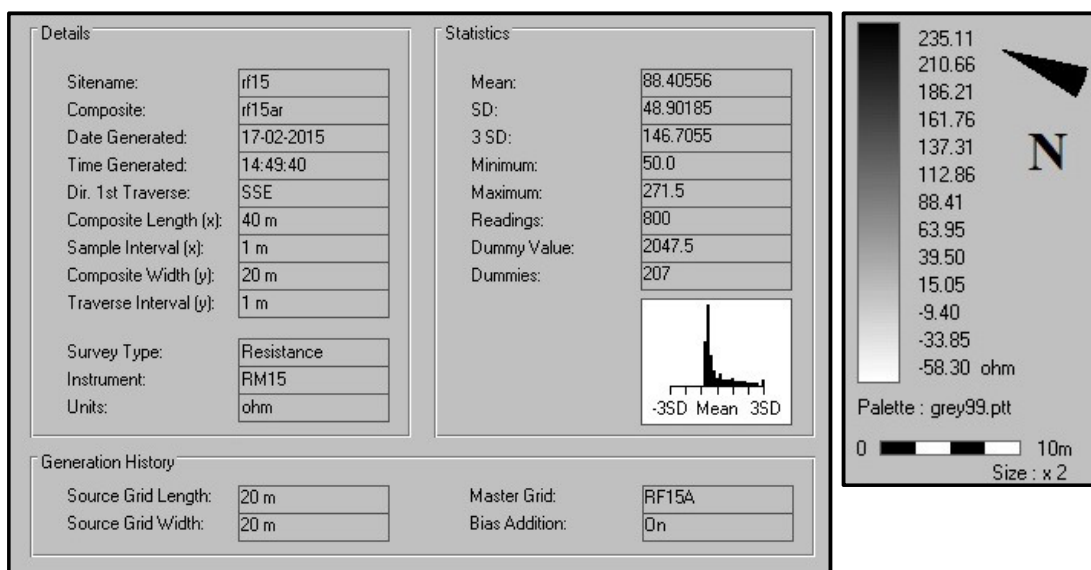


Figure 12 – Survey Site B Interpretation.

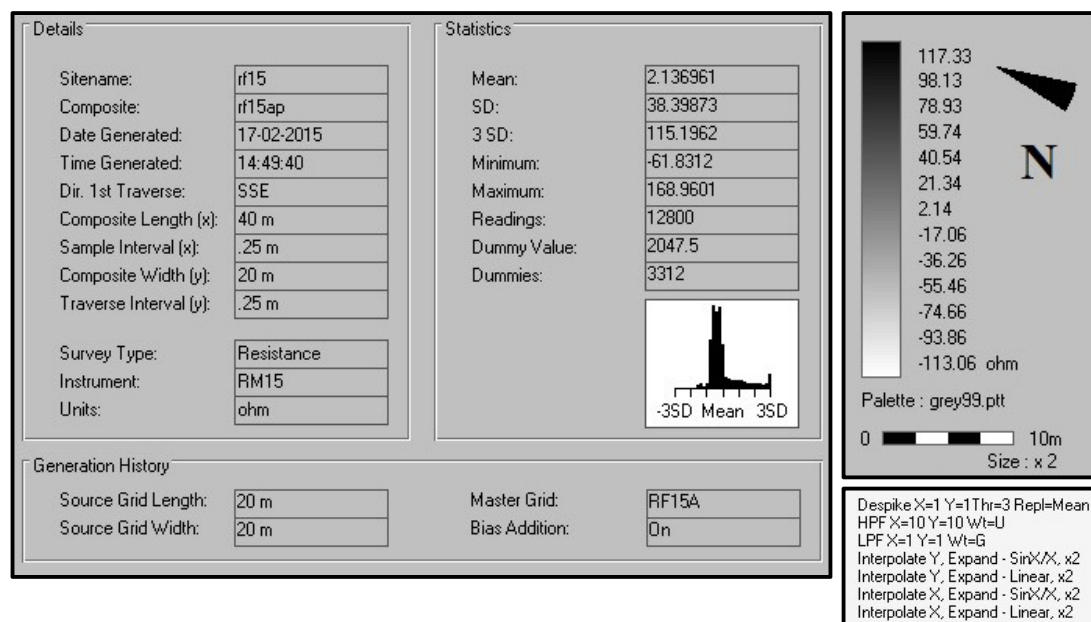
7 – APPENDICES

Survey Site A

Raw Data



Processed Data



Defect Removal – Noise Spikes: +/- 3 standard deviations (SD) about the mean.

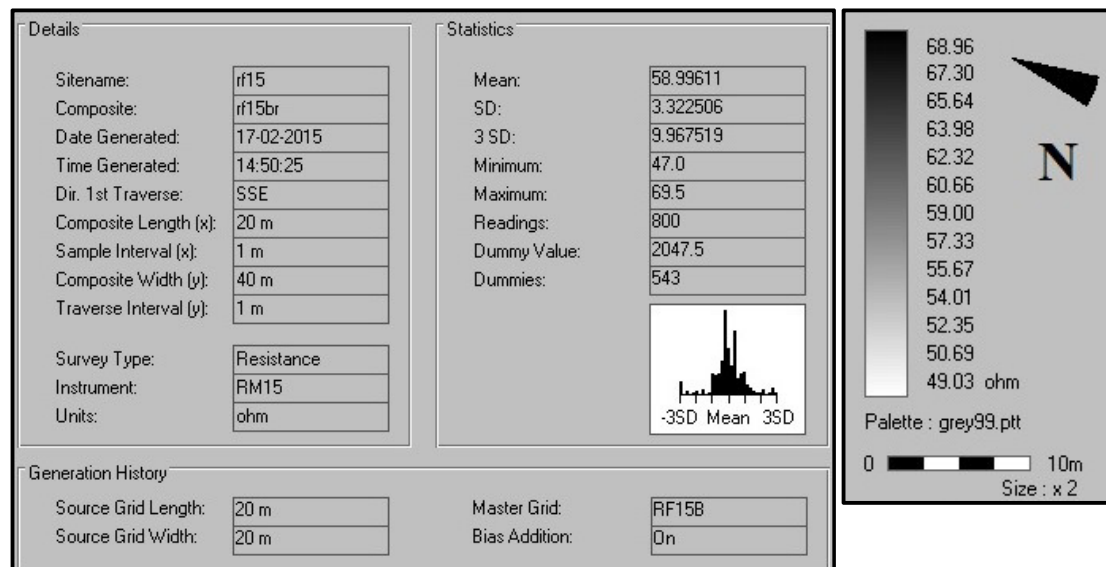
Removal of Geological Background: High Pass Filter function with a X / Y radii of 10.

Smoothing: Low Pass Filter function with a X and Y radii of 1.

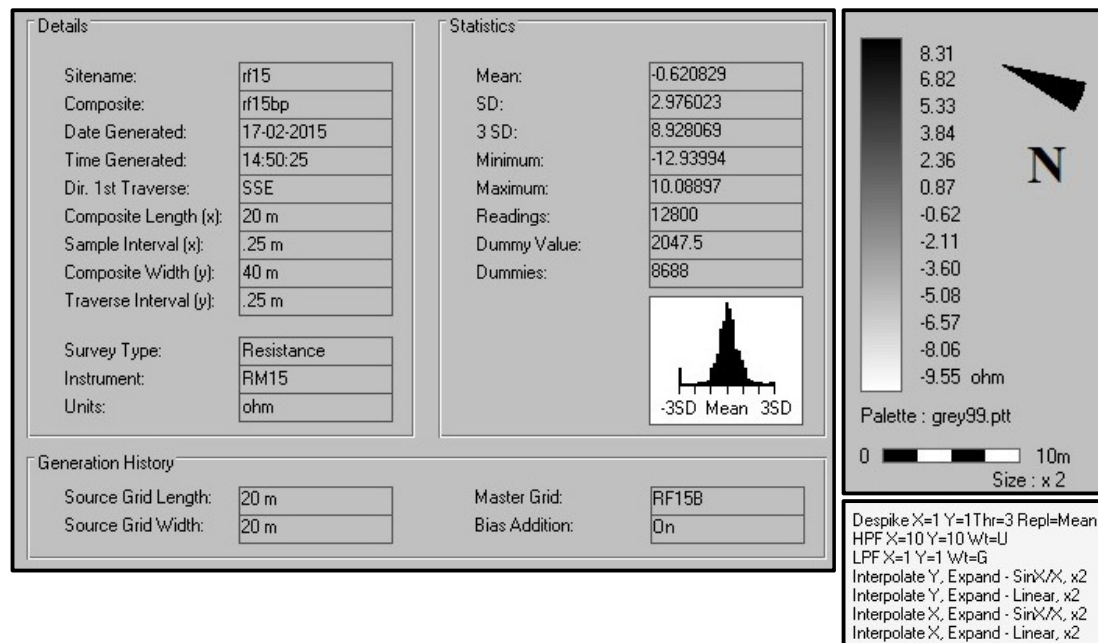
Interpolation (expand): Used to give a smoother appearance to the data and improve the visibility of weak archaeological features (Sin(x)/x).

Survey Site BH

Raw Data



Processed Data



Defect Removal – Noise Spikes: +/- 3 standard deviations (SD) about the mean.

Removal of Geological Background: High Pass Filter function with a X / Y radii of 10.

Smoothing: Low Pass Filter function with a X and Y radii of 1.

Interpolation (expand): Used to give a smoother appearance to the data and improve the visibility of weak archaeological features (Sin(x)/x).