WINECOVE CLIFF CASTLE

TREYARNON

ST MERRYN

CORNWALL

Results of a Geophysical Survey

South West Archaeology Ltd. report no. 231215

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WINECOVE CLIFF CASTLE, TREYARNON, ST MERRYN, CORNWALL
RESULTS OF A GEOPHYSICAL SURVEY

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Work undertaken by SWARCH for the Cornwall AONB

SUMMARY

This report presents the results of a magnetometry survey and resistivity survey carried out by South West Archaeology Ltd. (SWARCH) on land at the Scheduled Iron Age Cliff Castle at Wine Cove, St Merryn (List entry no. 1004234; MCO6588; HER no.21790). The site includes three promontory forts (MCO6589, MCO6590, MCO6591) defining a single cliff castle. It is in an area of coastal rough ground within a Cornwall area of the AONB. The surrounding area contains evidence of Mesolithic findspots, Bronze Age barrows, Iron Age settlement and farming, Medieval field systems, Post-Medieval quarries, and a World War II structure. This phase of geophysical survey was requested as part of the AONBs Monumental Improvement project.

The geophysical survey identified 36 groups of anomalies (1-26 on the magnetometry survey; and A-J on the resistivity survey) comprised of c.60-77 anomalies, depending on how one differentiates the responses. Agricultural activity and geological variation was also ostensibly apparent in the geophysical record.

Identifed anomalies from all three promontories included:

- *Eight linear anomalies and deposits associated with extant ramparts.*
- *Five discrete anomalies associated with possible pits or tree-throws.*

Identifed anomalies from the northern promontory included:

- *A division between topsoil and bare rock associated with weathering and erosion at the tip of the northern promontory.*
- *Three linear anomalies associated with footpaths and the south-west coast path.*

Identifed anomalies from the middle promontory included:

- *Two linear anomalies that may be associated with eroded pathways and/or outer ramparts to the castle.*
- *Linear anomalies and spreads that may be indicative of platforms and pits with burnt or Modern debris.*
- *Tracks or boundaries associated with anecdotal accounts of probable 19th century activity on the site relating to a tunnel on the middle promontory.*
- *Linear and discrete anomalies associated with archaeological features visible in the cliff edge of the middle promontory.*

Identifed anomalies from the southern promontory included:

- *A line of four discrete anomalies possible associated with the inner rampart of the southern promontory and indicative of stony deposits.*
- *A spread of anomalies associated with the edge of a possible platform or turf cutting or eroded area.*
- *A line and spread of anomalies indicative of pits, tree-throws or geology.*
- *A circular anomaly indicative of a possible ring ditch containing a possible spread or disturbed ground.*
- *A rectilinear anomaly indicative of a ditch.*
- *Linear anomalies possibly indicative of shallow ground disturbance, ditches, geology or agricultural activity.*

Other than evident buried archaeological features that are visible in the cliff edge of the middle promontory; the most significant anomalies on the site are associated with probable Post-Medieval to Modern activity, the extant castle ramparts, and a possible ring-ditch that could be representative of Iron Age settlement activity.

The surveys have ostensibly succeeded in identifying probable archaeological resources. However, they do not provide clear and definitive anomalies associated with identified buried probable archaeological features. It is possible that archaeological features and deposits are not clearly discernible in the geophysical record. Intrusive archaeological works would test the efficacy and validity of the results of the geophysical survey and aid to confirm the presence or absence of any archaeology resource on the site.

September 2023

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1.0 INTRODUCTION

LOCATION: WINECOVE CLIFF CASTLE, WINE COVE, NEAR TREYARNON
PARISH: ST MERRYN
COUNTY: CORNWALL
NGR: SX 85469 73592
SWARCH REF. CANB22 (WINE COVE)

1.1 PROJECT BACKGROUND

South West Archaeology Ltd. (SWARCH) was commissioned by the Cornwall Area of Outstanding Natural Beauty (AONB) to undertake a geophysical survey on land at Winecove Cliff Castle, near Treyarnon, St Merryn, Cornwall. This work was requested as part of the Monumental Improvement (MI) project at a number of Scheduled Monuments within the AONB. This work was undertaken in accordance with best practice and CIfA guidance.

1.2 TOPOGRAPHICAL AND GEOLOGICAL BACKGROUND

Winecove Cliff Castle is located on the coastline of the Trevose Head Heritage Coast, *c.*240m south of Treyarnon Bay and *c.*700m south of Constantine Bay. It is across a series of headlands with rugged cliffs and coves beneath a maritime cliff top grassland. The site includes three promontory forts/headlands protruding between Trethias Island, Wine Cove, Pepper Cove and Warren Cove. The earthworks of an Iron Age cliff top castle partially survive across the site, although erosion has presumably removed stretches of these defences. The site is mostly under long and tufty grass and slopes gently to the west and the coastal cliff edge, with some bare rock in places at the surface near the coastal edges of the site. The site is at a height of between *c.*23m and *c.*29m AOD.

The soils on the site are the shallow well drained loamy soils over rock of the Powys Association (SSEW 1983), which overlie the slate and siltstone of the Trevose Slate Formation and Rosenum Formation (BGS 2023).

1.3 METHODOLOGY

This work was undertaken in accordance with current best practice and CIfA guidance.

Any desk-based assessment aspect of this report follows the guidance as outlined in: *Standard and Guidance for Archaeological Desk-Based Assessment* (CIfA 2014a) and *Understanding Place: historic area assessments in a planning and development context* (English Heritage 2012).

The geophysical survey follows the general guidance as outlined in: *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider* (Europae Archaeologiae Consilium/European Archaeological Council 2016) and *Standard and Guidance for Archaeological Geophysical Survey* (CIfA 2014b).

FIGURE 1: SITE LOCATION (THE SITE IS INDICATED).

2.0 DOCUMENTARY BACKGROUND

2.1 HISTORICAL BACKGROUND

The site is in the parish of St Merryn, in the deanery and hundred of Pyder (Lysons 1814). St Merryn was recorded as *Sancte Marine* in 1259, and named for a 'Celtic' saint, Merin/Meren (Watts 2004). Treyarnon was first recorded in the 13th century as *Trearvan* and *Treyarnen*, probably meaning 'farm of Yarnenn' from the Cornish *tre* meaning 'farm' and a personal name (Watts 2004). Anecdotally Wine Cove may have been named in regards to wine products being smuggled via cliffs at the base of the cove (Pers. Comms.); however, in similar place names, 'wine' can be derived from 'winding' (e.g. Wineham (Watts 2004)) and could refer to rivers, or in this case, the coastline. Anecdotally, 'wine' could also refer to the colour of the sea, such as is a tradition in Homeric literature. The site and monument equates to the majority of plot 408 on the *c.*1841 tithe apportionment for St Merryn. This was part of the Trethries farm/estate, which was split among various owners and occupiers. Plot 408 was owned by a Jane Morcombe and occupied by Joseph Morcombe. Its field name was *Common* and it was listed in the tithe apportionment as under arable cultivation. The fields in the wider landscape had mostly prosaic names on the tithe apportionment; however, some of those in the immediate vicinity of the site had more interesting names possibly derived from local dialects or uses (see Table 3 in Appendix 2).

2.2 CARTOGRAPHIC DEVELOPMENT

The *c.*1810 Surveyor's draft map (Figure 21) that covers the site depicts the coastline of promontories at the site; including the three that constitute the site and a fourth immediately south of them. It also shows a possibly accurate approximation of the field pattern/enclosure immediately east of the site near *Treyarnon*.

The *c.*1841 St Merryn tithe map (Figure 22) depicts the site location in more detail, with a more accurate depiction of the promontories and adjacent, ostensibly Post-Medieval field system. The site and monument equates to the majority of plot 408.

The *c.*1880 Ordnance Survey (OS) mapping (Figure 23) shows continuity with the *c.*1841 tithe map regarding the local field-scape. It labels *Camp* at the site and depicts rampart earthworks on the site. The site is also depicted as rough ground. Continuity in the site layout and OS mapping is evident on the subsequent *c.*1905 OS mapping (Figure 24); although a barrow has been ostensibly identified or labelled to the south of the site. Further continuity over time is evident in *c.*1938 OS mapping (Figure 25), although with a number of structures to the north-east of the site. Subsequent mapping depicts beach houses/structures and properties in the approximate location of the structures north-east of the site, and a World War II bunker immediately east of the site that has subsequently been converted into private property/residence/holiday home. A camping and caravan site has also subsequently developed on the fields immediately east of the site, beside Trethias Farm.

LiDAR imagery from 2019 and 2022 (Figures 19 and 20) shows earthworks equating to the ramparts of the promontories and various paths and footpaths along and contiguous with the south-west coast path. One may also discern the direction in which ground has been worked or ploughed, especially the north-east corner and south-west promontory of the site. Modern enclosure and development to the east of the site is extremely clear. A specific topographic characteristic is evident on each promontory; a rip in the topsoil of the northern promontory defines a stark division between the area of bare rock towards its tip and the area with overlaying soil on its landward side; The access to a short extant length of tunnel is visible near the middle of the middle promontory; and the broad edge to a platform that may be natural or man-made is visible at the west end of the

southern promontory. Supporting cartographic sources and LiDAR imagery for this section can be seen in Appendices 1 and 2.

2.3 UNDESIGNATED HERITAGE ASSETS AND ARCHAEOLOGICAL SURVEYS

The Aerial Investigation and Mapping project (NMP) for the area conducted from 1994-2006 with continuing additions/amendments based on LiDAR and satellite imagery identifies the extant rampart banks and ditches of the castle (MCO6588), including: a single set of ramparts across the northern promontory; two sets of ramparts across the middle promontory and three sets of ramparts across the southern promontory. On this mapping the two outer sets of ramparts to the southern promontory align with the ramparts of the middle promontory, while the third southern rampart/ditch may align with the northern promontory. Given the presumed erosion of the coves between the promontories, and at the west ends of the promontories, it is difficult to be sure which ramparts once connected or if the ramparts ever had bends and wrapped about the coves. However, it appears as though these promontories were once connected within the limits of the ramparts. How much they existed as separate promontories or as a single cliff top at different times in the past can only be speculated upon. The identification of features that have been truncated, at the edge of the cliff edges, would allow for better informed speculation on the former extents of the promontories/cliff top. The NMP also identifies: relict/probable Medieval strip fields along the cliff edge to the south (MCO20766); extant Medieval field systems to the east (MCO29999); and various probable Iron Age field systems, Prehistoric settlement activity, such as probable roundhouse (e.g. MCO20768 and MCO21491), particularly to the south-south-east of the site.

Cornwall's Historic Environment Record (HER) records other undesignated/non-designated heritage assets near to the site. These include: possible 6th century pottery fragments from the river valley *c.*300m east of the site; a World War II air raid shelter/bunker in the rear garden of a property immediately east of the Scheduled Monument (MCO57856); to the south-east of the site near Gulland, at Carnevas was a Post-Medieval deer park (MCO25914) and cropmarks of Iron Age rounds (MCO21491, MCO21490), the afore mentioned Iron Age field system (MCO20768), possible pits *c.*10m across (MCO30005), and a ring-ditch cropmark of a possible Bronze Age barrow (MCO2375); within 300m north of the site, along the coastline were Mesolithic flint scatters (MCO6795, MCO6796, MCO6797), a cliff edge quarry (MCO25910), and the Post-Medieval grave of a shipwrecked sailor (MCO46977); and an extant Bronze Age barrow on the cliff edge above Fox Cove, *c.*200m south of the site (MCO2607).

Event entries pertaining to archaeological or heritage works near the site are also recorded on the HER. These include: field observations of bridges, milestones and crosses in the area (ECO4243); desk-based assessments of the coastal zone of the area and a geoarchaeological regional review (ECO5328, ECO5357); and watching briefs at Spin in Treyarnon Bay (ECO3009) and at the property of Trenouth, at the east end of Pepper Cove (ECO5389).

Cornwall's Historic Landscape Characterisation (HLC) describes the site as an area of *Coastal Rough Ground* (HCO8) – '*Unenclosed sloping ground beyond enclosed fields but above precipitous cliffs. A narrow band of land (from 50 to 800m wide) running along most stretches of the Cornish coast'*. The land immediately east of the site is described as Post-Medieval Enclosed Land (HCO13) and that of the wider landscape and around Treyarnon as *Medieval Farmland* (HCO4). Medieval Farmland is described as: *'The agricultural heartland, with farming settlements documented before the 17th century AD and whose field patterns are morphologically distinct from the generally straight-sided fields of later enclosure. Either medieval or prehistoric origins'*. And Post-medieval Enclosed Land is described as '*Land enclosed in the 17th, 18th, and 19th centuries, usually from land that was previously Upland Rough Ground and often medieval commons. Generally, in relatively high, exposed or poorly-drained parts of the county'.*

2.4 THE SITE AND WIDER DESIGNATIONS AND LISTED ASSETS

Other than the site, the only designated heritage asset particularly near to the site is the Grade II Listed, 19th century Treyarnon Farmhouse, *c.*600m east of the site (DCO9623; List entry no. 1212747).

Winecove Cliff Castle is a Scheduled Monument (DCO1631; List entry no. 1004234; MCO6588; HER no.21790). It is comprised of three promontory forts south of Trethias Island. Each of these promontories has its own HER entry (MCO6589, MCO6590, MCO6591, from north to south). Promontory forts are a form of hillfort that utilize a spur of land or headland that are naturally defended/defensible on multiple sides due to steep hills and cliffs. These spurs or headlands are enclosed by one or more sets of ramparts. These may be earth or stone banks with ditches and would probably have had wooden palisades and typically, entrance ways. These palisades may have extended along the cliff edges. Promontory forts are generally contemporary with other Iron Age hillforts, dating to between *c.*800BC and *c.*AD42, mostly after *c.*600BC. Identified settlement activity within these types of fort have indicated permanent high-status settlement with evidence for timber- and stone built round houses, storage buildings and animal enclosures. Choice of location for these forts having a display- as well as defensive function has also been suggested.

The Listing reasons for designation states that:
'*…Promontory forts are rare nationally with less than 100 recorded examples. They are relatively rare and important for understanding of the nature of social organisation in the later prehistoric period. The three promontory forts south of Trethias Island are unusual because they occupy a series of closely spaced headlands and all are defended in subtly different ways. They will contain archaeological and environmental evidence relating to their construction, longevity, relationship, development, relative chronologies, social organisation, territorial significance, trade, domestic arrangements, function and overall landscape context*.'

The details of the monument in the Listing text are:
'The monument includes three promontory forts, situated on three parallel small coastal headlands between Winecove Point, Pepper Cove and Warren Cove. All three are defended by steep cliffs above narrow coves except to the landward (east) side where they are defined by lines of ditches with or without ramparts across the narrowest points of the respective headlands. The southernmost has three well-defined and well-spaced ditches, two of which are rock-cut. Only the middle ditch has an accompanying rampart bank. The inner ditch has a centrally placed causeway, and the outer two ramparts have staggered entrances. The central fort has two ramparts with rock-cut ditches and centrally placed entrances. The northern fort is defined by a single partially infilled rock-cut ditch of up to 3m deep with a rampart of up to 0.8m high. It has a central entrance. The area of hinterland between the three forts is also included in the scheduling'.

Below are Cornwall's HER entries for the Scheduled Monument; first as a whole, then for each individual promontory from north to south:
'*Winecove Point is a complex site of uncertain development consisting of three promontories each with ramparts of various construction. It is assumed to have originated as one cliff castle, subsequently in part eroded away, but it may have developed as one organisation based on the three promontories. Each part of the site is described below; there has been very little work done on this site and the only finds known are a hearth exposed in a cliff face, and at least one spindle whorl has been found here. Such finds indicate that the site was occupied, but the extent of internal activity remains quite unknown. More work is needed on this site. The site is included in the Schedule*.' (MCO6588; HER no.21790; HER Sources: SCO5195, SCO14927, SCO5121, SCO16919, SCO4045, SCO8569).

'*The northernmost promontory of the cliff castle at Winecove Point possibly is a separate cliff castle in its own right. It is defended from the mainland by a single rock-cut ditch 0.3m deep with an inner bank 0.4m high. The rampart is much eroded and silted, as is the rest of the promontory, which is exposed to the worst of the weather. The rampart is continuous but rather lower in the middle, as if for an entrance. There seem to have been no finds in the area, and no evidence for occupation of the site*.' (MCO6589; HER no.21790.10).

'*The middle of the three promontories that form the Winecove Point cliff castle is better preserved than the others, and is defended by a double ditch with narrow central entrance. A further ditch is said locally to have originated as a track for a steam engine raising marble from a wreck in the cove below. A hearth is visible in the cliff section at SW 8537 7370, on the north-west side of the eroded cliff. A spindle whorl was found in a small cave at SW 8544 7371, on the sheltered south face of the cliff. The whorl is 4.0cm across, and ornamented by incised lines (now in possession of Mrs Taylor at Whitworth). The extent of occupation is not certain. The site is much denuded.*' (MCO6590; HER no.21790.20).

'*The southern of the three promontories that form the Winecove Point cliff castle is defended by three well spaced ramparts, two of which are rock cut. Only the middle one has an accompanying bank and has a central causeway. The other two have staggered entrances towards the southern ends of the ditches. It is suggested that the inner ditch is not contemporary with the other two on account of its straightness. There are a couple of depressions within what the OS call the sole rampart that may be hut circles. There is no evidence of occupation from finds etc.*' (MCO6591; HER no.21790.30).

2.5 ARCHAEOLOGICAL POTENTIAL AND GEOPHYSICAL RELEVANCE

The site has an obviously high archaeological potential, with extant substantial ramparts. A spindle whorl from the site and an identified 'hearth' indicate the potential for buried archaeological features, deposits and finds. Other examples of excavated promontory forts demonstrate potential for evidence of settlement activity in prominent defensive and potential trade centres. Mesolithic finds, Bronze Age burial mounds, Iron Age settlement and field systems, Medieval field systems, and a World War II structure have all been identified along the adjacent coastline and within *c.*500m in land from the site. Other than the presumed Iron Age nature of the Scheduled Monument, any number alternative prolific archaeological periods for the area could be represented on or near the site.

3.0 GEOPHYSICAL SURVEY

3.1 INTRODUCTION

An area *c.*1.6ha, comprising the interior of the Scheduled cliff castle and some of the area outside the castle was subject to a magnetometry survey; *c.*0.7ha that comprised areas of the interior of the castle was also subject to a resistivity survey. The purpose of the magnetometry survey was to identify and record magnetic anomalies within the survey: and the purpose of the resistivity survey was to identify and record anomalies of relative resistance within the proposed site. While identified anomalies may relate to archaeological deposits and structures the dimensions of recorded anomalies may not correspond directly with any associated features. The following discussion attempts to clarify and characterise the identified anomalies. The survey was undertaken on the 27th and 30th of January 2023 by J. Bampton, and P. Bonvoisin from SWARCH; and MI project staff. the survey data was processed by J. Bampton.

3.2 SITE INSPECTION

The area of the Scheduled Monument was under grass of varying length, or bare earth and exposed rock near the more weathered edges of the monument. The grass was generally tufty and the north-east, open grass area outside the cliff castle, was too long and thick to be surveyed. Each promontory of the fort had extant ramparts: the northern most promontory had shallow and gentle ramparts comprised of a broad bank and ditch; the middle promontory had substantial double ditched and double banked ramparts with possible tiers across the inner rampart ditch; the southernmost promontory had more substantially surviving double ditched and banked ramparts. The well-worn south-west coast path across the site ran approximately around the edge of where the promontories met the mainland-proper. The seaward tips of the promontories were generally very weathered with an increased amount of bare rock. In these areas and along the edges of the promontories in places one could discern a stratigraphy of very dark brown-grey topsoil overlaying two possible subsoils; an upper subsoil of mid grey-brown clays-silt with frequent shillet fragments; and a lower subsoil that contained frequent quartz stones and gravel overlaying the Natural shillety rock. In the middle promontory was a tunnel cut into the rock and came out at a platform at the north edge of the promontory. It may be associated with a steam engine that was used to lift marble from a wreck in the cove below; however, a deep track on the ground between the north and middle promontories was also ostensibly associated with these works (MCO6590). A west facing and north facing face of the cliffs on the middle promontory, west of the tunnel contained possible and probable man-made cut features, such as pits and/or ditches. Some of these had typical ditch-type profiles and others possibly equated to weathered striations/strata in the underlying geology. The southern promontory had a broad sub-rectangular platform of ostensibly cut or weathered turf in its north-west quadrant. A detailed description of the extant fort earthworks can be seen in its Scheduling text description (see Section 2.4). Supporting photographs for the site inspection can be seen in Appendix 3.

FIGURE 2: VIEW ACROSS THE MIDDLE- AND SOUTHERN PROMONTORY RAMPARTS FROM THE SOUTHERN EDGE OF THE NORTHERN PROMONTORY; VIEWED FROM THE NORTH (NO SCALE).

3.3 METHODOLOGY

The magnetometry and resistivity survey follow the general guidance as outlined in: *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider* (Europae Archaeologiae Consilium/European Archaeological Council 2016) and *Standard and Guidance for Archaeological Geophysical Survey* (CIfA 2014b).

3.3.1 MAGNETOMETRY METHODOLOGY

The magnetometry survey was carried out using a twin-sensor fluxgate gradiometer (Bartington Grad601). These machines are sensitive to depths of up to 1.50m. The survey parameters were: sample intervals of 0.25m, traverse intervals of 1m, a zigzag traverse pattern, traverse orientation was circumstantial, grid squares of 30×30m. The gradiometer was adjusted ('zeroed') every 0.5-1ha. The survey grid was tied into the Ordnance Survey National Grid- and set out using a Leica CS15 GNSS Rover GPS. The data was downloaded onto Grad601 Version 3.16 and processed using TerraSurveyor Version 3.0.36.0. The primary data plots and analytical tools used in this analysis were Shade and Metadata. A technical summary of the survey method, and data details and processing can be seen in Appendix 4.

3.3.2 RESISTIVITY METHODOLOGY

The resistivity survey was carried out using a RM15-D Resistivity Meter with an MPX15 Multiplexer module allowing for four terminal sensing using a PA20 multiprobe array with parallel twin log mode 2. These machines are sensitive to depths of up to c.1m. The survey parameters were: sample intervals of 1m, traverse intervals of 1m, a zigzag traverse pattern, traverse orientation was circumstantial, grid squares of 30×30m. The survey grid was tied into the Ordnance Survey National Grid- and set out using a Leica CS15 GNSS Rover GPS. The data was downloaded onto- and processed using TerraSurveyor Version 3.0.36.0. The primary data plots and analytical tools used in

this analysis were Shade and Metadata. A technical summary of the survey method, and data details and processing can be seen in Appendix 4.

3.3.3 ASSESSMENT OF METHODOLOGY

Both types of geophysical survey produced a usable range of results, demonstrating the potential for them to work and provide meaningful results. However, the range of resistivity survey results are difficult to interpret and it may be that this survey has worked less efficiently than is typical. The magnetometry and resistivity surveys provided data that corresponded to discernible potential archaeological features. Archaeological evaluation/excavation would test the efficacy and validity of the results of the geophysical survey and aid to confirm the presence or absence of any buried archaeology resource on the site. Some data responses indicative of both in-filled material and relatively low resistance, and stonier or compact material and relative higher resistance across the site may be indicative of agricultural groundwork's and/or geological variation and striations/strata.

3.4 RESULTS

The survey area was split across three areas: the northern promontory/area, the middle promontory, and the southern promontory/area. Tables 1 and 2 with the accompanying Figures 3-6 show the analyses and interpretation of the geophysical survey data. Additional graphic images of the survey data and numbered grid locations can be found in Appendix 1.

*note on 'Class' when interpreting the resistivity survey data:
• High responses refer to readings of higher relative resistance and represent built/compact stony features or relatively hard deposits. Simplistically, these are comparable to negative responses in the magnetometry data, and both are represent in the interpretive Figures 4 and 6 in shades of blue.

• Low responses refer to readings of lower relative resistance and represent in-filled cut features or relatively soft deposits. Simplistically, these are comparable to positive responses in the magnetometry data, and both are represent in the interpretive Figures 4 and 6 in shades of red.

In this instance the quantifiers for simplifying the understanding/interpretation of the resistivity data set is broken down into the middle and northern promontories, and the southern promontory. In general, the responses are extremely low and the narrow range of data may make identifying archaeological anomalies in the resistivity data difficult.

On the middle and northern promontories readings of above c.40 Ohm are considered high responses and readings below c.40 Ohm are considered low responses. Readings above c.70 Ohm are considered strong high; and readings below c.19 Ohm are considered strong low. Weak responses may be within a couple of readings of the mid-range qualifier. The shallow nature of the topsoil and potentially drastic changes in its depth from the rough cliff edge inland mean the range of potential natural variation in the survey is broad enough to encompass most anomalies. Therefore, form and relative response in the precise area of an anomaly play a larger role in determining its potential as a feature/anomaly. For this reason, all the resistivity anomalies have a restricted certainty of 'possible'. Generally, for the middle and northern promontories, responses of between c.20 Ohm and c.40 Ohm could be considered as probable natural variation. In areas of extremely shallow soil over bare rock, base resistance levels could be as low as c.15 Ohm.

With all the caveats for the middle and northern promontories in mind; on the southern promontory readings of above c.70 Ohm are considered high responses and readings below c.70 Ohm are considered low responses. Readings of between c.30 Ohm to 40 Ohm could be considered

probable natural variation across the western half of this survey area, and between c.40 Ohm and 70 Ohm could be considered probable natural variation across the eastern half of this survey area.

After data clipping to a range of c.12 Ohm to c.64 Ohm, values either side of c.37.5 Ohm for the entire site could be considered low and high responses respectively; with values of between c.20 Ohm and 60 Ohm considered natural variation.

TABLE 1: INTERPRETATION OF MAGNETOMETRY SURVEY DATA.

Anomaly Group	Class and Certainty	Form	Archaeological Characterisation	Comments
1	Very weak negative, probable	Curvi-linear	Paths / footpaths	Two examples in the northern area of the survey. Aligned south-east by north-west and curving north at their north-west ends. These responses are indicative of shallow compacted ground associated with well-established paths that run through and beside the site. Associated with Groups 2 and 7. Response strengths of between *c.*-6nT.
2	Weak negative, possible	Linear	Pathway or bank to outer rampart	A single anomaly located on the east side of the northern promontory ramparts. Aligned north-south. Indicative of possible compacted or stony material that could constitute a bank material, or the outer edge of a rampart ditch with more shallow overlying soil. Probably equates to a well-established path of the south-west coast path that skirts the edge of the ramparts beneath which the earth has been compacted or worn away over time. Possibly associated with Groups 1, 7, or 3, and B. Response strength of <-12nT.
3	Moderate-strong positive and moderate negative, probable	Linear	Ramparts, ditches and bank	An anomaly group of alternating positive and negative response at the extant ramparts of the northern promontory. These are negative-positive-negative-positive from the inside of the ramparts to the outside. Aligned north-south. These are indicative of cut and in-filled features such as ditches flanking a compacted or stony material associated with bank material, with possible internal bank material on its western side. It is not impossible that in the case of extant topographic features that these designations of ditch and bank could not be reversed; as accumulated material flanks a depression of shallow soil, as can sometimes be seen on paths and holloways. The responses become intermittent and irregular at the southern end of the group at Group 4, which may be indicative of some kind of disturbance or former entrance. Possibly associated with Group 2 and associated with Groups 4 and A. Response strengths of <+37nT and <-27nT.
4	Moderate positive, probable	Sub-oval and linear	Pits, hollows, or intermittent ditch segments	Located at the south end of the ramparts to the northern promontory. At this location linear negative and positive responses become very weak and two larger positive responses are present. These are indicative of cut and in-filled features such as pits, hollows, tree-throws or in this case segments of differentially in-filled or surviving ditch. These areas may have been affected by Modern activity or weathering near the current access to the tip of the promontory. It may also be associated with a relict access to the promontory. Associated with Group 3. Response strengths of *c.*+20nT to +25nT.
5	Weak negative, possible	Sub-oval in linear arrangement	Edge of weathered soil and bare rock	Approximately 3+ anomalies on the northern promontory. These responses define the edge of the weathered topsoil and bare rock on the western end of the promontory. They may be indicative of rocky deposits or shallow soil over rock. These have been depicted to identify responses that may be confusing to people who have not visited the site. Response strengths of *c.*-10nT.
6	Moderate positive, probable	Linear	Ditches	Located in the south-east part of the northern area of the survey, two linear anomalies with approximate right angles defining a possible entrance way east of the middle promontory. These are indicative of cut and in-filled features such as ditches. These are also on the alignment of the established south west coast path. It is possible that the path has been represented by different fences or ditches over time or that the path respected more long established features that once had a landscape presence and could be

				associated with the original castle or later, such as a period when a steam engine was apparently used to lift items from the cove (MCO6590). Associated with Groups 2 and 7. Response strengths of *c.*+12nT to +24nT.
7	Weak positive and negative with occasional moderate positive, possible	Linear spread	Weathered track, possible former ramparts	Located in the south-east part of the northern area. A broad and diffuse linear spread of positive responses flanking a negative response. Indicative of possible spread compacted or stony material, such as a bank, flanked by possible cut and in-filled features such as ditches. Aligned north-west by south-east. Broad and diffuse spread is not indicative of a clearly cut and in-filled feature; however, the approximate contiguous nature with Group 6 may allude to a feature that does not survive as clearly or distinctly along this section (Group 7). On the same alignment as the extant established south west coast path. Probably associated with that, but possibly also associated with earlier features or works including the afore mentioned steam engine track or ramparts to the castle. Occasional higher positive oval responses within the spread may allude to pits, hollows, tree-throws, or differentially in-filled ditch segments along the line of this anomaly. Associated with Groups 2 and 6. Response Strengths of between +7nT and +22nT with occasional spikes of +23nT to +30nT; and a diffuse central spread of *c.*-10nT.
8	Very weak to weak positive, probable	Linear	Ditch or geology	Located on the middle promontory, a right-angled linear anomaly indicative of a cut and in-filled feature such as a ditch. Although a weak response, its relative response to the surrounding geology is ostensibly characteristic of a feature, but it may be geological in nature as linear strata in the underlying geology is evident in the surrounding cliffs. A very weak negative shadow on its north-east side may simply be a relative response. Possibly associated with Group 9. Response strength of +6nT to +12nT.
9	Very weak positive, possible	Linear	Ditch	Located on the middle promontory, aligned north-west by south-east. This weak response would normally be considered natural or geological, but a possible ditch section containing frequent shillet was visible in the cliff edge at its north-west end (equating to Group 10). Therefore, indicative of a cut and in-filled feature, such as a ditch. Associated with Groups 8, 10 and F. Response strength of *c.*+6nT.
10	Very weak positive, probable	Linear or oval	Ditch or pit	Located on the middle promontory, near to a cliff edge west of an extant tunnel. Indicative of a cut and in-filled feature such as a ditch or a pit. Equates to an identified feature in the cliff edge. The response is very weak and identifying corresponding anomalies in the data is limited. This anomaly may run eastwards or south-eastwards or be a discrete anomaly; thus the 'possible' designation of Group 9. Associated with Groups 9 and F. Response strength of *c.*+6nT.
11	Very weak positive, possible	Linear	Geology, ditches	Located on the middle promontory near to an identified feature in the cliff edge (possibly identified as a hearth(?!) in the HER (MCO6590). Two or three intermittent responses. Aligned north-west by south-east. These would typically be written-off as natural variation in the strata; however, they are the most likely suspects associated with a possible feature identified in the adjacent cliff edge, unless the feature is a discrete one with no discernible associated anomaly in this survey. Possibly parallel to Group 9 indicative of geological strata or regular man-made features(?). Associated with Group H. Response strength of *c.*+4nT.
12	Weak-moderate positive, possible	Oval	Pit, tree-throw, geology	Five examples of discrete anomalies indicative of cut and in-filled feature, such as pits, tree-throws or some other hollow or depression. One located on the northern promontory; two on the middle promontory; and two on the southern promontory. The eastern example on the middle promontory could be associated with Group 14. On the middle promontory these have responses strengths of between +15nT and +20nT; the other examples range between +20nt and +33nT.
13	Moderate positive, probable	Amorphous Spread	Spread, hollow	Located on the middle promontory, possibly part of a relict boundary or track (Group 14), but indicative of a spread of material filling a possible broad hollow or pit. Has a diffuse

				response like a tail on its eastern side with a weaker response. Response strength of <21nT.
14	Weak negative with occasional weak positive, possible	Linear, or linear spread	Track, boundary	Located on the middle promontory, aligned approximately north-west by south-east. Generally weak and intermittent responses may be indicative of shallow ground disturbance. Aligned with the edge of an extant tunnel that may be 18th-19th century in date (associated with a steam engine that hauled goods/shipwrecked goods from the cove below). Could be indicative of compacted or worn ground associated with a track with intermittent adjacent pits or areas of ground disturbance. A poorly surviving boundary with removed bank and ditch could have a similar response. Associated with Groups 13, 15 and D. Response strengths of *c.*-5nT to -14nT and *c.*+9nT to +20nT.
15	Very strong positive and weak negative, possible	Oval	Burnt deposit, Modern debris, pit	Located on the middle promontory, within the line of Group 14. Indicative of possible Modern/ferrous debris, or a deposit of burnt material. Responses of such features or deposits could vary wildly depending on the exact position of the readings and source of the response, but a burning event with a response of this magnitude may typically have a more prominent negative signature/ring type response. Thus, this may be a thermoremanent or ferrous response; indicative of a deposit or debris within a pit or within the topsoil. A Modern deposit may be associated with 18th/19th century activity or later. Associated with Group 14. Response strength of *c.*+80nT and -10nT.
16	Weak-strong positive and negative, possible	Recti-linear spread	Edge of cutting / terrace	Located on the southern promontory. A broad recti-linear spread equating to- and defining a terrace or area of cut turf on the north-west edge of the southern promontory. This broad and irregular mixed response includes occasionally strong responses that may be indicative of deeper cut features or stonier/compacted deposits, but probably represent Modern ferrous debris and dipolar spreads or deposits, particularly in its north-east and south-west edges. Probably associated with Modern agricultural usage and possibly contiguous with evident ploughing or geological striations that appear to curve and respect this anomaly in this part of the site. Possibly associated with Group 17. Response strengths of *c.*+15nT to +55nT and *c.*-12nT to -54nT.
17	Moderate positive with occasional weak negative, possible	Line or spread of sub-ovals	Pits, tree-throws, ground disturbance	Approximately nine discrete anomalies, predominantly positive, but occasionally dipolar/negative that constitute a linear spread or arrangement of responses indicative of ground disturbance, pits, tree-throws or geology. The presence of this group along the western edge of the southern promontory may allude to an activity or division of space at this end of the site. Possibly associated with the same works responsibly for the adjacent platform defined by Group 16. Response strengths of between +20nT and +21nT and -15nT and -21nT.
18	Very weak-weak positive, possible	Circular	Ring ditch	Located in the south-west part of the southern promontory. An intermittent circular anomaly indicative of a cut and in-filled feature, such as a ring-ditch. Approximately 18m wide it would correspond to a very large structure or a small enclosure. Its weak response may indicate poor or shallow survival of any corresponding feature, or a fill similar to the surrounding geology. Tentatively, this could be associated with a barrow ditch. Associated with Group 19. Response strength of between +7nT and +14nT.
19	Weak positive, possible	Amorphous spread	Hollow, ground disturbance	Located within Group 18, on the southern promontory. A weak positive anomaly indicative of a spread within Group 18, which may correspond to internal features or hollows. However, this response has ostensibly been manipulated by ploughing/shallow ground disturbance and is within the realms of natural spikes in geological variation. Associated with Group 18. Response strength of *c.*+10nT.
20	Weak negative, possible	Linear arrangement of ovals	Postholes, pits, stony deposits	Four responses located along the western edge of the ramparts to the southern promontory. Aligned approximately north-south. These are not dissimilar to naturally occurring geological variations/spikes in response. However, they are in a suspiciously convenient alignment beside the ramparts and may be associated with them.

				Indicative of a compacted or stony deposit that may be associated with in-filled postholes, pits or debris from the rampart banks. Response strength of *c.*-15nT.
21	Strong positive, probable	Sub-oval	Made-ground, pit or ditch	Located on the southern promontory, across the entrance to through the western ramparts. Indicative of a cut and in-filled feature, such as a ditch or pit; or a build-up of material across removed ground to form a causeway through the ramparts. Associated with some slightly more compacted and stony material associated with rampart banks (Group 26). Response strength of *c.*+30nT to +50nT.
22	Strong positive and moderate negative, probable	Linear	Ditch and banks (ramparts)	Located on the southern promontory, between its inner and outer ramparts. Aligned approximately north-south. Indicative of a cut and in-filled feature, such as a ditch, flanked by compacted or stony bank material or naturally rock slopes. The probable ditch is divided or perhaps in two separate ditches either side of Group 23. Response strengths of +20nT to +40nT and -20nT to -32nT.
23	Weak-moderate negative, possible	Sub-rectangular spread	Made-ground, causeway	Located on the southern promontory, between its inner and outer ramparts; dividing Group 22 in two. Indicative of compact or stony deposit or made-ground; possibly filling a ditch that is represented by Group 22, or being a segment of natural underlying rock left in place during construction to form the causeway through the ramparts. Response strength of -14nT to -27nT.
24	Weak positive, possible	Linear	Ditch, made-ground to causeway or terrace/step/ platform on rampart bank	Located on the southern promontory, at the outer ramparts. Indicative of made-ground or in-fill to a cut and built-up feature. Possibly associated with a ditch or bank/terrace. Possible made-ground through the outer rampart causeway and across an internal platform/step in the outer rampart bank. Response strength of +10nT to +15nT and occasional associated negative responses of *c.*-19nT.
25	Very strong positive, probable	Oval	Pit (deep) or tree-throw, Modern deposit, geology	Located on the southern promontory, at its western end. A discrete anomaly possibly associated with Group 17 or 16. Indicative of a cut and in-filled feature, such as a pit or tree-throw. Its very strong response is out of character for the site and it may allude to some Modern deposit or a substantial feature, such as a well(?-tentatively) or similar in-filled tunnel-like feature. Response strength of <+70nT.
26	Moderate negative, probable	Linear spreads	Rampart bank material	Located on the southern promontory, near the entrance through the western ramparts. Indicative of compacted or stony material associated with bank material at the edges or foot of the rampart banks. Possibly associated with Group 21. Response strength of *c.*-22nT.
Other Anomalies				
-	Moderate-strong dipolar, probable	Point/ ovoid	Geology/ Ferrous objects/debris	The site has a small number of dipolar responses. Black crosses in Figure 4. The strongest examples are indicative of ferrous objects that are typically presumed to be Modern, such as machinery fragments or Modern objects. Similar and weaker responses can be indicative of geological features/anomalies. These are highly probable to be non-archaeological in nature. Responses of < +/-100nT.
-	Weak, positive and negative, probable	Alternating linears	Agricultural activity, drainage and ploughing	Across the majority of the site, but particularly clearly in the larger open areas, in the north-east of the survey area and across the southern promontory were semi-regular alternating linear anomalies indicative of agricultural activity such as ploughing. Green lines in Figure 4. Visible in shade plots of survey data. These generally run parallel to the cliff edges and paths and perpendicular to parts of the south west coast path. Also visible in LiDAR imagery. General response strengths of *c.*+/-5nT and < +/-8nT.

TABLE 2: INTERPRETATION OF RESISTIVITY SURVEY DATA.

Anomaly Group	Class of resistance and Certainty	Form	Archaeological Characterisation	Comments
A	Low, possible	Linear	Ditch (part of ramparts)	Located on the northern promontory, at its ramparts. Aligned approximately north-south. Indicative of an area of relatively low resistance indicative of a potentially softer deposit relatively, such as a ditch fill. Equates approximately to the base of the extant rampart ditch. Associated with Group 3. Response strength of *c.*27 Ohm.
B	Low and up to strong high, possible	Linear	Path, track, bank material	Located on the northern promontory, on the east side of its ramparts. Aligned approximately north-south. Indicate of areas of stony and/or compacted material and more loose, softer deposits. Probably equates to the compacted south west coast path. This may have been maintained or worn in patches and is at the edge of extant rampart banks that may account for deposits of bank material. This material may include stony and/or soily deposits. Associated with Group 2. Response strength of *c.*22 Ohm with higher response areas of *c.* 36-53 Ohm and <145 Ohm.
C	High, possible	Linear spreads	Bank material (to rampart)	Located on the middle promontory, on the west edge of its ramparts. Aligned approximately north-south. Indicative of stony or compacted deposit; at the edge of- and probably equating to a spread of weathered rampart bank material. Response strength of *c.*51 Ohm to 60 Ohm.
D	Low, possible	Curvi-linear	Ditch, shallow ground disturbance	Located on the middle promontory, aligned approximately east-west but with a curve. Indicative of a possible relatively soft deposit such as a ditch fill. Possibly corresponds to part of Groups 13 and 14. Possibly associated with shallow ground disturbance visible on LiDAR imagery. Response strength of *c.*36 Ohm.
E	High, possible	rectangular	ditches	Located on the middle promontory. Aligned approximately north-east by south-west, running into the northern edge of the survey area/promontory. Indicative of a possible stony or compacted deposit; perhaps a platform. Possibly associated with afore mentioned 18th/19th century works that may have occurred at this promontory. Response strength of *c.*40 Ohm.
F	High, possible	Irregular linear	Stony/compact material, natural	Located on the middle promontory. Aligned approximately east-west at the entrance to an extant tunnel and near the edge of the promontory at a narrow stretch. Indicative of a possible stony or compacted deposit. Ostensibly associated with the tunnel access or path in to it, which is possibly associated with the afore mentioned 18th/19th century works that may have occurred at this promontory. Response strength of *c.*40 Ohm.
G	low, possible	Linear	Ditch, natural	Located on the middle promontory. Aligned approximately east-west. Indicative of a short linear or discrete deposit of relatively soft material. This is generally within the realms of natural geological/resistance variation on the site and would ordinarily be dismissed; however, it approximately corresponds to a feature identified in the section of the cliff edge. This anomaly would indicate a ditch-type feature runs approximately east-west in this location. Associated with Groups 9 and 10. Response strength of *c.*23 Ohm.
H	low, possible	Ovals in linear / circular pattern	Pits, tree-throws, geology, segmented linear features	A group of 6 discrete anomalies, either forming a ring or in two linear anomalies located on the middle promontory. Indicative of relatively soft deposits, such as ditch or pit fills. Correspond approximately with linear or pit-like features in Group 11. May correspond to a possible pit or ditch identified in the cliff section near these anomalies. Possibly natural geological variation/features or man-made features indicative of a post-ring or ditches and /or pits. Associated with Group 11. Response strength of *c.*26 to 32 Ohm.
I	Low, possible	Recti-linear / amorphous spread	Edge of cutting / terrace	Located on the southern promontory. Predominantly four patches across a spread/area indicative of disturbed ground at the edge of a visible cutting/platform/terrace in this part of the site. Equating to Group 16 and visible on the ground and in LiDAR imagery. Associated with Group 16. Response strength of *c.*33 to 40 Ohm.
J	Weak low, possible	Linear	Ditches, geological striations,	Located on the southern promontory. Three examples aligned approximately east-west and north-west by south-east. Very weak and diffuse responses aligned either with an

			shallow ground disturbance	extant worn footpath on the site, or perpendicular and parallel to shallow ground disturbance, agricultural activity, or geological striations evident in the data sets and LiDAR imagery. Unlikely to be significantly archaeological in nature. Possibly associated with the cutting associated with Groups 16 and I. Response strengths of *c.*50 Ohm to 73 Ohm.
Other Anomalies				
-	Weak low and high, possible	Alternating linear anomalies	Agricultural activity, drainage and ploughing	Across the majority of the site, but particularly clearly in the larger open areas, in the north-east of the survey area and across the southern promontory were semi-regular alternating linear anomalies indicative of agricultural activity such as ploughing. Green lines in Figure 4. Visible in shade plots of survey data. These generally run parallel to the cliff edges and paths and perpendicular to parts of the south west coast path. Also visible in LiDAR imagery. General response strengths of between *c.*25 Ohm to 52 Ohm.

3.5 DISCUSSION

3.5.1 OVERVIEW

The geophysical survey identified 36 groups of anomalies (1-26 on the magnetometry survey; and A-J on the resistivity survey) comprised of *c.*60-77 anomalies (*c.*48-57 magnetic anomalies and *c.*12-20 resistivity anomalies, some of which equate to one-another), depending on how one differentiates the responses, across the survey area as a whole. These included: three linear anomalies associated with footpaths and the south-west coast path (Groups 1 and 2); two linear anomalies that may be associated with eroded pathways and/or outer ramparts to the castle (Groups 6 and 7); eight linear anomalies and deposits associated with extant ramparts (Groups 3, 4, 21, 22, 23, 24, 26 and C); a line of four discrete anomalies possible associated with the inner rampart of the southern promontory and indicative of stony deposits (Group 20); a division between topsoil and bare rock associated with weathering and erosion at the tips of the northern promontory (Group 5); linear anomalies and spreads that may be indicative of platforms and pits with burnt or Modern debris, and tracks or boundaries associated with anecdotal accounts of probable 19th century activity on the site (in the form of a extant worn paths and possibly a tunnel on the middle promontory) (Groups 13, 14, 15, and F); Linear and discrete anomalies associated with archaeological features visible in the cliff edge of the middle promontory (Groups 9, 10, 11 and H); a rectilinear anomaly indicative of a ditch (Group 8); five discrete anomalies associated with possible pits or tree-throws (Group 12); a spread of anomalies associated with the edge/slopes of a possible platform or turf cutting or eroded area on the southern promontory (Groups 16 and I); Linear anomalies possibly indicative of shallow ground disturbance, ditches, geology or agricultural activity (Group J); a line and spread of anomalies indicative of pits, tree-throws or geology in the south-west of the site (Groups 17 and 25); a circular anomaly indicative of a possible ring ditch (Group 18) containing an anomaly indicative of a spread or possible disturbed ground (Group 19). Additional visual interpretations of the data and cartographic sources supporting the discussion and comments can be seen in Appendices 1 and 2.

Instances of magnetic debris associated with ferrous debris or weak geological variations were also evident in the survey data as were a large number of striations typically indicative of agricultural works such as ploughing, but in this case may include geological striations/strata. Agricultural activity across the site and the presence of footpaths, is evident in the survey data and on satellite- and LiDAR imagery. Such activity may have truncated any buried archaeological resource.

Regarding the magnetometry survey, the general 'noise' (inherent geological variation) of the site varied from very low in areas (*c.*+/-0.5nT) to moderately high in other areas (<*c.*+/-8nT), with occasional higher fluctuations in the low teens. These fluctuations are often associated with ploughscars and anomalous points. Anomalies of a comparable strength are probably/possibly natural and geological in nature. In terms of the resistivity survey, responses of between, but not limited to, *c.*20 Ohm and *c.*40 Ohm are of possible natural/geological origins or variation; although,

as in a magnetometry survey, the potentially ephemeral and subtle nature of archaeological deposits or features may or may not be visible or present within this data set/range.

The results from this survey will be discussed below in relation to: the northern promontory/area; the middle promontory; and the southern promontory.

3.5.2 THE NORTHERN PROMONTORY/AREA

The majority of anomalies in the northern promontory/area of the survey correspond directly to extant topographic features. Only Groups 6 and 7 may be related to extant or relict topographic features that could be Modern or ancient.

Groups 1 and 2 equate to footpaths, including a section of the south-west coast path. These were visible at the time of the survey and are visible on LiDAR imagery.

Groups 3 and 4 equate to aspects of the extant ramparts across this promontory. The presence of Group 4 at the southern end of the ramparts where erosion has evidently taken is most significant toll may indicate differential survival or some other feature on the alignment of the rampart ditch/bank.

Group 5 equates to the boundary between the extant topsoil and bare weathered rock at the end of the promontory. This anomaly group essentially illustrates the existence of this division in the data set.

Groups 6 and 7; although in the northern area of the survey these anomalies extend north-west by south-east across the eastern-, landward end of the middle promontory. The well-worn south-west coast path approximately follows the line of Group 7, and these may equate to one another. However, the broad and diffuse Group 7 response includes possible bank and ditch-type responses, or possibly a path-type response with flanking deposits. This may be indicative of a former boundary line that could correspond to a relict outer rampart. A later path or boundary may have followed an extant topographic feature on the site. Group 6 represents possible ditch-type features that appear to define an entrance leading to the middle promontory. These could be associated with a relict outer rampart. However, their ostensible association with the extant south-west coast path and lack of obvious defensive topographic features may allude to them being more recent ditches or boundary features. This is not to say that later features could not have been influenced by now absent Iron Age features.

A single possible pit or tree-throw type anomaly (Group 12) was located on this promontory. This group may be indicative of a man-made feature or be natural/geological in origin. Four other examples; two on each of the other promontories, have been identified in this survey.

3.5.3 THE MIDDLE PROMONTORY

The middle promontory had features that were present on the site and visible in the sections of the cliff edge. The majority of geophysical anomalies either directly or indirectly appeared to be associated with these visible and extant features.

At the east end of this area Group C corresponded to the inner edge of the rampart bank and indicate a compacted or stony build to this edge of the rampart bank. At the west end of the promontory probable geological strata/striations, or shallow ground workings are represented by plough-like responses in the data; aligned either north-east by south-west or north-west by south-east.

The tunnel leading to a lower platform in the cliff edge on this promontory had associated geophysical responses indicative of compacted or stony debris across the tunnel (Group F) and on the approach to the tunnel from the east (Group 14). This response on the approach/access to the tunnel had both positive and negative magnetometry responses corresponding to a former track with a signature similar to a bank and ditched boundary, or an area of shallow ground disturbance. Associated with- and on the alignment of Group 14 were Groups D, 13 and 15. Group D directly corresponded to a length of Group 14. Group 13 represented a possible spread or deposit of material within a hollow or built-up area and possibly equating to a differently surviving or in-filled section of Group 14. Group 15 is in the path of the Group 14 response but has the signature of a deposit that possibly contained burnt/thermoremanent- or Modern debris. Although very strong this response is not atypical of burning *in situ*; however, that scenario cannot be discounted, and it may be that the response simply equates to a pit-type feature. Group E, near to Group 14, may be indicative of a rectangular platform of stony or compacted material.

Two possible archaeological features, ostensibly ditches, were visible in the edge of the cliff, beneath the topsoil and cutting the rock natural near the middle of the north side of the promontory. One of these was in a west-south-west facing section, and the other in a north-north-west facing section, near the same kink in the edge of the promontory. Groups 10 and G may equate to one of these, but the responses are not strong or clear. This may indicate an inaccuracy or failure for the surveys to confidently be used to identify archaeological features on the site. The visible 'ditch' corresponding to Groups 10 and G may run north-east or south-east depending on the accuracy of the two surveys. If it were to run south-east this would equate to Group 9 and possibly be related to Group 8; a probably right-angled ditch-type feature. It should be remembered that geological striations/strata ostensibly run on an equivalent alignment to these responses and may account for anomalies that coincidently align with the visible 'ditch' feature. Groups H and 11 possibly correspond to the other visible feature in the cliff edge, a possible ditch or pit. The HER records a possible 'hearth' in the cliff edge/section in this approximate location (MCO6590). The geophysical survey in this location indicates possible natural geological features, or linear and/or discrete anomalies that could be indicative of ditches or pit-type features. To the west in the same cliff section were a number of very angular deeper instances of soil that could be interpreted as potential features, but ostensibly equate to weathered/eroded sections of the natural rock strata. These could account for the probable natural/geological linear anomalies represented in the data set in this area and could account for some of the identified anomaly groups.

3.5.4 THE SOUTHERN PROMONTORY

As on the middle promontory, the southern promontory predominantly had anomalies associated with extant and visible topographic features. However, it also contained the most potentially significant potential archaeological anomalies, although some were notably ephemeral responses.

The east half of this area is dominated by anomalies associated with the extant ramparts: Group 24 indicates made-ground or an in-filled edge to the causeway and inner rampart, on which a slight step or platform is discernible on the ground. Group 23 depicts a probable deeper in-fill ditch with probable bank material on either side, within an extant rampart ditch, where Group 23 indicates a stony or compacted, or perhaps *in-situ* rocky natural causeway across the rampart ditch. Groups 21 and 26 are indicative of probable bank and causeway material at and through the inner rampart bank and ditch.

Of some interest to the ramparts in the east half of this area is Group 20, which may simply be indicative of stony or rocky debris at the edge of the rampart bank. Similar, probably natural responses are present in the dataset in sporadically in the west half of this promontory. However, these examples are interesting aligned parallel to- and along the inside edge of the inner rampart bank. They could be indicative of compacted or stony deposits, perhaps within postholes, pits or as pads.

The west half of this area contained anomalies associated with an extant platform/cutting on the north-west corner of the promontory. The mixed responses (Groups 16 and I) that correspond to the edge of this platform may be indicative of differential or changing deposits and depths, or simply correspond to shallow ground disturbance.

At the far end of the promontory and the south-west edge of the platform (Group 16) was a line of ostensibly large discrete anomalies (Group 17). These were in a linear alignment perpendicular to the promontory. They were indicative of large pits-type features or hollows. The majority of these had weak responses and might correspond to geological anomalies or shallow features; however, their pattern seems noteworthy. An example with a more distinct, strong response (Group 25) was at the north-west end of this line of anomalies. They may indicate a division or limit of land use across the promontory.

This promontory also had an ephemeral circular (penannular) anomaly indicative of a possible – ring-ditch (Group 18). This anomaly was approximately 18m in diameter, which could represent a large Iron Age roundhouse or small enclosure. It had gaps in response in its west and north-west sides, which is not typical for a round house of the time, but may have been affected by other factors, such as prevailing wind direction or desired viewsheds. A possible spread (Group 19) has also been identified within anomaly Group 18. This anomaly may be indicative of an in-filled hollow area, or in-filled internal features and has been highlighted due to its proximity to Group 18. However, it is extremely ephemeral and irregular and may show signs of shallow ground disturbance associated with ploughing or surface ground works. A barrow has been identified *c.*200m south of the site on the cliff edge at Fox Cove. It is not impossible that Groups 18 and 19 are indicative of a poorly surviving barrow; although it seems more probable that if this anomaly did correspond to a genuine archaeological feature that it would be associated with the Iron Age fort/castle.

Three linear anomalies (Group J) are probably indicative of shallow ground disturbance that could be associated with paths, ploughing, or geological striations. The northern most example ostensibly equates to a surface feature visible on LiDAR imagery; probably a path.

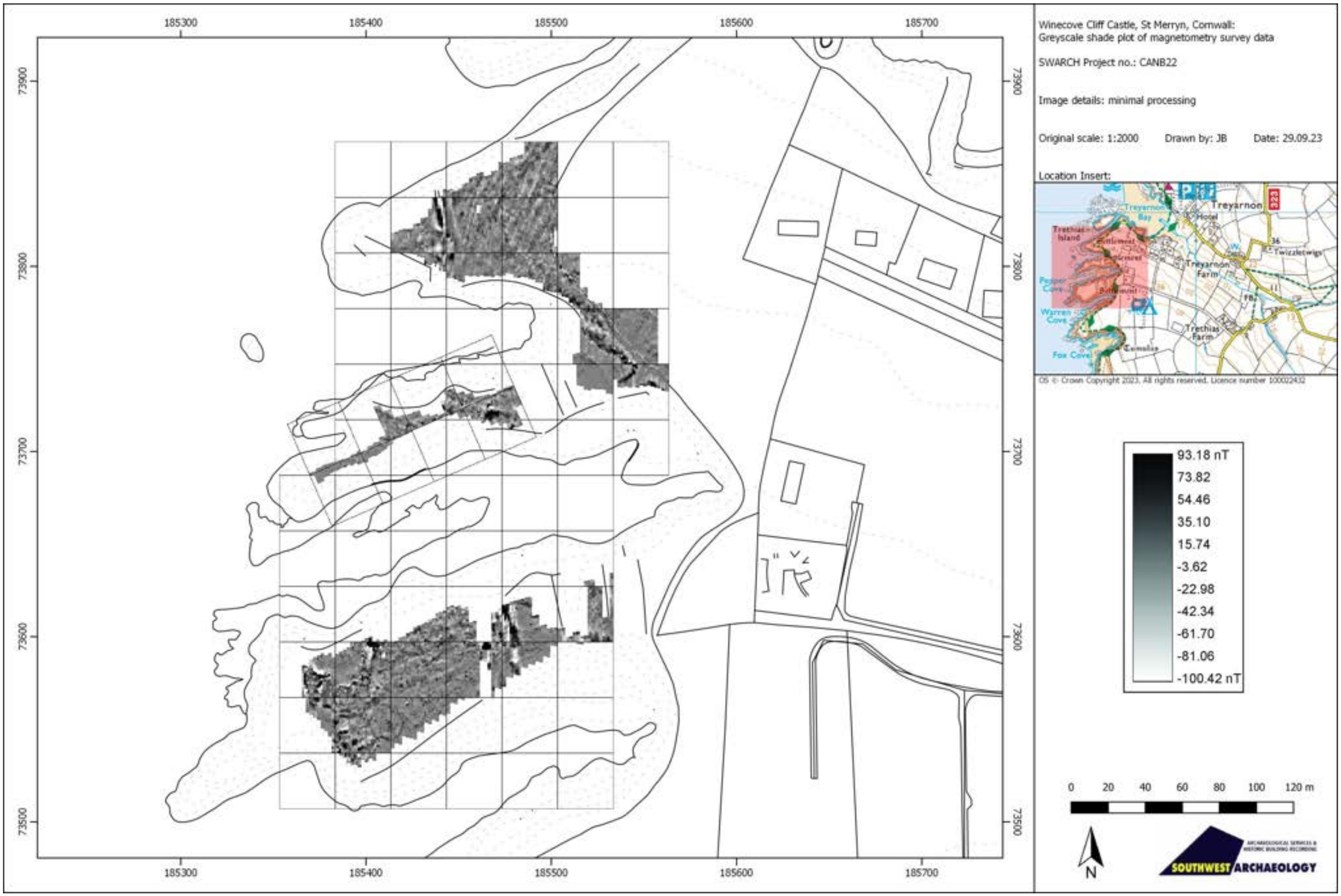

FIGURE 3: GREYSCALE SHADE PLOT OF MAGNETOMETRY SURVEY DATA; MINIMAL PROCESSING.

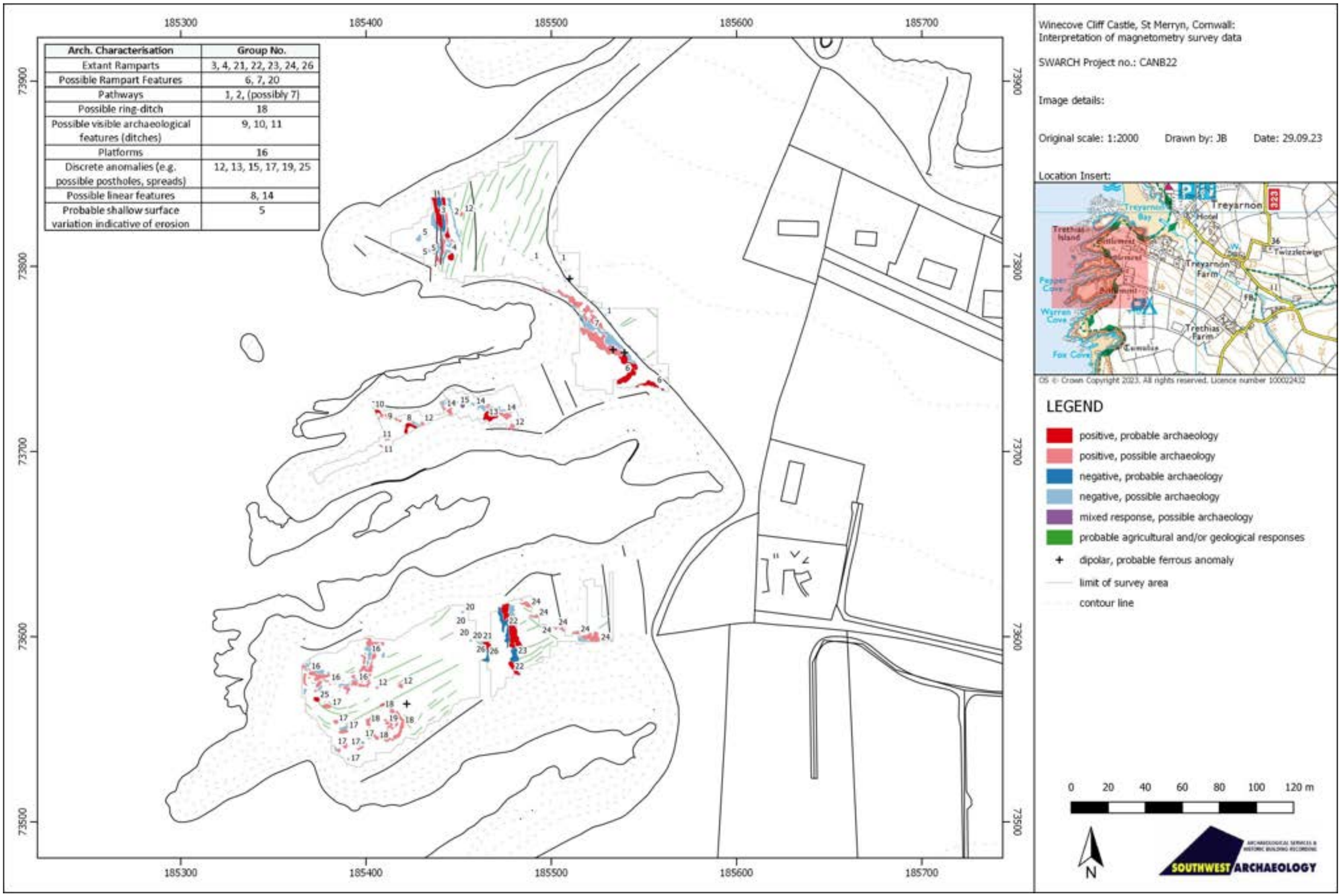

FIGURE 4: INTERPRETATION OF MAGNETOMETRY SURVEY DATA.

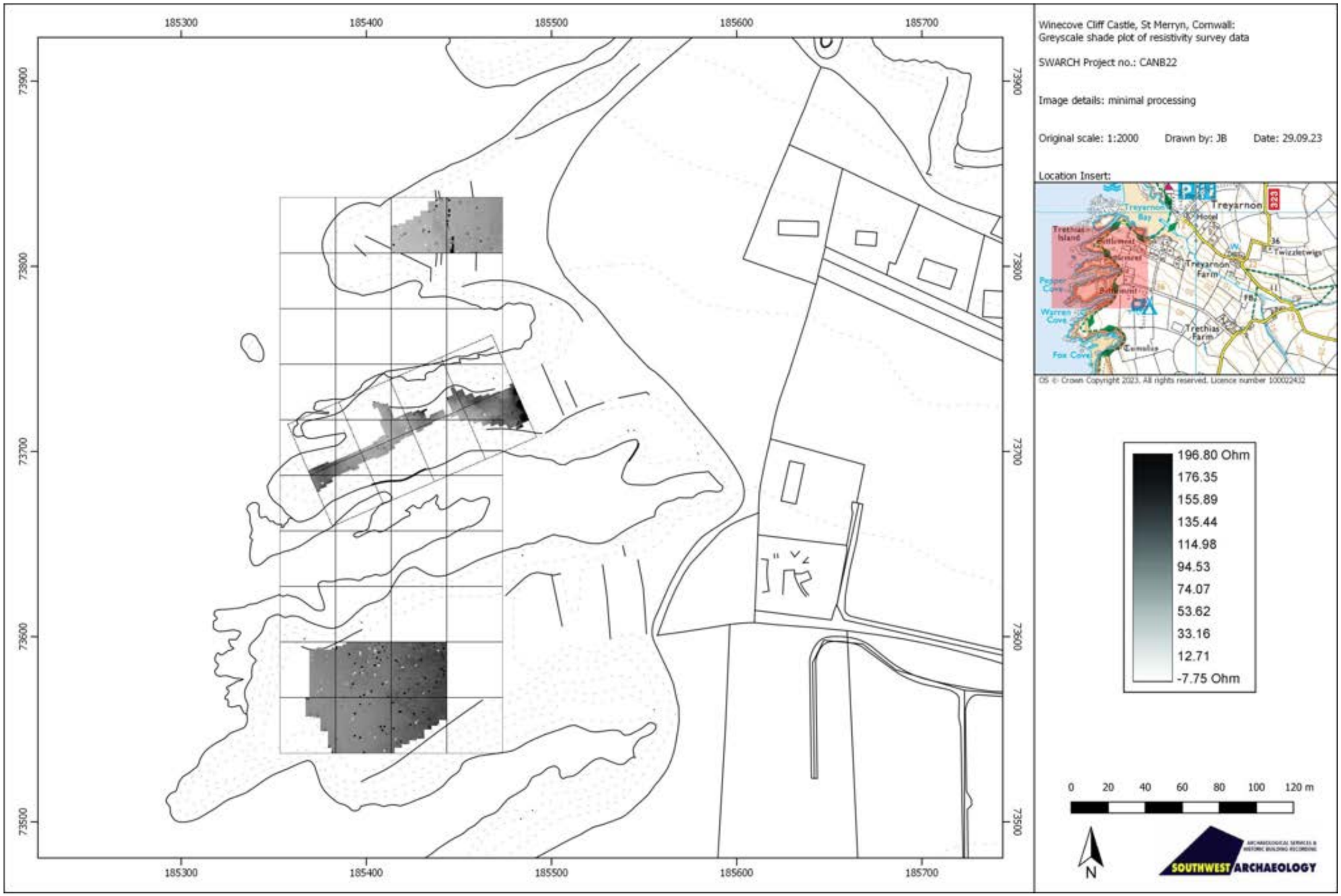

FIGURE 5: GREYSCALE SHADE PLOT OF RESISTIVITY SURVEY DATA; MINIMAL PROCESSING.

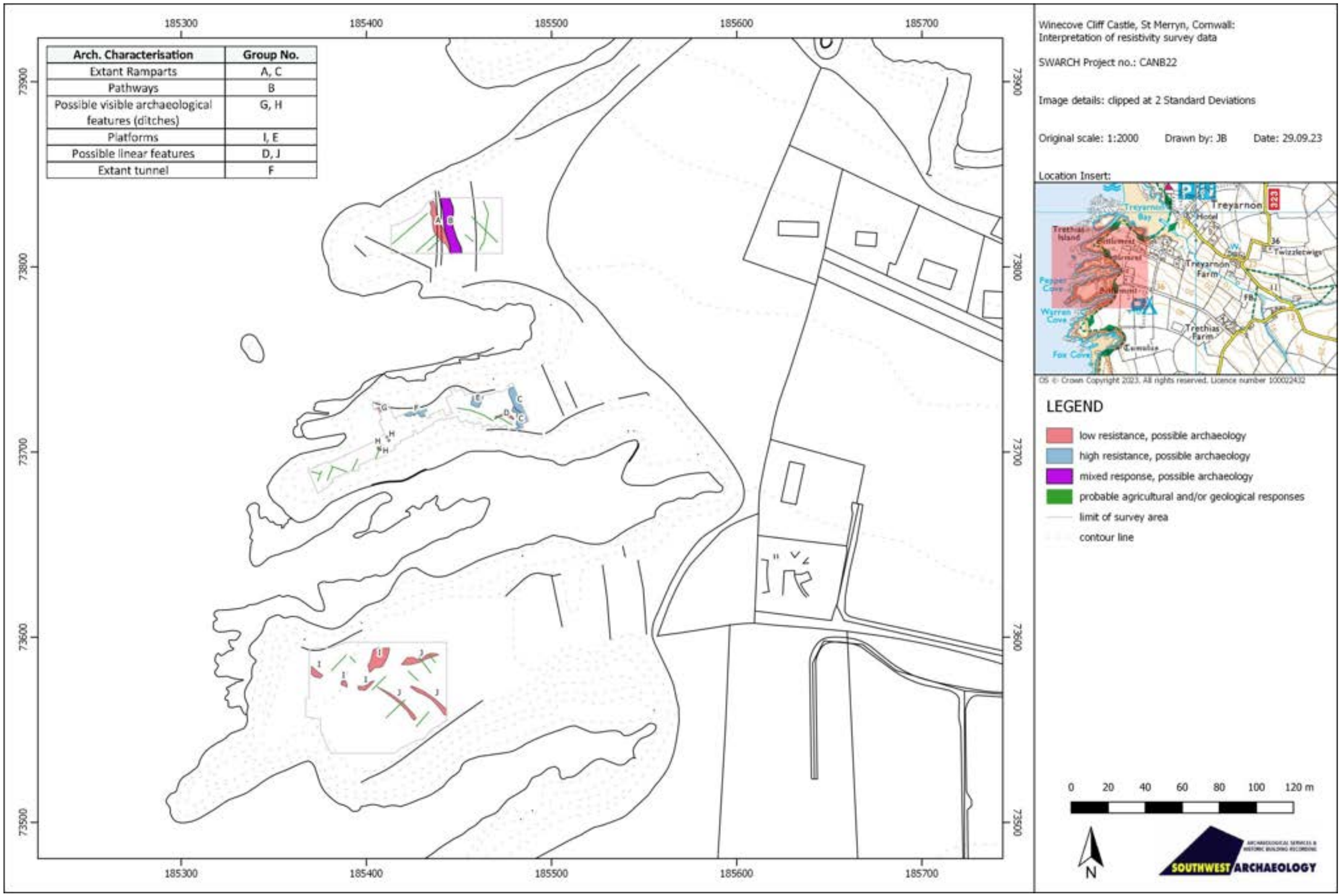

FIGURE 6: INTERPRETATION OF RESISTIVITY SURVEY DATA.

4.0 CONCLUSION

The site is located at the Scheduled Iron Age Cliff Castle at Wine Cove, St Merryn (List entry no. 1004234; MCO6588; HER no.21790). The site includes three promontory forts (MCO6589, MCO6590, MCO6591) defining a single cliff castle. It is in an area of coastal rough ground within a Cornwall area of the AONB. The surrounding area contains evidence of Mesolithic findspots, Bronze Age barrows, Iron Age settlement and farming, Medieval field systems, Post-Medieval quarries, and a World War II structure. This phase of geophysical survey was requested as part of the AONBs Monumental Improvement project.

The geophysical survey identified 36 groups of anomalies (1-26 on the magnetometry survey; and A-J on the resistivity survey) comprised of *c.*60-77 anomalies (*c.*48-57 magnetic anomalies and *c.*12-20 resistivity anomalies, some of which equate to one-another), depending on how one differentiates the responses, across the survey area as a whole. These included: three linear anomalies associated with footpaths and the south-west coast path; two linear anomalies that may be associated with eroded pathways and/or outer ramparts to the castle; eight linear anomalies and deposits associated with extant ramparts; a line of four discrete anomalies possible associated with the inner rampart of the southern promontory and indicative of stony deposits; a division between topsoil and bare rock associated with weathering and erosion at the tips of the northern promontory; linear anomalies and spreads that may be indicative of platforms and pits with burnt or Modern debris, and tracks or boundaries associated with anecdotal accounts of probable 19th century activity on the site relating to a tunnel on the middle promontory; Linear and discrete anomalies associated with archaeological features visible in the cliff edge of the middle promontory; a rectilinear anomaly indicative of a ditch; five discrete anomalies associated with possible pits or tree-throws; a spread of anomalies associated with the edge of a possible platform or turf cutting or eroded area on the southern promontory; Linear anomalies possibly indicative of shallow ground disturbance, ditches, geology or agricultural activity; a line and spread of anomalies indicative of pits, tree-throws or geology in the south-west of the site; a circular anomaly indicative of a possible ring ditch containing a possible spread or disturbed ground. Agricultural activity and geological variation was also ostensibly apparent in the geophysical record. Some of this activity and public footpaths were visible in LiDAR imagery.

Of particular significance, the survey has alluded to probable aspects of the extant ramparts; regarding areas of deeper ditches and built-up, stony, or compacted deposits. A linear alignment of discrete anomalies with possible stony deposits beside the inner ramparts of the southern promontory is of potential interest. Ostensibly the northern promontory has very little surviving west of its ramparts and no significant anomalies were identified within this part of the castle. The middle promontory predominantly contained anomalies indicative of possible Modern activity on the site, but some discrete anomalies indicative of possibly burnt deposits and a possible platform were present. Most notably, the middle promontory contained two identified probable buried archaeological features in the section of the cliff edge. These had profiles indicative of ditches; although one of these ostensibly equated to a previously identified 'hearth' (MCO6590). Geophysical anomalies may have equated to these features, but their geophysical form was not obviously clear, although another anomaly indicative of a possible ditch was located near to these features. Apart from the extant topographic feature of a 'platform', the most significant anomalies on the southern promontory were indicative of a potential ring-ditch and a line of discrete possible pit-like anomalies. The possible ring-ditch was a very ephemeral response, and any corresponding feature may only survive poorly. However, if it were a ring-ditch it could represent a large roundhouse, small enclosure, or even tentatively a barrow (although this seems less likely given the anomaly response and nature of the site). The line of discrete possible pit-like anomalies may indicate a line dividing land use or limits of land use and cannot be dated. They are notably adjacent to a potential Iron Age feature (the possible ring-ditch) and a probable Post-Medieval platform.

The surveys have ostensibly succeeded in identifying probable archaeological resources. However, they do not provide clear and definitive anomalies associated with identified buried probable archaeological features. It is possible that archaeological features and deposits are not clearly discernible in the geophysical record. Intrusive archaeological works may provide evidence that can be compared and equated to the geophysical record, allowing for an improved secondary interpretation of the data set. As a standard subsequent phase of archaeological works, intrusive archaeological works would test the efficacy and validity of the results of the geophysical survey and aid to confirm the presence or absence of any archaeology resource on the site.

4.1 RECOMMENDATIONS ON MONUMENT MANAGEMENT AND FURTHER WORKS

The survey shows that possible significant archaeological activity has survived in the geophysical record despite agricultural activity: but also that buried archaeological deposits may survive on the site and not be clearly visible in the geophysical record. The existing Scheduled area appears to encompass the extent of the monument, with no discernible probable features outside- or on the landwards side of the ramparts. The evident erosion and weathering of the cliffs is undeniable. The presence of probable archaeological features within the cliff edge/section in the western half of the middle promontory; along with the geophysical anomalies at the western end of the surveyable area on the southern promontory demonstrate the proven and potential loss of archaeological features, deposits, finds and information from continued coastal erosion. Continued use of the site as established rough grassland is likely the most logical way to slow/mitigate erosion of the soil across the site. Any mitigation of the cliff edge would literally be fighting back the tide.

Community based excavations, at least across the western, seaward, halves of the promontories and/or along their cliff edges (within safe parameters) would potentially rescue archaeological knowledge of a site that will otherwise be lost to the elements. The site has not yet been investigated by excavation and a small amount of work targeting the identified anomalies on the southern promontory and identified anomalies and features on the middle promontory would yield significant evidence, whether by its absence or presence. Test pitting or trenching across other areas of the site would further corroborate the results of this survey and help to establish deposit models and plans for future mitigation, study, use or protection. Previous promontory forts have been excavated (e.g. Trevelgue Head near Newquay (List entry no. 1006712), and relatively recently the cliff edges of other Scheduled Monuments have been excavated under community conditions, such as at Tintagel Castle (*recent excavation reports forthcoming*). These yielded significant results that tied these assets into a wider landscape and network of Prehistoric to Medieval communities; in particular the Iron Age Atlantic Zone.

5.0 BIBLIOGRAPHY & REFERENCES

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https://map.cornwall.gov.uk/website/ccmap/ and http://www.heritagegateway.org.uk

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https://environment.data.gov.uk/DefraDataDownload/?Mode=survey

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Surveyors draft map for the St Columb Major area, *c.*1810
St Merryn Tithe Map and Apportionment, *c.*1841

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Ordnance Survey 1st edition, 6 inch map, Sheet: Cornwall LXV.12, surveyed 1880, published 1888
Ordnance Survey 2nd edition, 6 inch map, Sheet: Cornwall LXV.12, revised 1905, published 1908
Ordnance Survey, 6 inch map, Sheet: Cornwall LXV.12, revised 1938, published 1945

APPENDIX 1: ADDITIONAL GRAPHICAL IMAGES OF THE GRADIOMETER SURVEY

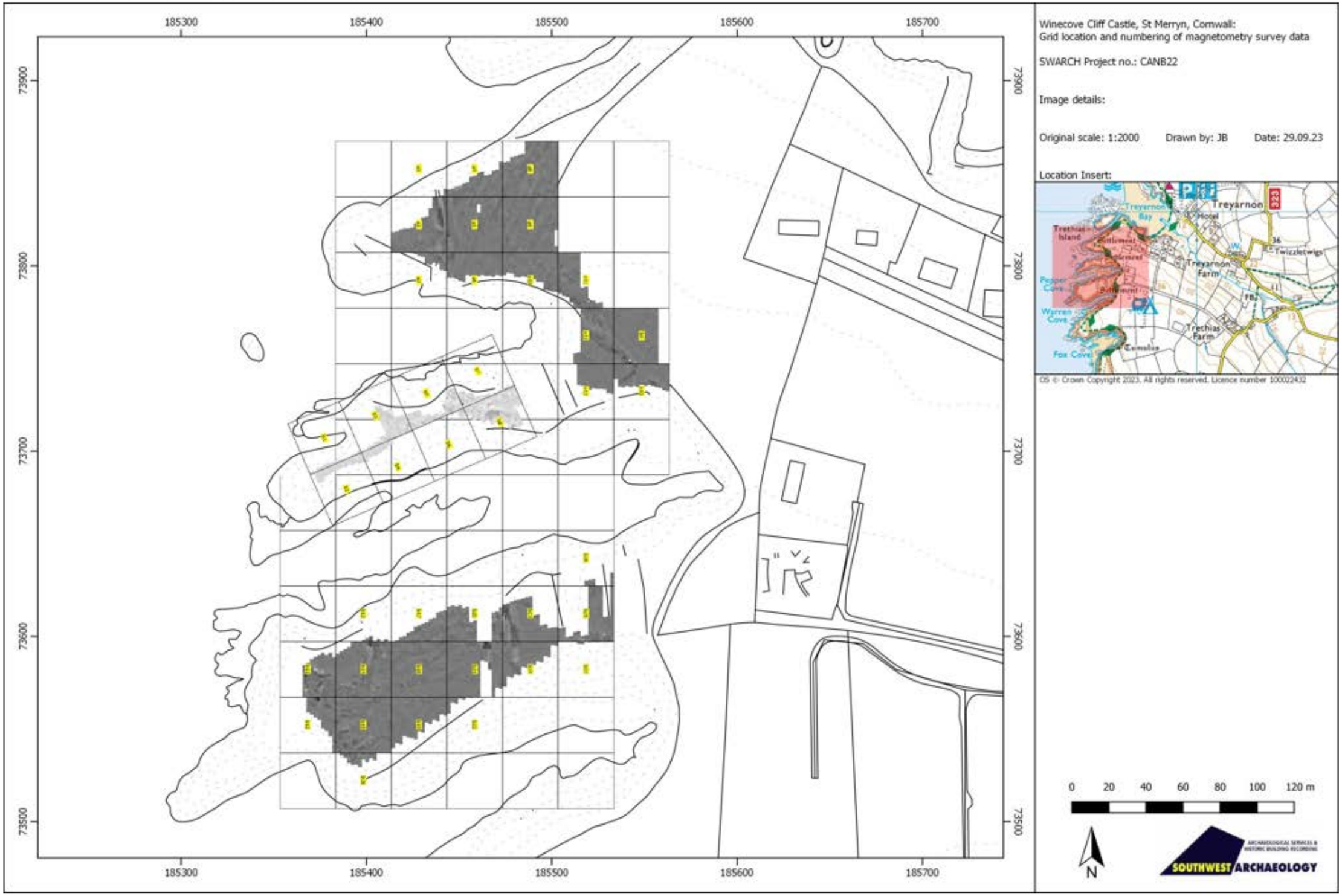


FIGURE 7: MAGNETOMETRY SURVEY GRID LOCATION AND NUMBERING.

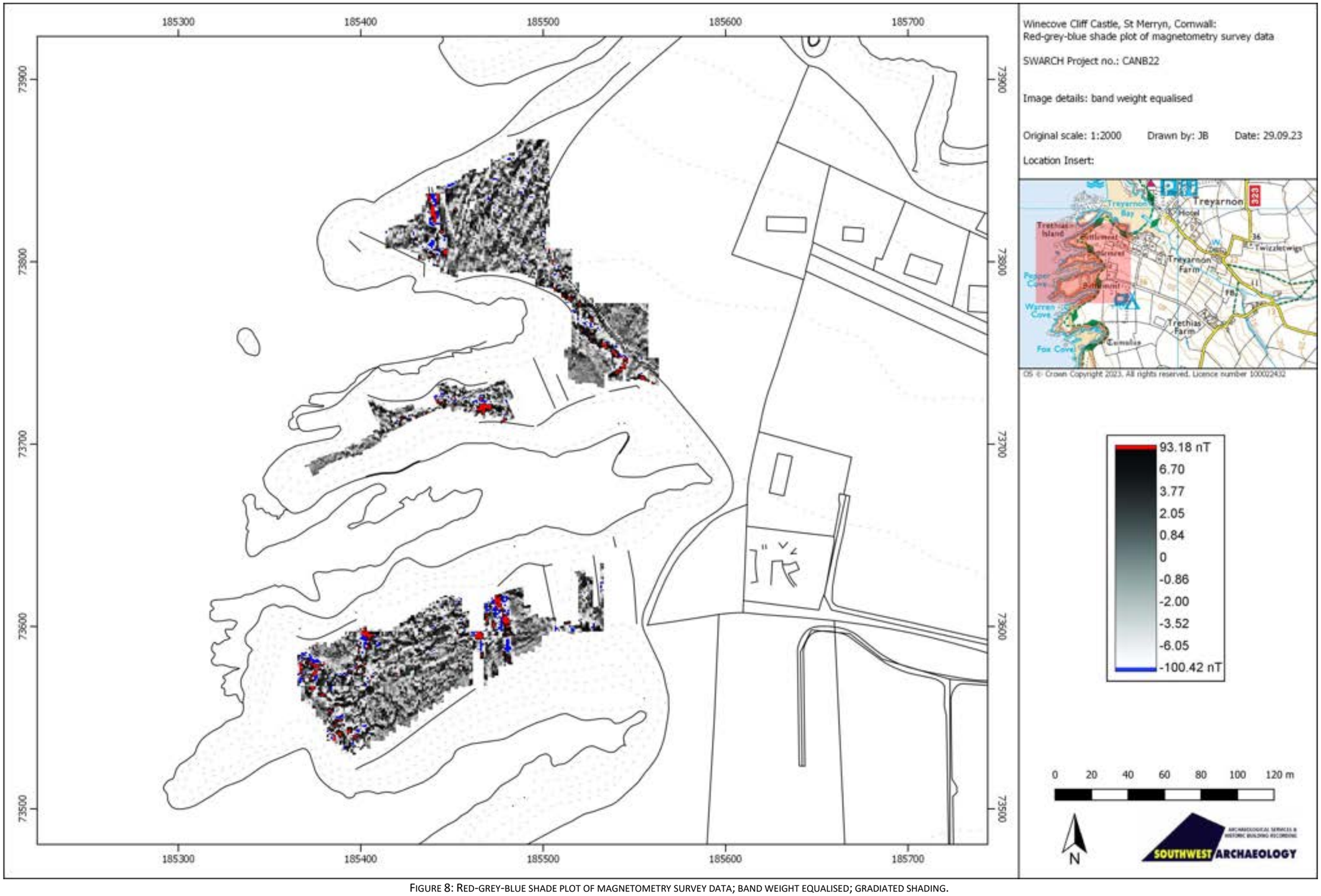


FIGURE 8: RED-GREY-BLUE SHADE PLOT OF MAGNETOMETRY SURVEY DATA; BAND WEIGHT EQUALISED; GRADIATED SHADING.

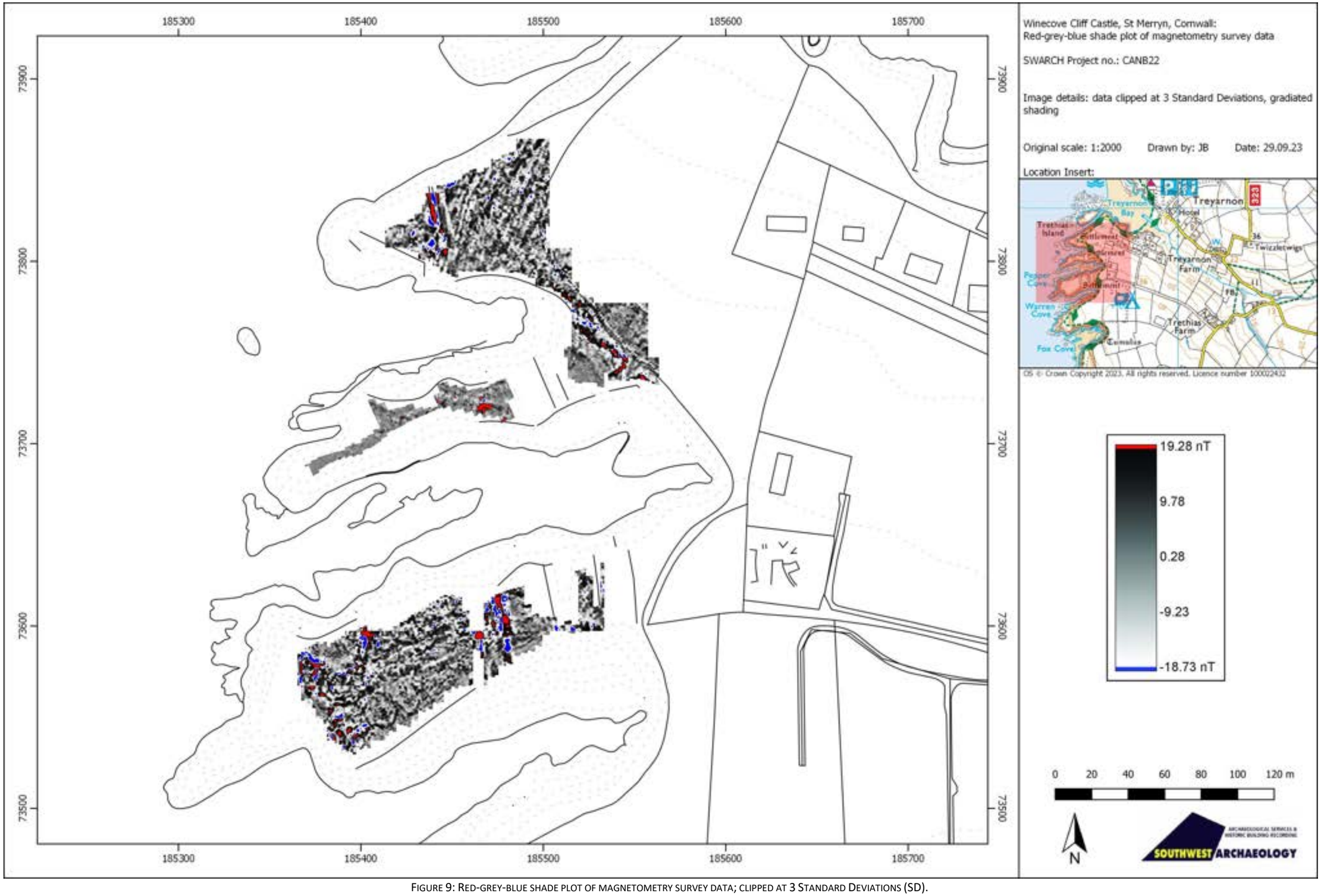


FIGURE 9: RED-GREY-BLUE SHADE PLOT OF MAGNETOMETRY SURVEY DATA; CLIPPED AT 3 STANDARD DEVIATIONS (SD).

FIGURE 10: RESISTIVITY SURVEY GRID LOCATION AND NUMBERING.

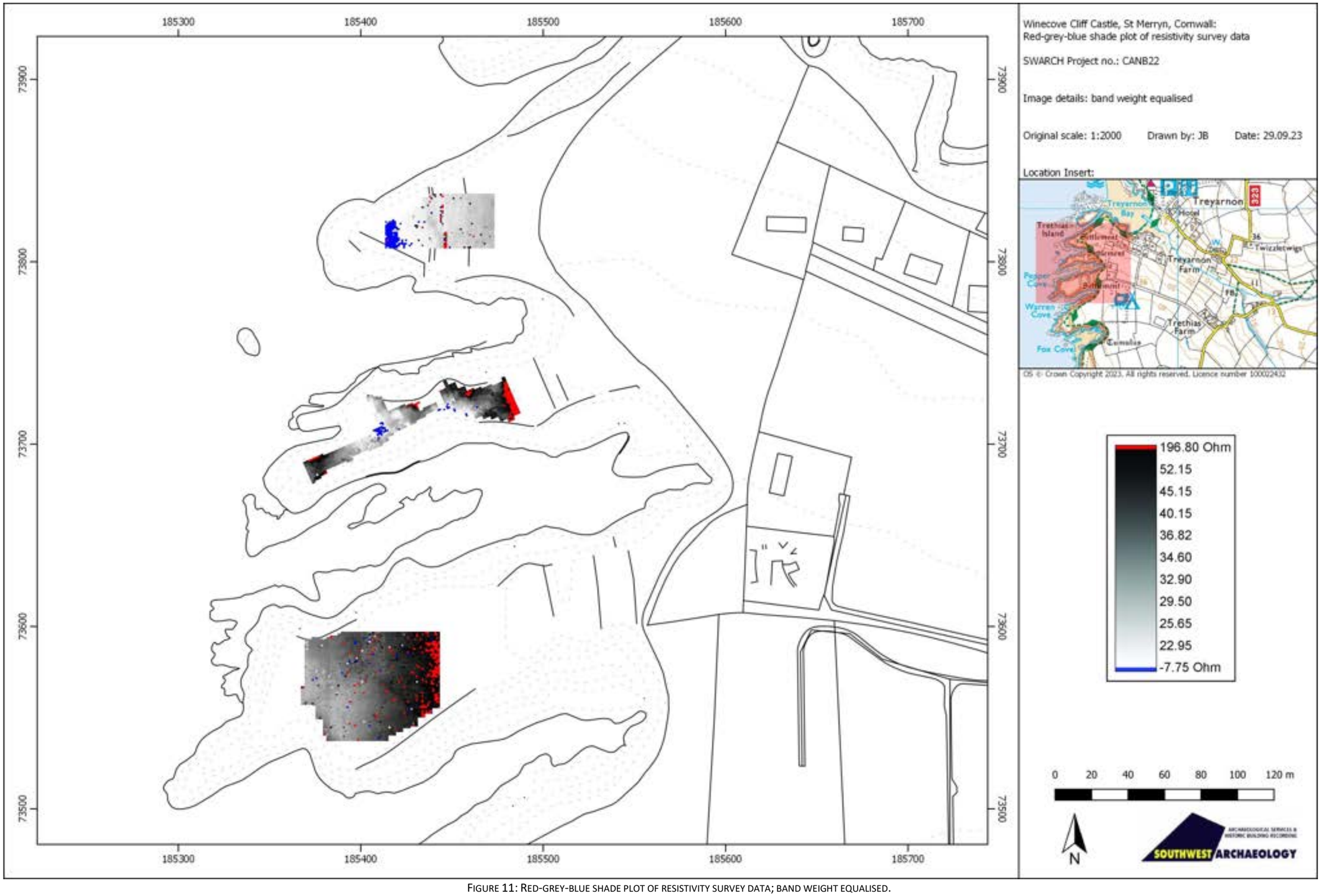


FIGURE 11: RED-GREY-BLUE SHADE PLOT OF RESISTIVITY SURVEY DATA; BAND WEIGHT EQUALISED.

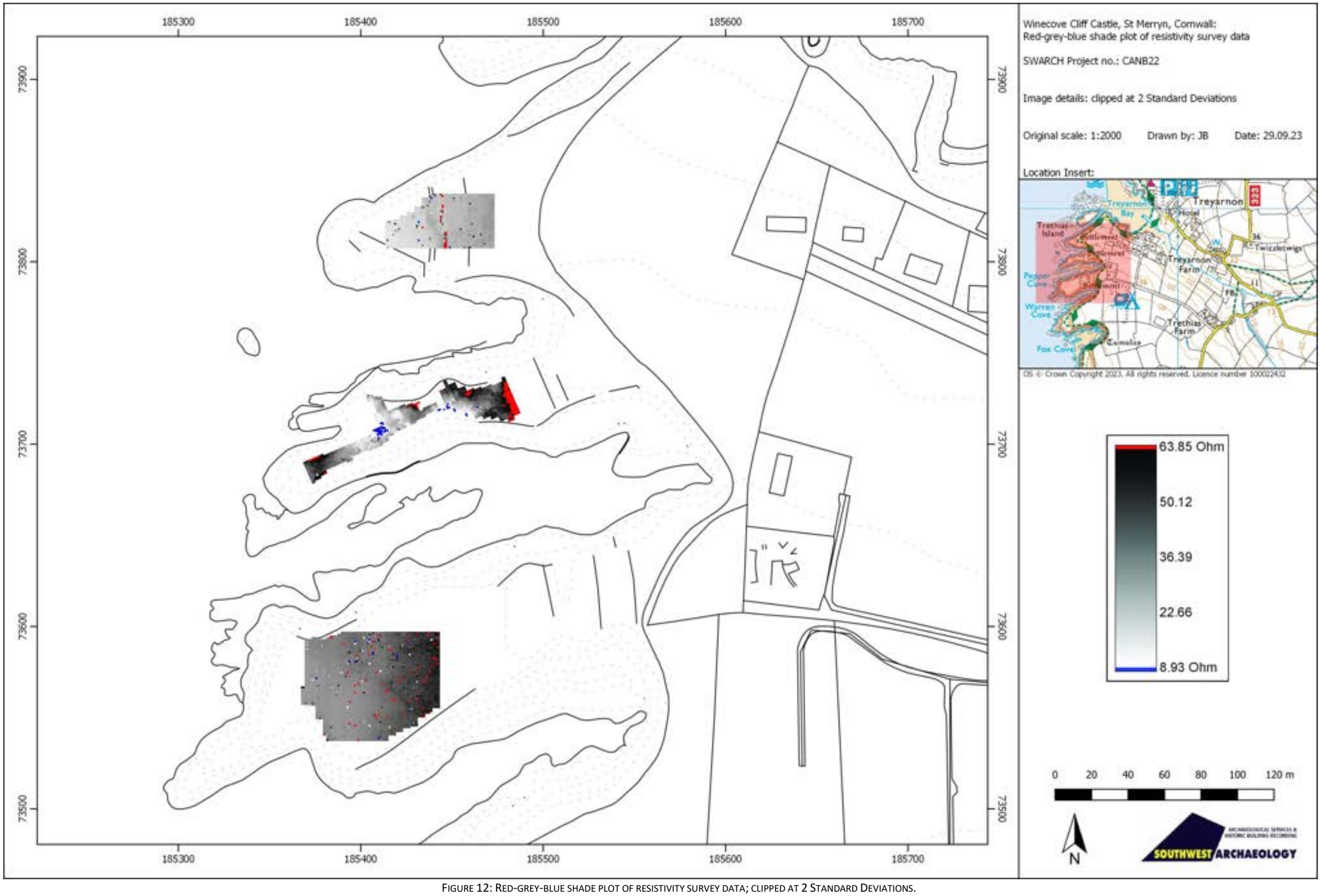


FIGURE 12: RED-GREY-BLUE SHADE PLOT OF RESISTIVITY SURVEY DATA; CLIPPED AT 2 STANDARD DEVIATIONS.

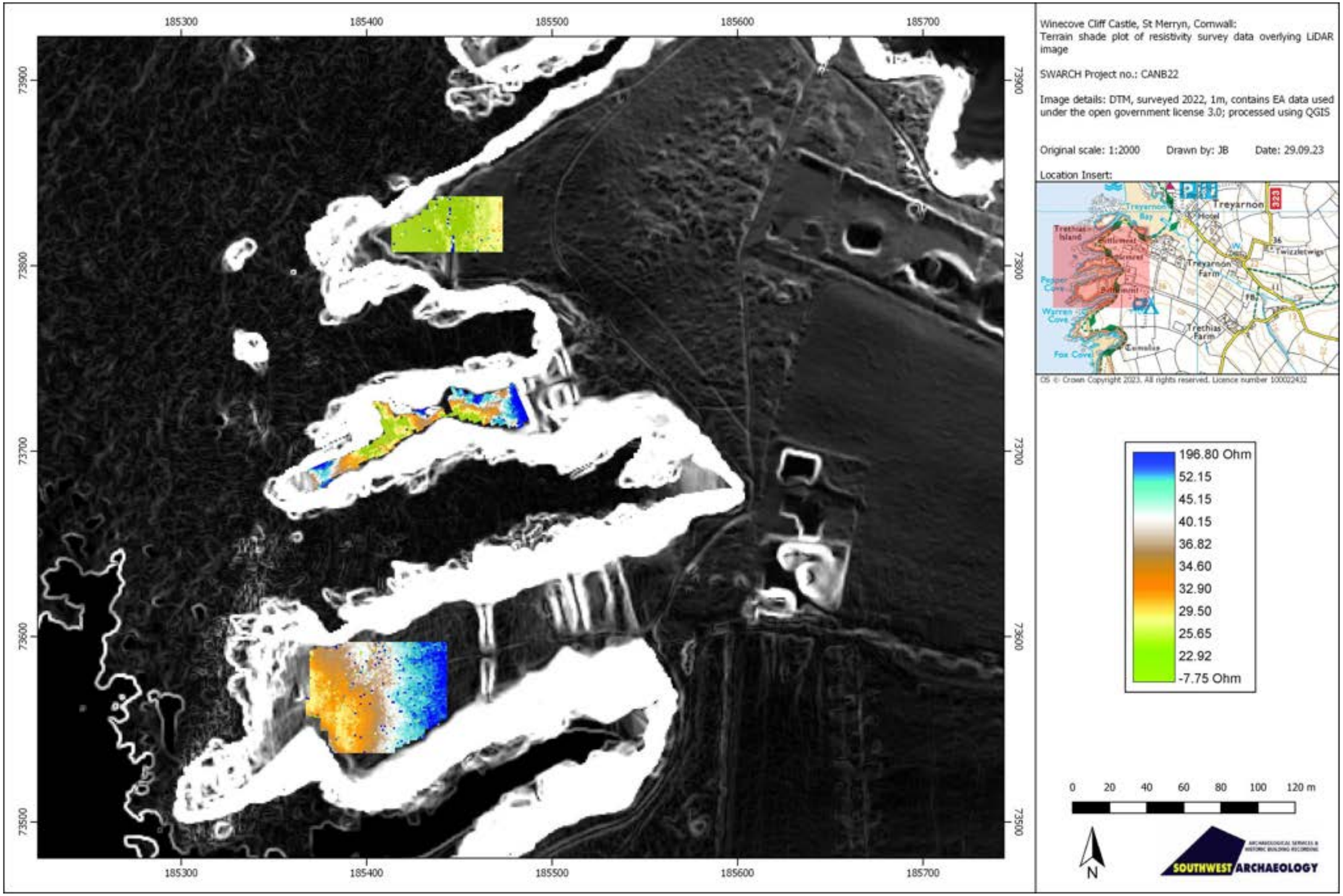


FIGURE 13: TERRAIN SHADE PLOTS OF RESISTIVITY SURVEY DATA (BAND WEIGHT EQUALISED), OVERLYING LIDAR IMAGERY.

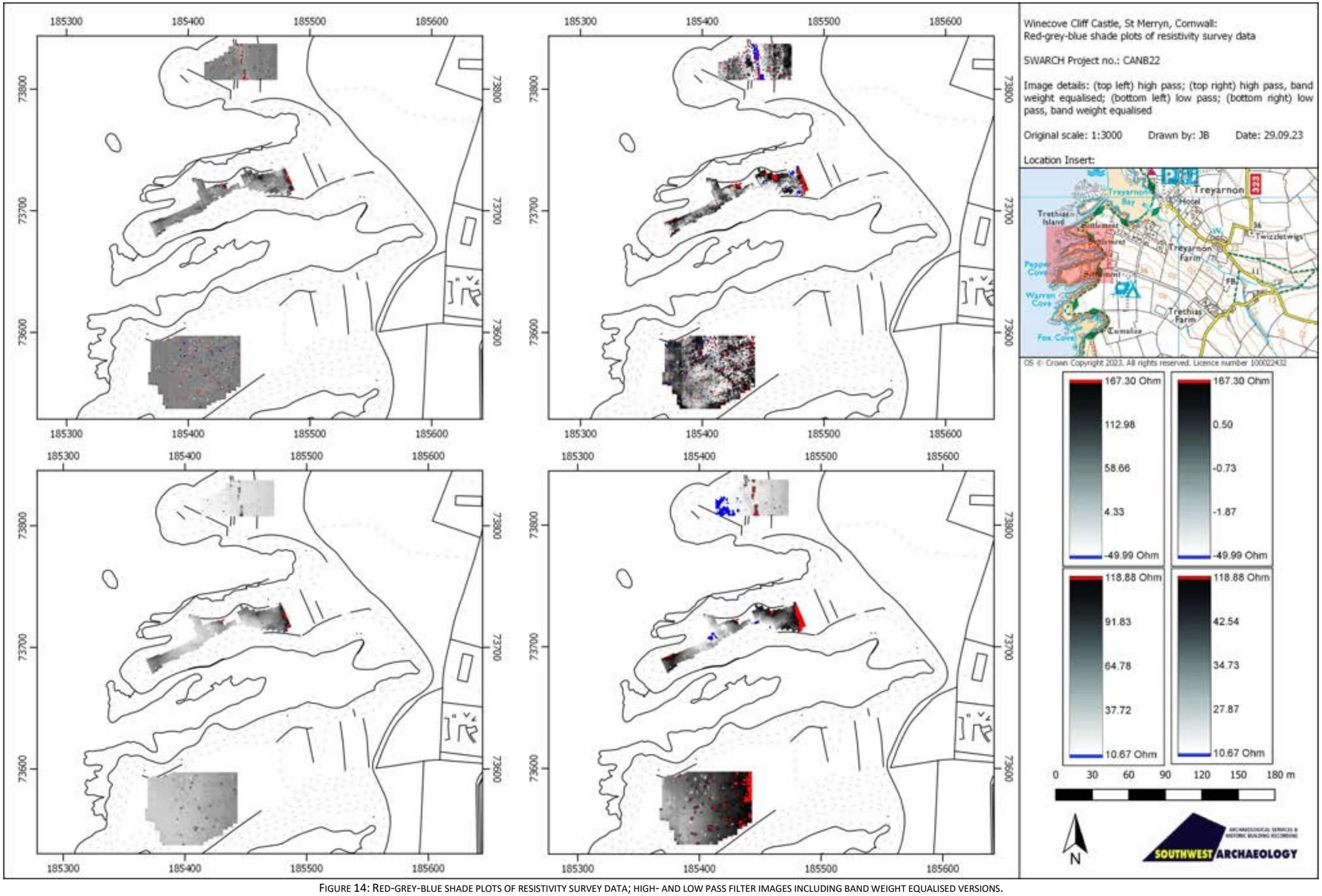


FIGURE 14: RED-GREY-BLUE SHADE PLOTS OF RESISTIVITY SURVEY DATA; HIGH- AND LOW PASS FILTER IMAGES INCLUDING BAND WEIGHT EQUALISED VERSIONS.

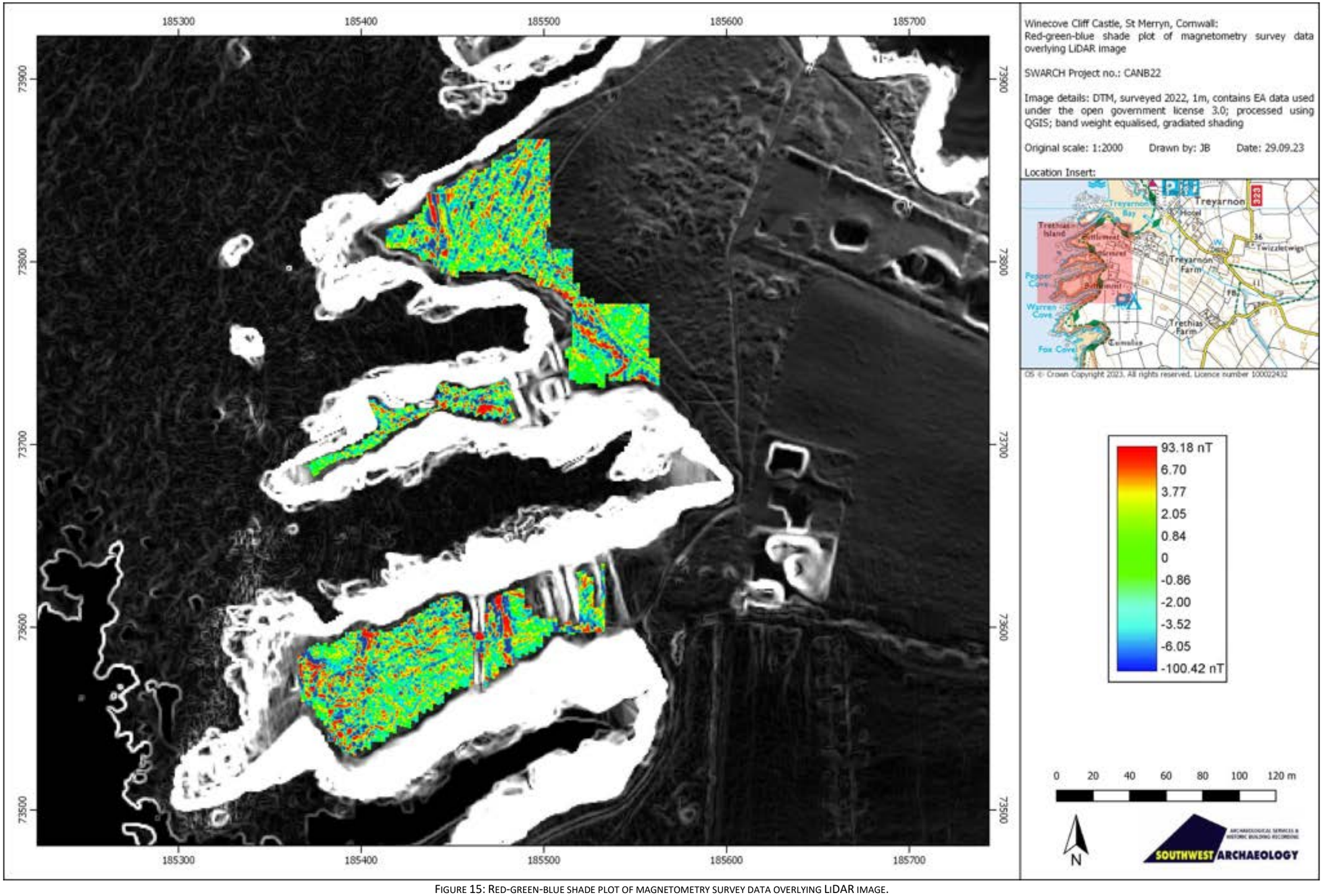


FIGURE 15: RED-GREEN-BLUE SHADE PLOT OF MAGNETOMETRY SURVEY DATA OVERLYING LIDAR IMAGE.

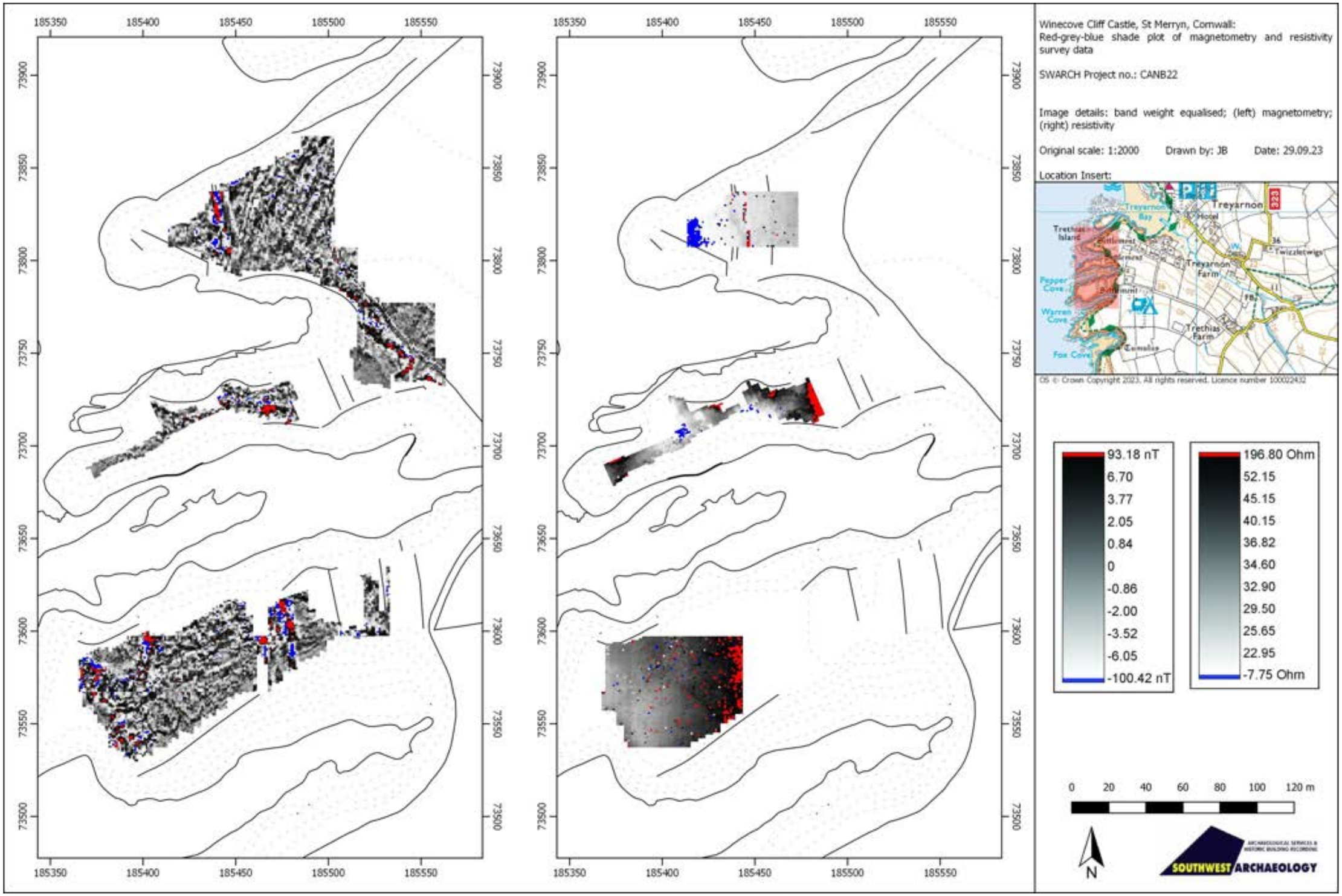


FIGURE 16: RED-GREY-BLUE SHADE PLOTS OF MAGNETOMETRY (LEFT) AND RESISTIVITY (RIGHT) SURVEY DATA; BAND WEIGHT EQUALISED.

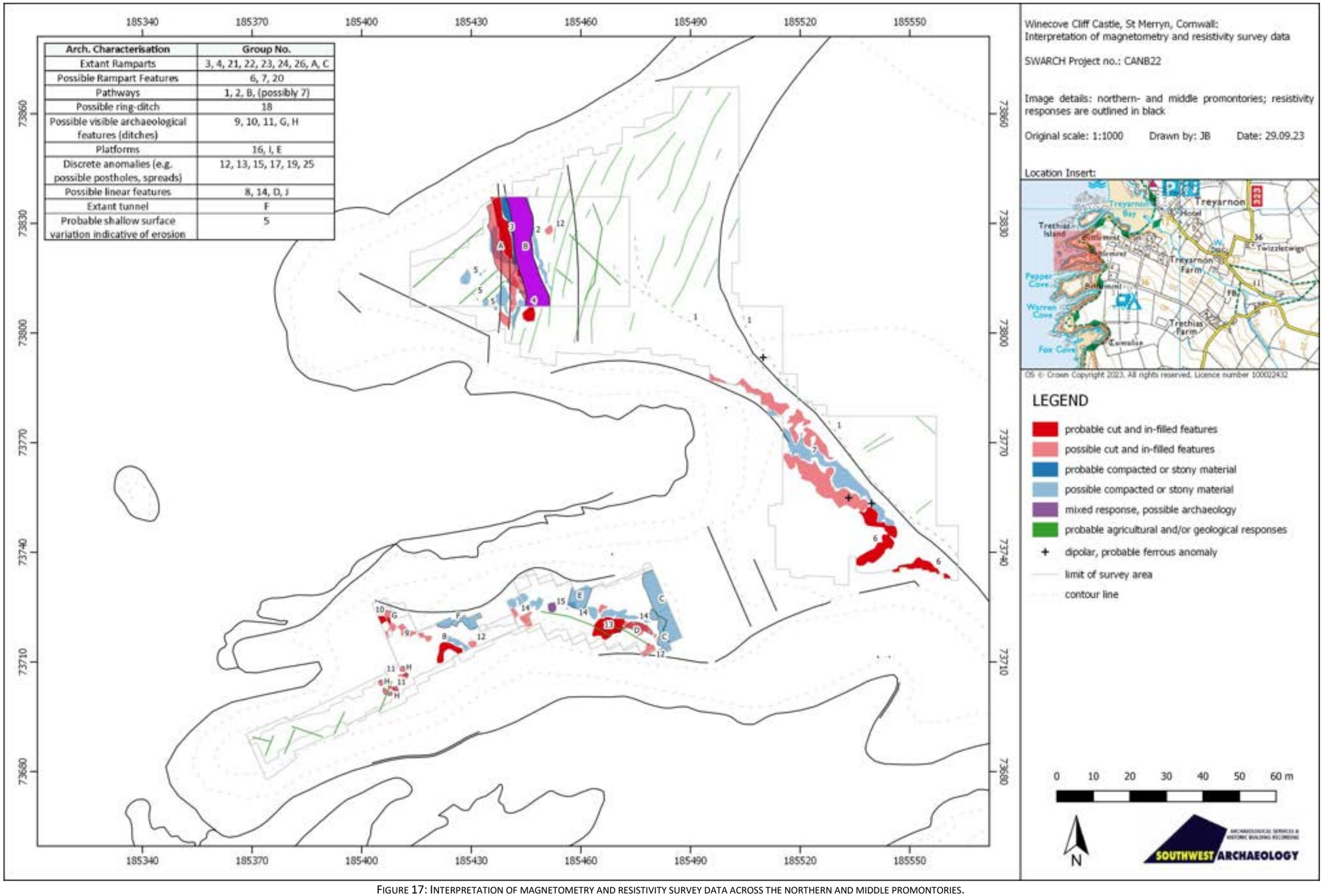


FIGURE 17: INTERPRETATION OF MAGNETOMETRY AND RESISTIVITY SURVEY DATA ACROSS THE NORTHERN AND MIDDLE PROMONTORIES.

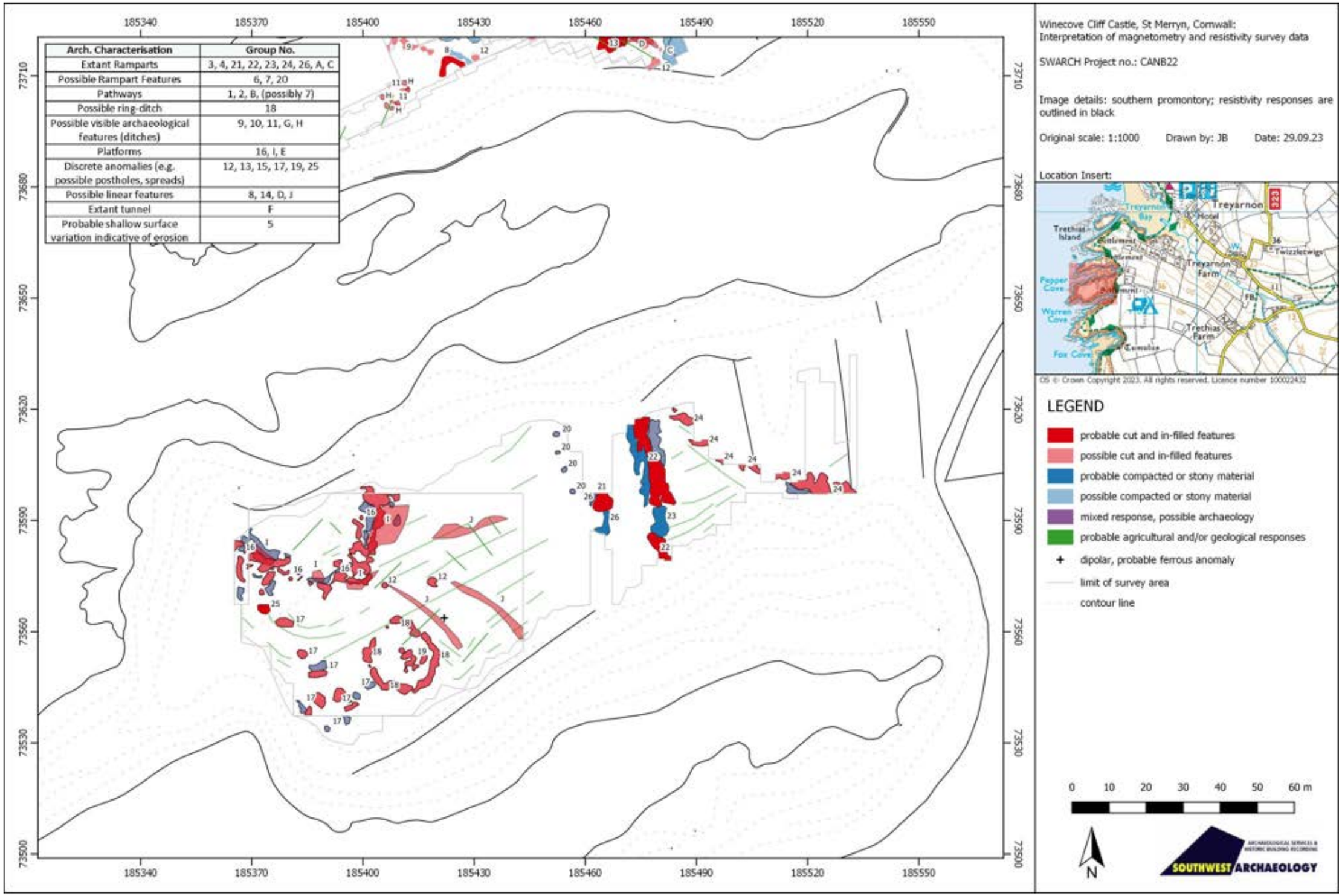


FIGURE 18: INTERPRETATION OF MAGNETOMETRY AND RESISTIVITY SURVEY DATA ACROSS THE SOUTHERN PROMONTORY.

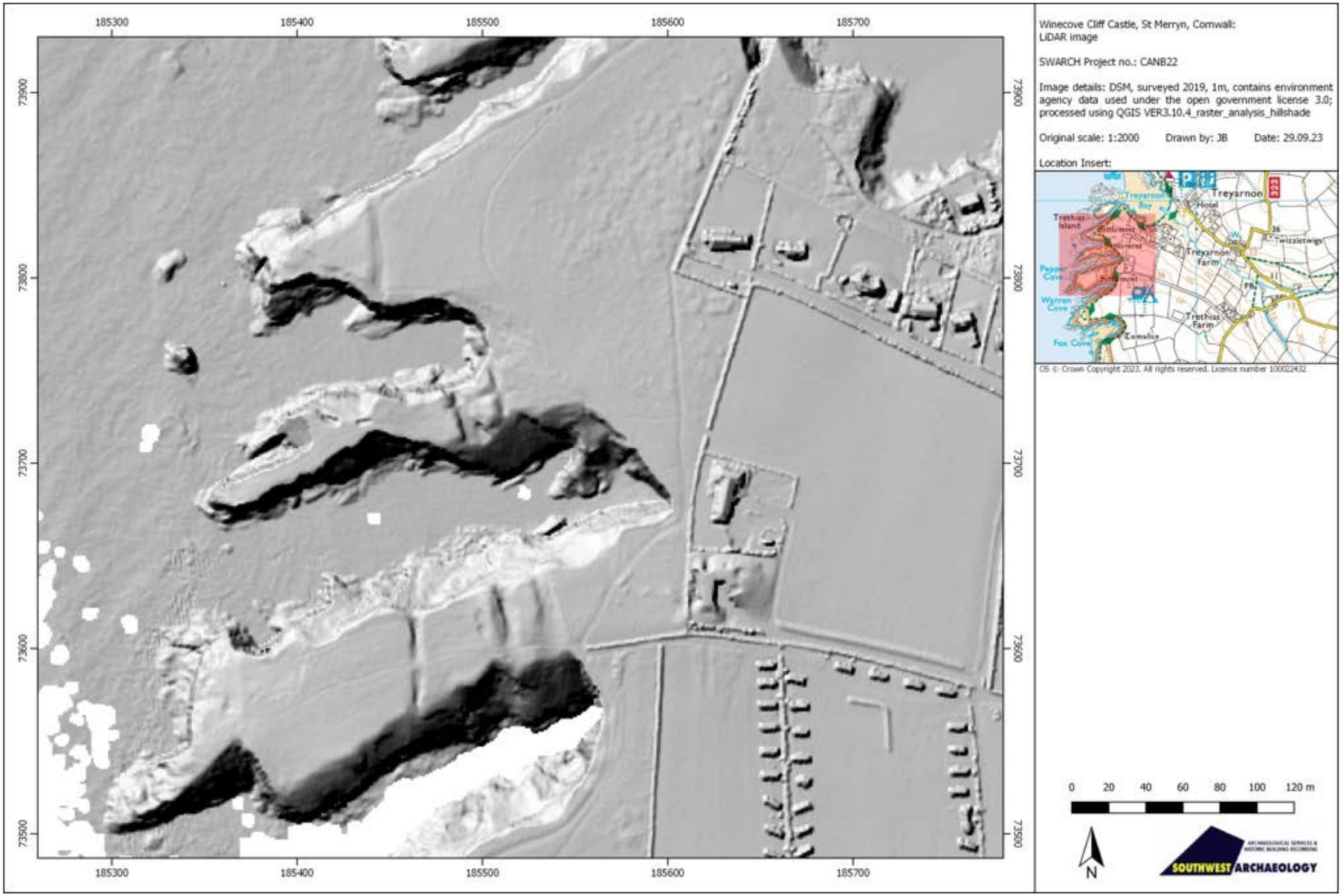


FIGURE 19: IMAGE DERIVED FROM LIDAR DATA; DSM SURVEYED 2019.

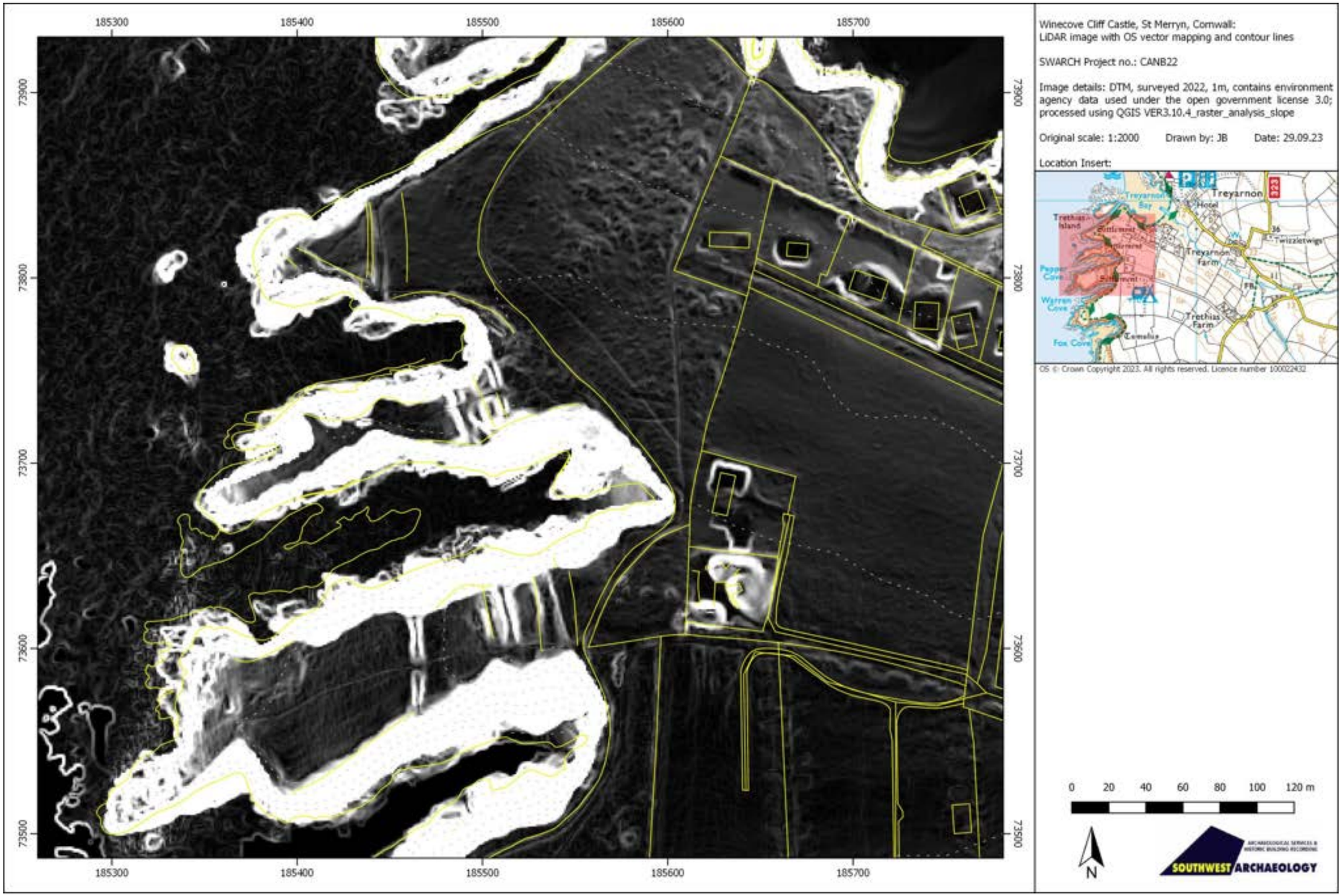


FIGURE 20: OS VECTOR MAPPING OVERLYING LIDAR IMAGE; DTM SURVEYED 2022.

APPENDIX 2: SUPPORTING SOURCES

FIGURE 21: EXTRACT FROM THE SURVEYOR'S DRAFT MAP, *C.*1810; THE APPROXIMATE LOCATION OF THE SITE IS OUTLINED IN RED (KK).

FIGURE 22: EXTRACT FROM THE *C.*1841 ST MERRYN PARISH TITHE MAP; THE SITE IS OUTLINED IN RED (KK).

TABLE 3: TRANSCRIPT EXTRACT FROM THE ST MERRYN TITHE APPORTIONMENT, *C.*1841 (KK).

Plot No.	Owner	Occupier	Field Name	Field Use
Trethies				
280	Thomas Hellyar	Himself	Zempern	Arable
281			Usty Veal	Arable
282			Usty Veal	Arable
283			Green Veal	Arable
284			Green Veal	Arable
285			Common	Arable
286			Higher Usty Veal	Arable
287			Cliff Field	Arable
404	Jane Morcombe	Joseph Morcombe	Higher Water Veals	Waste
405			Lower Water Veals	Arable
406			Higher Warred	Arable
407			Lower Warred	Arable
408			Common	Arable
412			Bunkers Hill	Arable

FIGURE 23: EXTRACT FROM THE ORDNANCE SURVEY 1ST EDITION, 6 INCH SERIES, PUBLISHED 1888; THE APPROXIMATE SITE IS OUTLINED IN RED (NLS).

FIGURE 24: EXTRACT FROM THE ORDNANCE 2ND EDITION, 6 INCH SERIES, PUBLISHED 1908; THE APPROXIMATE SITE IS OUTLINED IN RED (NLS).

FIGURE 25: EXTRACT FROM THE ORDNANCE 1938 REVISION, 6 INCH SERIES, PUBLISHED 1945; THE APPROXIMATE SITE IS OUTLINED IN RED (NLS).

Appendix 3: Supporting Photographs

1. VIEW ALONG THE SOUTH-WEST COAST PATH ON THE SOUTH SIDE OF THE NORTHERN PROMONTORY; VIEWED FROM THE EAST (NO SCALE).

2. VIEW ALONG THE COAST LINE NORTH OF THE SITE; VIEWED FROM THE SOUTH (NO SCALE)

3. WEST END OF NORTHERN PROMONTORY CLIFF; VIEWED FROM THE SOUTH (NO SCALE).

4. TUNNEL ON NORTH SIDE OF MIDDLE PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

5. WEST END OF MIDDLE PROMONTORY CLIFF; VIEWED FROM THE NORTH-EAST (NO SCALE).

6. VIEW ALONG THE MIDDLE PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

7. THE WEST END OF THE SOUTHERN PROMONTORY CLIFF FACE; VIEWED FROM THE NORTH-EAST (NO SCALE).

8. THE MIDDLE OF THE SOUTHERN PROMONTORY CLIFF FACE; VIEWED FROM THE NORTH (NO SCALE).

9. VIEW ALONG PEPPER COVE; VIEWED FROM THE NORTH-WEST (NO SCALE).

10. THE WEST END OF THE SOUTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

11. VIEW ACROSS WARREN COVE; VIEWED FROM THE NORTH-EAST (NO SCALE).

12. SOUTH-WEST FACING CLIFF EDGE ON SOUTH SIDE OF THE SOUTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

13. WEST END OF THE SOUTHERN PROMONTORY; VIEWED FROM THE SOUTH (NO SCALE).

14. PLATFORM AND NORTH SIDE OF THE SOUTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

15. MIDDLE OF THE SOUTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

16. WEATHERED EDGE OF SOIL AND ROCK ON SOUTH-EAST EDGE OF SOUTHERN PROMONTORY; VIEWED FROM THE WEST-SOUTH-WEST (NO SCALE).

17. THE SOUTHERN PROMONTORY FROM WITHIN ITS RAMPARTS; VIEWED FROM THE EAST (NO SCALE).

18. INTERNAL RAMPART BANK ON SOUTHERN PROMONTORY; VIEWED FROM THE SOUTH (NO SCALE).

19. VIEW SOUTH OF THE SOUTHERN PROMONTORY RAMPARTS, ACROSS WARREN COVE; VIEWED FROM THE NORTH (NO SCALE).

20. SOUTHERN PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH (NO SCALE).

21. VIEW FROM THE SOUTHERN PROMONTORY RAMPARTS ACROSS THE ADJACENT PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH (NO SCALE).

22. VIEW FROM THE SOUTHERN PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH-EAST (NO SCALE).

23. VIEW FROM THE SOUTHERN PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH-SOUTH-WEST (NO SCALE).

24. ANIMAL BURROWS IN THE SOUTHERN PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH-WEST (NO SCALE).

25. SOUTH-WEST COAST PATH PARALLEL TO NORTHERN PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH (NO SCALE).

26. SOUTH SIDE OF NORTHERN PROMONTORY; VIEWED FROM THE EAST (NO SCALE).

27. OPEN GROUND EAST OF THE NORTHERN PROMONTORY RAMPARTS; VIEWED FROM THE SOUTH-WEST (NO SCALE).

28. VIEW INTO THE MOUTH OF WINE COVE; VIEWED FROM THE NORTH-EAST (NO SCALE).

29. VIEW INTO WINE COVE; VIEWED FROM THE NORTH-WEST (NO SCALE).

30. VIEW FROM THE NORTHERN PROMONTORY TOWARDS TRETHIAS ISLAND; VIEWED FROM THE SOUTH-WEST (NO SCALE).

31. THE NORTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

32. VIEW FROM THE NORTHERN PROMONTORY LOOKING SOUTH-EAST; VIEWED FROM THE NORTH-WEST (NO SCALE).

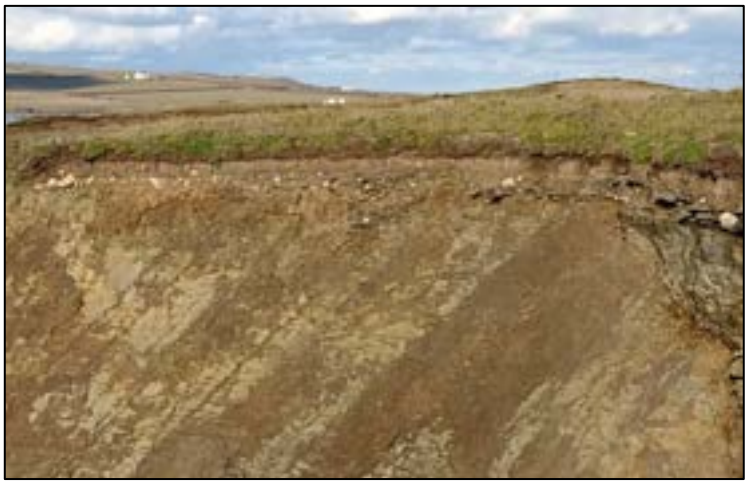
33. VIEW ALONG THE COAST FROM THE WEST END OF THE NORTHERN PROMONTORY; VIEWED FROM THE NORTH (NO SCALE).

34. SOILS AND STRATIGRAPHY AT THE WEST END OF THE NORTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

35. SOILS AND SOUTH SIDE OF THE NORTHERN PROMONTORY; VIEWED FROM THE WEST (NO SCALE).

36. VIEW OF A POSSIBLE DITCH IN THE SOUTH-WEST FACING CLIFF EDGE OF THE NORTH SIDE OF THE MIDDLE PROMONTORY; VIEWED FROM THE SOUTH (NO SCALE).

37. POSSIBLE DITCH IN THE SOUTH-WEST FACING CLIFF EDGE OF THE NORTH SIDE OF THE MIDDLE PROMONTORY; VIEWED FROM THE SOUTH-WEST (NO SCALE).



38. POSSIBLE DITCH IN THE SOUTH-WEST FACING CLIFF EDGE OF THE NORTH SIDE OF THE MIDDLE PROMONTORY; VIEWED FROM THE SOUTH-WEST (NO SCALE).

39. WINE COVE AND RAMPARTS ON NORTHERN PROMONTORY; VIEWED FROM THE SOUTH-WEST (NO SCALE).

40. THE WEST END OF WINE COVE; VIEWED FROM THE SOUTH (NO SCALE).

41. POSSIBLE ARCHAEOLOGICAL FEATURE IN THE NORTH FACING CLIFF EDGE AT THE WEST END OF THE MIDDLE PROMONTORY; VIEWED FROM THE NORTH-EAST (NO SCALE).

42. POSSIBLE ARCHAEOLOGICAL FEATURE IN THE NORTH FACING CLIFF EDGE AT THE WEST END OF THE MIDDLE PROMONTORY; VIEWED FROM THE NORTH-EAST (NO SCALE).

43. RAMPARTS ON THE NORTHERN PROMONTORY; VIEWED FROM THE SOUTH (NO SCALE).

44. RAMPARTS ON THE NORTHERN PROMONTORY; VIEWED FROM THE SOUTH (NO SCALE).

45. ROCKY OUTCROP AT THE WEST END OF WINE COVE; VIEWED FROM THE SOUTH-EAST (NO SCALE).

APPENDIX 4: TECHNICAL SUMMARY TABLES OF SURVEY METHOD AND METADATA

TABLE 4: TECHNICAL SUMMARY OF MAGNETOMETRY SURVEY METHOD AND METADATA.

Site no.	**Site Name**	**Site Type**	**Period**	**AONB Section**
26	Winecove Cliff Castle	Promontory Fort	Iron Age	4. Trevose Head to Stepper Point
Survey Type:	Magnetometry			
Equipment:	Twin sensor fluxgate gradiometer (Bartington Grad601) Leica CS15 GNSS Rover GPS			
Software:	Grad 601 - Version 3.16 TerraSurveyor - Version 3.0.36.0			
Instrument Settings / Parameters:	Survey Mode:	Grid Mode		
	Range:	100nT		
	Threshold:	2nT		
	Sensors:	2		
	Reject:	50 Hz		
Collection parameters:	Sample Intervals:	0.25m		
	Traverse Intervals:	1m		
	Traverse Pattern:	Zigzag		
	Traverse Direction:	North / Grid North / 0°		
	Adjustment frequency:	0.5-1ha		
Survey Size Metadata:	Individual Grid Size	30m x 30m		
	Composite Area:	*c.*6.48ha / *c.*360m x 180m		
	Area Surveyed:	1.5698ha		
Raw Response Metadata:	Max.:	98.38nT		
	Min.:	-99.77nT		
	Standard Deviation:	7.21nT		
	Mean:	4.55nT		
	Median:	4.17nT		
Processed Response Metadata: pre-clipping	Max.:	93.18nT		
	Min.:	-100.42nT		
	Standard Deviation:	6.33nT		
	Mean:	0.28nT		
	Median:	-0.01nT		
Processes:	DeStripe all traverses, median			
	DeStagger all traverses out- and inbound by -1.25m (grids b11-b16), by -1m (grids b17-b21), by -0.75m (grids a1-a6, a8, a9, a12), by -0.50m (all other grids)			
	Clip at +/- 3SD (Standard Deviation)			

TABLE 5: TECHNICAL SUMMARY OF RESISTIVITY SURVEY METHOD AND METADATA.

Site no.	Site Name	Site Type	Period	AONB Section
26	Winecove Cliff Castle	Promontory Fort	Iron Age	4. Trevose Head to Stepper Point

Survey Type:	Resistivity	
Equipment:	Geoscan Research RM15-D Resistivity Meter with MPX15 multiplexer module Four sensor PA20 multiprobe array system at 0.5m probe spacing Leica CS15 GNSS Rover GPS	
Software:	TerraSurveyor - Version 3.0.36.0	
Instrument Settings:	Survey / Log Mode:	Parallel Twin Log Mode 2
	Gain:	x1
	Current:	1 mA
	Frequency:	137 Hz
	Output Voltage:	40 V
	Auto-log Speed:	Medium
	High Pass Filter:	13 Hz
	Mains Frequency:	50 Hz
	Hardware:	PA5
	Interface:	MPX15
	Log Mode:	Parallel Twin
	# Parallel Reads:	2 (4P)
	Baud Rate:	9600
Collection parameters:	Sample Intervals:	1m
	Traverse Intervals:	1m
	Traverse Pattern:	Zigzag
	Traverse Direction:	North / Grid North / 0°
	Remote Probe Spacing:	Between 0.5m and *c.*1.5m
Survey Size Metadata:	Individual Grid Size	30m x 30m
	Composite Area:	*c.*4.50ha / *c.*300m x 1500m
	Area Surveyed:	0.7076ha
Response Metadata: raw data	Max.:	196.80 Ohm
	Min.:	-204.75 Ohm
	Standard Deviation:	27.87 Ohm
	Mean:	34.12 Ohm
	Median:	34.50 Ohm
Processed Response Metadata: processed	Max.:	196.80 Ohm
	Min.:	-7.75 Ohm
	Standard Deviation:	13.73 Ohm
	Mean:	36.39 Ohm
	Median:	34.60 Ohm
Processed Response Metadata: post-clipping	Max.:	63.85 Ohm
	Min.:	8.93 Ohm
	Standard Deviation:	11.09 Ohm
	Mean:	35.92 Ohm
	Median:	34.60 Ohm
Processes:	Edge Match (Area: Top 0, Left 0, Bottom 29, Right 59) to Bottom edge	
	Search & Replace +/-204.75 With: Dummy	
	Search & Replace 192 With: Dummy	
	Despike Threshold: 1 Window size: 3x3	
	Clip at 2SD (Standard Deviations)	
	High Pass filter with Gaussian weighted window 21x21 intervals	
	Low Pass filter with Gaussian weighted window 3x3 intervals	

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