



DARNLEY ARCHAEOLOGICAL SERVICES

**GEOPHYSICAL SURVEY BY MAGNETOMETRY, BAX FARM, TEYNHAM, Near
SITTINGBOURNE, KENT**

Planning Reference: n/a

NGR: TQ946 642

DAS Site Code: BXF20

OASIS Reference Number: TBC



Report prepared for Kent Archaeological Field School (KAFS)

By Darnley Archaeological Services

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Executive Summary

Darnley Archaeological Services was commissioned by KAFS (Kent Archaeological Field School), to undertake a geophysical survey using magnetometry on land at Bax Farm, Teynham, near Sittingbourne, Kent. Five hectares of an arable field were surveyed as part of an ongoing KAFS research project investigating an octagonal Roman bathhouse and associated settlement.

A series of positive linear and curvilinear anomalies were identified occupying much of the northern area surveyed characteristic of a possible Romano/British settlement. The southern area demonstrated one possible Late Prehistoric enclosure.



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1.0 Introduction

- 1.1 Darnley Archaeological Services (DAS) was commissioned by Kent Archaeological Field School (KAFS), to undertake a geophysical survey using magnetometry on land at Bax Farm, Teynham, near Sittingbourne, Kent, as part of an ongoing archaeological study of the area.
- 1.2 The site survey and reporting conform to current national guidelines as set out in '*Geophysical Survey in Archaeological Field Evaluation*' (English Heritage 2008), '*The Use of Geophysical Techniques in Archaeological Evaluations*' (Gaffney et al. 2002) and the Chartered Institute for Archaeologists' *Standard and guidance for archaeological geophysical survey*' (CIfA 2014).

2.0 Site Location and Description

- 2.1 Bax Farm is located in the administrative district of Swale Borough Council, approximately 4km east of Sittingbourne, 1.5 km northwest of Teynham village and 7km west of Faversham. The proposed survey site centres on 594741, 164189.
- 2.2 The bedrock geology comprises sand, silt and clay of the Thanet Formation, not previously known to affect magnetometry surveys adversely.
(<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>).

3.0 Planning Background

- 3.1 No planning applications on the site are known to exist.

4.0 Archaeological and Historical Background

- 4.1 This survey was commissioned by the Kent Archaeological Field School to expand on research conducted on the site by them in 2009 when an octagonal Roman bathhouse was fully excavated on the site (Wilkinson, 2012). Further features phased from Late-Bronze Age to Late Roman are present in the survey area and pottery from the 12th and 13th centuries have been recovered from robber trenches in the foundations of the bathhouse. The extent of archaeological activity in the area reminds one that caution should be employed when attempting to associate anomalies from the survey results with the bathhouse and villa due solely to their proximity.
- 4.2 A detailed study of the Kent Historic Environment Record database was undertaken to assist the analysis, discussion and conclusions to the geophysical survey results. The following provides each entry's HER number and brief description.

4.3 Prehistoric

TQ96SW255	Iron Age features, Bax Farm. In the survey area.
TQ96SW1015	Neolithic/Bronze Age findspot following fieldwalking activity over the entire survey area.



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TQ96SW194 Flint tempered sherds of Iron Age pottery were found at this point through field walking in 1996.

4.4 Roman

TQ96SW191 Bax Farm Roman Villa, adjacent to the octagonal bathhouse in the centre of the survey area.

TQ96SW1021 Seventeen sherds of Roman pottery were found in 1996 during fieldwalking.

TQ96SW1245 Roman building remains in the northwest corner of the survey area.

TQ96SW1025 Roman tiles in the adjacent field west of the survey area.

TQ96SE16 Romano-British fragments of Horse' bit and urns, found pre 1882. Possible date any time during the Roman period. South-east of the survey site.

TQ96SW1016 Three sherds of Roman pottery were found during fieldwalking.

4.5 Anglo-Saxon

TQ96SW253 Anglo-Saxon pottery found on the site of the Roman bathhouse.

TQ96SW254 Anglo-Saxon activity on the site of Bax Farm Roman villa.

TQ96SE6 Three Anglo-Saxon fibulae were reported to have been found in a Teynham brickfield around 1890, accompanied by amber and glass beads, a bronze armilla, a small bronze buckle, a bronze ring and fragments of amber coloured glass vase. Other finds of a spear, sword and shield boss were said to have come from Richardson's brickfield in 1881 but were suspected to be from the Kingsfield, brick field in Faversham.

4.6 Medieval

TQ96SW1019 Almost 40 sherds of medieval pottery were found during fieldwalking west of the survey area.

TQ96SW192 Medieval pottery finds in the northwest corner of the survey area.

TQ96SW1163 Bax Farmhouse, dating to 15th century south-south-west of the survey area.

TQ96SW1017 Fourteen sherds of medieval and post-medieval pottery were found during field walking in 1998.

TQ96SW1018 Twenty-eight sherds of medieval and post-medieval pottery during fieldwalking

TQ96SW1165 Church of St Giles Grade 1 listed 12th-14th century church west of the survey area.

4.7 Post Medieval

TQ96SW1163 Bax Farmhouse south-south-west of the survey area.



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MKE85538	Wilfred's Cottage, farmstead northwest of the survey area.
MKE85538	Cheke Court, farmstead, northwest of the survey area.
TQ96SW294	Oast northwest of Cheke Court, Post-medieval to Modern, northwest of the survey area.
TQ96SW63	Telegraph station at Telegraph Hill of Admiralty Shutter network 18th century, northwest of the survey area.
MKE85459	Binny Cottages, a Post Medieval – Approximately 19th c. loose courtyard plan farmstead, west of the survey area.
MKE85535	Lower Frognal Farm, a Post Medieval – Approximately 19th c. loose courtyard plan farmstead, east of the survey area.
TQ96SW1267	Late 19th century chalk pits south of the survey area
TQ96SE59	Richardson's Top Field Brickworks opened in the mid-19th century and connected by small-gauge railway north-east to Conyers Creek.
MKE85562	Sheepwash northeast of Lower Frognal Farm with a loose courtyard plan with a building to one side of the yard.

4.8 Multi-period and unknown

TQ96SW35	Tonge Castle, Medieval motte and bailey castle excavated in the 1930s, historical records exist of an 11th-century castle on the site, and the HER mentions the possibility of an AD 1st c. occupation. The site is partially covered by a medieval pond which has post-medieval alterations and may have formed part of the defences along with ditches and banks, south-west of the survey area.
TQ96SW315	Cropmark of an enclosure of unknown date, south-west of the survey area.
TQ96SW1054	Possible medieval moated manor house, Frognal, Teynham of unknown date. Possible archaeological trace of a moat and mound, also documentary evidence of a manor house by Hasted. The site currently occupied by several Grade II listed farm buildings (16th c.)
TQ96SE51	Collapsed chalk pit with chamber, possibly connected to nearby shallow chalk pit. Date unknown
TQ96SE1039	Two unidentified mounds, undated. North-east of the survey site.

- 4.9 The Kent HER contains records of monuments and finds covering a range of periods from Later Bronze Age to the present day. The record shows a continuity of settlement in the immediate area including high-status dwellings such as Tonge Castle (TQ96SW35) and the possible manor house at Frognal (TQ96SW1054), frequent Post-Medieval agricultural buildings and industrial activity in the form of quarries or mines (TQ96SE51, TQ96SE59 and TQ96SW1267). The records give a sufficient overview of the archaeological and historical context within the overall surrounding landscape.



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5.0 Methodology

- 5.1 The geophysical survey consisted of a detailed gradiometer survey of the area made available, extending approximately 5 hectares.
- 5.2 The fieldwork was carried out by a team of experienced geophysicists (Richard Taylor & Fred Birkbeck) from Darnley Archaeological Services, assisted by archaeology undergraduates from University of Kent, on 11 & 12 March 2020. The survey was accurately located and tied into the National Grid using a Leica GS18T RTK NetRover GPS.
- 5.3 The survey was carried out using a Bartington Grad601-2 Dual Fluxgate Gradiometer with an onboard automatic data logger. This instrument is a highly stable magnetometer which utilises two vertically aligned fluxgates, one positioned 1m above the other. This arrangement is then duplicated and separated by a 1m crossbar. The arrangement allows for rapid assessment of the archaeological potential of the site. Data storage from the two fluxgate pairs is automatically combined into one file and stored using the onboard data logger.
- 5.4 Data collection was undertaken in a zig-zag traverse pattern, using a sample interval of 0.25m and a traverse interval of 1m.

Summary of Survey Parameters

5.5 Fluxgate Magnetometer

Instrument:	Bartington Grad601-2 Dual Fluxgate Gradiometer
Sample Interval:	0.25m
Traverse Interval:	1.0m
Traverse Separation:	1.0m
Traverse Method:	Zig-zag
Resolution:	0.01nT
Processing Software:	Terrasurveyor version 3.0.35.10
Surface Conditions:	Established arable
Area Surveyed:	5 Hectares
Dates Surveyed:	11 & 12 March 2020
Surveyors:	Richard Taylor & Fred Birkbeck
Survey Assistants:	Kelsey Bennett & Tom Marshall
Data Interpretation:	Richard Taylor & Fred Birkbeck



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Data Collection and Processing

- 5.6 The grids were marked out with tapes measures and recorded using a Leica GS18T RTK NetRover GPS. Magnetic data was collected on a west-east alignment. The data collected from the survey has been analysed using Terrasurveyor 3.0.35.10. The resulting data plots are presented with positive nT/m values and high resistance as black and negative nT/m values and low resistance as white.
- 5.7 The data sets have been subjected to processing using the following filters:
- Clipping
 - De-Striping
 - De-Spiking
 - Interpolate
- 5.8 The De-Striping process – when data from a magnetometer survey conducted in a zig-zag pattern are processed, they can exhibit alternating bands of light and dark traverses caused by the direction sensitivity of the survey machine. The De-Stripe function assumes that the directional error is constant and sets the mean of all traverses to either zero or a value typical to all traverses.
- 5.9 Clipping – the clip function removes extreme data values by replacing the min and max readings with either absolute values or by +/- standard deviations.
- 5.10 De-Spike – ferrous objects on or under the ground surface cause anomalously strong spikes in plotted data. The de-spike function detects and replaces these readings with a mean filter.
- 5.11 Interpolate – the interpolate function increases the resolution of plotted data by generating extra data points between every existing data point in both X and Y directions.

6.0 Results

- 6.1 To interpret any anomalies, the survey data has been processed to the values of -12 to 10 nT/m (Figures 6 & 12). This enhances faint anomalies that may otherwise not be noted in the data, with several anomalies identified across the data set, and these are discussed in turn and recorded as a single of double-digit numbers.

Survey Area – Linear & Positive Anomalies

- 6.2 At the eastern side of survey area is (1), a circular positive curvilinear anomaly with a linear anomaly branching off in an easterly direction, both of which are suggestive of ditches associated with Late Iron Age "banjo" enclosures.
- 6.3 Toward the centre of the survey area is (2), a series of curvilinear and adjoining rectangular positive anomalies believed to be the location of the Roman octagonal bathhouse.
- 6.4 North of (2) is a series of positive linear anomalies (3) forming approximately 100m rectilinear feature, characteristic of an enclosure.
- 6.5 To the northwest side of the rectilinear anomaly (3) is a parallel linear anomaly that appears as a trackway or road (4).



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- 6.6 Southwest of (2) is a large rectangular positive anomaly (5) that may be the footprint of a building or structure.
- 6.7 Within the confines of (3), toward the western corner is a series of significant positive anomalies (6) that are suggestive of a structure.

Survey Area – Magnetic Noise, Dipolar and Bipolar Anomalies

- 6.8 Enclosing (2) is a large area, approximately 30m x 30m, of magnetic noise (7) likely relating to a combination of ferrous waste, thermoremanent material and other detritus accumulating around the margins of the probable bathhouse and any associated structures.
- 6.9 Within the confines (3) is an area showing a rectangular positive anomaly, surrounded by a more substantial area, approximately 15m x 9m, of magnetic noise (8) likely to relate to a combination of ferrous waste, thermoremanent material and other detritus associated with building demolition.
- 6.10 Similarly, to the west of (8) lies a similar area of anomaly components (9).
- 6.11 At the western side of the survey area is a circular area, approximately 15m in diameter, of magnetic noise (10) with an underlying positive response (suggesting a possible structure/platform) and a positive linear heading off the anomaly in a northeast direction.
- 6.12 Northeast of (10) is a rectangular area of magnetic noise (11), approximately 35m x 20m and contains several small positive anomalies suggestive of postholes that appear to form rectangular patterns.
- 6.13 To the north of a site is a sizeable bipolar anomaly (12), likely a modern service or water pipe, the southern arm of which truncates the rectilinear anomalies associated with (3).

7.0 Discussion and conclusion

- 7.1 The geophysical survey revealed the probable remains of the previously-excavated Roman octagonal bathhouse, and what appears to be an associated complex series of linear and curvilinear anomalies, potential structural footprints and a track or road.
- 7.2 Also, the survey revealed a potential Late Prehistoric circular enclosure to the east.
- 7.3 In conclusion, the survey has identified a site containing a complex series of possible multi-period anomalies, that also adds to the broader picture of Roman/British settlement remains excavated to date.

8.0 Effectiveness of Methodology

- 8.1 The non-intrusive evaluation employed was particularly appropriate to the scale and nature of the site to be surveyed. Magnetometry was the prospection technique best suited to the identification of archaeological remains on site. Other techniques would have required further justification and may have proved too time-consuming. However, any prospect of future archaeological evaluation trenching may benefit



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from additional small-scale resistivity survey over targeted areas that may indicate the presence of stone structures.

9.0 Acknowledgements

- 9.1 Sincere thanks are extended to Kelsey Bennett and Tom Marshall for their site assistance.
- 9.2 Darnley Archaeological Services wish to extend their gratitude to the landowner, Oliver Doubleday, for the kind permissions and access to the site.

10.0 References

CIfA, 2014, *Standard and guidance for archaeological survey*, Chartered Institute for Archaeologists, Reading

English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage

Gaffnet C., Gater J., and Ovenden S., 2002, *The Use of Geophysics Techniques in Archaeological Evaluations*. IFA No. 6 The Institute of Archaeologists

Webapps.kent.gov.uk/KCC.ExploringKentsPast.Web.Sites.Public

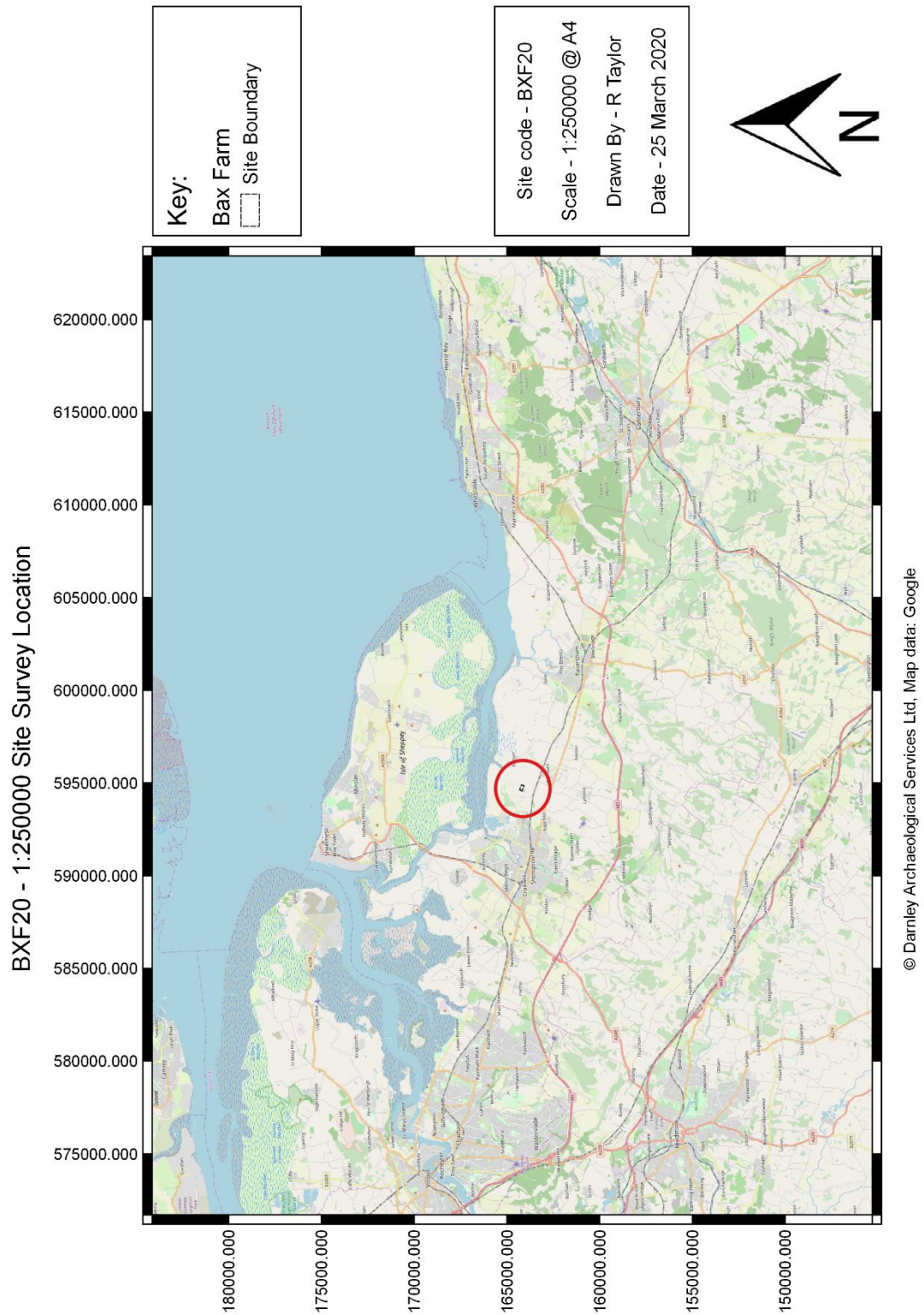
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Wilkinson P., 2012, *An archaeological investigation of the Roman octagonal bath-house at Bax Farm, Teynham, Kent*, Kent Archaeological Field School



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Appendix 1



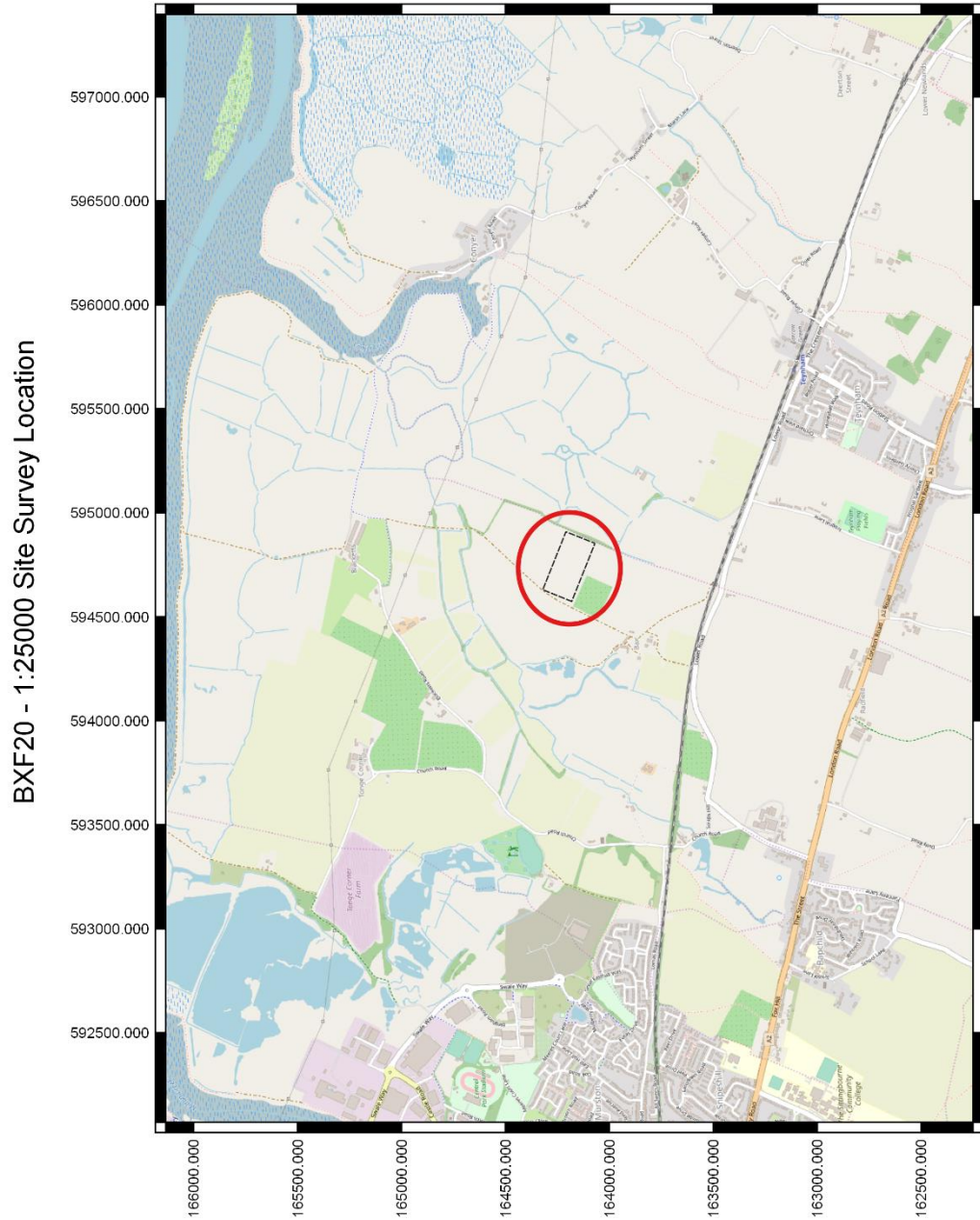
(Figure 1: 1:250000 Site Location)



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Key:
Bax Farm
Site Boundary

Site code - BXF20
Scale - 1:25000 @ A4
Drawn By - R Taylor
Date - 25 March 2020

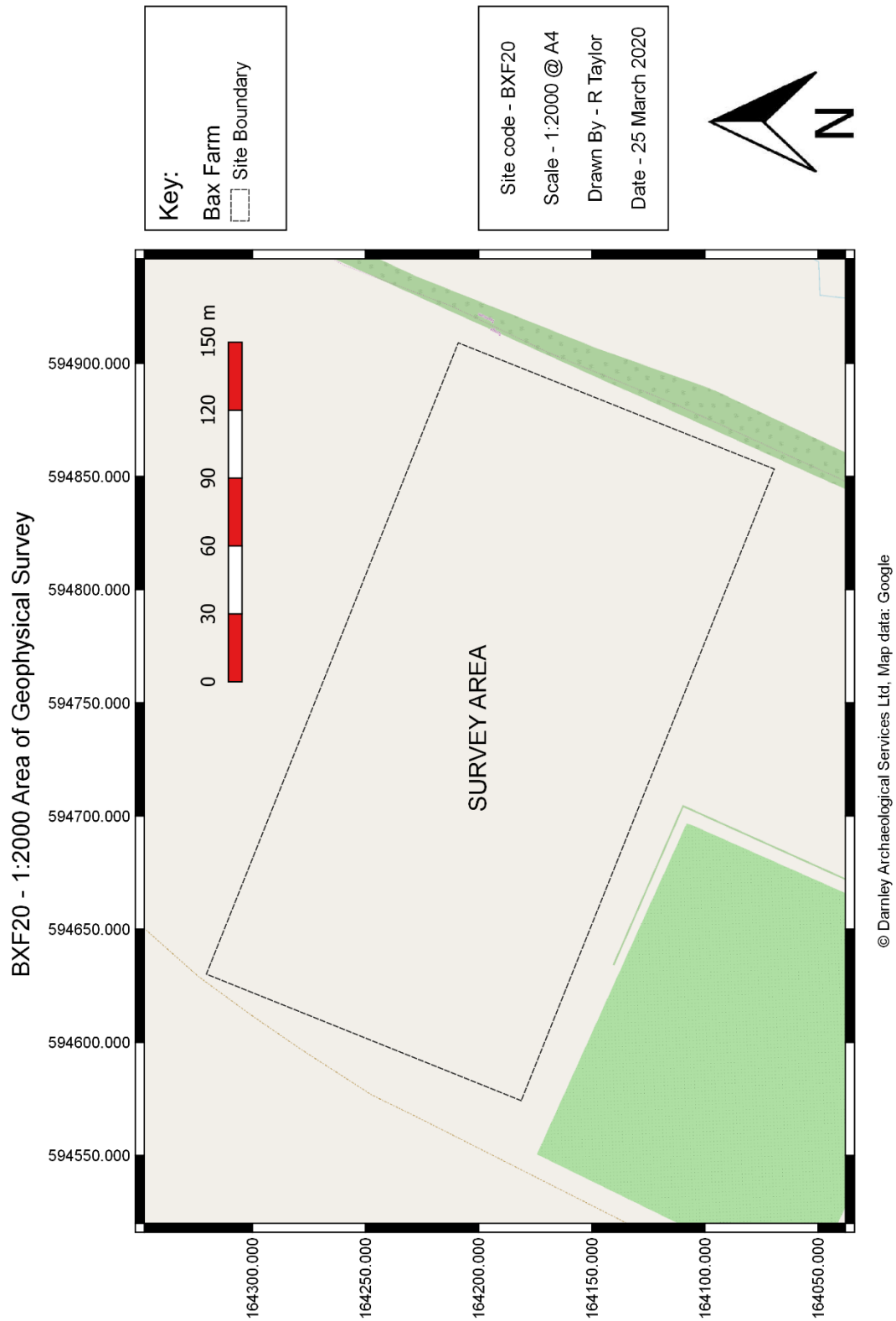


© Darnley Archaeological Services Ltd, Map data: Google

(Figure 2 – 1:25000 Site Location)



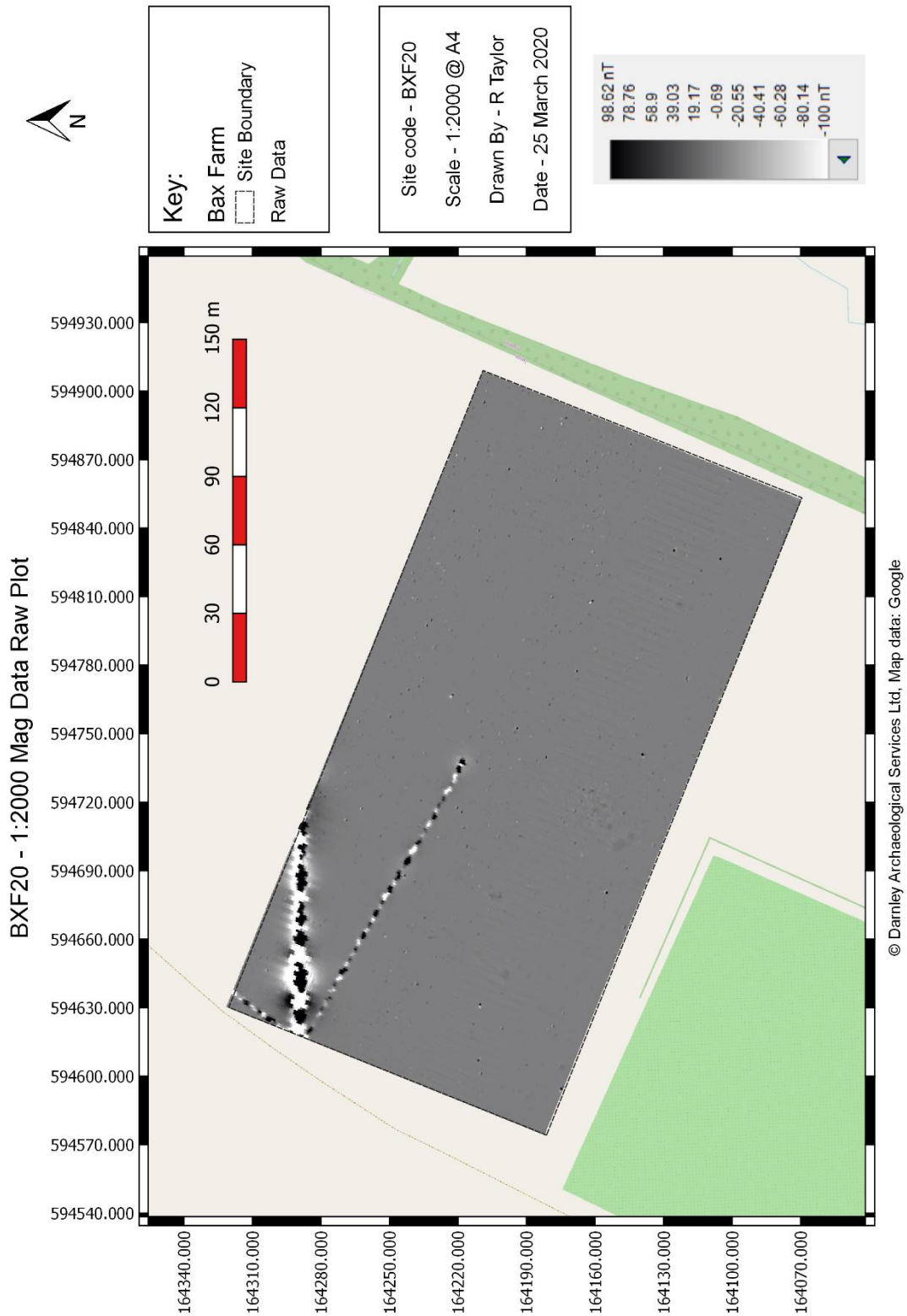
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(Figure 3 – 1:2000 Area of Geophysical Survey)



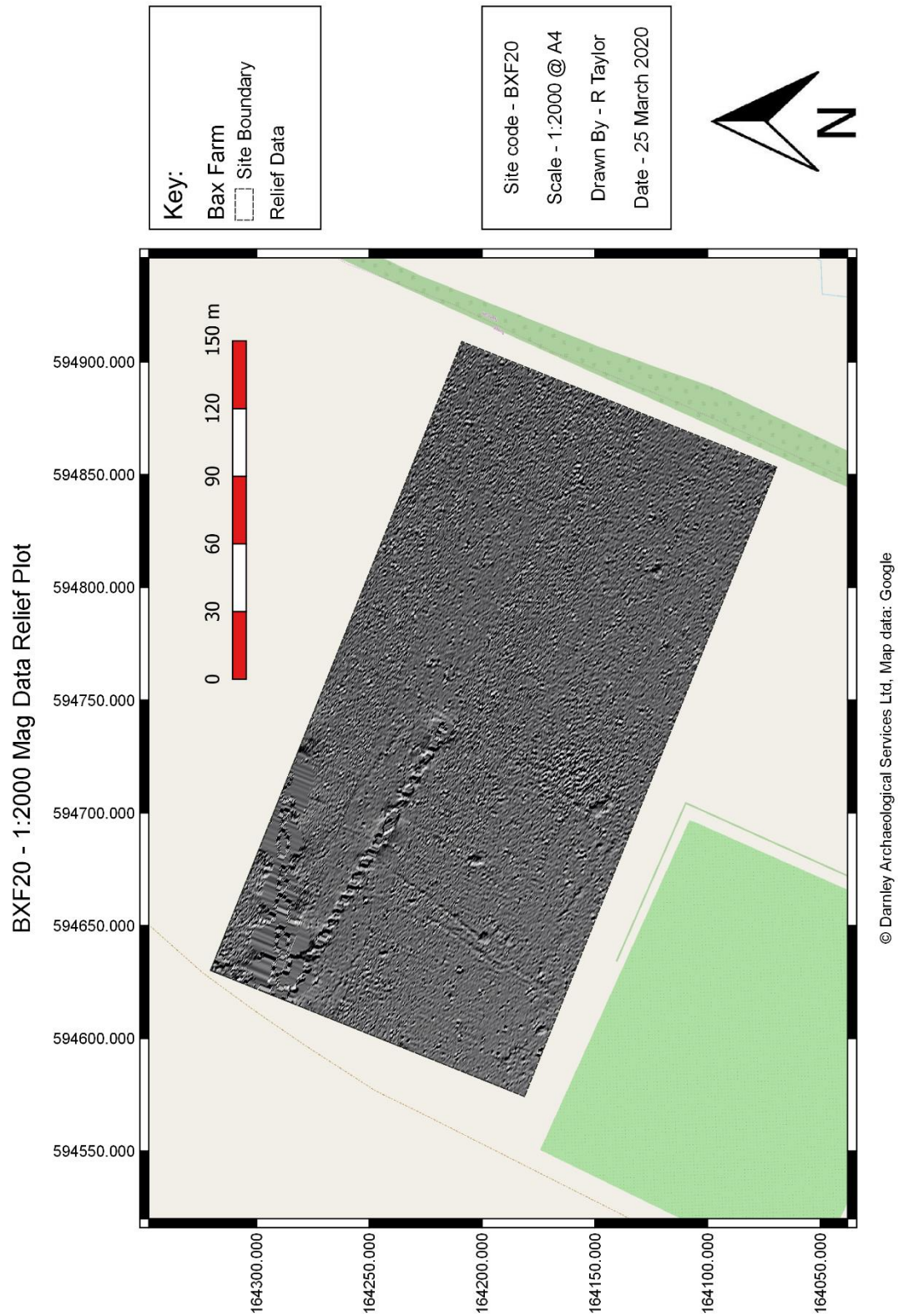
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(Figure 4 – 1:2000 Mag Data Raw Plot)



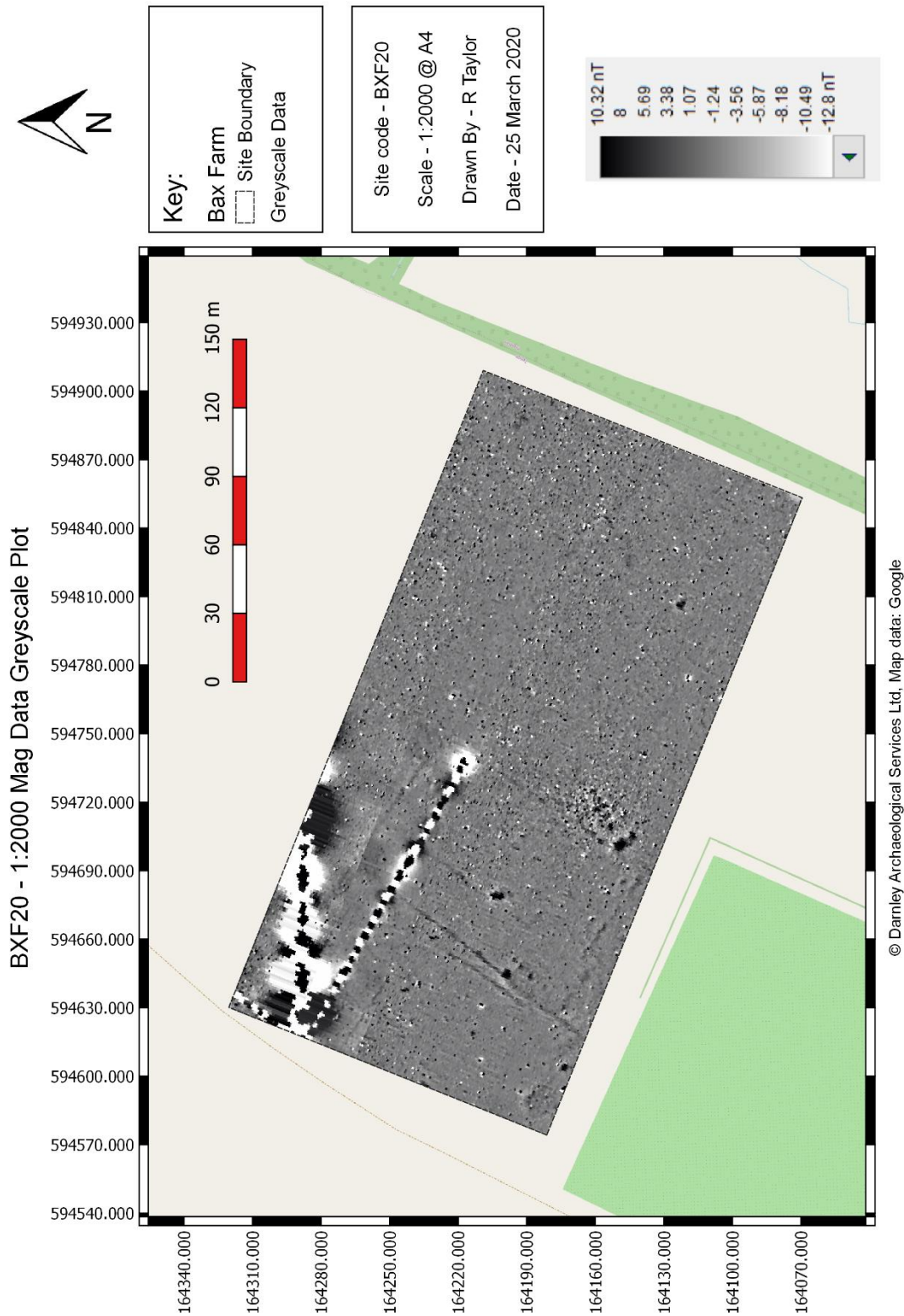
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(Figure 5 – 1:2000 Mag Data Relief Plot)



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(Figure 6 – 1:2000 Processed Mag Data Greyscale Plot)



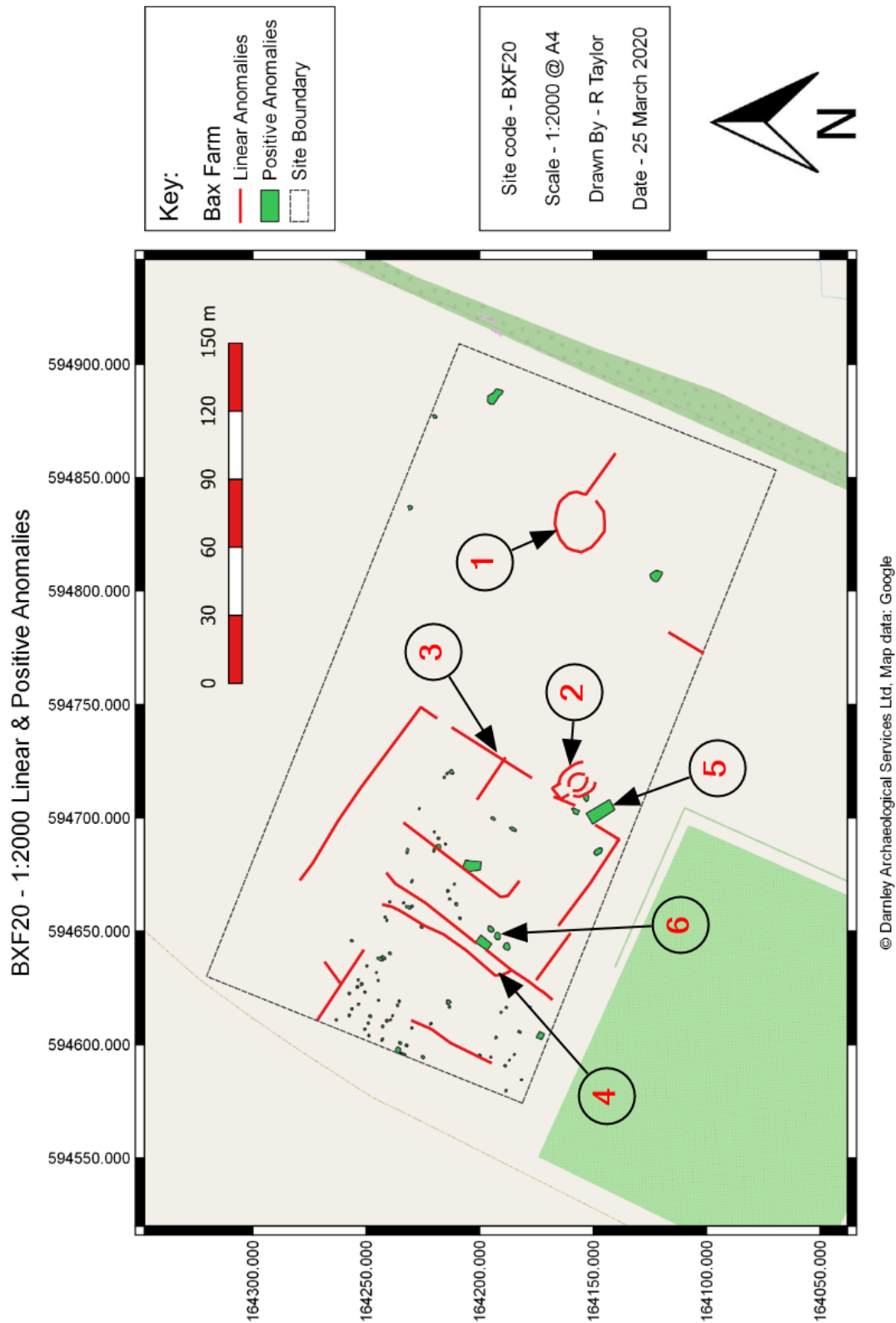
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(Figure 7 – 1:2000 Linear & Positive Anomalies)



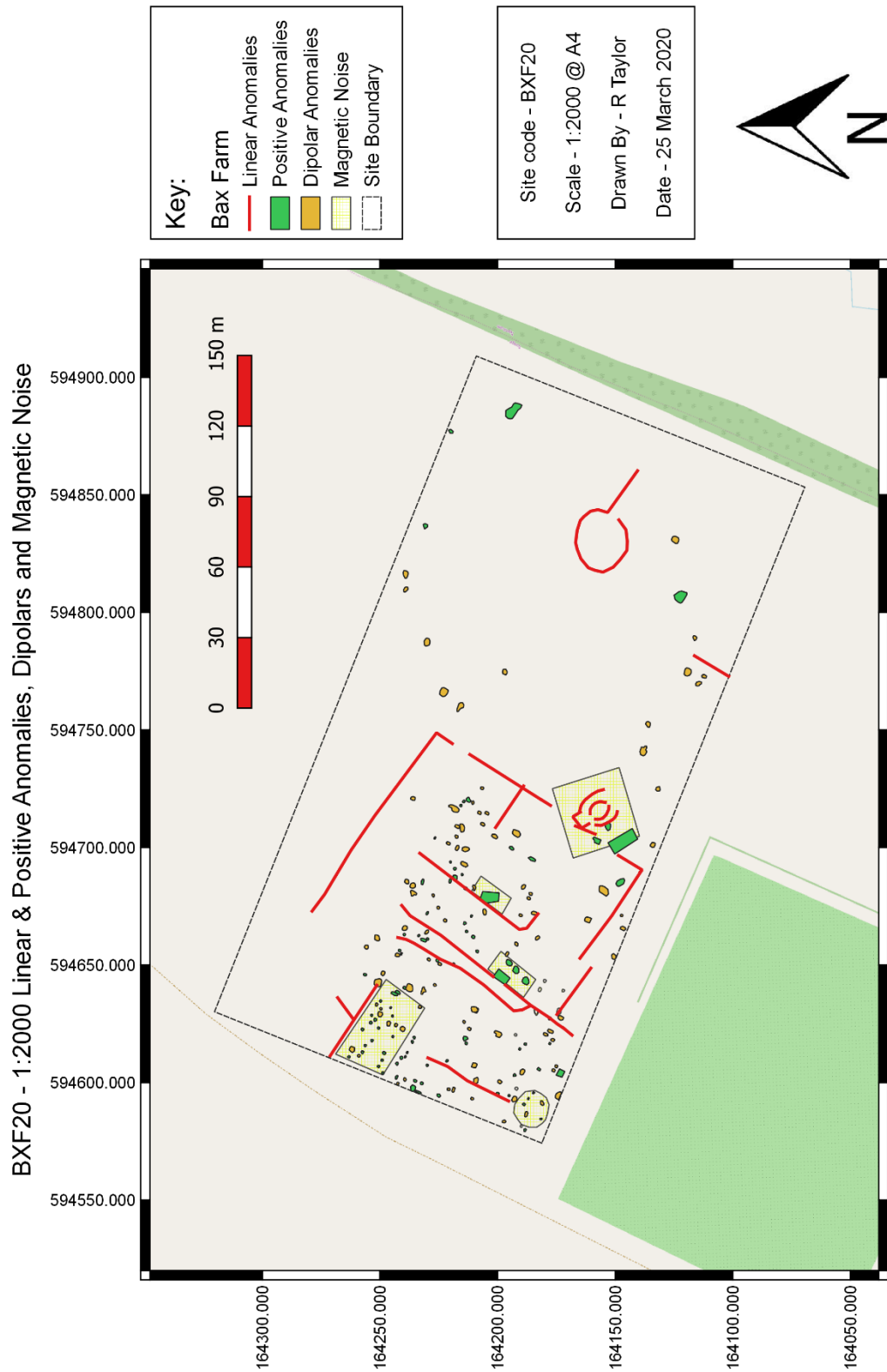
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(Figure 8 – 1:2000 Annotated Linear & Positive Anomalies)



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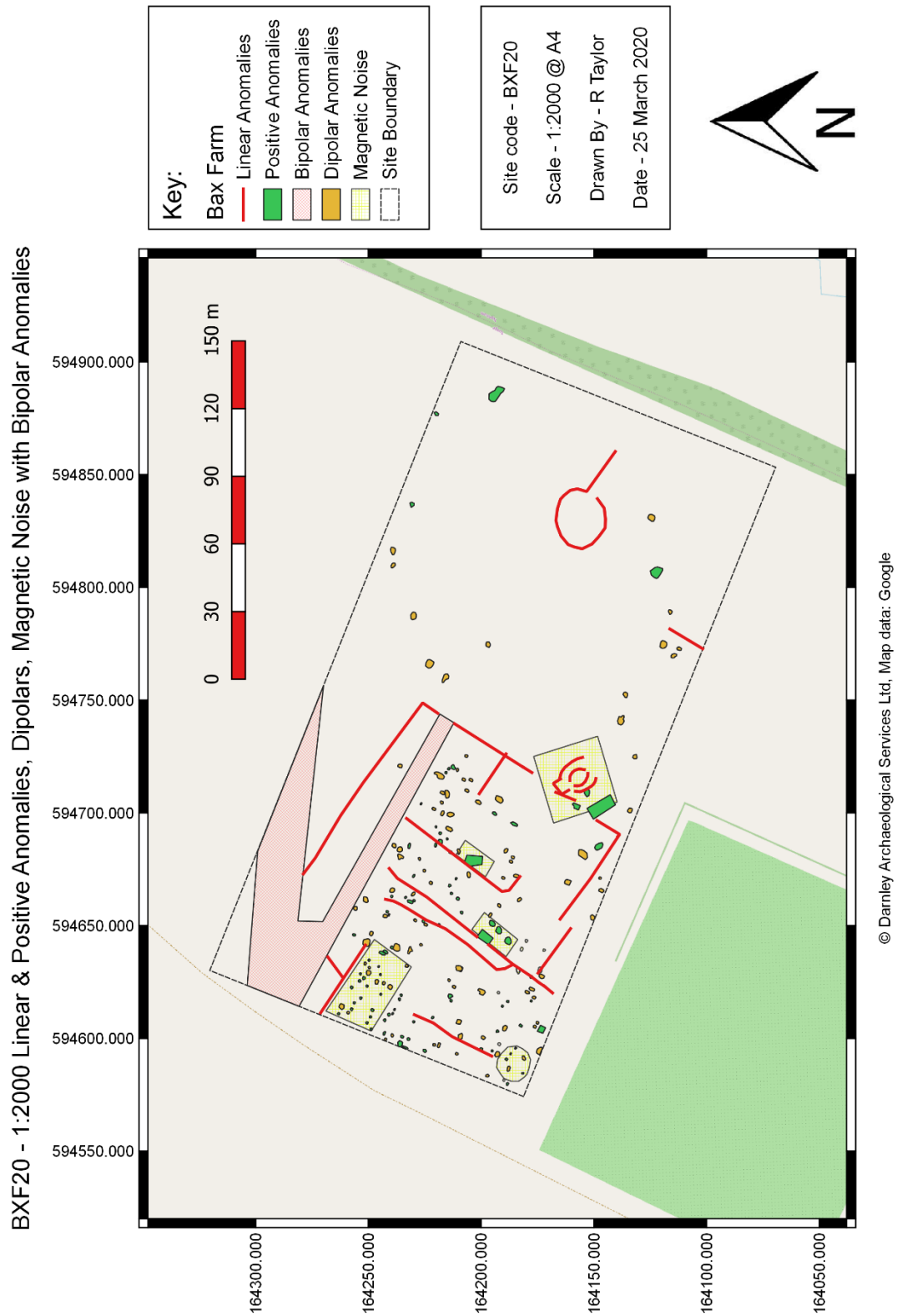


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(Figure 9 – 1:2000 Linear & Positive Anomalies, Dipolars and Magnetic Noise)



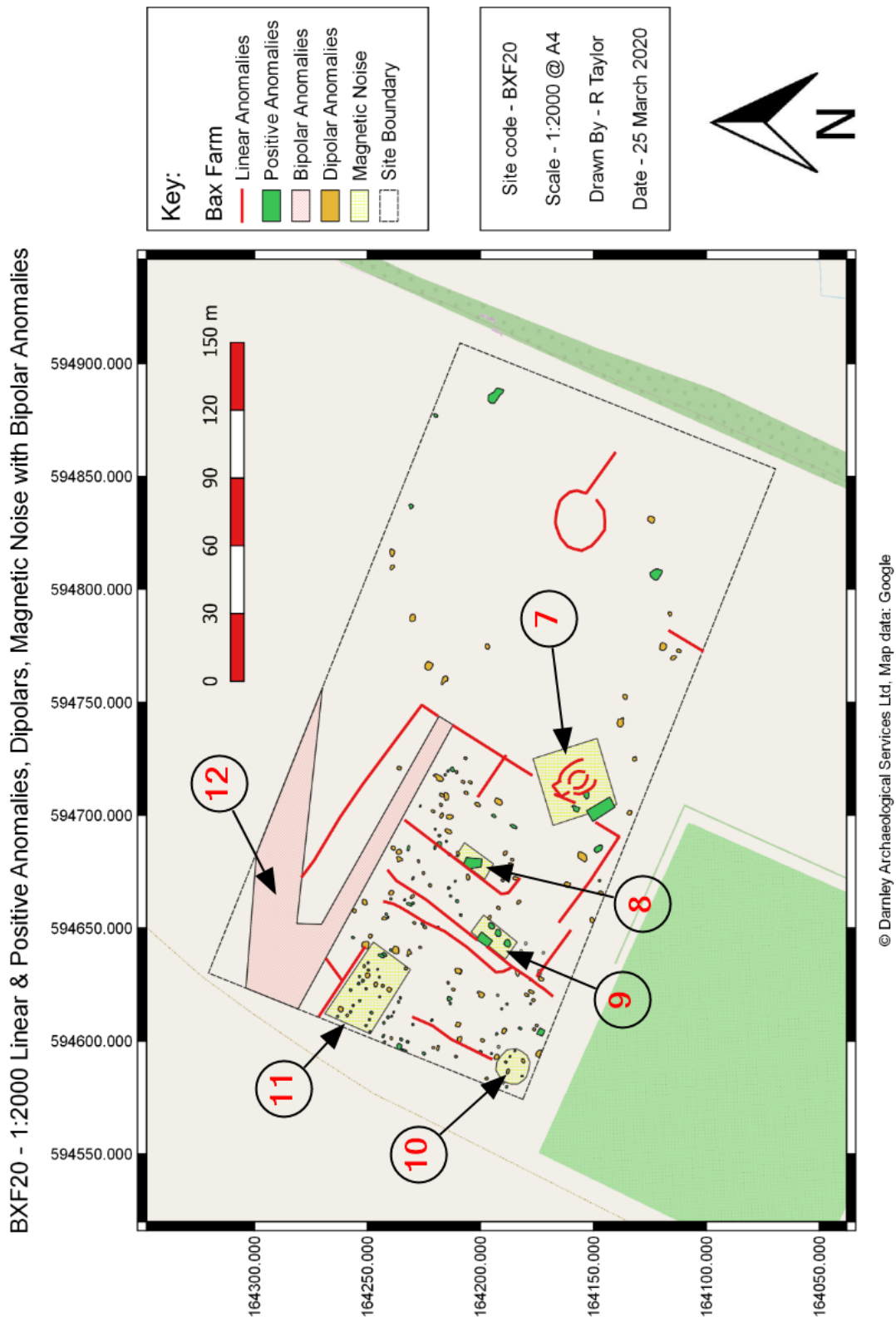
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(Figure 10 – 1:2000 Linear & Positive Anomalies, Dipolars and Magnetic Noise with Bipolar Anomalies)



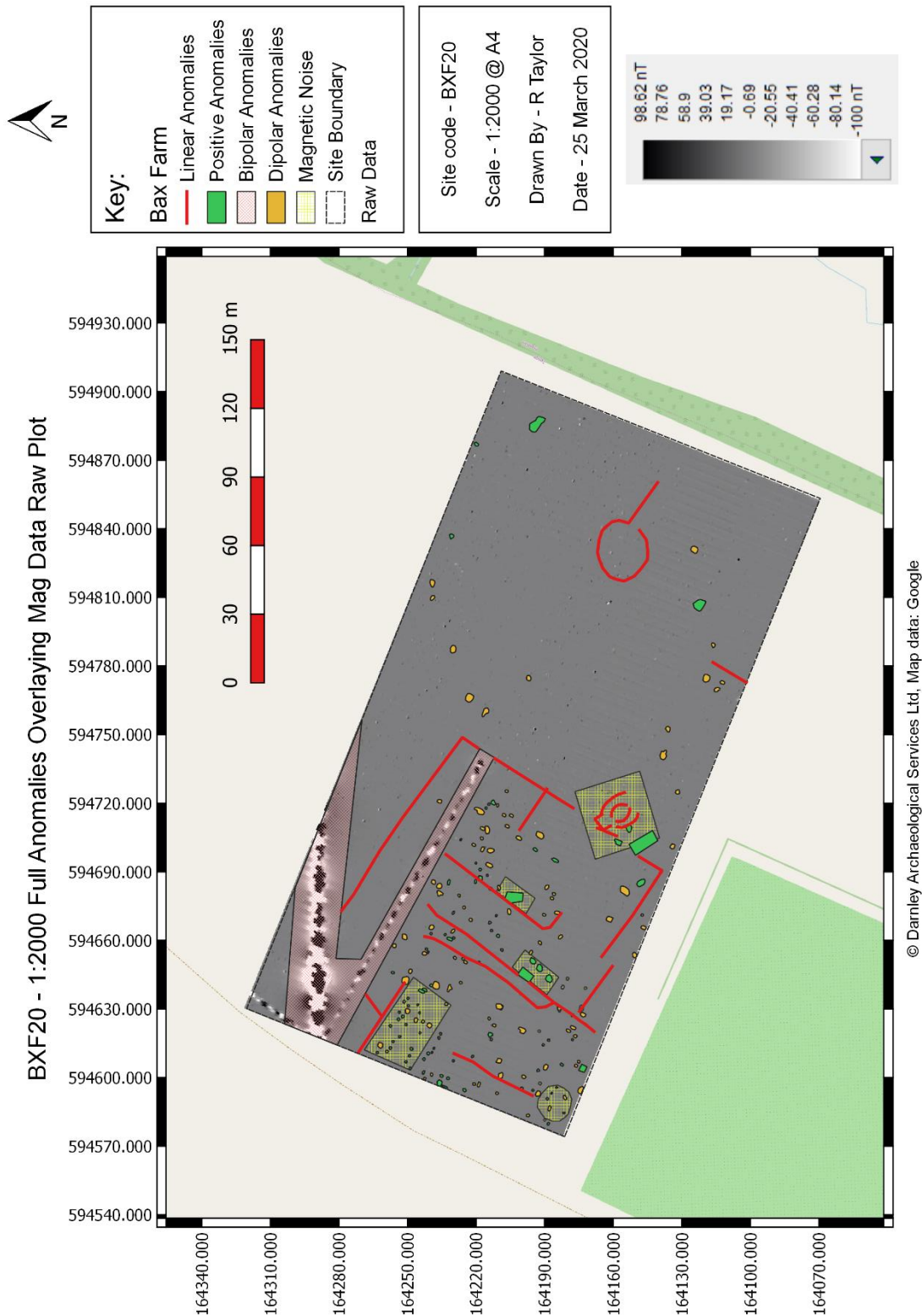
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(Figure 11 – 1:2000 Annotated Linear & Positive Anomalies, Dipolars and Magnetic Noise with Bipolar Anomalies)



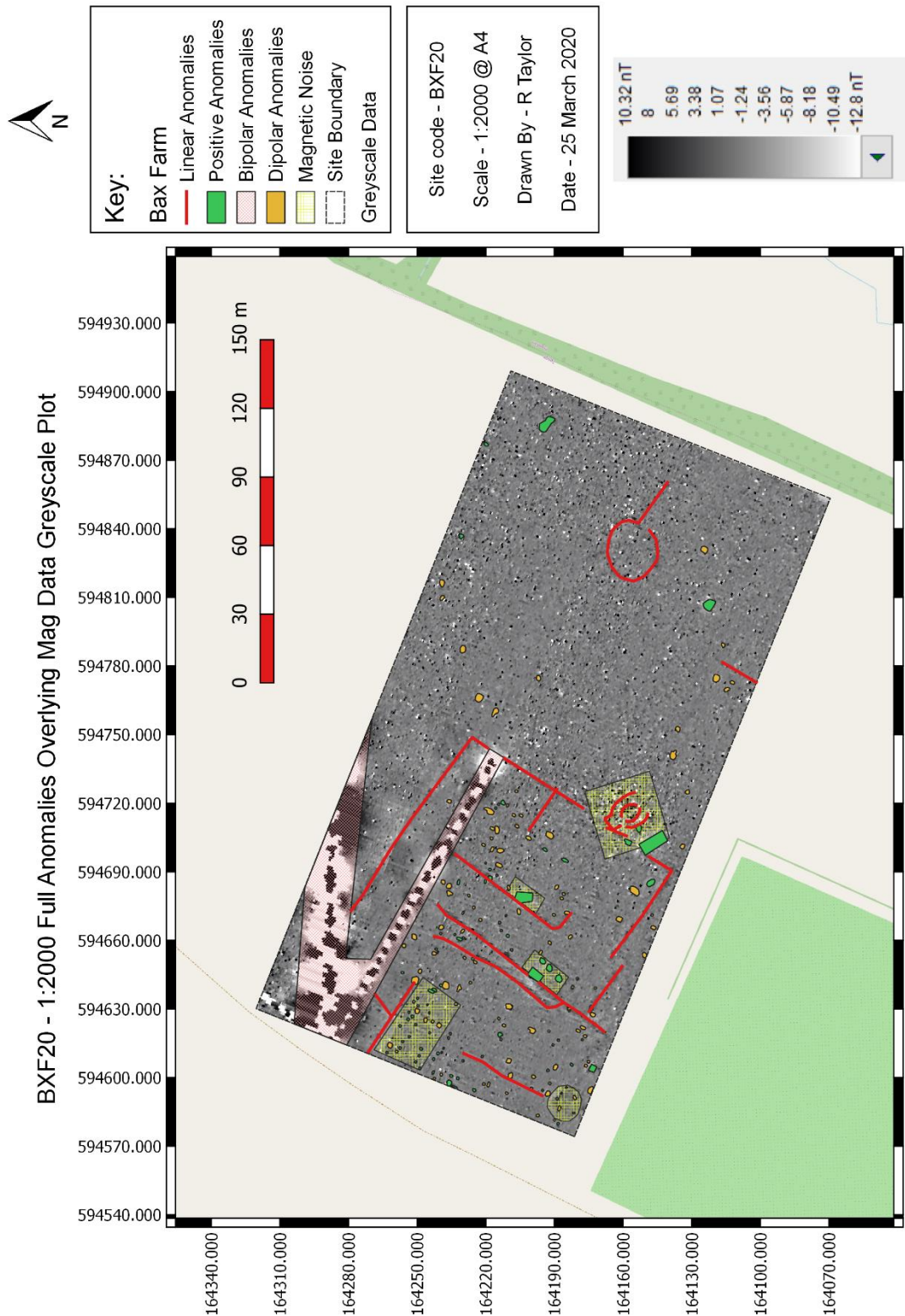
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(Figure 12 – 1:2000 Full Anomalies Overlaying Raw Mag Data Plot)



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(Figure 13 – 1:2000 Full Anomalies Overlaying Processed Mag Data Greyscale Plot)