

A303 Amesbury to Berwick Down

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Environmental Information Review

Geophysical Survey Report Stage 1

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Executive Summary

A detailed gradiometer survey and ground penetrating radar (GPR) survey was conducted over eight areas along the route of the A303. The survey forms part of an ongoing programme of archaeological works being undertaken along the A303 between Amesbury and Berwick Down to inform the PCF Stage 2 Options Assessment Phase for the A303 improvement scheme (NGR 406767, 140697 – NGR 4152612, 142253). The project was commissioned by Arup Atkins Joint Venture (AAJV) with the aim of establishing the presence, or otherwise, of potentially significant archaeology within the Stonehenge, Avebury and Associated Sites World Heritage Site (WHS) and wider proposed assessment corridors. It also aimed to define the extent and character of any features within each survey site.

The site comprises a number of arable fields covering a total area of 227.8 ha. The geophysical survey was undertaken between 10th of August and the 21st October 2016. The detailed gradiometer survey has been successful in detecting a high density of anomalies of archaeological interest across the scheme.

The anomalies identified by the detailed gradiometer survey are primarily ditch-like features which take a number of different forms and date to a variety of different periods. These largely correspond with known archaeological remains derived from aerial sources and represent complexes of prehistoric funerary monuments. Evidence for field systems, settlement, a Roman building and a variety of other significant archaeological features were also identified.

Several former field boundaries correlate with OS mapping and aerial photography for the scheme and areas of increased magnetic response, superficial geological deposits, agricultural ploughing trends and numerous modern services were also located.

The GPR survey was targeted over eight areas where significant archaeological features were encountered. The majority of these relate to funerary monuments in the form of Neolithic long barrows and Bronze Age round barrows. The results of this GPR survey confirmed this interpretation and provided additional detail regarding their character and extent. In some cases, it also identified additional possible archaeological features within the monuments that are also likely to be of significance.

The combination of the detailed gradiometer and the GPR survey identified a complex range of archaeological features and provided greater detail regarding their character and extent. In particular, this adds to our knowledge of the development of the prehistoric landscape within and adjacent to the WHS.

1 Introduction

1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by Arup Atkins Joint Venture (AAJV) to carry out a geophysical survey over eight areas along the route of the A303 (hereafter “the Scheme”, (**Figure 1**)). The survey forms part of an ongoing programme of archaeological works being undertaken along the A303 between Amesbury and Berwick Down to inform the PCF Stage 2 Options Assessment Phase for the A303 improvement scheme.
- 1.1.2 The Scheme is divided into eight areas (SW1 – SW4; NW 4; SE1; NE1 and NE2) covering a total of 227.8 ha with individual survey areas located to the north and south of the A303.
- 1.1.3 A written scheme of investigation (WSI) for the geophysical survey [1] was submitted to and approved by Wiltshire Council Archaeological Service (WCAS), acting on behalf of the Local Planning Authority, Wiltshire Council (WC), prior to the commencement of the ground works.

1.2 Scope of the document

- 1.2.1 This report presents a brief description of the methodology followed, the detailed survey results and the archaeological interpretation of the geophysical data.
- 1.2.2 A description of the location, topography and geology of the eight areas is included in the results section. It is intended that each relevant section can be utilised as a summary of the results for each survey area. For ease of comprehension an archaeological background for each survey is also provided within this section.

1.3 Archaeological background

- 1.3.1 The archaeological context has been presented in brief within the *Archaeological Geophysical Survey Design Brief* [2], which examined the potential for the survival of buried archaeological remains within the development area and surrounding landscape.
- 1.3.2 Four of the survey sites are situated within the Stonehenge, Avebury and Associated Sites World Heritage Site (WHS) (SW2, SW1, SE1 and NE2) whilst the remaining four (SW4, NW4, SW3 and NE1) are situated outside of the boundary. All of the survey areas are however located within a landscape containing nationally and regionally important multi-period archaeology. A high density of archaeological features, potentially of national and international significance in terms of their contribution to the Avebury and Stonehenge World Heritage Site’s ‘Outstanding Universal Value’ (OUV), were identified by the Stonehenge World Heritage Site Mapping Project [3] surrounding the current A303 and, as such, much of the data on known archaeological remains from this area is derived from aerial sources.
- 1.3.3 The Stonehenge, Avebury and Associated Sites World Heritage Site is internationally important for its complexes of outstanding Prehistoric monuments [4]. The 26 square kilometres of the WHS encompasses Stonehenge, Avebury and a range of Neolithic and Bronze Age ceremonial and funerary monuments

and associated sites that survive exceptionally well in the surrounding landscape. The area was a focus for ceremonial and funerary activity throughout the Neolithic and Bronze Age and there is a general potential across the Stonehenge WHS for the discovery of previously unrecorded archaeological remains relating to prehistoric and later activity.

- 1.3.4 Extensive surveys in association with the A303 Stonehenge Improvements have demonstrated the potential for the presence of archaeological remains (e.g. [5] [6] [7] [8]). In addition, the WHS Research Framework has been compiled and updated [9] [10] [11], and numerous major research projects have been carried out, such as the Stonehenge Riverside Project and the Stonehenge Hidden Landscapes Project [12, pp. 9, and fig 1.9]. More recent large scale geophysical research has also provided extensive and detailed mapping of archaeological of the landscape [13] [14] [15].
- 1.3.5 A more extensive description of the known archaeological resource within the individual survey sites is given at the beginning of the results section for each area.

2 Methodology

2.1 Introduction

2.1.1 Geophysical surveys over each of the areas adhered to the methodology set out below, prepared in accordance with guidelines and recommendations published by English Heritage (now Historic England) in 2008 [16], as per the WSI [1].

2.2 Aims and objectives

2.2.1 The aim of this geophysical survey is to gather information to inform the design proposals and wider environmental disciplines for the selection of the final route options.

2.2.2 The project specific objectives for this geophysical survey are defined by the Client as follows:

- To determine the presence/absence of potentially significant archaeology within the WHS and wider proposed assessment corridors;
- Define the extent and character of any features within each survey site; and
- Produce an interpretive report on the findings of the survey to inform the options screening process.

2.3 Fieldwork methodology

2.3.1 Individual survey nodes were established using a Leica Viva RTK GNSS instrument at 30m x 30 m intervals for the hand-held gradiometer and ground penetrating radar (GPR) surveys. The cart-based gradiometer system uses a Leica Captivate RTK GNSS instrument, which receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems. Both instruments allow positions to be determined with a precision of 0.02m in real-time is precise to approximately 0.02 m and therefore exceed Historic England recommendations [16].

Gradiometer Survey

2.3.2 The detailed gradiometer survey was undertaken over all eight sites using Bartington Grad-01-1000L gradiometers at 1 m intervals mounted on either a non-magnetic cart or on a hand-held frame with an effective sensitivity of 0.03 nT Data will be collected at 0.25 m intervals along transects spaced 1 m apart, in accordance with Historic England guidelines [16].

GPR Survey

2.3.3 The GPR survey was conducted on eight individual survey areas, selected by the Client from the detailed gradiometer data. These surveys used a GSSI SIR 3000 control unit with a 400 MHz shielded antenna mounted on a tricycle cart with odometer to record horizontal distance. This was deployed across all of the GPR survey areas with data collected along traverses spaced 0.5 m apart. Data with the 400 MHz antenna were collected at 50 scans per unit (1 unit = 1 m) with an effective time window of 50 ns.

2.3.4 A field test of the antenna frequency was undertaken prior to the commencement of the survey using a 400 and 900 MHz antenna in accordance with Europae Archaeologiae Consilium [17] and Historic England guidelines [16]. This established that the 400 MHz antenna was likely to provide the most information

regarding the nature of archaeological remains within each area and therefore no further survey was undertaken using an alternative antenna. Data was collected in the zigzag method with the exception of a small number of lines where obstacles required a parallel data collection method.

2.4 Data processing

Gradiometer Survey

- 2.4.1 Data from the survey was subject to minimal data correction processes. These comprise a zero mean traverse function (± 5 nT thresholds) applied to correct for any variation between the sensors used, and a de-step function to account for variations in traverse position due to varying ground cover and topography.
- 2.4.2 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix A**.

GPR Survey

- 2.4.3 Data from the survey was subject to common radar signal correction processes. These comprise amplitude and wobble correction of the radar profile to correct for variance in temperature and soil moisture content, background and bandpass filtering to remove noise in the data from the surrounding area, and XYZ mean line to correct for mosaic effects from variance in the day-to-day conditions during the survey. These steps were applied to all datasets collected across the Scheme.
- 2.4.4 The approximate depth conversions have been calculated on the assumption that the GPR pulse through the ground is travelling at a certain velocity in each area, which is summarised in **Appendix C (Table 5-1)**. The approximate depth conversions for each area are shown in **Appendix C (Table 5-2Table 5-9)**.
- 2.4.5 It is possible to determine more precisely the average velocity of the GPR pulse through the ground if excavated features at a known depth can be identified in the data; however, this is rarely possible. Instead, the radargrams were analysed for suitable hyperbolic reflections, which can be used to determine the velocity of the GPR pulse through the subsurface deposits so that measured signal travel times can be converted to depths.
- 2.4.6 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix B**.

3 Geophysical survey results and interpretation

3.1 Introduction

- 3.1.1 Each geophysical survey area is discussed individually in the following section. A brief description of the location, topography, geology is provided and a consideration of a site specific archaeological background is also included. Specific reference is also made to the ground coverage and conditions at the time of survey.
- 3.1.2 For ease of reference, the detailed gradiometer and GPR survey results are presented together within in the following results section. Each survey area is referred to individually, beginning in the west, at SW4 and finishing in the east at NE1.

Gradiometer Survey

- 3.1.3 The detailed gradiometer survey was undertaken intermittently between the 10th of August and the 21st October 2016. The conditions at the time of survey were generally very good across the Scheme with favourable weather throughout the period of fieldwork. All of the fields were either recently cropped or covered with a short grass and were largely clear, with only minor obstructions preventing survey. Where larger impediments prevented survey, in the form of vegetation, crop or hay stacks, these are mentioned in the following results section for each area.
- 3.1.4 For each of the eight areas, results are presented as a series of greyscale plots, archaeological interpretations at a scale of 1:1500 (**Figures 2-3; 6; 8-12; 18-19; 22-25; 30-32; 36; 38**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale image. The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (**Figures 4-5; 7; 13-17; 20-21; 26-29; 33-35; 37; 39**). Full definitions of the interpretation terms used in this report are provided in **Appendix D**.
- 3.1.5 Numerous ferrous anomalies are visible across the Scheme. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.
- 3.1.6 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be present than have been identified through geophysical survey.
- 3.1.7 Gradiometer survey may not detect all services present on Site. This report and accompanying illustrations should not be used as the sole source for service locations and appropriate equipment (e.g. CAT and Genny) should be used.

GPR Survey

- 3.1.8 The GPR survey was undertaken over eight selected areas across the Scheme (**Figure 1**) which were all identified as containing significant archaeology by the detailed gradiometer survey.

- 3.1.9 The 400 MHz antenna used in this survey has the potential of detecting features to a depth of 2-3 m in optimal conditions, however the total depth reached varies depending on the specific conditions of each area.
- 3.1.10 For ease of interpretation, the most representative timeslices have been selected for presentation with the interpretation image detailing the salient results from each relevant c.0.11-0.13 m section. This is then followed by a graphical summary of all of the timeslices in order to provide a summary and a more complete understanding of how these features may relate to each other.
- 3.1.11 The GPR surveys have identified several point reflectors, planar returns and linear responses, along with anomalous areas of high and low amplitude in each area. Results are presented as a series of greyscale timeslices, colour scale timeslices and archaeological interpretations at a scale of 1: 750 for Area 1, 7 and 8, and 1:500 for Area 2 – 6 (**Figures 43; 47; 49; 52; 55; 58; 61; 64**). The greyscale plots display black representing high amplitude responses and white relating to low amplitude responses. The colour scale plots are presented in an attempt to more clearly display responses at the upper and lower end of the scale, with blue representing low amplitude and yellow pertaining to high amplitude (**Figures 44; 48; 50; 53; 56; 59; 62; 65**)
- 3.1.12 All features are described in terms of their geophysical character. It is important to stipulate that all the depths referred to in this report are approximate levels below the current ground surface. The interpretation of the ground penetrating radar data highlights the presence of potential archaeological features, possible archaeological features and high amplitude responses alongside a series of linear trends (**Figures 45; 49; 51; 54; 57; 60; 63; 66**)
- 3.1.13 It should be noted that small features and waterlogged features may produce responses that are below the detection threshold of the GPR antennae. Excessive disturbance can also impede the ability of geophysical techniques to detect archaeology. It may therefore be the case that more archaeological features may be present than have been identified through the geophysical survey.

3.2 SW4

Site location, topography and geology

- 3.2.1 SW4 is the western most of the eight areas surveyed along the Scheme. It is located c.400 m south-west of Winterbourne Stoke and c.9.2 km west of Amesbury, in the county of Wiltshire.
- 3.2.2 The survey in this location encompassed an area of 22.3 ha over two fields of agricultural land covered by crop stubble. The Site is bounded by the A303 to the north, woodland to the east, and further agricultural land to the south and west. The B3083 Berwick Road runs through the eastern part of the Site.
- 3.2.3 The Site is on a south-east facing slope, ranging in elevation from c.120 m aOD in the north-west, to c.75 m aOD at the south-eastern extent.
- 3.2.4 A set of overhead cables traverse the Site from north to south across the eastern field of the Site.

- 3.2.5 The solid geology comprises chalk of the Seaford Chalk Formation. There are no recorded superficial deposits for the majority of the Site. However, a band of Head – clay, silt, sand, and gravel deposits is present in the east [18].
- 3.2.6 The soils underlying the west of the Site are likely to consist of brown rendzinas of the 343h (Andover 1) association, the centre covered by grey rendzinas of the 342a (Upton 1) association, and the east by brown calcareous earths of the 511f (Coombe 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.2.7 This area is located outside of the WHS and does not contain any known remains that are closely associated with the prehistoric funerary and ceremonial landscape at Stonehenge. However, several Bronze Age barrows are recorded in the surrounding area (WSHER number: MWI6396, 7172, 7206). The Site contains recorded features from the Late Prehistoric through to the medieval period (WSHER 2016).
- 3.2.8 A number of linear cropmark features (WSHER number: MWI7095), coincide with the central part of the Site and extend beyond its boundary to the north and south. Excavation of these features has produced a Cornish hand axe and a number of Neolithic to Bronze Age worked flints. The corresponding WSHER entry broadly describes these features as forming part of a field system of Early Neolithic to Romano-British date. However, a later prehistoric to Romano-British date is more probable. It is thought that the field system was re-used during the medieval/post-medieval period, with evidence of ridge and furrow visible within some fields.
- 3.2.9 Features associated with an Iron Age enclosure and Romano-British settlement (WSHER number: MWI6943) extend into the western edge of the Site, although the core of this area lies to the north of the A303. A combination of aerial photography, geophysical survey, and excavation has identified evidence of both Iron Age and Romano-British settlement in this area. This includes a round house, as well as a number of pits and rectilinear enclosure. The Iron Age activity is enclosed by a large oval ditch.
- 3.2.10 The medieval village of Winterbourne Stoke (WSHER number: MWI6975) lies immediately to the east of the Site. It is possible that earthworks relating to the village extend into the survey area. However, it is more likely that the Site formed the agricultural hinterland around the village, as evidenced by ridge and furrow seen in the area.
- 3.2.11 An undated oval enclosure (WSHER number: MWI7132) lies on the south-western boundary of the Site. This feature was identified on aerial photography, with no further information recorded.

Gradiometer survey results and interpretation

- 3.2.12 The gradiometer survey was undertaken by Wessex Archaeology's in-house geophysics team between the 4th – 10th August 2016. An overall coverage of 20.5 ha was achieved, with an area of woodland in the north-west and overgrown vegetation in the south-west (**Figures 2-5**)

- 3.2.13 The survey has detected several anomalies identified as being of an archaeological or possible archaeological origin. Perhaps most obviously, there are a series of linear anomalies across the SW4 which are likely to be associated with ditch-like features.
- 3.2.14 At **4000** a sinuous positive (0 - +1 nT) linear anomaly runs east – west across the Site for c.310 m at **4000**. To the east of this there are two further linear anomalies which are also on a similar east-west alignment at **4001** and **4002**. However, these are much thinner and more regular in shape measuring 1 -1.5 m in width. In addition, there are numerous positive linear anomalies (+1 – +2 nT) running perpendicular to these features at (**4003 - 4009**). These are largely north – south aligned, aside from **4003** which is orientated north-west – south-east. They measure 1 – 2 m in width and form a series of rectangular areas. Whilst they are intermittent and there is not always a physical relationship between them it is likely that this relates to a known Early Neolithic to Roman field system in the area (WSHER number: MWI17095). It is possible that some of anomalies at the western extent of the feature relate to an Iron Age and Romano-British settlement to the north of the Site (WSHER number: MWI16943), representing enclosures or other settlement activity. However, this cannot be determined from the geophysical data alone.
- 3.2.15 Two wide (6-8 m) positive linear anomalies with associated negative (-2 – +1 nT) responses (**4010-4011**) are located in the centre of the Site. The northern of the two anomalies (**4010**) is c.91 m in length whilst **4011** is c.71 m, however its southern extent is not seen in full due to the confines of the survey area. These anomalies are indicative of ditch features, with possible evidence of an associated bank. The similarity of the two features, in terms of magnetic profile and orientation, suggests that they are likely associated, however, their exact origin is not clear. They may relate to the field system seen elsewhere within the survey area at **4000**, or later agricultural activity.
- 3.2.16 A further positive linear anomaly with associated negative (-1 – +1 nT) response (**4012**) is seen to the east of **4011**. This anomaly is narrower (c.3 m), but is similarly indicative of a ditch feature with a possible associated bank. **4003** is c.80 m in length and orientated north-north-east – south-south-west. The lack of surrounding archaeological features with a similar orientation suggests that a modern agricultural origin is most likely, however the possibility that it relates to the field system at **4000** cannot be discounted.
- 3.2.17 A large number of small discrete positive anomalies are seen across the Site. The majority are 1 – 2 m in diameter and between 0 – 1 nT. The larger and stronger (1 – 2 nT) examples of these anomalies have been picked out as possible archaeology as they are indicative of pit features. Whilst it is possible that any of these pit-like features across the Site may be of archaeological origin, it is likely that the majority are evidence of natural pitting and weathering in the soft chalk bedrock.
- 3.2.18 A magnetically strong (+/-100 nT) linear anomaly (**4012**) runs c.156 m north-west – south-east across the east of the Site. This relates to the Esso Fawley – Avonmouth pipeline known to run through the area.

- 3.2.19 Four long (58 – 195 m) sinuous anomalies (**4013**) running north-west – south-east across the east of the Site. These relate to an area of Head deposits of clay, silt, sand, and gravel recorded in the area [18].
- 3.2.20 Directly south-west of the pipeline identified at **4012** there is a further negative linear anomaly, which appears to follow the same north-west - south-east trajectory (**4014**). It is not clear if this is associated with the construction of this pipeline or whether it is associated with a further ditch/bank in this area.
- 3.2.21 Large areas of magnetic variation have been detected across the north-east of the Site. These anomalies do not have clear shape or pattern, suggesting a natural rather than archaeological origin. Irregular linear responses are seen within these areas running parallel to the gradients of the Site, again supporting a geological origin rather than archaeological.
- 3.2.22 A large amount of regularly spaced parallel linear anomalies, indicative of ploughing, are visible across the Site. The majority of these are straight and closely (2 – 4 m) spaced suggesting that they are modern in origin. However, at least three phases of ploughing are evident, so it is possible that earlier agricultural activity is present but being obscured.

3.3 NW4

Site location, topography and geology

- 3.3.1 NW4 lies to the north-east of SW4. The Site is located immediately west of Winterbourne Stoke and c.9 km west of Amesbury, in the county of Wiltshire. The survey encompassed an area of 5.4 ha of harrowed agricultural land. The Site is bounded by the A303 to the south, the B3083 to the east, and further agricultural land on other sides.
- 3.3.2 The Site is on an east facing slope, from c.90 m aOD in the west to c.75 m aOD at the south-eastern extent.
- 3.3.3 A set of overhead cables traverse the Site from midway along the eastern boundary to the south-western corner of the Site.
- 3.3.4 The solid geology comprises chalk of the Seaford Chalk Formation with no recorded superficial deposits [18].
- 3.3.5 The soils underlying the west of the Site are likely to consist grey rendzinas of the 342a (Upton 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.3.6 This area is located outside of the WHS and does not contain any known remains that are closely related associated with the prehistoric funerary and ceremonial landscape at Stonehenge. The WSHER does not contain any records within the confines of the Site. However, the widespread evidence of activity from the Early Neolithic through to the post-medieval period in the surrounding area suggests that there also some potential for archaeologically significant remains to be present within the survey area.

3.3.7 Evidence of an Early Neolithic field system (WSHER number: MWI7095), later re-used in the medieval/post-medieval period, is recorded to the north, west, and south of the Site. Two Bronze Age round barrows (WSHER number: MWI6396, 7206) are recorded c.500 m west of the Site, whilst the scheduled Bronze Age Winterbourne Stoke West Group barrow cemetery (WSHER number: MWI7055-66, NHLE number: 1015019) lies c.700 m to the north-east. Iron Age and Roman settlements are recorded c.650 m west and c.600 m north of the Site (WSHER number: MWI6943, 7098).

Gradiometer survey results and interpretation

- 3.3.8 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 10th – 11th August 2016. An overall coverage of 4.8 ha was achieved. It was not possible to survey 0.6 ha of the area due to overgrown vegetation along the field boundaries (**Figures 6-7**).
- 3.3.9 The survey has not identified any anomalies that can confidently be interpreted as being associated with archaeological remains. A possible archaeological feature has been detected in the south of the Site in the form of a negative (-1 nT) linear (**4100**). This anomaly runs c.36 m east – west, and is indicative of a former bank or earthwork. However, its isolated nature suggests that it could equally relate to modern agricultural activity or a service trench.
- 3.3.10 There a very small number of pit-like anomalies across the Site. The larger examples measuring above c.1 m in diameter, and stronger (+1 – +2 nT) examples of these anomalies have been identified as possible archaeology. It is possible that any of these pit-like features across the Site may be of archaeological origin but it is likely that the majority are evidence of natural pitting and weathering in the chalk bedrock.
- 3.3.11 A magnetically strong (+/-100 nT) linear anomaly (**4101**) runs c.185 m north-north-east – south-south-west across the east of the Site before turning and running c.176 m along the southern boundary. This is indicative of an underground service, such as a pipe or cable.
- 3.3.12 A band of weak positive (0 - +1 nT) amorphous anomalies (**4102**) has been detected in the north of the Site. The lack of shape or pattern to these anomalies is indicative of geological variation. Whilst none are recorded [18], it is likely that there are superficial deposits covering this area.
- 3.3.13 Parallel linear anomalies are seen across the Site on north-east – south-west and north-west – south-east orientations. These are indicative of ploughing activity; however, its date is not clear. The ploughing is not seen in its entirety, with large gaps between anomalies making it difficult to interpret accurately. The fact that the anomalies are aligned with modern field boundaries suggests that the ploughing is most likely modern or post-medieval at the earliest.

3.4 SW3

Site location, topography and geology

3.4.1 SW3 is the largest area surveyed across the Scheme and lies to the c.1.2 km east of NW4. The Site is located c.1 km east of Winterbourne Stoke and c.6.7 km west of Amesbury, in the county of Wiltshire. The survey encompassed an area of 69.2 ha of agricultural land covered by crop stubble. The Site is bounded by the

A303 to the north, the A360 to the east, and further agricultural land to the south and west.

- 3.4.2 The Site is on a north facing slope, ranging from c.120 m aOD in the south to c.105 m aOD along the northern boundary.
- 3.4.3 The solid geology comprises chalk of the Seaford Chalk Formation, with no recorded superficial deposits across the majority of the area. A small band of Head – clay, silt, sand, and gravel deposits is present in the north-west [18].
- 3.4.4 The soils underlying the west of the Site are likely to consist of brown rendzinas of the 343h (Andover 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.4.5 This area is located outside of the WHS but also contains archaeological remains dating from the Neolithic and Bronze Age that are associated with the ceremonial landscape surrounding Stonehenge. The WSHER contains records for a number of monuments within the Site boundary ranging in date from the Late Prehistoric to modern.
- 3.4.6 A Bronze Age enclosure (WSHER number: MWI7128) lies on the north-eastern boundary of the Site. This, combined with a bowl barrow to the north of the A303, is a scheduled monument (NHLE number: 1011048). The irregular rounded enclosure is recorded on aerial photography and may relate to a Bronze Age settlement (WSHER number: MWI6924) recorded c.100 m to the east.
- 3.4.7 Another scheduled Bronze Age feature is present in the east of the Site in the form of a bowl barrow (WSHER number: MWI6398, NHLE number: 1011045). A previous geophysical survey of the monument identified a ring ditch comprised of five or six segments, with an internal diameter of c.20 m.
- 3.4.8 Four further Bronze Age barrows (WSHER number: MWI7136AP, 7153, 7154, 7210) are aligned north – south in the centre of the Site. Each of these is visible as a cropmark in aerial photography, with little other recorded information. MWI7210 is not seen in its full extent. The cropmarks show a segmented ditch, whilst previous geophysical survey identified a ‘C-shaped’ enclosure.
- 3.4.9 A possible Bronze Age boundary ditch (WSHER number: MWI6407) runs north-west – south-east across the Site. This feature can be traced on aerial photography for c.2.2 km, and is one of a number of prehistoric linear ditches dividing Salisbury Plain.
- 3.4.10 Two Bronze Age pits and a posthole (WSHER number: MWI6933-4) are recorded in the north-west of the Site. Each of these has been previously excavated, along with an Iron Age pit (WSHER number: MWI6944), short linear Roman feature (WSHER number: MWI6945), and undated pits and a ditch terminus (WSHER number: MWI7004-6) in close proximity.
- 3.4.11 A sinuous linear feature (WSHER number: MWI7125) runs north-north-east – south-south-west through the centre of the Site. This feature runs for c.1.5 km and is thought to be later prehistoric in date, however, the feature terminates to

the north of a Romano-British settlement, suggesting that it may be a contemporary trackway.

- 3.4.12 The Romano-British settlement is recorded in the south of the Site (WSHER number: MWI7155). Aerial photography has identified numerous rectilinear enclosures, pits, banks, and ditches aligned along a central trackway. The central focus of settlement activity is located south of the survey area. There is also some evidence of medieval ridge and furrow within the area of the settlement.
- 3.4.13 Further possible evidence of medieval agricultural activity is recorded in the north-east of the Site. Parallel linear banks are recorded as a field system of unknown date (WSHER number: MWI7094). It is possible that these relate to medieval lynchets.
- 3.4.14 The Site formed part of Oatlands Hill Aerodrome (WSHER number: MWI6984) during WWII. This extended south and west of the survey area. The aerodrome contained domestic buildings in the west, a control tower in the north-western corner, four blister hangers across the area, and three grass runways. The facility was used as a satellite for Old Sarum airfield, and as such was not as well developed or equipped.

Gradiometer survey results and interpretation

- 3.4.15 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 2nd September – 6th September, 4th and 10th – 21st October 2016. An overall coverage of 67.6 ha was achieved. There were several small obstructions across the area including overgrown vegetation at field boundaries, hay bales, and an area of concrete in the south-west (**Figures 8-17**)
- 3.4.16 The survey has identified a large number of anomalies of an archaeological origin, predominately across the east of the Site. A positive (+4 – +7 nT) rectilinear anomaly (**4200**) truncated by the A303 can be seen on the north-eastern boundary of the Site. This is indicative of a ditch feature and relates to a Bronze Age enclosure (WSHER number: MWI7128, NHLE number: 1011048). What can be seen of the feature is 2 – 3 m wide and runs c.66.5 m east-south-east from the northern boundary before turning north-north-east for c.20.5 m and running back into the site boundary. A small gap is seen in the ditch at the western end, however it is not clear whether this is contemporary with the construction of the enclosure, caused by plough damage, or indicative of a change in ditch fill.
- 3.4.17 A positive (+5 – +11 nT) fragmented circular anomaly (**4201**) has been detected in the north-east of the site. This relates to the ring ditch of a known Bronze Age barrow (WSHER number: MWI6398, NHLE number: 1011045). The ditch, which is formed of six segments, has an internal diameter of c.20 m and a width of 2.5 – 3.5 m. The causeways separating the ditch segments vary from 2.5 – 5 m. Whilst this feature is recorded as a Bronze Age round barrow the segmented ditch and southern entrance is more indicative of a Neolithic hengiform monument, although the presence of an external bank is not clear.
- 3.4.18 There are two small discrete positive anomalies in the south-west of the ring ditch. These are indicative of pit features, however it is not clear whether these are internal features, or are natural in origin.

- 3.4.19 A positive (+1 – +2 nT) circular anomaly (**4202**) can be seen in the centre of the Site. This is associated with the ring ditch of a known Bronze Age barrow (WSHER number: MWI7154). The ditch measures c.1.5 m in width and has an internal diameter of c.14 m. There is no evidence of internal features or breaks in the ditch. However, its weak nature may be evidence that the barrow has been truncated by ploughing activity.
- 3.4.20 A further positive (+1 – +3 nT) circular anomaly (**4203**) is present in the south of the Site. This is also related to the ring ditch of a known Bronze Age barrow (WSHER number: MWI7136). The feature is notably weaker in the eastern extent before gradually fading out. The ditch has an internal diameter of c.31 m and measures 2 – 2.5 m in width. The fading of the anomaly on its eastern side may indicate that this part of the barrow is less well preserved. It is possible that it has been truncated by a later trackway (**4208**).
- 3.4.21 A positive (+2 – +4 nT) linear anomaly (**4204**) runs c.864 m north-west – south-east across the site. The feature is truncated by a modern service (**4235**) and a probable Romano-British trackway (**4208**). This is recorded as a Bronze Age boundary ditch (WSHER number: MWI6407). The ditch is 2.5 – 4 m wide and is known to extend to a total length of 2.2 km and can be seen to continue into SW2 at **4302**.
- 3.4.22 Two positive (+2 – +7 nT) linear and rectilinear anomalies (**4205 - 4206**) have been detected in the south of the Site. These appear to form part of a known Romano-British settlement (WSHER number: MWI7155), which extends further south of the surveyed area. The northern linear (**4205**) c.64 m east before turning c.135 m south-south-east. **4206** runs to the south of **4205** in the form of two parallel linear anomalies. These are orientated west-south-west – east-south-east, with the northern of the two running c.125 m and the southern c.65 m. These anomalies appear to be enclosing ditches of an area of dense pitting (**4207**). There is no clear evidence for an enclosing feature to the west, however the pitting appears to come to an abrupt stop suggesting that there may have been a fence or palisade that is not clearly visible in the geophysical data. The pit features vary in size from 1 – 3.5 m in diameter and cover the majority of the enclosed area. There are small areas clear of pitting, however it is not clear what these relate to. It is likely that this group of features represents an enclosed area of Romano-British industrial activity, lying on the northern edge of the settlement, however, it is not possible to provide any more detail from the survey data alone.
- 3.4.23 A sinuous, weak (-1 – +1 nT) positive and negative anomaly (**4208**) runs approximately north-east – south-west across the centre of the Site for c.710 m. The width of the feature varies from c.4 m at its northern extent to c.35 m at the south. This is related to a feature recorded as a late prehistoric linear feature (Monument ID: MWI7125). However, given that it appears to terminate at a Romano-British settlement (Monument ID: MWI7155) it seems that is most likely related to a Romano-British trackway. The feature curves around, and possibly truncates, a Bronze Age barrow (**4203**) indicating that it post-dates this. The northern terminus of the feature is not clear, and the anomaly is very poorly defined in this area.
- 3.4.24 A positive (+3 nT) 'C' shaped anomaly (**4209**) has been detected in the north of the Site. This is related to an oval enclosure ditch of unknown date (Monument ID: MWI7210). The enclosure is orientated north-east – south-west with the ditch

running for c.98 m including a c.4 m break at its north-eastern extent. Given its size it is likely that the gap is part of the construction of the enclosure rather than plough damage. The geophysical data does not provide any further information on the date of the feature, however given its location and the surrounding landscape a Bronze Age or Late Prehistoric date would not seem unreasonable. There is a further positive (+3 – +4 nT) linear anomaly (**4210**) 36 m to the south-west of **4209**. This is 42 m in length and indicative of a ditch feature. It is possible that this forms part of the same enclosure seen at **4209** but this cannot be determined with confidence without further investigation.

- 3.4.25 A series of weak (0 – +2 nT) positive linear anomalies (**4211-17**) can be seen across the east of the Site. These are likely to form part of an undated field system (WSHER number: MWI7094), which is also seen extending into SW2. **4211-13** lie in the north-east of the Site and comprise north-north-east – south-south-west and east – west orientated ditch features forming rectilinear enclosures. The ditches are all 1.5 – 2 m in width and cover an area c.150 m north – south and c.300 m east – west. The weak nature and fragmentation of the anomalies suggests that they have likely been truncated by later ploughing activity, particularly given that a much greater number of linear features was identified in aerial photography.
- 3.4.26 In the east of the Site there are several more positive linear anomalies at **4214-16**. These are east – west orientated ditch features with widths of 1.5 – 2 m, as with **4211-13**. These vary in length from c.40 – 75 m with no evidence of north – south ditches forming fields. However, this is likely due to plough damage rather than then not having existed. The final area of ditch features (**4217**) relating to the field system lies in the south-east of the Site. These are more sinuous in nature, running c.255 m north-north-east, with a c.171 m westerly projection. These anomalies have more variance in their width (c.1.5 – 8 m), however their alignment with other features, both in the survey data and on aerial photography, suggests that they are part of the same field system.
- 3.4.27 A weak positive (+1 nT) rectilinear anomaly (**4218**) has been identified in the south-east of the Site, with a further linear (**4219**) to the south of it. **4218** runs c.76 m north-west before turning c.44 m south-east, whilst **4219** runs c.21 m north-west – south-east, but is truncated by the survey boundary. These are both indicative of ditch features, with widths of c.1 m. Whilst it is possible that these relate to the field system seen at **4211-17**, they do not share an orientation or similar magnetic profile. This suggests that the features were constructed at different times or by different methods, however their precise origin is not clear from the survey data alone.
- 3.4.28 A possible linear anomaly is seen at **4220** in the south of the Site. This feature runs c.65 m on a similar east – west alignment to **4205**. It is possible that this is an extension of the Romano-British enclosure ditch, however this anomaly is weaker (0 – +1 nT) and lies c.50 m to the west. This makes the anomalies origin difficult to determine with archaeological and agricultural origins being equally likely.
- 3.4.29 A long (c.765 m), broad (3.5 – 16.5 m), sinuous anomaly (**4221**) runs approximately east – west across the Site. Whilst this would be the expected response for a geological feature, such as an area of Head deposits, no such feature is recorded in this location [18]. The feature also appears to separate two

areas of ridge and furrow (**4227** and **4228**) suggesting that it could be evidence for a medieval field boundary. However, it is not possible to confirm this on the basis of these geophysical survey results.

- 3.4.30 Four further positive linear anomalies of possible archaeological origin are seen across the north (**4222-24**) and east (**4225**) of the Site. Each of these anomalies is weak (0 – +1.5 nT) and bears little resemblance in terms of magnetic profile or orientation to surrounding features. Whilst it is possible that any of these could be associated with the archaeological anomalies seen across the site, it is equally possible that they are of agricultural or natural origin. **4222** runs c.78 m north – south, **4223** is c.34 m long on a north-west – south-east orientation, whilst **4224** runs c.60 m west-north-west – east-south-east. Each of these three anomalies has a similar width of c.2 m. **4225**, which runs c.64 m on a north-north-east – south-south-west orientation, is broader than the others at c.5 – 8 m wide.
- 3.4.31 A weak negative (-1 nT) linear anomaly (**4226**) is present in the south-east of the Site. The weak negative and broad (c.15 m) nature of the anomaly is indicative of a natural variation in the geology. However, given its proximity it may relate to the undated field system at **4211-17**. This anomaly is truncated by the confines of the survey area making a more confident interpretation difficult.
- 3.4.32 Three areas of widely spaced (15 – 20 m) parallel linear anomalies (**4227-29**) are seen across the north and west of the site. These are indicative of medieval to post-medieval ridge and furrow. **4227** runs west-south-west – east-north-east across the north of the site. **4228** and **4229** run north – south in the centre and west of the site respectively.
- 3.4.33 Linear areas of increased magnetic responses (**4230-34**) have been identified across the Site. Each of these is related to a former field boundary present on available historic mapping. **4230** runs east – west across the site and is visible on the 1877 edition Ordnance Survey map of the area. **4231**, forming a rectilinear boundary in the north-west is visible on the 1901 edition Ordnance Survey map. **4232** extends south from **4231** and is first present on the 1924 edition Ordnance Survey map. **4233** and **4234** run north – south across the centre of the site and are both first seen on the 1961 edition Ordnance Survey map.
- 3.4.34 A magnetically strong (+/-100 nT) linear anomaly (**4235**) runs for 1 km north-east – south-west across the Site. This is indicative of a modern underground service, such as a pipe or cable.
- 3.4.35 A weak positive (+1 nT) sinuous anomaly (**4236**) in the west of the Site. The anomaly varies in width from 5 – 7.5 m. It runs on a north-north-east – south-south-west orientation for c.250 m including a c.43 m break at its centre. This relates to known area of Head deposits noted in geological mapping of the area [18].

3.5 SW2

Site location, topography and geology

- 3.5.1 SW2 lies to the immediate east of SW3. The Site is located c.2.3 km east of Winterbourne Stoke and c.6.2 km west of Amesbury, in the county of Wiltshire. The survey area coincides with an area of 18.3 ha of agricultural land covered by

crop stubble. The Site is bounded by the A360 to the west, an area of woodland to the east, and agricultural land on other sides.

- 3.5.2 GPR Area 1 and Area 2 were located within SW2 and covered 0.4 ha and 0.2 ha respectively (**Figure 40**)
- 3.5.3 The Site is on a south facing slope, ranging in height from c.110 m aOD in the north-west to c.95 m aOD along the southern boundary.
- 3.5.4 The solid geology comprises chalk of the Seaford Chalk Formation, with no recorded superficial deposits across the majority of the area. A band of Head – clay, silt, sand, and gravel deposits runs along the southern boundary [18].
- 3.5.5 The soils underlying the west of the Site are likely to consist of brown rendzinas of the 343h (Andover 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.5.6 The Site is located within the WHS and contains extant Neolithic and Bronze Age monuments. There is also some evidence for Roman activity within the Site boundary (WSHER 2016).
- 3.5.7 A Neolithic long barrow (WSHER number: MWI13159) is recorded in the north-west of the Site. This feature was identified by aerial photography as two parallel ditches, with no extant mound.
- 3.5.8 A scheduled Bronze Age linear boundary (NHLE number: 1010837) runs along the eastern boundary of the Site. The boundary runs for c.1 km and forms part of a complex of boundary earthworks extending over 4 km from the west of Winterbourne Stoke crossroads to Rox Hill. Another, non-scheduled, Bronze Age boundary ditch (WSHER number: MWI6407, 12690) runs west-north-west – east-south-east across the centre of the Site, extending into SW3. It is possible that these features are associated.
- 3.5.9 Two former field systems are recorded across the Site. Both have been identified by aerial photography, with one, of probable prehistoric or Romano-British date, covering the entire Site and extending southwards (SWHER number: MWI13128). The other (SWHER number: MWI7094) is of uncertain date and is less well recorded. It extends into the western part of the Site, with more being visible in SW3.

Gradiometer survey results and interpretation

- 3.5.10 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 31st August – 2nd September 2016. An overall coverage of 18.3 ha was achieved (**Figures 18-21**)
- 3.5.11 The survey has identified several anomalies of archaeological and possible archaeological origin. Two positive (+2 – +5 nT) parallel linear anomalies (**4300**) on a north-east – south-west orientation has been detected in the north of the Site. These relate to the flanking ditches of a Neolithic long barrow (WSHER: MWI13159). The western ditch is c.54 m long, whilst the eastern is c.51 m in length. Both ditches are c.1.5 – 3.5 m wide, with a separation of c.20 – 24 m between them. Two shorter (both c.18.5 m long) internal ditches are visible at the

southern end of the barrow. The function of these is not clear from the data alone, however it may indicate an internal structure. There is no other evidence of internal features or remains of the barrow mound.

- 3.5.12 Another two parallel positive (+3 – +6 nT) linear anomalies (**4301**) can be seen on a north – south orientation in the south-west of the Site. These are likely related to the flanking ditches of a previously unrecorded Neolithic long barrow. The western ditch is c.38 m in length and c.2 – 3 m wide, whilst the eastern ditch is c.43 m long and c.2.5 m wide. There is a separation of c.12 – 14.5 m between the ditches, with no evidence of internal features. The ditches are fragmented suggesting that the barrow is truncated by ploughing activity.
- 3.5.13 A positive (+2 – +5 nT) linear anomaly (**4302**) runs east-south-east from the western boundary for c.342 m before turning east-north-east for c.65 m towards the eastern boundary. This is related to a Bronze Age boundary ditch (WSHER number: MWI6407), which also extends into SW3. The ditch is c.2 m wide and has no breaks across the Site.
- 3.5.14 Another positive (+0.5 – +1 nT) linear anomaly (**4303**) appears to extend west-south-west from the bend of **4302**. The ditch is seen as four segments running west-south-west c.167 m, before turning west-north-west for c.166 m, and finally turning south-west-south for c.20.5 m. The exact origin of this feature is not clear. Whilst the feature extends from the Bronze Age boundary ditch at **4302** it is weaker in nature and fragmented. The ditch is on the same orientation as an undated field system seen to the west of the Site (WSHER number: MWI7094) and as such may relate to this. It is possible that this field system post-dates the Bronze Age boundary ditch (**4302**) and uses it as the northern extent of the system.
- 3.5.15 A further fragmented positive (+2 – +4 nT) linear anomaly (**4304**) that appears to be related to the same field system (WSHER number: MWI7094) lies 110 m south of **4303**. The anomaly runs c.295 m west-south-west from the eastern boundary, becoming two parallel linear anomalies across the western extent, before turning north-west for c.42 m. This feature runs parallel to the ditch seen at **4303**, suggesting that they are associated with each other and form part of the same undated field system.
- 3.5.16 An area of weak negative (-0.5 – -1 nT) rectilinear anomalies (**4305**) may also form part of the same field system. These are indicative of earthwork or bank features and appear to extend south of **4303** on a west-south-west – east-north-east orientation. The feature forms an incomplete rectangle, c.69 x 21.5 m, with only the southern, eastern, and part of the northern extent visible. This may be evidence of an enclosure within the field system seen at **4303** and **4304**, however, this relationship is not clear and the anomalies may be caused by the ploughing activity seen across much of the Site.
- 3.5.17 Areas of weak west-south-west – east-north-east orientated linear anomalies (**4306-9**) are seen across the east of the Site. These share an orientation with the field system seen at **4303** and **4304**, suggesting that they may be evidence of ploughing activity. However, their weak nature means they could equally be of a natural geological origin. **4306** and **4307**, in the north-east of the Site are both c.40 m long. Four linear anomalies are seen at **4308**, which are c.86, 80, 79, and

43 m long respectively. **4309** runs along the southern boundary of the Site for c.93 m.

- 3.5.18 Two positive (+1 – +4 nT) linear anomalies (**4310** and **4311**), also of possible archaeological origin, can be seen running c.209 m along the southern boundary of the Site. This is indicative of a ditch with a width of c.1.5 m. The exact origin of this anomaly is not clear; it may relate to an archaeological boundary or land division, such as those seen at **4302** – **4304**, but could equally relate to a modern agricultural feature, such as a trackway.
- 3.5.19 A further possible archaeological positive (+2 – +4 nT) linear anomaly (**4312**) has been detected in the north-west of the Site. This is indicative of a ditch feature, however it does not clearly share an orientation with any surrounding archaeological feature, making interpretation difficult. The ditch runs c.89 m north-west – south-east and is c.1.5 m wide. It may relate to the nearby Neolithic long barrow (**4300**) or Bronze Age boundary ditch (**4302**), however it could also be of a more modern agricultural origin.
- 3.5.20 A broad (c.5 m) negative (-1 – -2 nT) linear anomaly (**4313**) has been identified in the south-west of the site. The anomaly runs c.38 m north-east – south-west. This is indicative of a compaction of material, perhaps associated with a former bank or earthwork feature, and may be of archaeological origin. However, these correspond closely to the projected line of the dismantled railway depicted on the 1928 Ordnance Survey Six-Inch map and are therefore likely to be associated with this.
- 3.5.21 There many pit-like anomalies across the Site. The larger (c.1 m+ in diameter), and stronger (+1 – +2 nT) examples of these anomalies have been identified as possible archaeology. It is possible that any of these pit-like features across the Site may be of archaeological origin it is likely that the majority are evidence of natural pitting and weathering in the chalk bedrock. At **4314** in particular there is a distinctive circular anomaly which measures in diameter and is perhaps one of the more convincing cases for a possible pit-like feature.
- 3.5.22 A small (c.3.5 m internal diameter) semi-circular positive (+2 – +5 nT) anomaly (**4315**) is present in the north-west of the Site. The origin of this feature is not clear, however given the history of the area it is possible that it relates to a prehistoric funerary monument. It is not possible to determine this with any confidence, and the anomaly could equally have a natural or modern agricultural origin.
- 3.5.23 An area of widely (9 – 20 m) spaced parallel linear anomalies (**4316**) has been detected in the south-west of the Site. This is indicative of an area of ridge and furrow ploughing. It is possible that this is associated with the undated field system seen at **4303** and **4304** which shares the same west-south-west – east-north-east orientation. Closer spaced (c.5 m) parallel linear anomalies are also seen across much of the Site on a roughly north – south orientation. This is also likely to be ridge and furrow ploughing, but the tighter centres suggest a later, post-medieval date.
- 3.5.24 A wide (20 – 30 m) sinuous band of slightly increased magnetic responses (**4318**) extends along the southern boundary of the Site. This is most likely related to variation in the superficial geology or soils of the Site, although none is recorded [18].

- 3.5.25 Three areas of increased magnetic responses (**4317-19**) can be identified across the Site. **4317** is the most linear of these and runs c.368 m on a roughly north – south orientation. The origin of this is not clear, however it is similar to the response that would be expected from a post-medieval field boundary. **4318** and **4319** run along the western boundary of the Site. Both of these are likely related to modern agricultural disturbance and are possibly associated.
- 3.5.26 Two linear anomaly (**4321**) also runs along the southern boundary of the Site. This extends for c.530 m, including a c.120 m gap in the centre of the feature. This relates to a former field boundary present on the 1974 edition Ordnance Survey map of the area.
- 3.5.27 A magnetically strong (+/-100 nT) linear anomaly (**4322**) has been identified running c.26.5 m north-east from the south-western corner of the Site. This is indicative of a modern underground service, such as a pipe or a cable.

GPR survey results and interpretation

GPR Area 1

- 3.5.28 GPR Area 1 measured 60 x 70 m. It was located over the two parallel broad linear features identified in the gradiometer survey at **4300**, which relate to the flanking ditches of a Neolithic long barrow (Monument ID MW113159). GPR was employed to provide further information regarding the two internal narrow linear ditches, which were also visualised in the southern part of the long barrow, located slightly askew from the alignment of the larger ditches.
- 3.5.29 The GPR survey was successful in identifying a number of high amplitude responses throughout the dataset, many of which are likely to relate to archaeological remains (**Figures 43-45**). A total depth of 2.32 m was reached and no obstacles prevented the collection of GPR data. For ease of interpretation, the most representative time slices have been selected for presentation with the interpretation image detailing the salient results from each relevant c. 0.13 m section.
- 3.5.30 The uppermost timeslices are heavily affected by surface features attributable to ground conditions on the site. These are very clearly visible within Timeslice 2 (0.11 – 0.24 m). In the southern part of the survey area there are several north-east – south-west orientated high amplitude linear trends which are attributable to existing plough furrows. Perhaps most destructive, however, are the east - west orientated plough lines in the central part of the survey area. The effect of this can be seen in the majority of the dataset as it has prevented effective ground coupling with the antenna. Despite this, following minor processing of the data it is still possible to see archaeological features within this area.
- 3.5.31 There are three pairs of high amplitude linear features on a north – south orientation (**5300 – 5302**), the most central of which (**5300**) arches in a semi-circular fashion in the northern extent. These are associated with vehicle ruts, which are still clearly visible on the ground. These surface features can be identified throughout the dataset as ‘ringing’. Whilst there are processes which can be performed to the GPR data to remove these and the plough lines, this would result in the removal of other features of potential archaeological origin and therefore was not performed.

- 3.5.32 The first timeslice that displays responses that are likely to be associated with archaeological remains is Timeslice 5 (0.47 – 0.59 m). Within this image it is possible to visualise the two parallel flanking ditches of the long barrow (**5303** and **5304**), which were identified in the gradiometer survey (**4300**), as well as the two internal, narrower linear features. This becomes clearer in Timeslice 6 (0.58 – 0.71 m), where the two inner linear features are clearly visible (**5305** and **5306**). The western outermost linear (**5303**) measures approximately 38 m in length, with the shorter inner linear feature at **5305** represented as an intermittent high amplitude feature measuring 12 m in length. The eastern linear feature is slightly longer, with the outermost ditch (**5304**) measuring 52 m in length and the internal ditch being harder to define. The width of these features is also difficult to delineate, as only a fraction of the width of the linear anomalies identified in the gradiometer survey appears to be visible as a high amplitude response in the GPR survey results. Whilst this makes it difficult to precisely define the extent of the ditch, it does provide some information regarding the nature of the fills, which are likely to make up the feature. For example, this response may suggest that some of the fill of the ditch is composed of material, which is poorly conductive such as flint or compacted chalk, with a central fill perhaps likely composed of a higher conductivity material such as a silty clay.
- 3.5.33 A further interesting aspect of the linear features identified at **5303 – 5306** concerns the depth to which they may extend to within the time slices. Following Timeslice 7 (0.7 – 0.83 m) the linear features are no longer visible as high amplitude linear responses. Instead, they are represented by broad linear bands of low amplitude. This is perhaps best visualised within Timeslice 11 at (1.13 – 1.26 m) and Timeslice 17 (1.81 – 1.93 m), but generally this trend can be seen to continue throughout the remainder of the timeslices until Timeslice 20 (2.21 – 2.33 m). This could imply that the ditch extends to a depth of over 2 m; however, if the fill of the ditch is composed of a material which is highly conductive, as suggested previously, then it is possible that the energy of the radar wave has largely dissipated at a certain point. As a result, it is difficult to provide an accurate depth for the base of the feature. Nonetheless, it is clear that the GPR response of the long barrow is very complex and that this may be associated with the nature of the fills.
- 3.5.34 Between the two flanking ditches identified at **5303** and **5304**, there are no further clearly identifiable features likely to be of archaeological origin. Nonetheless, there are some areas of high amplitude responses located in the area of the long barrow ditches, which may be of significance. These are most clearly visible in Timeslice 5 (0.57 – 0.69 m) as amorphous responses, possibly indicating a change in the ditch fill at these positions. However, these anomalies are not consistently present in deeper timeslices, meaning it is not easy to provide a more confident interpretation.
- 3.5.35 Deeper in the Timeslices there are several other isolated patches of high amplitude, which are likely associated with superficial geological changes. For example, a broad 5 – 7 m wide amorphous band of high amplitude visible in Timeslice 11 (1.12 – 1.26 m) at **5307**. In the timeslices below this depth there are further high amplitude responses, but these are all thought to relate to geomorphological variation.

GPR Area 2

- 3.5.36 Area 2 was surveyed using the 400 MHz antenna covering an area of 40 x 50 m. This was situated over two broad, parallel linear features identified in the gradiometer survey at **4301**. These features are thought to relate to the flanking ditches of a second Neolithic long barrow, which was previously unknown.
- 3.5.37 The GPR survey was successful in identifying a number of high amplitude responses throughout the dataset, many of which are likely to relate to archaeological remains (**Figures 46-48**). A total depth of 2.27 m was reached and there were no obstacles preventing data collection.
- 3.5.38 The uppermost timeslices are partially affected by surface features attributable to ground conditions on the site. These are clearly visible within Timeslice 2 (0.11 – 0.24 m) as there are several north-east by south-west orientated high amplitude linear trends attributable to shallow modern plough furrows. In addition, there are two pairs of high amplitude linear features on a north by south orientation, which are related to vehicle wheel ruts. The presence of these surface features has influenced the remainder of the dataset, and in particular, **5308** and **5309** are identified throughout many of the timeslices.
- 3.5.39 Within the central part of Timeslice 2 (0.11 – 0.24 m), there is an area of amorphous high amplitude reflectors, which may be of archaeological significance (**5310**). This covers a slightly linear, irregularly shaped area on a north-west by south-east alignment. It does not appear to continue much deeper through the time slices, having largely disappeared by Timeslice 4 (0.34 – 0.47). Though the shape and form of this feature is not particularly revealing, its location between the two ditches identified in the gradiometer survey at **4301**, may suggest archaeological significance. One possible explanation is that it represents remnants of mound material within the centre of the long barrow. However, as this is only faintly visible at an approximate depth range of 0.11 – 0.47 m, it is likely that this is largely contained within the plough soil. A further possibility is that it could be associated with a pronounced or raised area of natural geology where the mound was originally located. The mound material perhaps acting to protect the area from rainwater dissolution and ploughing. Despite this, it is impossible to confidently assert either interpret. Further investigation would be necessary to determine which interpretation is correct.
- 3.5.40 The first timeslice that clearly displays responses associated with archaeological remains is Timeslice 4 (0.34 – 0.47 m). Within this timeslice the two flanking ditches identified within the gradiometer survey become visible at **5311** and **5312**. However, these are most clear within the following Timeslice 5 (0.45 – 0.58 m). Within these timeslices two high amplitude intermittent linear reflections aligned on a north-north-west by south-south-east orientation are evident. The western most example **5311** measures approximately 41.5 m in length and is a maximum of 1.5 m wide. This feature is slightly larger at its southern terminus, measuring approximately 2 m. The eastern linear is slightly longer, measuring 43 m in length, but is of a similar maximum width of 1.5 m. The southern terminus of **5312** is also larger, measuring 3.9 m in width. This may imply that both ditches were significantly wider at the southern end of the feature.
- 3.5.41 There is a noticeably large gap between the northern and southern part of the linear at **5311**, and several smaller but equally notable gaps in the centre of **5312**. This is likely due to variations in conductivity of ditch fills as opposed to a break in

this feature. By Timeslice 7 (0.68 – 0.81 m) there is little to no visible evidence for the ditches below this depth, giving an approximate depth range of 0.34 – 0.81 m for these two ditches. It is possible the ditch extends deeper than has been detected within this survey as the lower, primary fills of the ditch are likely to be harder to detect with GPR, perhaps being largely composed of material similar to that of the natural geology. Despite this, it is clear that the long barrow has been heavily truncated by agricultural ploughing.

- 3.5.42 Between the aforementioned linear features at **5311** and **5312**, there are additional features likely to be of archaeological origin (**5313**). These are present between Timeslice 4 (0.34 – 0.47 m) and Timeslice 6 (0.57 – 0.69), but are most clear within Timeslice 5 (0.45 – 0.58 m). Within this timeslice there are several small, roughly circular high amplitude point source reflectors. These measure approximately 0.5 – 1 m in diameter and are roughly orientated parallel with the two flanking ditches. It is possible that this represents two alignments of pits/postholes approximately 3 – 5 m from the eastern and western ditches. Though small pits and postholes of this nature are not always identified by GPR, it is possible that flint inclusions within the features have caused a significant reflection to the radar pulse. Furthermore, as these are present through several timeslices and orientated in a linear fashion, close to that of other known archaeological features, it is likely that these reflections represent pits/postholes within the Neolithic long barrow. However, further investigation would be necessary to confirm the exact nature of these remains.
- 3.5.43 There was a significant amount of flint present on the surface across the survey area. This has resulted in several random high amplitude point source reflections visible across the dataset. As a result, it is difficult to distinguish responses pertaining to small archaeological features and naturally occurring flints. However, where responses continue through two or more timeslices and are arranged in an anthropogenic configuration, they are more likely to reflect evidence of archaeology. The reverse is true where “features” are not evident in more than two timeslices.
- 3.5.44 In Timeslice 4 (0.34 – 0.47 m) there is a faint, moderate amplitude linear response located in the north-east corner of Area 2 at **5306**. This is poorly defined, and just visible in Timeslice 5 (0.45 – 0.58 m) but likely to relate to the feature identified in the gradiometer survey at **4314**. It was not clear whether this broad negative 5 m wide linear was archaeological or geological. The GPR data suggest that if of archaeological origin, this feature is likely to have been severely plough damaged. extend to any great depth.
- 3.5.45 Beyond Timeslice 7 (0.68 – 0.81 m), there are no further responses associated with archaeological features identified. However, from Timeslice 8 (0.79 – 0.92 m) shows a series of amorphous high amplitude reflectors across a broad east – west aligned area measuring approximately 18 m in width. This is also conspicuous Timeslice 10 (1.02 – 1.15 m) at **5315** and continues throughout the remainder of the timeslices to Timeslice 20 (2.15 – 2.27 m). As this feature descends it appears to gradually shift to a more northerly position, suggesting that this feature is gradually sloping from south to north, as is evident from Timeslice 17 (1.81 – 1.94 m). An analysis of the radargrams confirms the presence of an undulating planar return and suggests that this relates to local geomorphology, where dipping bands of marl or flint bedding within the chalk appear as a series of

high amplitude reflectors that migrate laterally throughout the amplitude timeslices.

3.6 SW1

Site location, topography and geology

- 3.6.1 SW1 lies to the immediate east of SW2. The Site is located c.2.6 km east of Winterbourne Stoke and c.5.4 km west of Amesbury, in the county of Wiltshire. The survey area encompasses 45.5 ha of agricultural land covered by crop stubble. The Site is bounded by an area of woodland to the west, and agricultural land on all other sides.
- 3.6.2 GPR Area 3 was located within SW1 and covered 0.09 ha in the centre of the field (**Figure 41**).
- 3.6.3 The Site is on a south facing slope, ranging in height from c.100 m aOD in the north to c.85 m aOD at the southern boundary.
- 3.6.4 The solid geology comprises chalk of the Seaford Chalk Formation with no recorded superficial deposits across the majority of the area. A band of Head – clay, silt, sand, and gravel deposits runs east-west across the south of the Site and north-south through the centre [18].
- 3.6.5 The soils underlying the west of the Site are likely to consist of brown rendzinas of the 343h (Andover 1) association across the majority of the Site with areas of humic rendzinas of the 341 (Icknield) association in the east and north-west [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.6.6 This area is located within the WHS and contains a number of extant Neolithic and Bronze Age monuments, as well as evidence for possible Roman activity (WSHER 2016).
- 3.6.7 Two scheduled Bronze Age barrows (WSHER number: MW112979-80, NHLE number: 1010831-2) are located in the centre of the Site. Both have been previously excavated, with the more northern of the two (WSHER number: MW112979, NHLE number: 1010831) found to contain a cremation, whilst no evidence for funerary activity was found within the other.
- 3.6.8 Another scheduled Bronze Age barrow in the north-east of the Site contains Wilsford Shaft (WSHER number: MW112519, NHLE number: 1010833), a pond barrow with a 6 m deep shaft at its centre. The pond barrow has been the subject of excavation, which recovered a number of artefacts including stitched vessels, Middle Bronze Age pottery, amber beads, bone pins, and animal bones. The feature is interpreted as being a 'ritual shaft' containing votive offerings.
- 3.6.9 A Bronze Age or Iron Age linear feature (WSHER number: MW113133) runs north-east – south-west across the southern part of the Site. Excavations showed the feature to be a single 'V-shaped' ditch, which can be traced for c.1.2 km in aerial photography. The possible remnants of an associated bank have also been recorded.

- 3.6.10 Part of a prehistoric or Romano-British field system (WSHER number: MWI13128) extends into the north-west of the Site. The majority of this feature lies outside of the survey area to the south-west, covering much of SW2.
- 3.6.11 Two areas of undated linear features are also recorded in the west (WSHER number: MWI12748) and running north-east – south-west across the Site (WSHER number: MWI13149). Both have been identified by aerial photography, with little other recorded information.

Gradiometer survey results and interpretation

- 3.6.12 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 22nd – 30th August 2016. An overall coverage of 44.7 ha was achieved. An area of 0.9 ha along the western boundary could not be surveyed due to overgrown vegetation (**Figures 22-29**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale image.
- 3.6.13 The survey has identified a number of anomalies of archaeological and possible archaeological origin. A positive (+0.5 – +1 nT) linear anomaly (**4400**) runs c.580 m north-east to south-west across the east of the Site with two westerly protruding linear anomalies midway through the field. These are indicative of ditches and relate to two features within WSHER. The main linear is recorded as a Bronze Age or late prehistoric linear earthwork (WSHER number: MWI13133) and the protruding linears as part of a prehistoric or Romano-British field system (WSHER number: MWI13128). Evidence from the geophysical data, similar readings and magnetic profiles, suggests that these anomalies all form part of the same feature. Given that MWI13133 has been excavated, whilst MWI13128 is based on aerial photography records, it is most likely that this feature is a Bronze Age to Iron Age land division.
- 3.6.14 A positive fragmented circular anomaly (**4401**) has been detected in the centre of the Site. This is indicative of a ring ditch and relates to a scheduled Bronze Age bowl barrow (WSHER number: MWI12979, NHLE number: 1010831). The ditch is separated into five segments varying in width between 2 and 4 m, forming a circle with an internal diameter of c.18 m. It is not clear which, if any, of the gaps in the ditch are contemporary with the construction of the barrow and which are caused by later plough damage. There is a strong magnetic response (-35 – +65 nT) in the centre of the barrow. Whilst this would normally be interpreted as a modern ferrous response its location is possible evidence of internal features or disturbance at the centre of the barrow.
- 3.6.15 A circular area of strong (+95 nT) magnetic response (**4402**) in the north of the Site. This corresponds with the location of a scheduled Bronze Age pond barrow containing a ritual shaft (Wilsford Shaft) at its centre (WSHER number: MWI12519, NHLE number: 1010833). The strong magnetic response may relate to capping of the shaft following excavation in 1960-61 and masks any other information about the barrow. An area of increased magnetic response extends north from the barrow. It is not clear whether this is coincidental or is located to the barrow and its excavation.
- 3.6.16 A broad (2.5 – 7 m) weak positive (+0.5 – +1 nT) linear anomaly (**4403**) extends c.111 m south-westerly into the Site from the north-eastern boundary. This is similar in appearance to natural features seen across the Site (**4409**), but does not share an alignment or correlate with the change in gradient seen on the

ground. This anomaly shares an orientation with the Bronze Age to Iron Age land division seen at **4400**, suggesting that they are associated. It is likely therefore that **4403** represents a further land division or field boundary of similar date.

- 3.6.17 An area of widely spaced (10 – 12 m) parallel linear anomalies (**4404**) has been detected in the south of the Site. These are indicative of an area of medieval to post-medieval ridge and furrow. There is a large amount of ploughing seen across the Site, however the majority has a tighter spacing (2 – 3 m) suggesting it is modern in origin. It is possible that the ridge and furrow extends further than has been interpreted but its visibility has been impacted modern ploughing.
- 3.6.18 Four positive linear anomalies (**4405-8**) can be seen across the west of the Site. These vary in length from c.20 – 106 m, with **4405-7** on a roughly north-east – south-west orientation and **4408** on a west-north-west – east-south-east orientation. The relative isolation of each of these anomalies makes interpretation difficult. They are all indicative of ditch features, and as such may relate to former field boundaries or enclosures. However, they could equally relate to modern agricultural activity. **4408** runs on the same orientation and extension as the southern of the two westerly protrusions from **4000**, although it is not possible to say whether they are related from the geophysical data alone.
- 3.6.19 Broad, weak positive, linear and curvilinear anomalies are identified running from the southern corner to the northern corner of the site, with a roughly right-angled bend (**4409**). This band of anomalies varies between 60 m and 70 m in width. The feature is recorded as linear features of unknown date (WSHER number: MWI13149). However, the weak broad responses seen in the geophysical data are more typical of a former watercourse. This is supported by the topography of the site, with the responses lying at the bottom of a shallow valley. An area of similar responses in the north-west of the Site (**4410**) are likely related to the same feature, although there is no physical connection visible in the data.
- 3.6.20 A negative linear anomaly (**4411**) runs north-west – south-east through the centre of the Site. This relates to a former field boundary depicted on the 1972 edition Ordnance Survey map of the area.
- 3.6.21 Along the line of **4411** and approximately 70 m to the south-east of **4401**, a further Bronze Age bowl barrow (WSHER number: MWI12980, NHLE number: 1013812) is known. However, there are no magnetic anomalies in this area which corresponds with this feature. This is mostly a result of the fact that it has been excavated and is also likely to have been severely truncated by ploughing activity. Furthermore, the presence of **4411** has also damaged or obscured this feature.
- 3.6.22 Three magnetically strong (+/-100 nT) linear anomalies are present in the west (**4412**), south (**4413**), and east (**4414**) of the Site. These are indicative of underground services such as pipes or cables. **4412** runs c.185 m on a north-east – south-west orientation, whilst **4413** and **4414** run c.217 m and c.383 m respectively on north-west – south-east orientations. **4413** also has a southerly projection.

GPR survey results and interpretation

GPR Area 3

- 3.6.23 GPR Area 3 covers an area measuring 30 x 30 m. This is located over a curvilinear anomaly identified in the gradiometer survey at **4401**, which represents

a scheduled Bronze Age bowl barrow (Monument ID MW112980). This data suggested that there were several breaks in the ring ditch, as well as a magnetically strong dipolar response at the centre. The GPR was therefore deployed in this area in order to attempt to provide further detail regarding the character of these anomalies.

- 3.6.24 The GPR survey at Area 3 was successful in identifying responses throughout the dataset which are likely to relate to archaeological remains (**Figures 49-51**). A total depth of 2.19 m was reached and no obstacles within the survey area prevented data collection.
- 3.6.25 Within the uppermost timeslices a series of high amplitude linear responses are visible on a north-west – south-east alignment. This is visible within Timeslice 2 (0.11 – 0.24 m) and are related to the existing shallow plough furrows which were visible on the ground surface. The effect of these is apparent throughout many of the timeslices, but this has not hindered the detection of further archaeological features below this depth.
- 3.6.26 In Timeslice 5 (0.45 – 0.58 m), a series of broken curvilinear high amplitude response at **5400 – 5403** can be identified. These are located on the edges of the ring ditch identified in the gradiometer survey (**4401**). **5400** is located on the inside edge, and **5401 - 5403** are on the outside. Those located on the outside consistently measure approximately 1 – 1.5 m in width, but are difficult to define in terms of length. They do not appear to extend deeper into the timeslices and are indistinguishable after Timeslice 7 (0.66 – 0.78 m). The intermittent nature of these suggests that they are plough damaged. Despite this, it is possible to suggest that the ring-ditch identified at **4401** had a bank on its outer edge. Whether there is a bank on the inner edge of the ditch is harder to define, as it does not visibly extend beyond Timeslice 5.
- 3.6.27 Within Timeslice 5 (0.45 – 0.58 m) there is a curvilinear low amplitude response at **5404**. This between the high amplitude features at **5400 – 5403** and is only faintly visible, but relates to the ditch of the Bronze Age bowl barrow. The feature is clearest in the southern part of the survey area, where it measures approximately 4 – 5 m in width. This extends as a low amplitude response to a depth of 2.19 m, however, it becomes increasingly difficult to distinguish from Timeslice 17 (1.81 – 1.94 m). In the northern part of GPR Area 3, this is notably harder to visualise and is much thinner measuring 2 m in width. This is most pronounced within Timeslice 9 (0.91 – 1.03 m) where **5404** is only faintly visible. The western extent of the ditch is consistently identifiable as a faint low amplitude response, and is partially obscured by the dominance of the ploughing trends. However, a ring ditch with an internal diameter of 18 m is evident within this area as captured by the gradiometer survey.
- 3.6.28 One implication of the variable response of the ditch in the GPR dataset is that ploughing has affected different areas of the feature more than others. For example, the south-western part of the ring-ditch is much better preserved than the rest of the feature. This could imply that the original topography of the area was transformed by modern agricultural practice.
- 3.6.29 From Timeslice 9 (0.91 – 1.03 m) it is possible to identify a broad, roughly north-west – south-east aligned linear high amplitude response at **5405**. This is amorphous and is located in the south-west corner of survey area. It is

inconstantly visible until the deepest timeslice (Timeslice 20 – 2.08 – 2.19 m), and shifts slightly to a more south-westerly position. This type of response is likely to be associated with superficial geology, perhaps associated with a concentration of flint or other poorly conductive material.

- 3.6.30 Timeslice 13 (1.36 – 1.49 m) displays a cluster of high amplitude features at **5406**. Elements of this are visible in many of the timeslices and a strong magnetic response is recorded in the gradiometer survey in this area. This may relate to previous excavations on the monument, but the exact dimensions and location of this is not clear from the results of either geophysical survey.

3.7 NE2

Site location, topography and geology

- 3.7.1 NE2 lies c.2.7 km north-east of SW1. The Site is located to the north-west of Amesbury, in the County of Wiltshire. The survey area encompasses 43.1 ha of agricultural land covered by crop stubble and grass. The Site is bound by the A303 to the south, Countess Road to the east, an area of woodland to the west, and agricultural land to the north.
- 3.7.2 The Site is on an east facing slope from c.110 m aOD in the west to c.75 m aOD in the east.
- 3.7.3 A set of overhead cables run east-west across the eastern half of the Site and an area.
- 3.7.4 The solid geology comprises chalk of the Seaford Chalk Formation with no recorded superficial deposits across the majority of the area. Bands of Head – clay, silt, sand, and gravel deposits run across the centre and east of the Site, with an area of Head, 1 – gravel in the east [18].
- 3.7.5 The soils underlying the west of the Site are likely to consist of brown rendzinas of the 343h (Andover 1) association, the centre covered by grey rendzinas of the 342a (Upton 1) association, and the east by brown calcareous earths of the 511f (Coombe 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.7.6 This area is also located within the heart of the WHS and contains extant Bronze Age monuments related to the Stonehenge landscape and is highly likely to contain buried archaeological remains from these periods.
- 3.7.7 A total of 11 Bronze Age barrows are recorded across the Site, all of which are scheduled. Five of these are scheduled as part of two groups of two (WSHER number: MWI12951-2, NHLE number: 1014088) and three (WSHER number: MWI12945, 12953-4, NHLE number: 1010331) in the north-west of the Site. The others are recorded as separate features, but are likely associated with each other. One lies on the south-western boundary (WSHER number: MWI12921, NHLE number: 1012129), three in the centre of the Site (WSHER number: MWI12743, 12950, 12958, NHLE number: 1009143, 1009144, 1009151), and two in the east (WSHER number: MWI12948, NHLE number: 1009142, 1012128). Other scheduled Bronze Age activity is seen within the Site with the Stonehenge

Avenue (WSHER number: MWI12527, NHLE number: 1010140) running north – south through the west of the area.

- 3.7.8 Four fields of medieval ridge and furrow (WSHER number: MWI12817) cover the centre of the Site. These have been identified by aerial photography and extend further north and south of the Site.
- 3.7.9 Post-medieval activity is evidenced in the form of the former Amesbury to Market Lavington road (WSHER number: MWI12700) running through the west of the Site, and earthworks associated with Amesbury Abbey Park (WSHER number: 13148) in the east. An area of undated ditches (WSHER number: MWI12687), likely related to a former field system, is also recorded across the western part of the Site.

Gradiometer survey results and interpretation

- 3.7.10 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 18th August – 1st September 2016. An overall coverage of 31.5 ha was achieved. There were a number of obstructions accounting for the 11.6 ha not surveyed on the Site. These include fenced off areas containing trees, hay bales, and areas covered by crop in the centre and south-east of the Site (**Figures 30-35**)
- 3.7.11 The survey has identified a number of anomalies of archaeological and possible archaeological origin. A semi-circular positive (+3 – +5 nT) anomaly (**4500**) has been detected in the north-west of the Site. This is indicative of a ring ditch feature and relates to a Bronze Age barrow (WSHER number: MWI12945), forming part of a scheduled barrow group (NHLE number: 1010331) with **4501** and **4502**. The eastern extent of the barrow was not surveyed due to an area of trees. However, the visible part of the ditch is 2 – 3 m wide and c.12 m in diameter.
- 3.7.12 **4501** lies c.45 m east of **4500** in the form of a positive (+3 – +5 nT) circular anomaly. This is another Bronze Age barrow (WSHER number: MWI12953), with a similar 2 – 3 m wide ditch. The ditch has an internal diameter of c.16 m and a possible 2 m break in its eastern side. However, this could be due to plough damage or a localised change in the composition of the ditch fill.
- 3.7.13 The final barrow in the group (WSHER number: MWI12954) is seen in the form of an oval shaped anomaly (+3 – +6 nT) with flattened sides (**4502**) 4 m east of **4501**. It is c.31 m at its widest extent (aligned west-south-west to east-north-east) and c.21 m at its narrowest. The ditch is 2 – 3.5 m wide with breaks in the northern and southern sides. The fact that these breaks are both midway along the sides of the barrow suggests that they contemporary with its construction, rather than caused by later plough damage. Two possible pit-like features are seen within the barrow, but it is not clear whether these are associated with the barrow or have a different origin.
- 3.7.14 Two more ring ditches (+3 – +5 nT) (**4503-4**) are present c.130 m north-east of **4502**. These form a scheduled Bronze Age barrow group (NHLE number: 1014088). Both barrows are circular in shape with 1.5 – 3 m wide ditches, and contain possible pit-like features within them. **4503** (WSHER number: MWI12952) has an internal diameter of c.21 m and a possible small break in its southern side. **4504** (WSHER number: MWI12951) has an internal diameter of c.28 m and a

possible break in its western side. In both cases it is not clear whether the breaks in the ditches are contemporary with the construction of the barrows or caused by plough damage or a change in ditch fill.

- 3.7.15 The final known barrow in the data (**4505**) has been identified on the south-western boundary of the Site. This is seen as a positive (+2 – +7 nT) semi-circular anomaly, relating to a further scheduled Bronze Age barrow (WSHER number: MWI12921, NHLE number: 1012129), with its full extent truncated by the boundary of the Site. A c.35 m length of the 3 m wide ditch is visible.
- 3.7.16 Two positive (+0.5 – +5 nT) parallel linear anomalies (**4506**) run across the south-west of the Site on a north-west – south-east alignment. Both ditches are c.1.2 m wide with a separation of c.22 m. Their northern extent is obscured by modern field boundaries, however the western ditch runs c.221 m and the eastern is c.247 m in length. These relate to the Stonehenge Avenue (WSHER number: MWI12527, NHLE number: 1010140), which continues into area SE1.
- 3.7.17 A further two parallel positive (+0.5 nT) linear anomalies (**4507**) have been detected in the north-west of the Site. These run north-west – south-east for c.198 m, becoming indistinguishable from each other at points but with a maximum separation of 2.5 m. After a gap of c.37 m at the southern end the feature appears to continue for c.117 m as a slightly stronger (+1 nT) single linear anomaly (**4508**) on a more easterly trajectory. These features relate to a post-medieval road known to run through the area (MWI12700).
- 3.7.18 A positive (+1 – +5 nT) linear anomaly (**4509**) can be seen running on an undulating east – west orientation across the south-west of the Site for c.330 m. The linear is c.2 m wide with two c.40 m long southerly projections approximately midway along its length. An additional linear anomaly (**4510**), which likely forms part of the same feature, runs east – west to the south of **4509**. This segment is also c.2 m in width, and runs for c.124 m. These anomalies are likely part of an undated field system known to exist in this area (WSHER number: MWI12687).
- 3.7.19 The final anomaly that can be confidently described as archaeological in origin is a positive (+0.5 – +1 nT) linear (**4511**) in the east of the Site. This anomaly is orientated north – south, and runs for c.95 m. It does not relate to any previously known archaeological feature, nor is it recorded on any available historic mapping of the area. This suggests that it is likely to have an archaeological origin, although its exact function is not clear. The feature's orientation in relation to other features and the modern field system suggest it is likely related to a former agricultural feature, such as a field boundary or enclosure ditch.
- 3.7.20 A weak positive (+0.5 nT) curvilinear anomaly (**4512**) can be made out in the data to the west of **4511**. It has a roughly circular shape, with a diameter of c.15 m. Given the Site's setting it is possible that this is evidence of a further Bronze Age barrow. However, its weak nature would suggest it is severely plough damaged or, alternatively, that it actually corresponds with a change in the superficial geology at this location.
- 3.7.21 Three areas of widely (15 – 18 m) spaced parallel linear anomalies (**4513-5**) have been identified across the north-west of the Site. These are indicative of ridge and furrow cultivation and correspond with known medieval field boundaries in the area (WSHER number: MWI12817). **4513** and **4514** are seen on roughly east – west alignments, whilst **4515** is seen on a north – south alignment.

- 3.7.22 A magnetically strong (± 100 nT) right angled linear anomaly (**4516**) is present in the south-east of the Site. It runs c.40 m north-north-west – south-south-east before turning c.18 m east-north-east. This is indicative of an underground service, such as a pipe or cable.
- 3.7.23 A weak (+0.5 nT) linear anomaly (**4517**) can be seen in the centre of the Site. This extends c.55 m west-north-west – east-south-east from an existing field boundary. It is also present on the 1885 edition Ordnance Survey map of the area. Another possible field boundary (**4518**) is seen in the east of the Site. This is seen as a linear concentration of ferrous responses, indicative of a post-medieval field boundary. However, it is not clearly identifiable on any available historic mapping.
- 3.7.24 Areas of weakly positive (+0.5 – +1 nT) amorphous anomalies (**4519-20**) have been detected across the east of the Site. The weak nature of these anomalies combined with their lack of shape or pattern over a large area suggests that they are likely related to gravel Head deposits recorded in the area [18].

3.8 SE1

Site location, topography and geology

- 3.8.1 SE1 lies immediately south of NE2. The Site is located to the north-west of Amesbury, in the County of Wiltshire. The survey area encompasses 18.9 ha of agricultural land covered by crop stubble. The Site is bound by the A303 to the north, Stonehenge Road to the south-west, and an area of woodland to the east.
- 3.8.2 SE1 contains the remaining five GPR across the field (Areas 4 – 8). This covered a total area of 1.13 ha with each area measuring approximately 0.1 – 0.3 ha (**Figure 42**).
- 3.8.3 The Site is on an east facing slope from c.100 m aOD in the west to c.80 m aOD in the east.
- 3.8.4 A set of overhead cables run south-west to north-east across the western half of the Site.
- 3.8.5 The solid geology comprises chalk of the Seaford Chalk Formation with no recorded superficial deposits across the majority of the area. A band of Head – clay, silt, sand, and gravel deposits runs north-south across the east of the Site [18].
- 3.8.6 The soils underlying the Site are likely to consist of grey rendzinas of the 342a (Upton 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.8.7 This area is located within the heart of the WHS and contains extant Neolithic and Bronze Age monuments related to the Stonehenge landscape, and is highly likely to contain buried archaeological remains from these periods. The Avenue (WSHER number: MW112527, NHLE number: 1010140) runs through the west of the Site on a south-south-east – north-north-west orientation.

- 3.8.8 Seven Bronze Age barrows are recorded within the Site, six of which are scheduled. Three of the barrows lie in the north-west of the Site (WSHER number: MWI13052, 13055-6, NHLE number: 1012127, 1012130, 1012131). The central of these three (WSHER number: MWI13056, NHLE number: 1012131) has been previously excavated 'without result'. A further three barrows (WSHER number: MWI12653, 12724, 13127) form a group in the centre of the Site. This group is scheduled (NHLE number: 1012132), with the barrows aligned north-west – south-east.
- 3.8.9 The final Bronze Age barrow (WSHER number: MWI12654) is located in the centre of the Site, and appears to overlay a Neolithic long barrow (WSHER number: MWI12478). The Bronze Age barrow lies at the south-eastern end of the long barrow. However, their relationship, if any, is not known. It is possible that this forms a cist at the end of the long barrow, rather than being a separate Bronze Age feature.
- 3.8.10 An area of ridge and furrow (WSHER number: MWI12817) is seen in the north of the Site, and continues northwards across NE2. An undated ditch (WSHER number: MWI12688), seen as a cropmark, lies to the south of the ridge and furrow, with the remains of an early 20th building (WSHER number: MWI12906), removed in the 1950s, lying further south.

Gradiometer survey results and interpretation

- 3.8.11 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 15th – 17th August 2016. An overall coverage of 18.7 ha was achieved. It was not possible to survey a 0.7 ha area in the centre of the Site due to dense vegetation. Smaller obstructions across the area included hay bales and a circular fenced off area (**Figures 36-37**)
- 3.8.12 The survey has identified a large number of anomalies of archaeological origin. A weak (+0.5 – +1 nT) positive circular anomaly (**4600**) with an internal diameter of c.15 m has been detected in the north-west of the Site. This is associated with the ring ditch of a known Bronze Age bowl barrow (WSHER number: MWI13052, NHLE number: 1012130). The ditch has a width of c.1.5 m with no clear breaks at any point. However, the weak nature of the anomaly suggests that barrow has been truncated by ploughing activity.
- 3.8.13 Another positive (+3 – +6 nT) circular anomaly (**4601**) lies 45 m north-east of **4600**. This anomaly has an internal diameter of c.21 m and is also related to a Bronze Age barrow (WSHER number: MWI13056, NHLE number: 1012131). The ring ditch has a width of c.2 m with no clear breaks. This suggests that the ditch is likely to be in good condition, with limited plough damage.
- 3.8.14 A further positive (+2 – +4 nT) circular anomaly (**4602**) has been detected 100 m east of **4601**. This has an internal diameter of c.31 m and is associated with another Bronze Age bowl barrow (WSHER number: MWI13055, NHLE number: 1012127). The ditch has a width of c.1 – 2.5 m and is intersected in the north-west by an underground service (**4615**). The ditch response does become weaker in the south suggesting that this area may be truncated by ploughing activity. The centre of the barrow has not been surveyed as it is fenced off.
- 3.8.15 Two parallel positive (+4 – +6 nT) anomalies on a north-west – south-east alignment culminating in a semi-circular linear anomaly (**4603**) is seen 50 m east

of **4602**. These relate to the flanking ditches of a Neolithic long barrow (WSHER number: MWI12478) and the ring ditch of a Bronze Age barrow (WSHER number: MWI12654). The flanking ditches of the long barrow are both c.21.5 m in length and are separated by c.13 m. The ring ditch has an internal diameter of c.21.5 m. The ditches of both barrows are fairly consistent in width at c.3 m. There is a concentric ring ditch at the centre of the Bronze Age barrow with an internal diameter of c.6 m and a pit-like anomaly at the centre of this. This is evidence of internal features within the barrow, likely related to funerary activity such as a mortuary enclosure. The ring ditch has three breaks in the eastern side, however it is not clear whether these are caused by plough damage or are contemporary with the barrow's construction. Perhaps the more interesting gap is in the western side of the round barrow. There is no evidence of the ring ditch continuing through the long barrow, which could mean a number of things. It is possible that this side of the ring ditch has been truncated by ploughing, however the possibility that these features have a closer relationship cannot be discounted from this data alone. It is possible that the ring ditch is contemporary with the Neolithic long barrow, forming a cist at its eastern end. However, further investigation would be needed to clarify the exact relationship and chronology of these features.

- 3.8.16 Two positive (+1 – +2 nT) parallel linear anomalies (**4604**) run across the west of the Site on a north-north-west – south-south-east orientation. These relate to the ditches of the Stonehenge Avenue (WSHER number: MWI12527, NHLE number: 1010140), which extends across NE2. The western ditch runs for c.325 m across the Site, whilst the eastern runs c.334 m. The ditches are both c.1.2 m in width and are separated by 21 – 26 m.
- 3.8.17 Three positive (+1 – +2 nT) circular anomalies (**4605-7**) aligned west-north-west – east-south-east have been detected in the centre of the Site. These are all related to ring ditches forming a scheduled Bronze Age barrow group (NHLE number: 1012132). Both **4605** (WSHER number: MWI13127) and **4606** (WSHER number: MWI12724) have internal diameters of c.12.5 m and ditch widths of c.1.5 m. Both also appear to suffer from similar levels of plough damage, with several small gaps across their western sides. A gap in the east of each of the barrows is more likely to be contemporary with their construction as it is at the same location on both ditches. **4607** (WSHER number: MWI12653) has evidence for two concentric ring ditches with internal diameters of c.15 m and c.9 m respectively. This barrow appears to be severely truncated by ploughing with the ditches giving weak responses with several breaks, which is particularly evident on the inner ditch. Each of the three ring ditches contains small discrete positive anomalies. These are indicative of pit features and may be evidence of internal activity.
- 3.8.18 Immediately south of the barrow group is an area of rectilinear alignments of ferrous responses (**4608**). These form a roughly rectangular (c.36 x 8 m) feature on an east – west alignment with no clear southern extent. There is smaller (c.10 x 8 m) rectangular feature within this, but little other detail is clear within the data. This relates to an early 20th century building and enclosure (WSHER number: MWI12906).
- 3.8.19 There are several potential pit-like features throughout the entirety of the field SE1, but of particular note is a cluster of four particularly strongly positive (+2 – +6 nT) anomalies (**4609**). These are located directly to the north-east of the ring ditch identified at **4600** and are situated in close proximity to each other. It is unclear as to what exactly these pit-like features may represent, but their size (2 –

3 m diameter) and arrangement suggests that they are likely to be of archaeological origin.

- 3.8.20 A positive (+1 – +2 nT) linear anomaly (**4610**) running c.27 m on a north-east – south-west alignment can be seen in the north of the Site. This is indicative of a ditch feature and may be of archaeological origin. Whilst the anomaly is in close proximity to archaeological features (**4602** and **4603**) it is relatively isolated in terms of its form and orientation, but does relate to a more extensive undated ditch identified by aerial photography (WSHER number: MWI12906). It is therefore possible that this is a ditch however, there is a chance that it may be related to modern agricultural practices.
- 3.8.21 Three features (**4611-4613**) have been identified across the Site as being likely related to former field boundaries. **4611** runs for c.70 m in the north-west of the Site and is likely related to a previous extension of the Site's western boundary. **4612** runs c.115 m north – south in the north of the Site. This is thought to relate to a former field boundary as it shares a similar orientation with current boundaries and an area of dense vegetation 20 m to the east. **4613** is the only feature seen on available historic OS mapping dating to 1885. The feature, which runs c.286 m north – south, including two breaks of c.110 and 7 m, is present on the 1878 edition Ordnance survey map of the area.
- 3.8.22 Directly to the north-west of **4612** an area of levelled ridge and furrow has been suggested from aerial photographs (WSHER number: MWI12817). This interpreted as a southern continuation of features in NE2, however it is not clear whether this is the case. Whilst there are some ploughing trends to the north of **4302**, there is no clear evidence of ridge and furrow within the gradiometer survey data. There are generally very few ploughing trends in SE1 and It is possible that this is due to ferrous anomalies across the area which are obscuring these subtle features.
- 3.8.23 A large (c.31 x 21 m) area of strong (-50 – +60 nT) magnetic response (**4614**) is seen in the south-east of the Site and is interpreted as coherent ferrous. This is indicative of an area of backfilled or made ground and corresponds with a negative topographic feature present on the historic OS mapping dating to 1888. It is possible that this indicates the location of post-medieval quarrying activity.
- 3.8.24 Four strong (+/- 100 nT) magnetic linear anomalies (**4615-18**) have been detected across the Site. These are indicative of modern underground services; such as pipes or cables. **4615** is complex with extensions running north-west – south-east, north – south, and east – west. The east – west extension truncates a Bronze Age barrow (**4602**). **4616** runs c.105 m north from the southern boundary of the Site. **4617** and **4618** are both orientated north – south in the east of the Site, and run c.47 and 20 m respectively. It is likely that these two anomalies are associated with each other, with the connecting section of the service either removed or constructed of a different material, such as plastic.

GPR survey results and interpretation

GPR Area 4

- 3.8.25 The entirety of GPR Area 4 covers a 40 x 40 m area and is situated over a number of features identified in the gradiometer survey. This includes a known Bronze Age bowl barrow (Monument ID MWI13052) and several potential pit-like features (**4600** and **4609**).

- 3.8.26 The GPR survey of Area 4 was successful in identifying responses throughout the dataset that are likely to relate to archaeological remains (**Figures 52-54**). A total depth of 2.25 m was reached and no obstacles within the survey area prevented data collection.
- 3.8.27 The uppermost timeslices display linear high amplitude responses on a north – south, and north-west – south-east orientation. This is clearest within Timeslice 2 (0.11 – 0.24 m). These are attributable to existing plough furrows visible on the current ground surface and evident in the data until Timeslice 6 (0.56 – 0.69 m). The plough lines on a north-west – south-east alignment continue slightly deeper until Timeslice 7 (0.67 – 0.80 m).
- 3.8.28 It is possible to recognise features of likely archaeological origin from Timeslice 5 (0.56 – 0.69 m). The most prominent of these is the roughly circular ring ditch at **5600** that relates to a feature identified of the same dimensions in the gradiometer survey (**4600**). This is visible as a 1 m wide high amplitude curvilinear response within the western part of the survey area. It is consistent until Timeslice 15 (1.57 – 1.70 m) where it is no longer possible to visualise. Although there appear to be small gaps in the ditch, these are resolved in the following timeslices, and it is clear that the ditch forms a complete circle. This also corresponds clearly with the gradiometer survey results and there is no indication of any mound material on either the internal or external edge of the ring ditch.
- 3.8.29 Within **5600** there are a number of small, roughly circular (0.5 – 1 m) high amplitude responses. Several of these are visible through two or more timeslices, which are highlighted as possible archaeology at 5601. Within Timeslice 6 (0.56 – 0.69 m) these are located in the north and eastern extent of the ring ditch, whereas within Timeslice 11 (1.12 – 1.25 m), they are present in the south-west. These features were not identifiable within the gradiometer survey results. Given the high amplitude nature of the responses, it these features may represent postholes or pits, likely containing a low conductivity material such as flint.
- 3.8.30 In Timeslice 6 (0.56 – 0.69 m) there are some significant high amplitude responses directly to the east of the ring ditch (**5602**). These measure 1 – 2 m in diameter and are irregular in shape and size. They do not appear to continue beyond Timeslice 7 (0.67 – 0.80 m). In the gradiometer survey these are manifest as strong positive magnetic anomalies and interpreted as possible pits. It is possible that these may still represent a cluster of pits in this area, but as they do not continue to any great depth and do not conform to any clear arrangement, it is difficult to provide any further information regarding the precise nature of these.
- 3.8.31 Within Timeslice 14 (1.46 – 1.58 m), there is a high amplitude response located within the curvilinear ditch. This is unevenly linear in shape and measures 2 m in length (**5603**). It is faintly visible from Timeslice 11 (1.12 – 1.25 m), and elements of the feature extent to Timeslice 19 (2.02 – 2.15 m). The strength and location of this may suggest a further internal feature within the bowl barrow. However, as it is located at considerable depth it is difficult to provide a more specific interpretation, particularly as it is not visible within the gradiometer survey results.

GPR Area 5

- 3.8.32 GPR Area 5 covers an area measuring 35 x 35 m. and is located over a known Bronze Age bowl barrow (Monument ID MW113056). No internal features were identified within the ring ditch in the gradiometer survey (**4601**).

- 3.8.33 The GPR survey at Area 5 was successful in a number of features associated with archaeological remains (**Figures 55-57**). A total depth of 2.34 m was reached and there were no obstacles within the survey area that prevented data collection.
- 3.8.34 High amplitude linear responses on a north – south orientation dominate the results within the uppermost timeslices. This is representative of plough lines and can clearly be seen within Timeslice 3 (0.23 – 0.36 m). The effect of this is also evident throughout much of the dataset, but is indistinct beyond Timeslice 6 (0.59 – 0.71 m).
- 3.8.35 From Timeslice 5 (0.47 – 0.60 m) a low amplitude curvilinear feature occupies the centre of the survey area at **5604**. This has an internal diameter of approximately 21 m and a width of 2 – 3.5 m. It is visible as a low amplitude response, only shifting very slightly in position throughout the timeslices. Following Timeslice 16 (1.76 – 1.88 m) it is present as a weak low amplitude response. This feature matches very well with the positive magnetic anomaly identified in the gradiometer survey at **4601**. Though it is not dominant within the results, it is clear that a continuous ring ditch is present within this area.
- 3.8.36 On the north-east edge of the ring ditch at **5604** there is a 20 m curvilinear high amplitude response which is clearest within Timeslice 6 (0.59 – 0.71 m). This is intermittent and does not continue much deeper into the dataset, having largely disappeared by Timeslice 7 (0.67 – 0.80 m). Given the location of the feature immediately outside the ring ditch, and the high amplitude nature of the response, it is possible that it is associated with remnant bank material. If this is the case, it is likely that it is largely removed either by ploughing or natural erosion as it is not visible on any other side of the feature.
- 3.8.37 Within **5604** there is no evidence of any internal features. There are a number of small-scale high amplitude responses, but these are not consistent in shape and do not persist through consecutive timeslices.
- 3.8.38 Beyond Timeslice 6 (0.59 – 0.71 m) it is possible to visualise amorphous strong high amplitude responses within the centre of the ring ditch. This is present throughout the rest of the timeslices, shifting laterally from the south-east to north-westerly. Within Timeslice 11 (1.17 – 1.30 m) this is most easily perceptible at **5606**, where a roughly linear high amplitude response on a south-west – north-east orientation is clear. This is interrupted by the continuous presence of the ring ditch at **5604**. It is interpreted as superficial geology due to the irregularity in position amorphous form.

GPR Area 6

- 3.8.39 GPR Area 6 was surveyed using the 400 MHz antenna covering an area measuring 50 x 50 m. Within this area there is a very large known Bronze Age barrow (Monument ID MWI13055) that was very clearly visible within the gradiometer survey results at **4602**.
- 3.8.40 The survey was successful in identifying a number of high and low amplitude responses throughout the dataset, many of which are likely to relate to archaeological remains (**Figure 58-60**). A total depth of 2.19 m was reached and only a circular area containing trees at the centre was not surveyed in the centre of the area.

- 3.8.41 Timeslice 2 (0.11 – 0.23 m) displays a series of curvilinear high amplitude responses which correlate with the edge of an area containing trees at the centre. To the south of this, there are also high amplitude linear responses on an east – west orientation. These are both likely to be associated with plough lines visible on the surface.
- 3.8.42 Elsewhere within the uppermost timeslices, there is a high amplitude linear feature in the northern part of the area at **5607**. This is on a south-south-west – north-north-east alignment, extends for approximately 10 m, and measures 1 – 1.5 m in width. As this feature is located solely within the upper time-slices, it is likely that it may be of modern origin. It is also located close to a modern service identified in the gradiometer survey, which transects the northern part of the Bronze Age bowl barrow, and is therefore likely to be a continuation of this. The GPR has not detected the east – west orientated service identified in the gradiometer survey because it is probably located between the 0.5 m transects. The reason it is so clear within the gradiometer survey is due to its ferrous magnetic properties.
- 3.8.43 The first timeslice that displays responses associated with the Bronze Age bowl barrow is Timeslice 4 (0.33 – 0.45 m). Close to the central area containing trees there is a roughly circular area measuring approximately 21 m in diameter at **5608**. This is characterised by a high amplitude response and continues throughout the dataset until Timeslice 7 (0.66 – 0.78 m). It is possible that this represents an area of mound material in the centre of the feature, however further investigation would be required to confirm this.
- 3.8.44 From Timeslice 4 (0.33 – 0.45 m) a poorly defined low amplitude curvilinear response can in a roughly circular formation is visible in the centre of GPR Area 6. At this depth, it is characterised by a faint relatively broad area measuring 4 – 5 m in width. Below this, it is represented by a much thinner curvilinear low amplitude response measuring approximately 2 – 3 m wide, which continues throughout the remainder of the dataset to Timeslice 20 (2.08 – 2.19). It is clearest within Timeslice 11 (1.10 – 1.22 m) where the most complete extent of the feature can be visualised at **5609**. This is intermittent within the GPR results and is clearer in the northern part of Area 6. At **5610** there is an area of low amplitude which corresponds with the general location of the bowl barrow, but it is difficult to distinguish this from natural geology. This variation in the response of the GPR may be due to differential preservation of the feature.

GPR Area 7

- 3.8.45 GPR Area 7 covers a total area of 60 x 45 m. This area was selected to investigate some complex magnetic anomalies identified in the gradiometer survey at **4603**. These features consist of two parallel linear features that culminate in the south-east in a broad semi-circular curvilinear ditch. These features probably relate to a Neolithic long barrow and a Bronze Age barrow (Monument ID MWI12654). The purpose of the GPR survey was to provide a more detailed understanding of the features, their relationship and phasing.
- 3.8.46 The GPR survey at Area 7 was successful in detecting a variety of high and low amplitude responses throughout the dataset, most of which are likely to relate to archaeological remains (**Figure 61-63**). A total depth of 2.33 m was reached and there were no obstacles within the survey area that prevented data collection.

- 3.8.47 Within the uppermost timeslices by a series of high amplitude linear trends are visible, which associated with shallow plough furrows visible on the current ground surface. These are mostly aligned on a north-south orientation, with a small number on a more north-west – south-east orientation. The effect of this ploughing is particularly prevalent within Area 7 and some plough lines can be seen throughout the remainder of the timeslices, albeit to a lesser extent following Timeslice 7 (0.70 – 0.83 m). Despite this, it is still possible to identify a number of responses that are likely to relate archaeological remains.
- 3.8.48 Within Timeslice 5 (0.47 – 0.60 m) it is possible to recognise two broad low amplitude responses in a parallel linear configuration. These are orientated on a north-west – south-east alignment measure approximately 5 m in width. They are separated by a 13 – 15 m gap and the most northerly example (**5311**) measures 23 m in length. The more southerly feature (**5312**) is longer and in the south-eastern arches in a northerly direction to form a large curvilinear feature. These features are continuously present throughout the dataset and can be seen through to Timeslice 20 (2.21 – 2.33 m), albeit more faintly. These features relate to ditches associated with the known Neolithic long barrow and Bronze Age round barrow identified at **4603** in the gradiometer survey. However, within the GPR dataset there are a number of differences and additional features that provide further detail on the nature and extent of the previous understanding of these.
- 3.8.49 The southern low amplitude linear/curvilinear response at **5312** is largely consistent throughout the dataset. In the gradiometer survey, there are two very clear breaks in the linear feature at **4603**. One that matches the length of the northerly linear at **5311**, which measures approximately 22 m in length, and another at the most south-easterly point. Within Timeslice 16 (1.75 – 1.88 m), a gap which corresponds with the latter break in this linear. The westerly break in the ditch is not visible in any of the timeslices for this area. This does not necessarily imply that there is not a break in this feature at this location, but that the difference between the fill of the ditch and the background geology may not be easily detectable by GPR. Moreover, as these gaps in the linear are striking within the gradiometer survey data of the area, it is very likely that they are real.
- 3.8.50 From Timeslice 6 (0.58 – 0.71), it is possible to identify two slightly amorphous high amplitude linear features on the same north-west – south-east alignment as **5611** and **5612**. This is most clearly visible within Timeslice 7 (0.66 – 0.78 m), but is only very faintly visible beyond this depth. Both of these responses are of a very similar length, measuring approximately 17 m. The most westerly feature at **5613** measures 5 – 6 m in width, whereas **5614** is less broad measuring 2.5 m in width. These are located on the outer edge of the linear low amplitude responses, and most likely associated with the parallel Neolithic long barrow ditches. Given the location and the high amplitude nature of the response, these may represent remnant bank material on the outer edges. However, as this is only visible over a relatively short depth range, it is likely that these are heavily ploughed out.
- 3.8.51 In between the two parallel linear flanking ditches there are several additional high amplitude responses that also relate to features associated with the Neolithic long barrow. At **5615** there is a cluster of roughly circular responses measuring approximately 1.5 – 2 m in diameter. Elements of these features are visible from Timeslice 7 (0.70 – 0.83 m) to Timeslice 16 (1.75 – 1.88 m), but are perhaps clearest in Timeslice 10 (1.05 – 1.18 m). These are largely located at the south-eastern end of the long barrow aspect of this feature, and appear to line the inner

edge of the flanking ditches. It is likely that these features relate to a series of post-holes or pits, most likely containing poorly conductive material such as flint.

- 3.8.52 In Timeslice 16 (1.75 – 1.88 m), within the centre of the eastern curvilinear ditch, there is a weak low amplitude response which is roughly circular in shape (**5616**). This measures approximately 7 – 8 m in diameter and is represented by a 0.7 – 1.5 m wide ditch. This is only very faintly visible and is not clearly present within any of the preceding timeslices. However, it does correspond with part of the feature identified within the gradiometer survey and probably relates to an internal curvilinear feature in the centre of the round barrow. As this response has no clear physical relationship with any other part of the overall feature, it is impossible to comment on the phasing of this feature. However, the depth at which it is present is certainly of significance.
- 3.8.53 Within Timeslice 16 (1.75 – 1.88 m), to the west of **5616** there is a curvilinear feature which matches the shape of the eastern part of **5612**. This is thinner than the ditch identified at **5612**, measuring approximately 2 m in width, but has a similar internal diameter. Though poorly represented throughout the rest of the dataset, only clearly being identifiable within Timeslice 16, it is possible that this represents a continuation of the ditch to form a complete circular feature. Despite this, it is difficult to understand why this would not be visible in the upper timeslices, or within the gradiometer survey and it is therefore only interpreted as possible archaeology. Furthermore, as it also appears to underlie features at **5615**, it is unclear how this could relate to the overall feature.
- 3.8.54 Whilst the high and low amplitude features within GPR Area 7 are generally clearly identifiable, it is difficult to piece together the exact phasing and relationship of these features from results of this geophysical survey alone. It is clear, however that there is a very complex arrangement of features covering broad date range and further investigation would be required to understand this.

GPR Area 8

- 3.8.55 GPR Area 8 is the largest area surveyed, covering an area measuring 75 x 45 m. It is positioned over archaeological features identified in the gradiometer survey at SE1. This includes three circular ring ditches that form a group of Bronze Age barrows (**4605 – 4607**) that are all of a similar size and contain evidence of internal features (Monument ID MWI3127, MWI12724 and MWI1653). It also covers a known enclosure and building dating to the 20th century identified at **4608** (Monument ID MWI12906).
- 3.8.56 The GPR survey at Area 2 was identified a number of high amplitude responses throughout the dataset, many of which relate to archaeological remains (**Figure 64-66**). A total depth of 2.30 m was reached and there were no obstacles within the survey area that prevented data collection.
- 3.8.57 The uppermost timeslices show a significant number of high amplitude linear trends on a north – south orientation, as well a small number on a north-west – south-east orientation. These are associated with shallow plough furrows visible on the current ground surface and following Timeslice 7 (0.69 – 0.81 m) are no longer visible.
- 3.8.58 The first timeslice where it is possible to perceive clear archaeological features is Timeslice 5 (0.46 – 0.58 m). Within this it is possible to identify the outline of three

curvilinear high amplitude responses (**5617 – 5619**). These are not consistently visible in their entirety until Timeslice 7 (0.69 – 0.81 m), where it is possible to determine nearly complete roughly circular high amplitude linear responses at each location. These have largely disappeared from the dataset by Timeslice 11 (1.15 – 1.27 m), except for **5619**, which continues to be visible until Timeslice 13 (1.38 – 1.50 m). These features correspond closely to the three Bronze Age barrows identified in the gradiometer survey at **4605 – 4607**.

- 3.8.59 Each ring-ditch has very slightly different dimensions and potential for internal features. For example, **5617** has an internal diameter of 14 m and the ditch itself measures 1 m in width. There is no evidence for any internal features within the ditch, though there are some isolated high amplitude responses in the south-west, and east of the feature which could relate to possible bank material located on the inside edge of the ditch. However, as this does not extend beyond Timeslice 5 (0.46 – 0.58 m) it is likely to have been previously impacted by ploughing.
- 3.8.60 At **5618**, the ditch is less than 1 m wide, with an internal diameter of 13 m. There are high amplitude roughly curvilinear responses that may be associated with internal features within the ring-ditch. These are located on the south-eastern internal edge of the feature, and are clear until Timeslice 6 (0.57 – 0.70 m). There is also a slightly amorphous high amplitude response in the centre of the **5618**, which measures around 2 – 3 m in diameter. This is no longer visible following Timeslice 7 (0.69 – 0.81 m), and the shape of it is not particularly indicative of a certain type of feature. One possibility is that these relate to pit-like features.
- 3.8.61 The most easterly ring ditch at **5619** has an internal diameter of 14 m and the outermost high amplitude curvilinear response is approximately 1 m wide. In contrast to the aforementioned examples, there is convincing evidence for an internal ring ditch. This is offset by a distance of approximately 1.5 m within the centre of the outer ditch, and has an internal diameter of around 8 m. The ditch itself is represented by a 1 m wide high amplitude curvilinear response that is partially visible within Timeslice 5 (0.45 – 0.58 m) and Timeslice 7 (0.69 – 0.81 m). It is clearest within Timeslice 13 (1.38 – 1.50 m), but is no longer visible beyond Timeslice 15 (1.61 – 1.73 m). It is fairly consistent throughout the timeslices, and extends deeper than the external ring-ditch. It is difficult to contemplate the implication of this, but it may imply that there are two or more phases of activity.
- 3.8.62 There are some meandering roughly linear high amplitude responses visible throughout the entire dataset at **5620** and **5621**. These become increasingly broad and amorphous as the depth increases and are both irregular in shape. They are visibly intersected by the ring ditches at **5617 – 5619**. The strength and irregularity of this response is indicative of superficial geological features, potentially associated with seams of flint or other poorly conductive material within the natural geology.
- 3.8.63 Elsewhere within Timeslice 5 (0.46 – 0.58 m) it is also possible to identify some very high amplitude linear response at **5622**. This is located close to the south-west corner of Area 8 and can be visualised as a 35 m long, 1 m wide linear response on a west-north-west – east-south-east orientation. To the south of this there is a 5 x 10 m rectangular arrangement slightly to the west of the centre of this. This is evident until Timeslice 9 (0.92 – 1.04 m) where it begins to fade out. This relates to the highly magnetic response identified at **4609** in the gradiometer

survey, which is associated with a known 20th century building. From Timeslice 9 onwards, there is a cluster of more irregular high amplitude responses at **5623**, directly to the south-east of the building. Given that this is located deeper than the walls of the structure, it is possible that this relates a degree of levelling directly west of the building.

3.9 NE1

Site location, topography and geology

- 3.9.1 NE1 lies c.150 m east of NE2. The Site is located to the north-west of Amesbury, in the County of Wiltshire. The survey area encompasses 5.1 ha of agricultural land covered by crop stubble. The Site is bound by the A303 to the south, Countess Road to the west, woodland to the east, and agricultural land to the north.
- 3.9.2 The Site is generally flat, varying between c.70 m aOD and c.75 m aOD across the area.
- 3.9.3 The solid geology comprises chalk of the Seaford Chalk Formation with superficial River Terrace Deposits, 4 – sand and gravel [18].
- 3.9.4 The soils underlying the Site are likely to consist of brown calcareous earths of the 511f (Coombe 1) association [19]. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

Archaeological background

- 3.9.5 NE 1 is located outside of the WHS, but is in relatively close proximity to other elements of the prehistoric ceremonial landscape at Stonehenge. The WSHER records evidence of activity from the Neolithic through to the Anglo-Saxon period within the Site.
- 3.9.6 Trial pitting within the south of the area in 1993 (WSHER number: MWI11896) recorded a buried flint scatter thought to relate to Neolithic settlement close to the River Avon, which lies to the south. A later excavation to the north revealed further evidence of Neolithic to Early Bronze Age activity in the form of a pit (WSHER number: MWI11909). Three further pits were identified to the north of the Site during the same excavation.
- 3.9.7 Further test pits and archaeological evaluations have also been undertaken within the area [20] [21]. This has identified a substantial masonry building possibly of Romano-British date (WSHER number: MWI12030) in the north-east of the Site with walls up to 0.8 m thick. The walls were constructed of compacted chalk with a flint exterior, whilst internal walls comprised solely of chalk. Two Anglo-Saxon sunken feature buildings (WSHER number: MWI12036) within the survey area were also revealed. However, excavation of these features was kept to a minimum, only establishing their date and character, so as not to compromise the features for any potential future work.
- 3.9.8 A 20th century haul road associated with gravel and clay quarrying was also identified in a number of trenches.

Gradiometer survey results and interpretation

- 3.9.9 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between the 18th – 24th August 2016. An overall coverage of 5.1 ha was achieved (**Figures 38-39**).
- 3.9.10 The survey has identified several anomalies of archaeological and possible archaeological origin. Two adjoining negative (-0.5 to – +1.5 nT) rectilinear anomalies (**4700**) in the east of the Site. These relate to a previously excavated Romano-British building (WSHER number: MW112030). The geophysical anomaly shows the building extending further west and south than was uncovered during excavation. The northern part of the feature is orientated east-west with dimensions of c.15 m by c.6 m at its widest points. There are gaps in the anomaly along the western wall and south-eastern corner, possibly indicating external doorways. A possible internal wall running north-south can also be seen. The southern part of the feature is orientated north-south with dimensions of c.15 m by c.11.5 m. A gap in the wall dividing the two parts of the building indicates the location of an internal door, whilst a gap in the south-east may indicate an external door. There are three small discrete internal features within the southern part of the anomaly. Two of these are negative features, indicating that they may relate to areas of masonry, whilst the other is positive, possibly relating to a pit feature.
- 3.9.11 Two further negative (-0.5 to – +1.5 nT) rectilinear anomalies (**4701**) lie immediately south of **4700**. These are likely to be further Romano-British buildings associated with **4700**. Both anomalies are orientated east – west, with the western of the two forming a more clearly defined feature. The western anomaly is c.8.5 m by c.6.5 m with a c.2.5 m internal protrusion from its southern wall likely related to an internal wall. A further protrusion from the northern wall, this being c.1.5 m and external, may indicate that the building extends further than is seen in the data or show a connection between the building and that seen in **4700**. A gap in the south-eastern corner may be the location of an external doorway, particularly as it appears to align with a similar gap in the western wall of the eastern building. The eastern anomaly is c.9.5 m square, with no clear evidence of internal walls. There is a c.3 m easterly extension from the south-eastern corner suggesting that the building extends further than is seen in the data. There are gaps in the western and eastern wall, possibly relating to the positions of doorways. Two positive pit-like anomalies are seen, which are likely associated with the buildings. One lies at the centre of the eastern feature, whilst the other lies between the two. Whilst these are indicative of pits their exact origin is not clear.
- 3.9.12 Four areas of positive rectilinear and curvilinear anomalies (**4702-4705**) are seen around the features at **4700** and **4701**. However, these anomalies do not share the east-west or north-south orientation of **4700** and **4701**, suggesting a different origin. **4702** is orientated north-west – south-east and comprises two linear features and a 'U' shaped anomaly covering c.15 m square. **4703** is linear anomaly with irregular width running c.30 m north-north-east – south-south-west to the east of **4700**. **4704** lies to the north-north-east of **4700** in the form of a broken c.14 m square orientated north-west – south-east. **4705** is a sub semi-circular anomaly with an internal square feature to the north-north-west of **4700**. The anomaly is orientated north-east – south west, covering an area c.14 m by c.9.5 m. The anomalies across all four areas are similar in width, with the majority being c.1.5 m and areas up to c.4 m wide. Whilst all of these are indicative of

ditches, their strength (0.5 to 1 nT) is similar to the responses given by superficial deposits (**4710**) across the survey area, indicating that this may be a more likely origin.

- 3.9.13 Two parallel positive (0 – 1+ nT) linear anomalies (**4706**) are seen in the north-west of the site. These are orientated north-east – south-west and are indicative of ditch features. The anomalies are separated by a gap of 11 – 12 m, with western of the two extending c.37.5 m, whilst the eastern extends c.109.5 m including two gaps of 4.5 m and 30.5 m. These are likely to be of archaeological origin, possibly relating to the haul road which was recorded in this area during archaeological evaluation [20].
- 3.9.14 Three magnetically strong (+/-100 nT) linear anomalies have been detected in the west (**4707**) and south (**4708-4709**) of the Site. These are indicative of modern underground services; such as pipes or cables. **4707** is c.17.5 m in length, whilst **4708** and **4709**, both in the south, are c.19 m and c.65.5 m respectively. It is likely that **4708** and **4709** connect, however the route is not clear in the geophysical data.
- 3.9.15 A large number of broad, amorphous, positive (+0.5 – +1 nT) anomalies (**4710**) are present across the Site. The widespread nature, lack of discernible pattern, and relatively weak nature suggest that these are likely related to the sand and gravel river terrace deposits recorded across the area [18].
- 3.9.16 Linear areas of strong (+/-50 nT) magnetic response (**4711**) are seen in the south of the Site. This is magnetic disturbance from fence lines running through the area.
- 3.9.17 There are some features of archaeological origin which are likely to be present within NE1 that are not well represented within this gradiometer dataset of this area. This includes two Anglo-Saxon sunken feature buildings (WSHER number: MWI12036), which are most likely not visible due to the shallow nature of the features. As they are also recorded as being poorly defined and heavily truncated (WA 2003b), this is perhaps unsurprising. However, it is possible that further remains of this nature may not have been detected by the gradiometer survey of NE1.

4 Discussion

4.1 Gradiometer survey

- 4.1.1 The detailed gradiometer survey has been successful in detecting a high density of anomalies of archaeological interest across the Scheme. The anomalies are primarily ditch-like features, which take a number of forms and date to a variety of periods. These largely correspond with known archaeological remains derived from aerial sources and represent complexes of prehistoric monuments. However, several additional archaeological features have also been identified.
- 4.1.2 Several former field boundaries were identified which correlate with OS mapping and aerial photography for the Scheme. Areas of increased magnetic response, superficial geological deposits, agricultural ploughing trends and numerous modern services were also located.

- 4.1.3 In SW4, positive and negative linear anomalies are seen across the site (**4000 – 4012**). The magnetic strength, orientation and size of these features varies, but generally all appear to adhere to an approximate orthogonal arrangement. It is considered likely that these represent a field system associated with an Iron Age enclosure and Romano-British settlement south of Parsonage down (WSHER number: MWI6943), which is directly to the north-west.
- 4.1.4 SW3 is the largest area covered as part of this geophysical survey and similarly revealed a variety of linear features. In the north-east corner of SW3 **4200** can be attributed to a Bronze Age enclosure. At **4209** there is evidence for an oval enclosure, and at **4204** a probable boundary ditch. These are associated with known Bronze Age features. However, it is possible that these may have also been present or visible in subsequent periods, as many later features respect their orientation.
- 4.1.5 In the south-west corner of SW3 there is a dense area of pit-like features and an area of increased magnetic response at **4207**. Though it is difficult to provide more specific interpretations of individual features, these are likely to represent a north-western extension of the later Prehistoric and Romano-British Settlement at Oatlands Hill. Extending north-east from this, a known sinuous linear feature at **4208** was also revealed. This appears to head in the direction of the previously mentioned Bronze Age features at **4200**. Whilst the significance of this is not apparent from the results of this survey alone, it emphasises that this archaeological landscape of the WHS is a palimpsest.
- 4.1.6 There are a number of other linear anomalies which are considered to be of possible archaeological significance in this area. However, these are often poorly defined. Some of this is likely to be attributable to medieval agricultural activity, but not as extensively as has been mapped in aerial photography. This may suggest that some of these features have been 'over-interpreted' or are perhaps severely plough damaged.
- 4.1.7 Elsewhere within SW3, there are a number of curvilinear anomalies which are associated with the funerary aspect of the landscape. Three ring-ditches at **4201 – 4203** which are of varying size correlate with known Bronze Age barrows, however **4201** in particular is notably different in shape and character. It is not formed of a complete circular ditch, but six segments in a circular arrangement. As a result, it is possible that this feature is perhaps indicative of a Neolithic hengiform monument, although the presence of an external bank is not clear.
- 4.1.8 SW2 contained one known Neolithic Long barrow (**4300**) and one previously unidentified (**4301**). These are both represented by at least two flanking ditches and display limited evidence of any internal features. They are both slightly different in terms of their size and orientation and were targeted for GPR survey. As such, they are discussed at length in reference to the GPR results.
- 4.1.9 There are a number of other linear features in SW2 and several are associated with the same field system identified in SW3 (**4302 – 4304**). For example, **4302** is most clearly a continuation of the Bronze Age boundary ditch at **4204**. In addition, there are several possible linear features which are less clearly represented but probably associated with the same field system. However, the aerial photographic evidence displays many more linear features across SW2 than has been located by the gradiometer. Many of those undetected are aligned on an approximate

north - south alignment. As this is also the orientation of the ploughing trends, it is possible that this field system has either been 'over-interpreted' or is severely plough damaged.

- 4.1.10 The survey results in SW1 has generally much fewer linear features than other area. This is also reciprocated by information recorded by the NMP in this area and may be due to the variable topography in this area. Despite this, a linear feature at **4400** corresponds with an earthwork dated to the Early Bronze Age to Late Iron Age. Several of the other features mapped from aerial photography in this area are related to superficial geology as opposed to field systems (**4409**; **4410**).
- 4.1.11 There are three recorded Bronze Age barrows in SW1. Two of which are recorded as bowl barrows, and one, known as the Wilsford Shaft, is a pond barrow. Only two of these features are identified within the gradiometer survey (**4401**; **4402**) and it is not precisely clear why this is the case. The inconspicuous barrow has been excavated and is located on the line a field boundary at **4411**. It is suggested these have obscured the detection of this barrow and that it is likely to be heavily truncated.
- 4.1.12 An archaeological trial trench evaluation was undertaken by Wessex Archaeology in SW1 and SW2. This was undertaken immediately following the geophysical survey and trenches were positioned to target known and possible features and to sample apparently blank areas. The results of this are discussed in a separate report [22], but largely support the interpretations made in this report.
- 4.1.13 NE2 and SE1 are located very close to each other at the eastern end of the Scheme and are characterised by a dense concentration of prehistoric funerary monuments (**4500 – 4505** in NE2 and **4600 – 4603**; **4605 – 4607** in SE1). These are centred around the double ditch feature known as the Stonehenge Avenue, which transects both NE2 and SW1 at **4506** and **4604**. All of these features are very clearly represented in the gradiometer dataset and correlate well with known monuments in this area. The seven examples in SE1 were targeted with GPR survey and a more focussed discussion of these features is provided for regarding these.
- 4.1.14 Several post-medieval features were located within NE2 and SE1 including a Road (**4507**), a building (**4608**) and evidence for possible quarrying (**4614**). There are also several undated linear ditch-like features and evidence for ridge and furrow, particularly in NE2.
- 4.1.15 NE1 contributed no identifiable evidence associated with the prehistoric landscape of the WHS. Whilst flint scatters and other discrete features of this date have been previously identified within this area, they are unlikely to be detected by gradiometer survey.
- 4.1.16 The clearest archaeological feature in NE2 is a known Roman Building at **4700**. This has previously been partially excavated [20], however the gradiometer survey has suggested that a more extensive arrangement of buildings or rooms may be present (**4701**). Moreover, there are several less clearly identifiable possible features within the immediate vicinity which may be of significance (**4702 – 4705**).

- 4.1.17 Previous investigations within NE1 have partially excavated two Anglo-Saxon sunken feature buildings [20]. These are not reciprocated in the gradiometer data the implication of this is that further remains of this nature may not have been detected by the gradiometer survey and therefore could be present elsewhere within NE1.
- 4.1.18 It should be noted that small, weakly magnetised features may produce responses that are below the detection of magnetometers. It may therefore be the case that more archaeological features may be encountered than have been identified through geophysical survey. This is particularly pertinent across the WHS landscape as prehistoric funerary monuments are known to have provided a focal point for secondary burials. Such features are frequently not detected by gradiometer survey and therefore the presence of archaeological features of this nature cannot be ruled out.

4.2 GPR survey

- 4.2.1 The GPR survey has been successful in detecting a number of significant responses, which are likely to be associated with archaeological remains across Areas 1 - 8. The majority of these relate to funerary monuments in the form of Neolithic long barrows and Bronze Age round barrows.
- 4.2.2 The main aims of the GPR survey were to improve our understanding of the extent and character of key features previously identified by the detailed gradiometer survey. It also aimed to establish whether any change to our interpretation is needed on the basis that further significant features are present within these survey areas.
- 4.2.3 All of the significant features identified in the detailed gradiometer survey (**4300 – 4301, 4401, 4600 – 4609**) were successfully detected within the GPR survey results. However, the response of these features has varied depending on the location of each area. For example, the ring-ditches identified at **5404, 5604** and **5609** are identifiable by a low amplitude response, whereas **5600, 5617 – 5619** are visible as high amplitude. It is impossible to provide an exact reason for this variation, other than to variable fills of features and background geology.
- 4.2.4 The two Neolithic long barrows identified in Areas 1 and 2 represent the most complex datasets, due to the difficulty in distinguishing features from the background material. This is also the case within Area 7, where it is difficult to differentiate between the remains of the Neolithic long barrow and the Bronze Age barrow. Despite this, a number of previously unidentified features located within the monuments are tentatively proposed and as such contribute to the understanding of these monuments.
- 4.2.5 A total of eight Bronze Age barrows were identified in Areas 3 – 8. The results of the GPR survey has enhanced our knowledge of these features by providing an estimated depth of the features, and commented on the level of preservation and the effect of modern ploughing. In some cases, it has identified additional possible archaeological features within the ring ditch that are likely to be of significance (Area 7, 8). However, the results of this survey have largely confirmed the interpretation of these feature as Bronze Age barrow monuments.

4.3 Conclusion

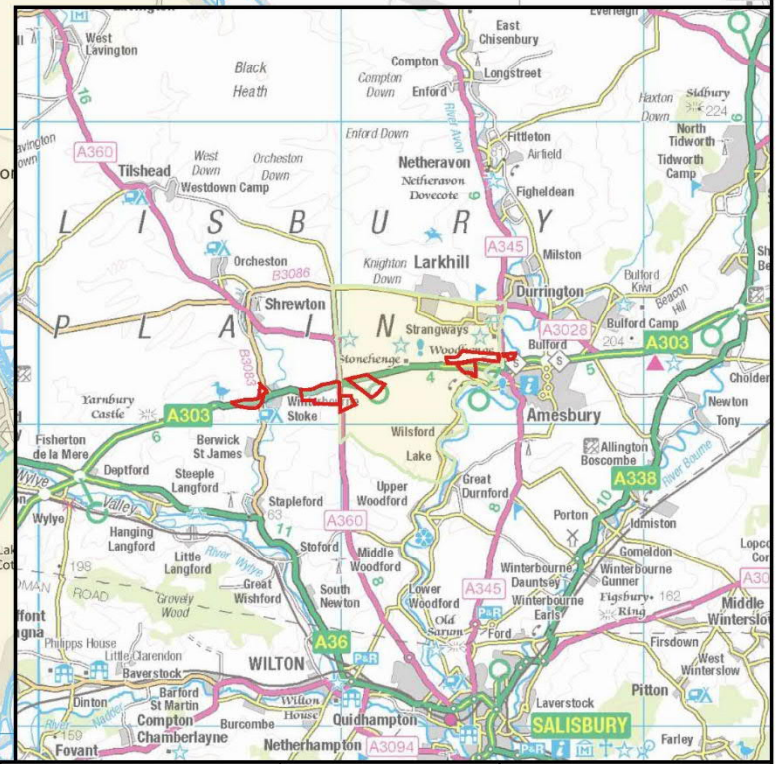
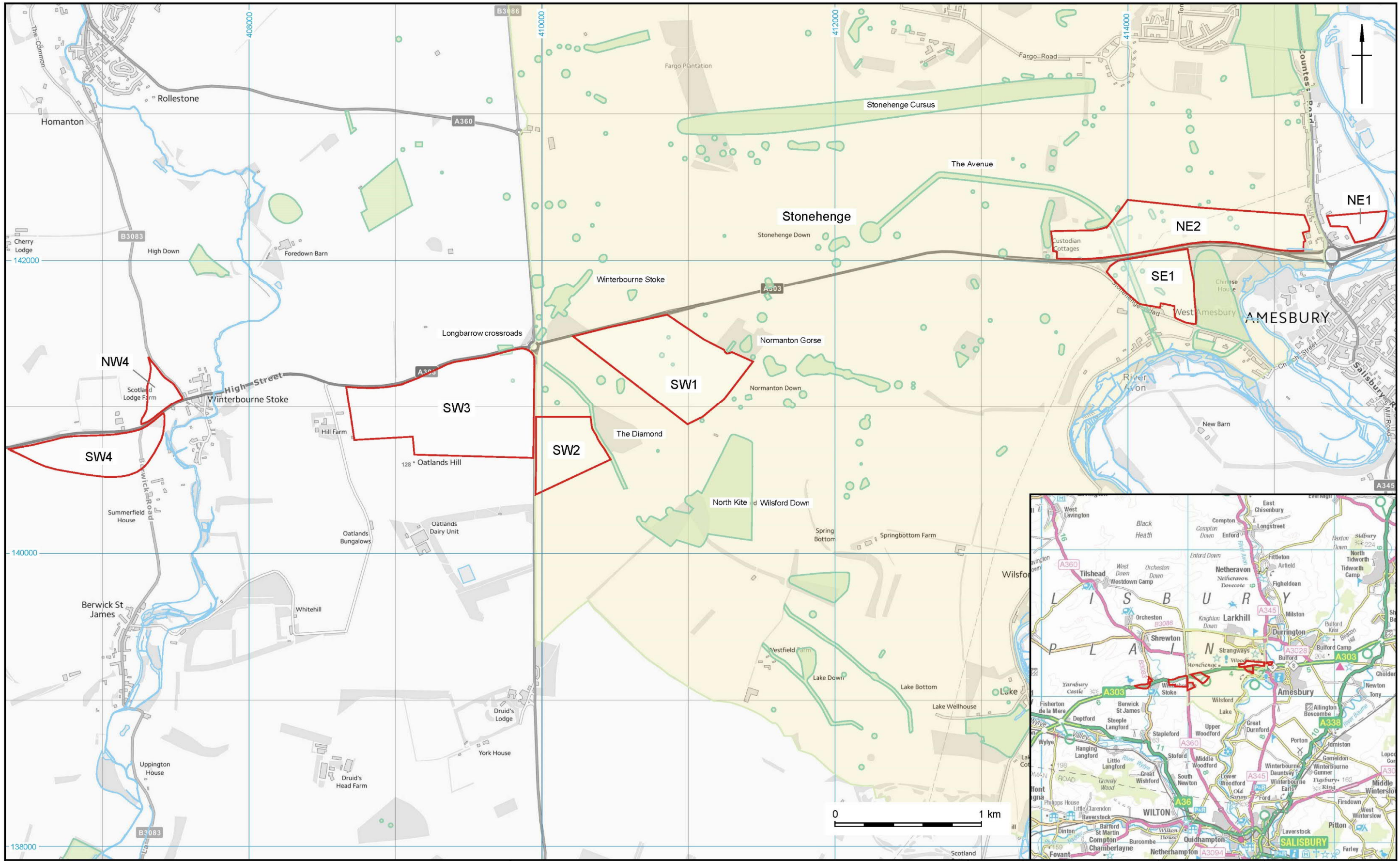
4.3.1 In conclusion, the combination of the detailed gradiometer and the GPR survey has been successful in fulfilling the overarching geophysical survey objectives. Both datasets corroborate well with each other and have also shown that a significant amount of plough damage has occurred across these survey areas. Despite this, a complex range of archaeological features have been identified and greater detail provided on their character and extent. While it is impossible to comment precisely on their phasing and dating, the surveys have assisted in the recognition of additional discreet archaeological features. This therefore adds to our knowledge of the development of the prehistoric landscape within and adjacent to the WHS.





4.4 Recommendations

4.4.1 Following the results of the geophysical survey, further archaeological investigation is planned for several areas across the scheme. The written scheme of investigation (WSI) for the evaluation [23] was submitted to and approved by Wiltshire Council Archaeological Service (WCAS), acting on behalf of the Local Planning Authority, Wiltshire Council (WC), prior to the commencement of the ground works. The locations of the trenches indicated in the WSI were based on information from aerial photographs from Historic England's National Mapping Programme (NMP) and from geophysical gradiometer survey.

4.4.2 Additionally, it is recommended that further data should be collected via trial trenching from the areas identified as superficial archaeology / potential spreads to ensure that these responses are not masking weaker and potentially archaeological responses. Trenches should also be planned to investigate areas where no anomalies of potential archaeological interest have been identified within the Site.

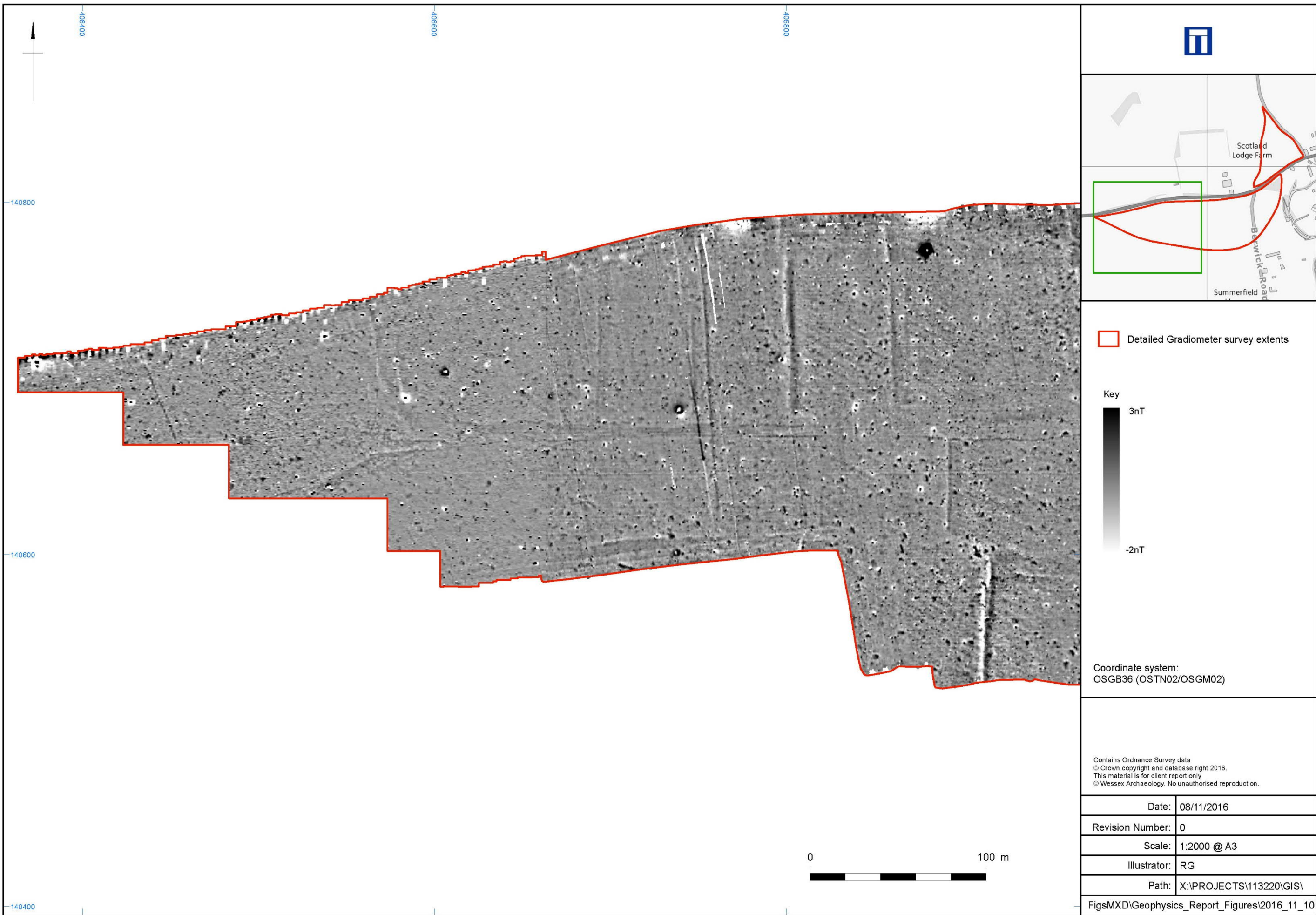
5 Figures



 Coordinate system: OSGB36 (OSTN02/OSGM02)	 Area of geophysical survey  World heritage site  Scheduled monument	Contains Ordnance Survey data © Crown Copyright and database right 2016. This material is for client report only © Wessex Archaeology. No unauthorised reproduction.		Date: 08/11/2016	Revision Number: 0
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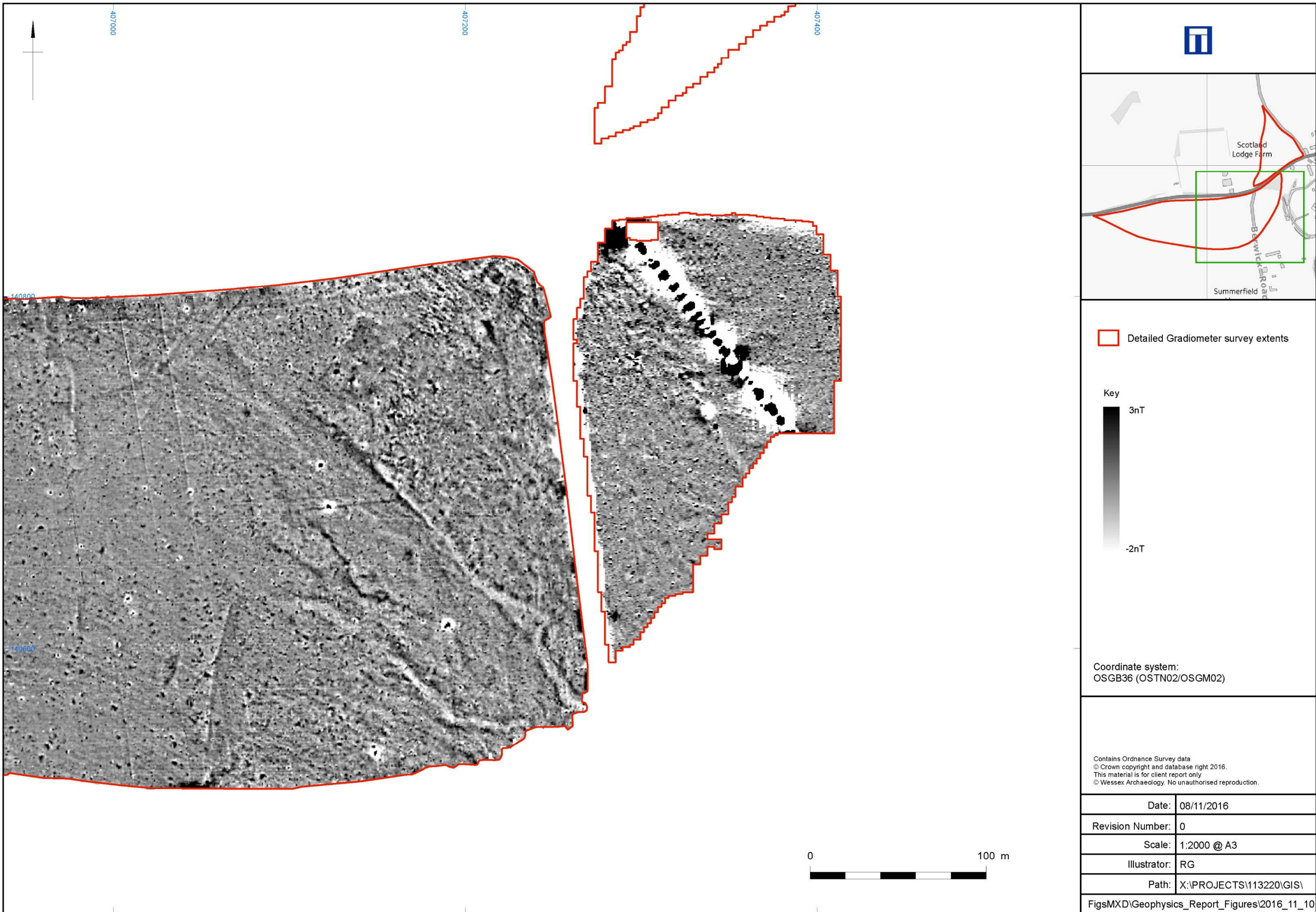
Location of geophysical survey areas

Figure 1



SW4 west: Greyscale plot

Figure 2



SW4 east: Greyscale plot

Figure 3

Scotland Lodge Farm
Summerfield
Bewick Road

Detailed Gradiometer survey extents

Key

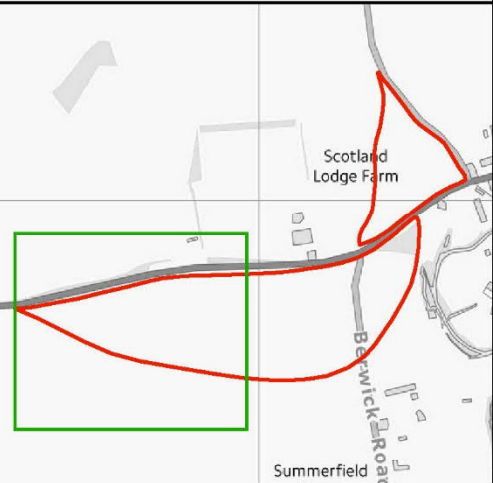
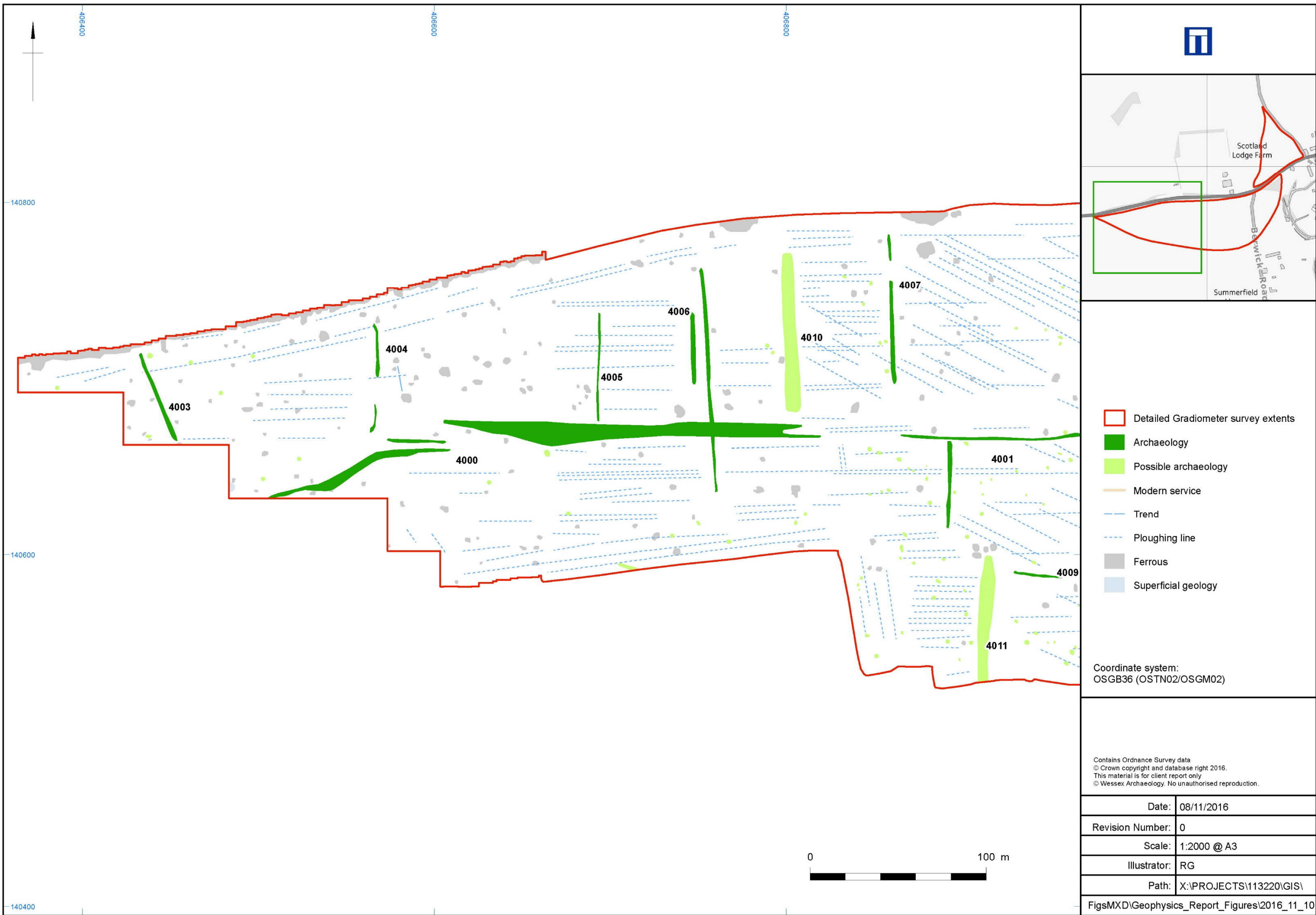
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- Archaeology
- Possible archaeology
- Modern service
- Trend
- Ploughing line
- Ferrous
- Superficial geology

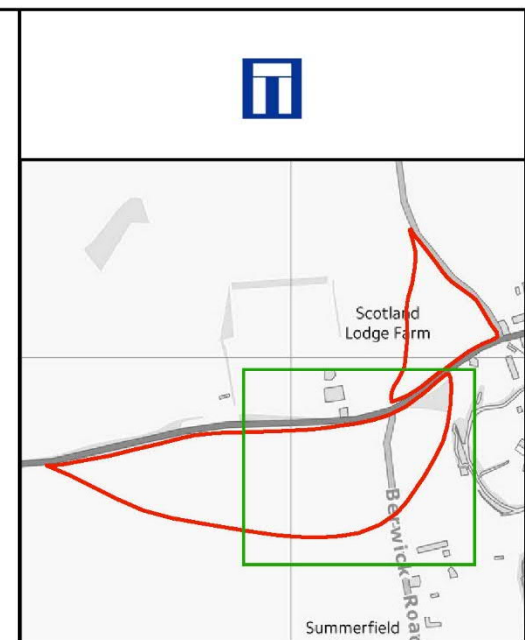
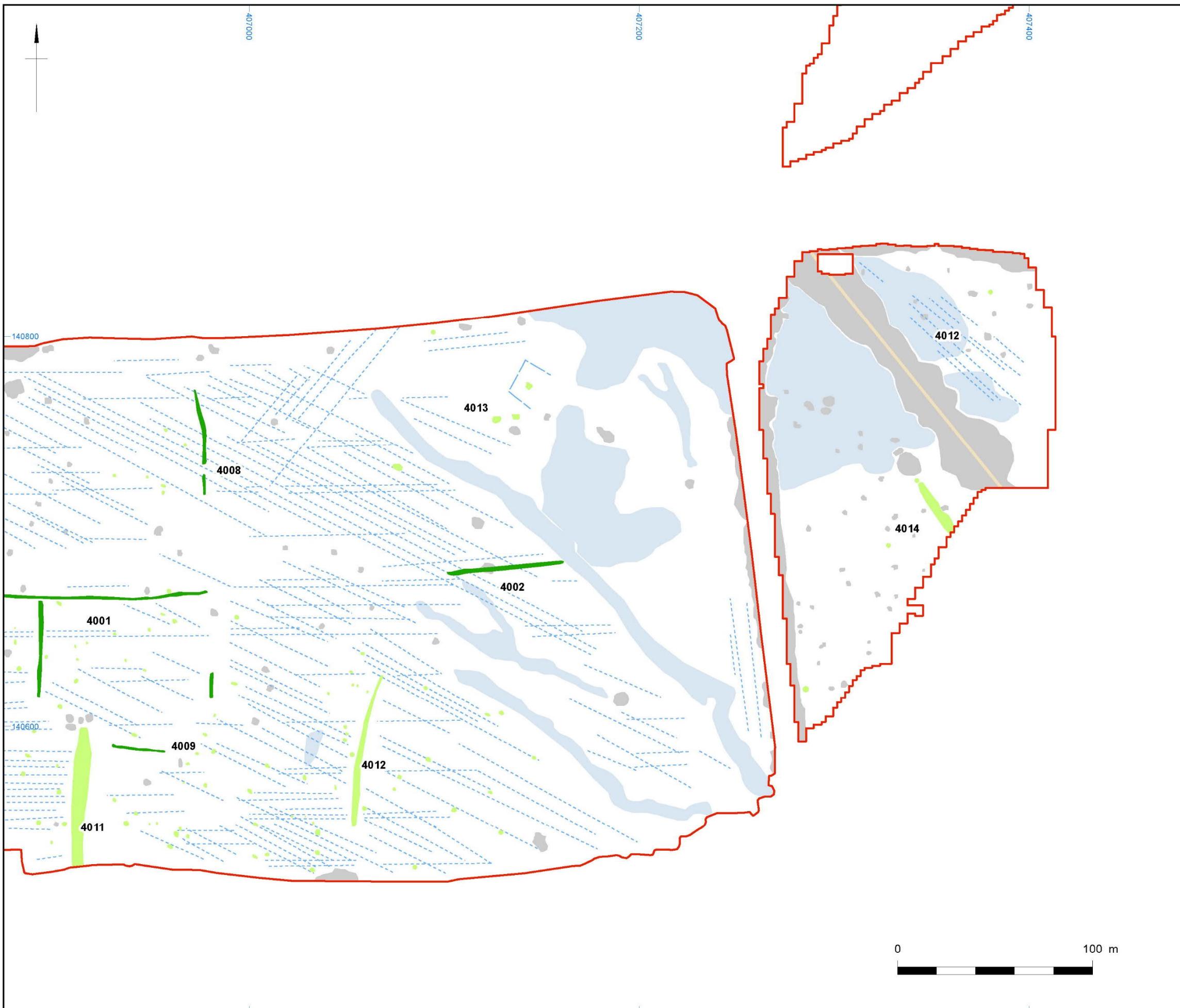
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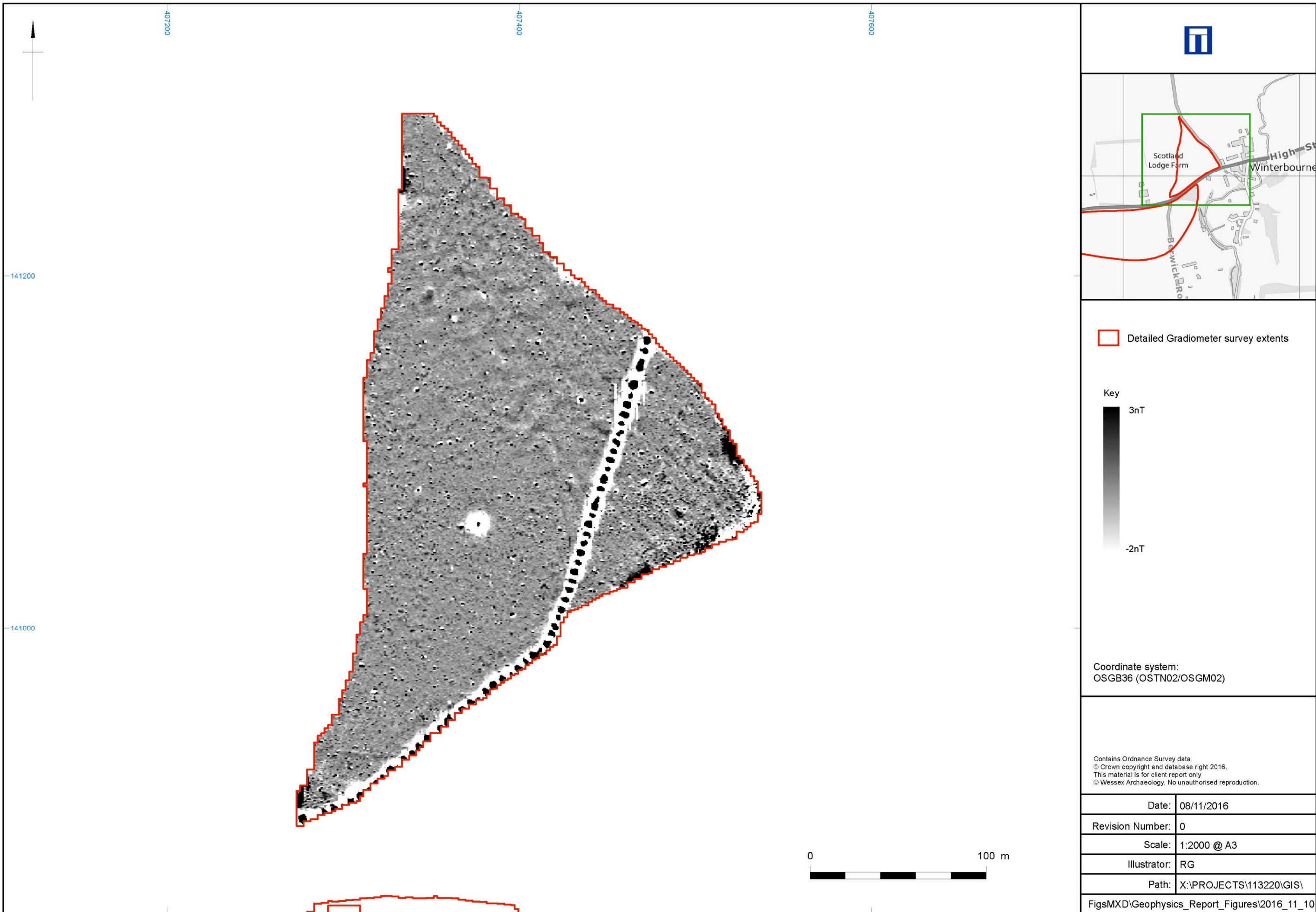
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NW4: Greyscale plot

Figure 6

Scotland Lodge Farm
Winterbourne
High Street
Berwick Road

Detailed Gradiometer survey extents

Key

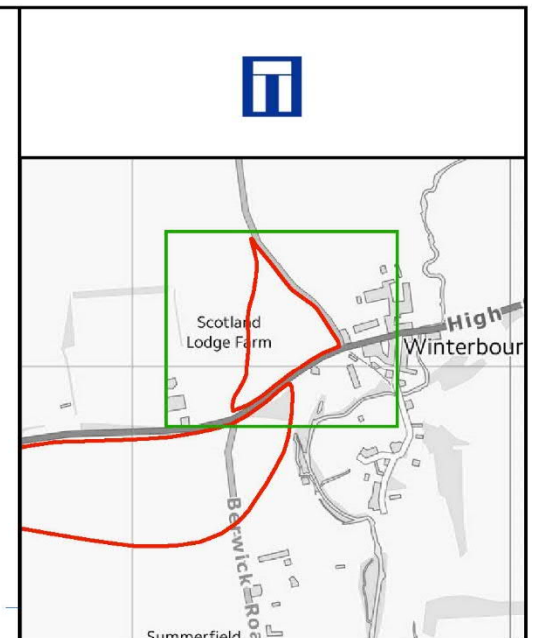
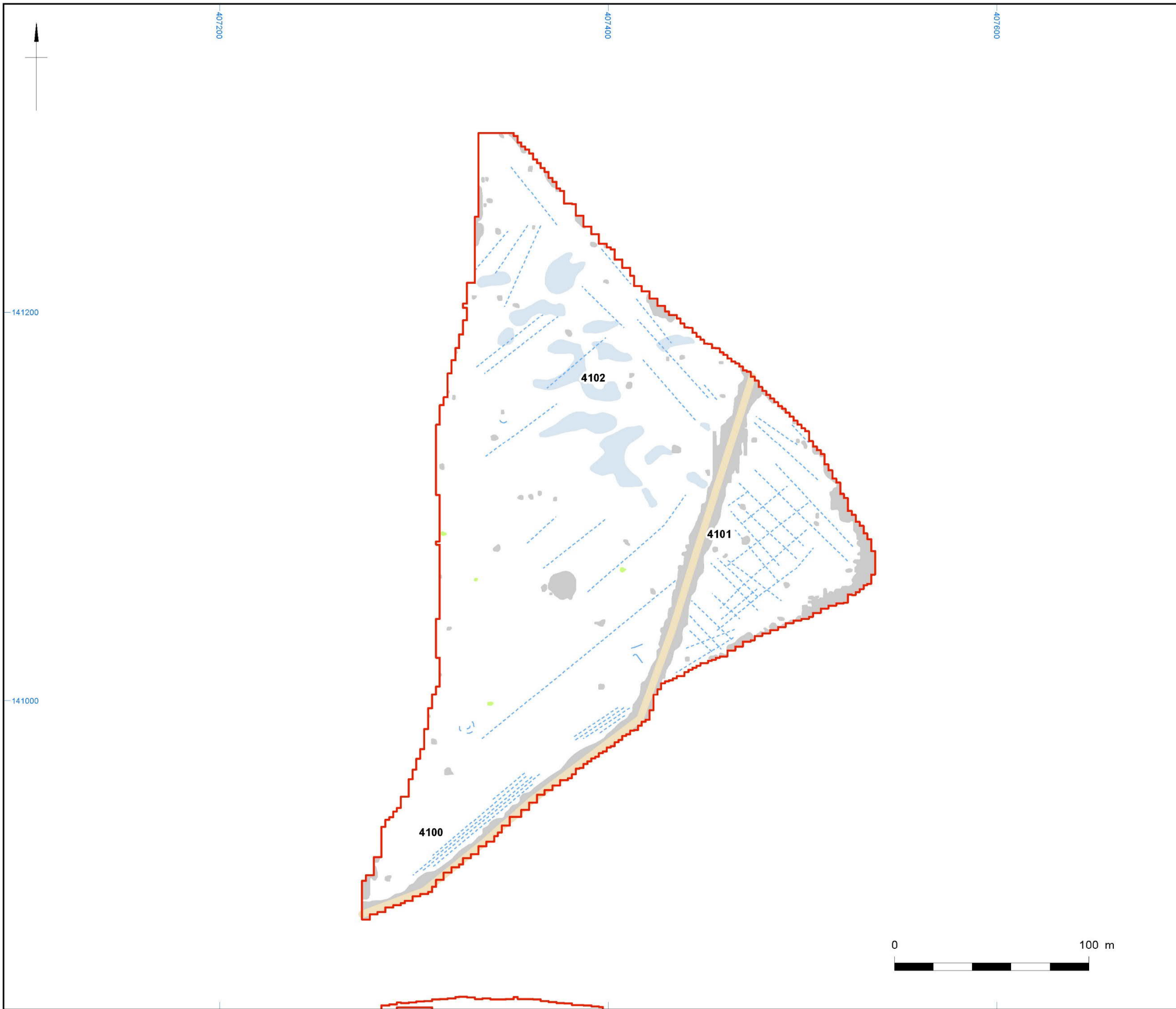
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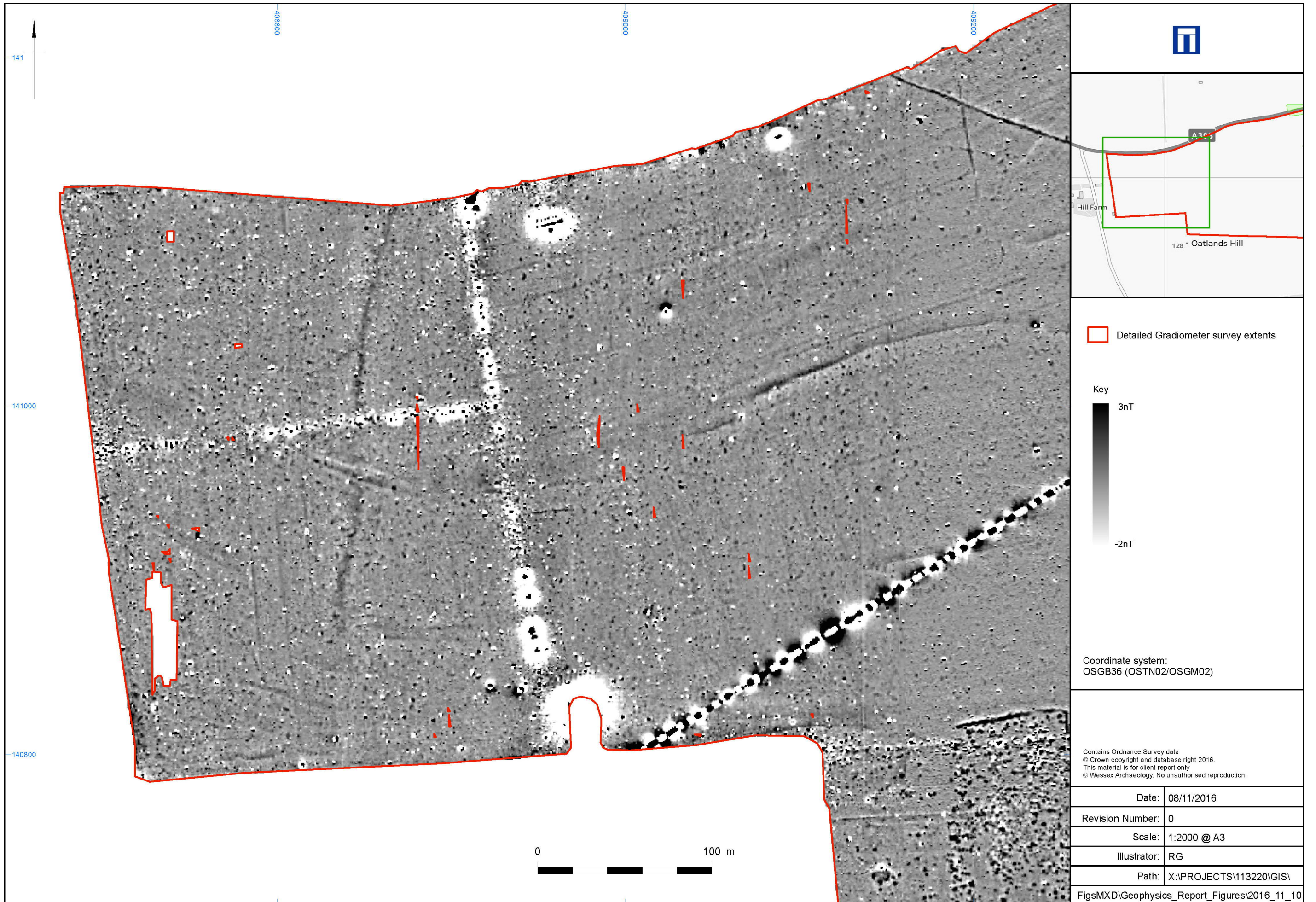


- Detailed Gradiometer survey extents
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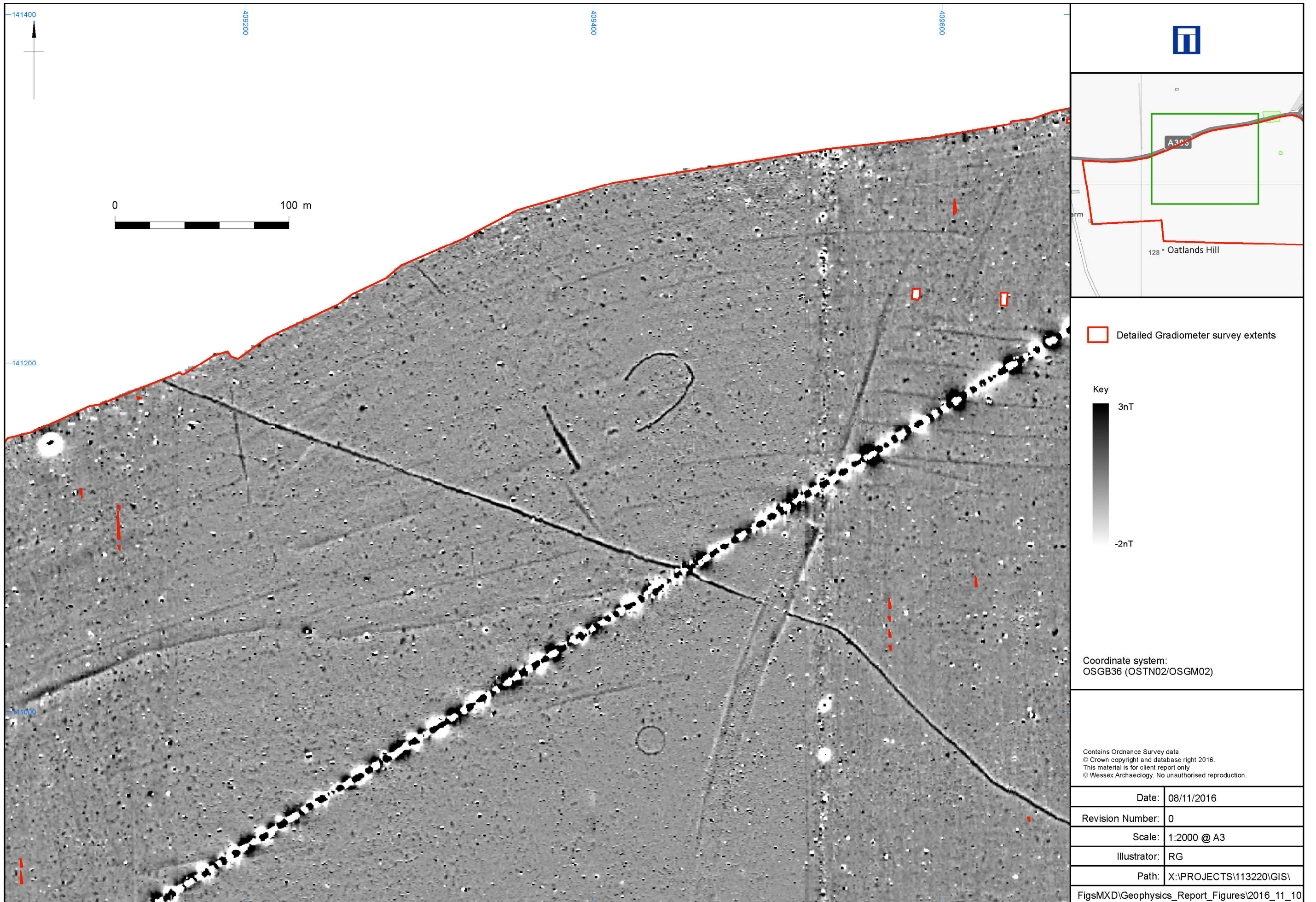
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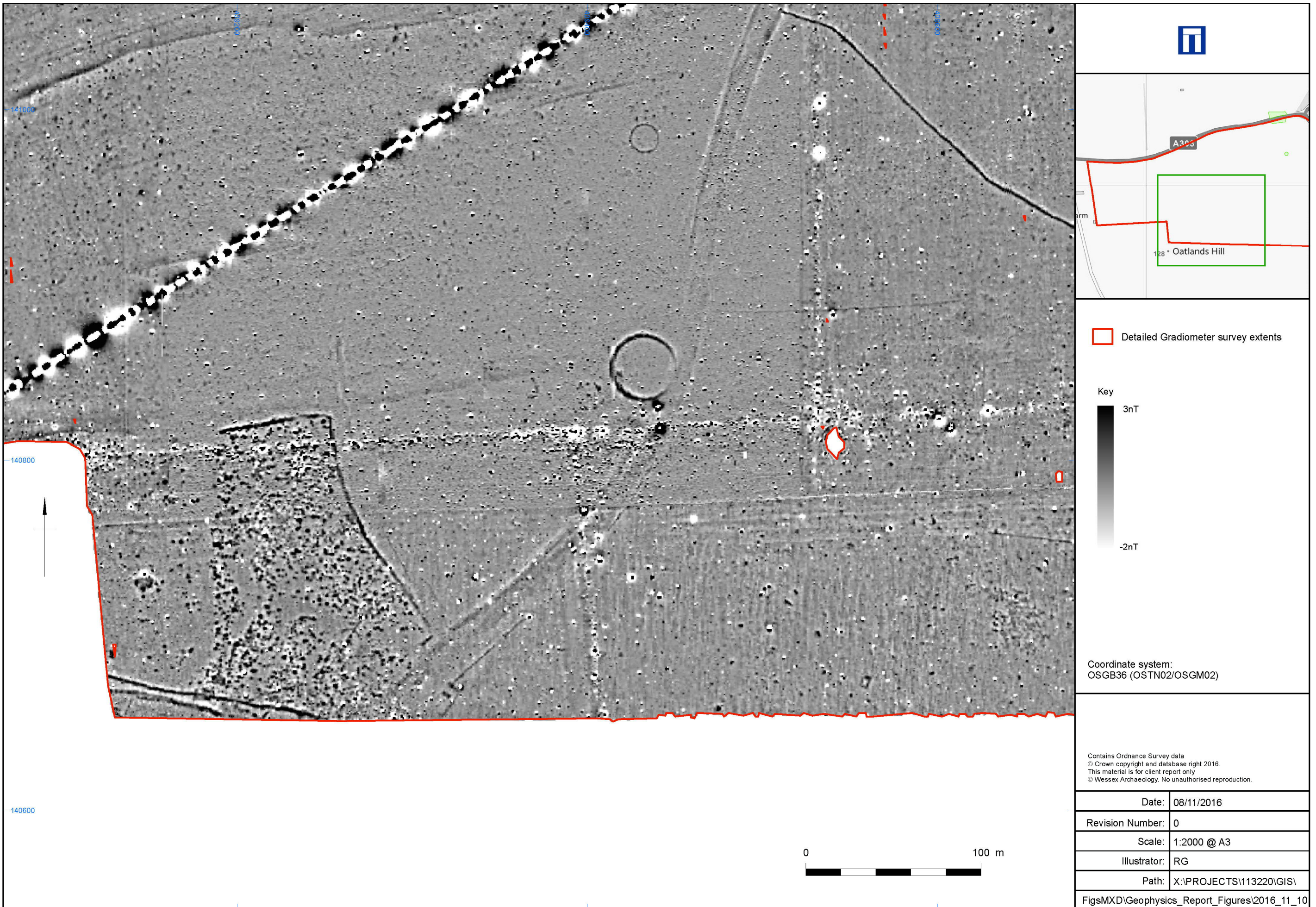


SW3 west: Greyscale plot

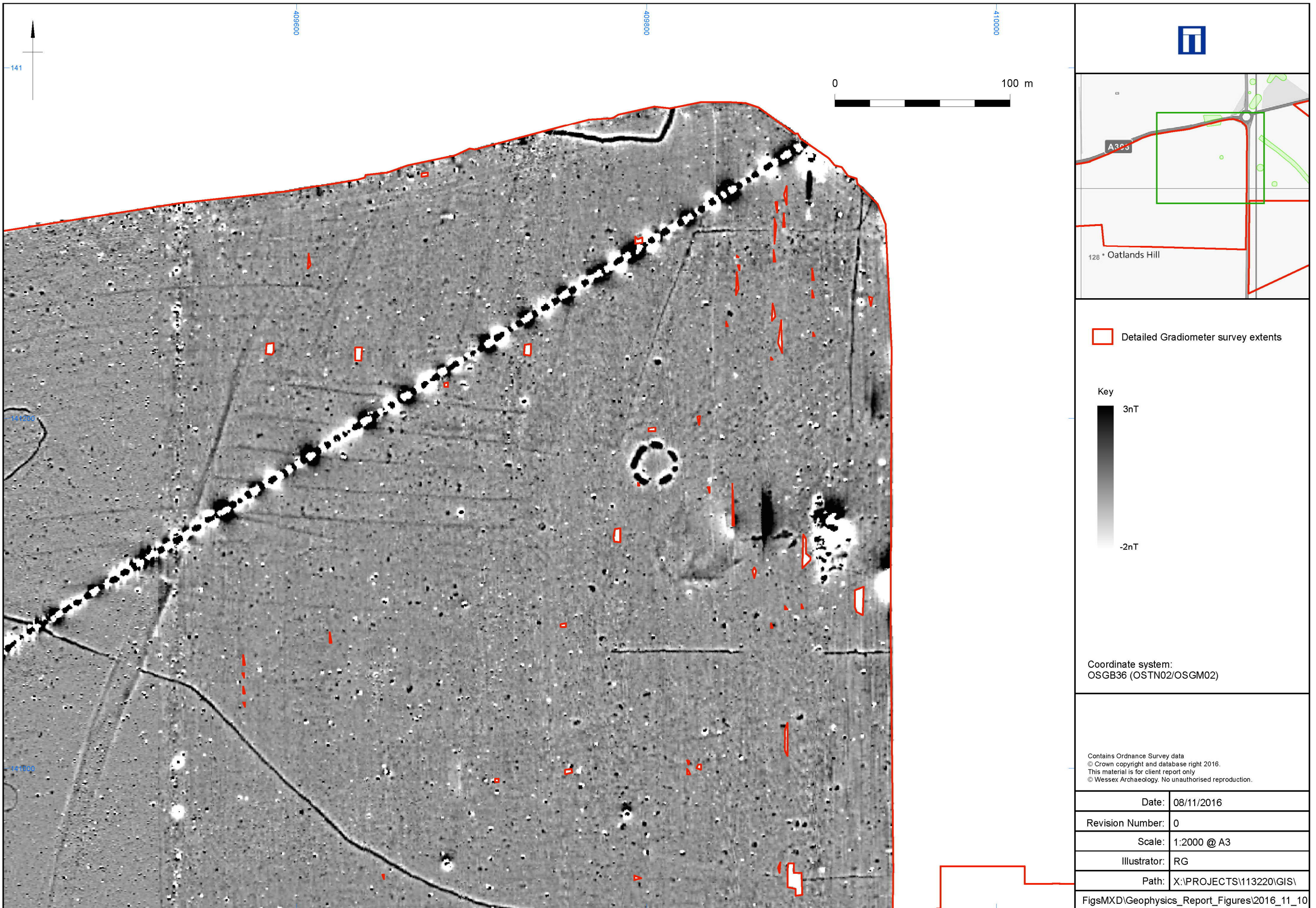
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SW3 north central: Greyscale plot

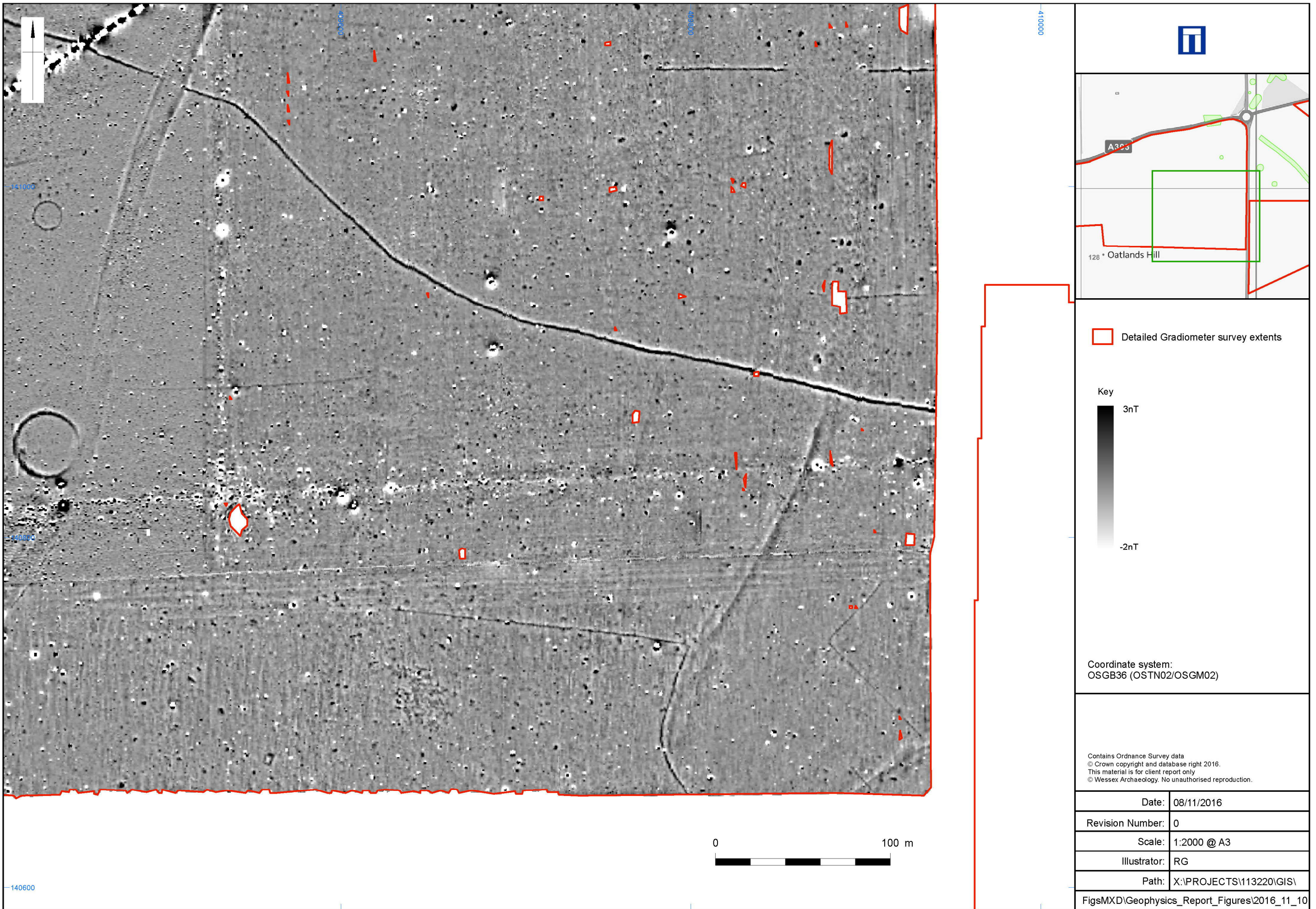


SW3 south central: Greyscale plot



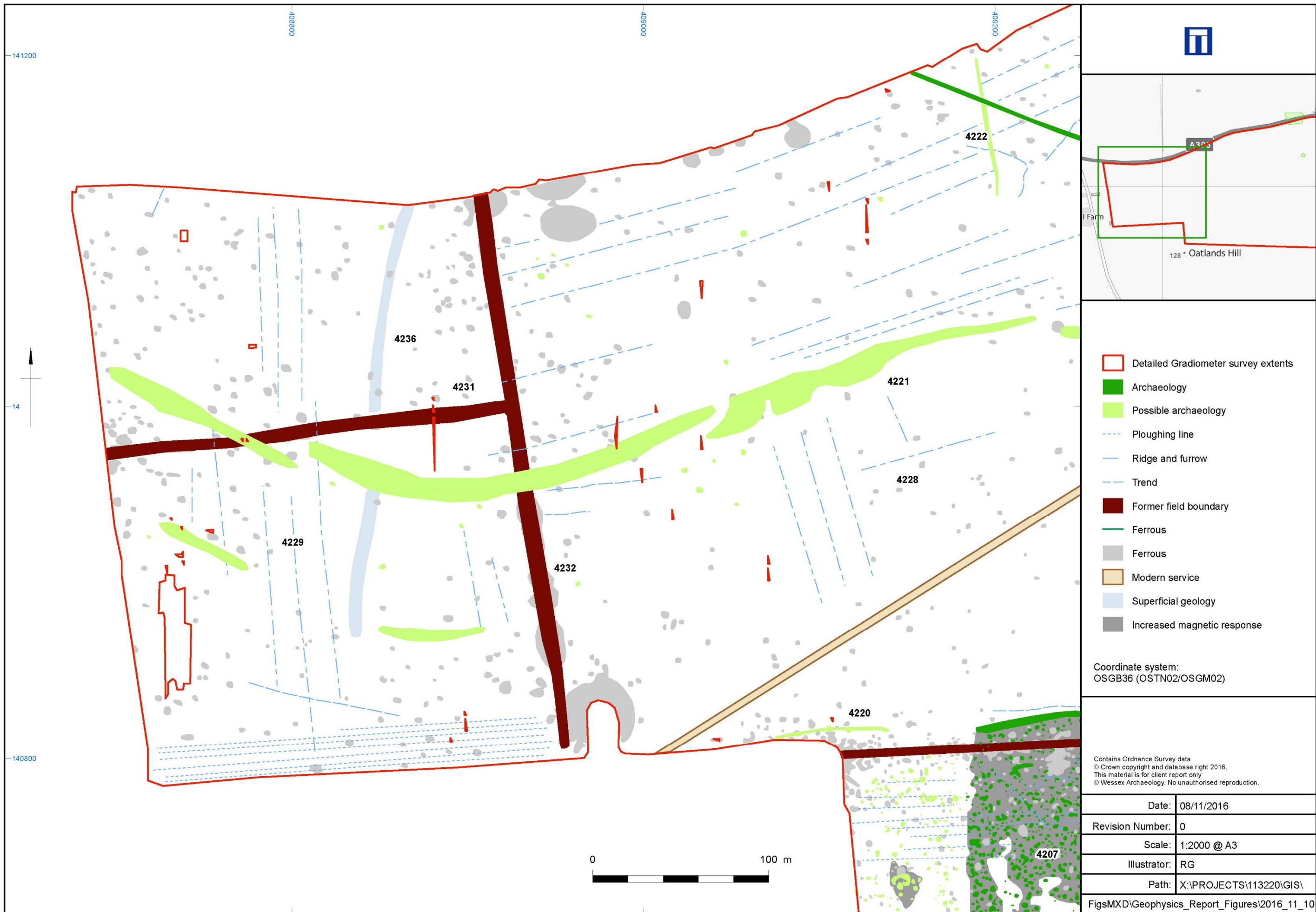
SW3 north east: Greyscale plot

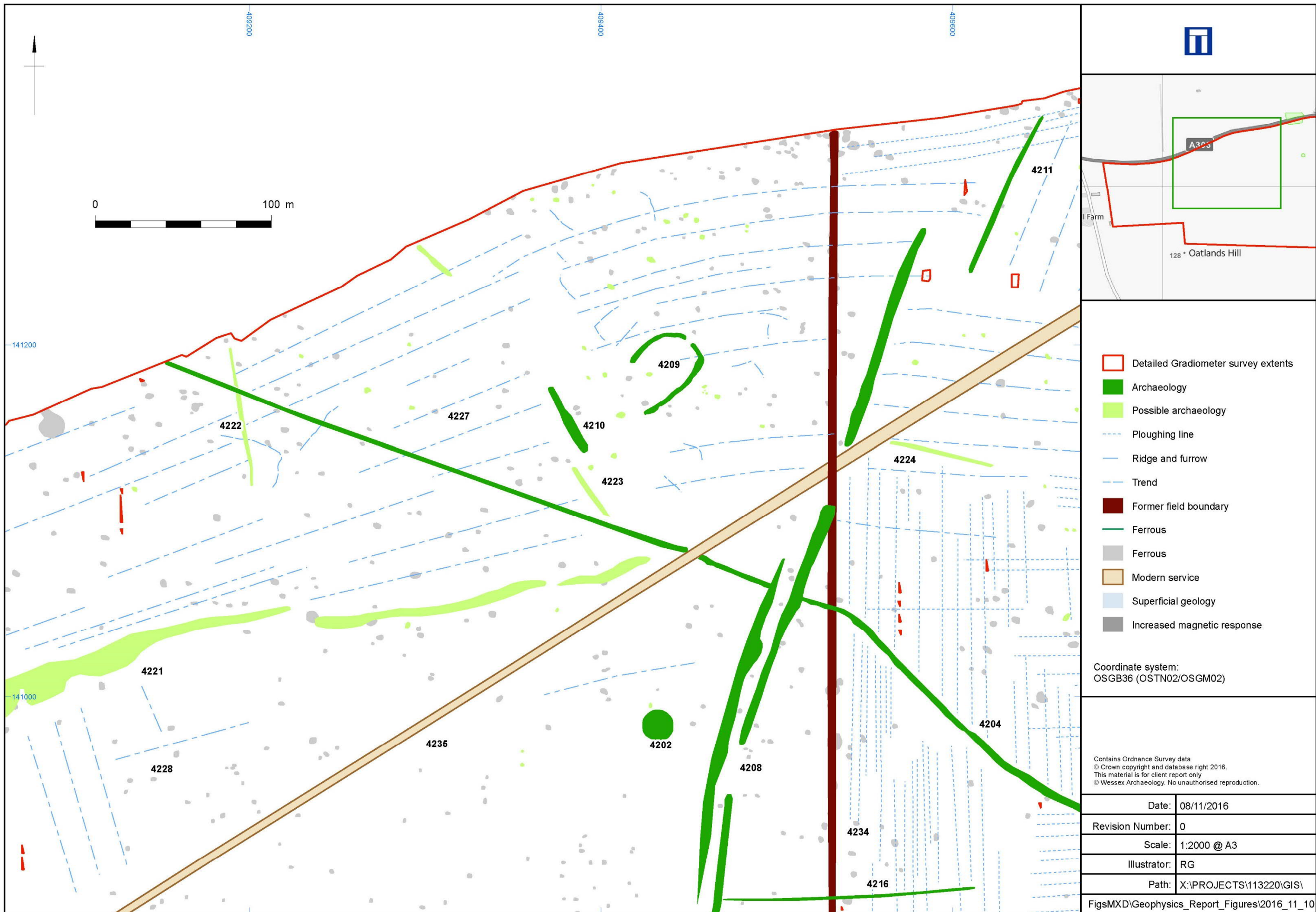
Figure 11



SW3 south east: Greyscale plot

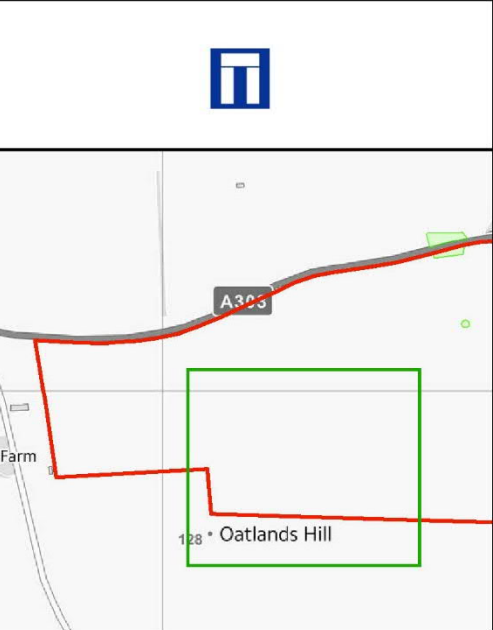
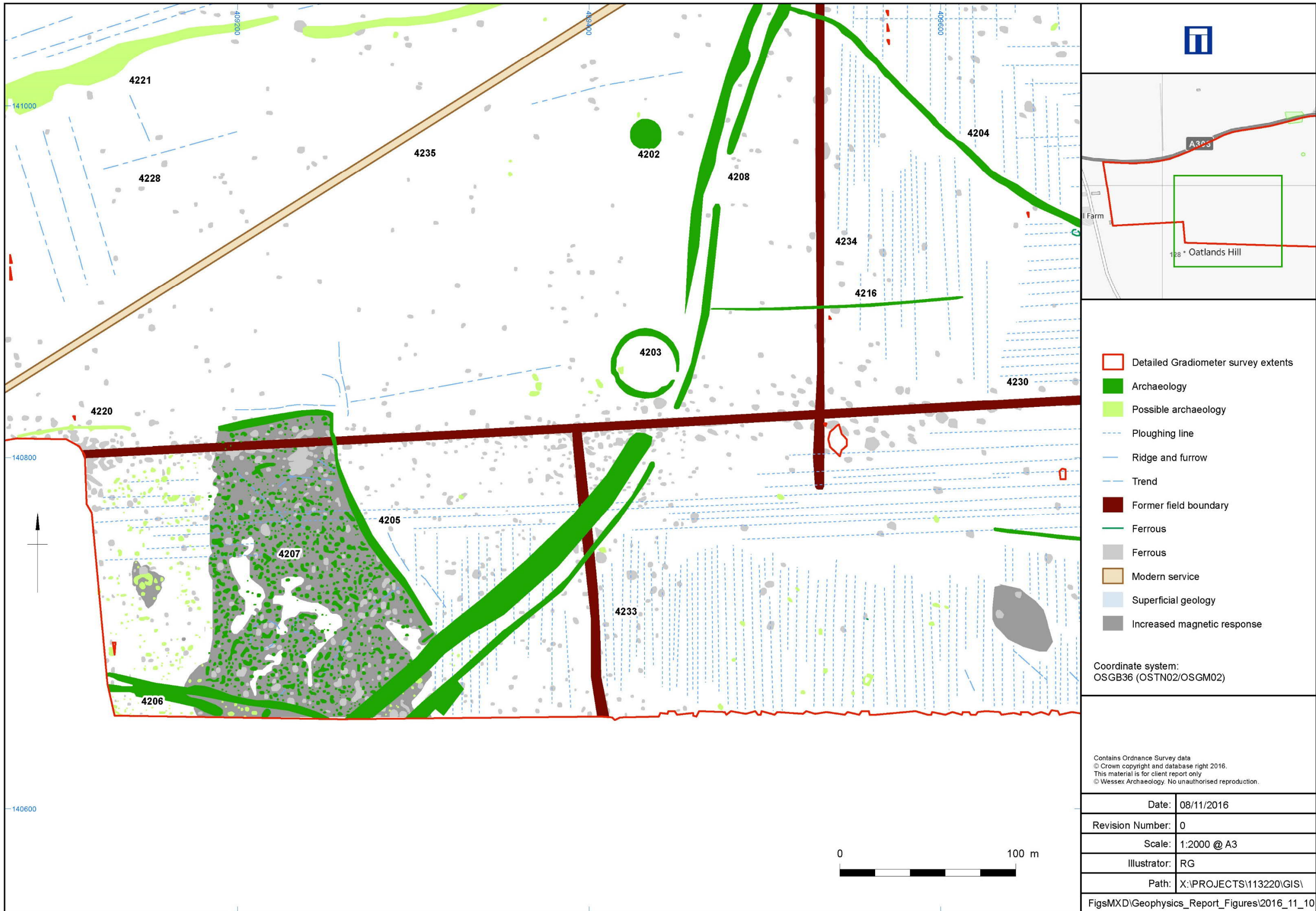
Figure 12





SW3 north central: Interpretation

Figure 14

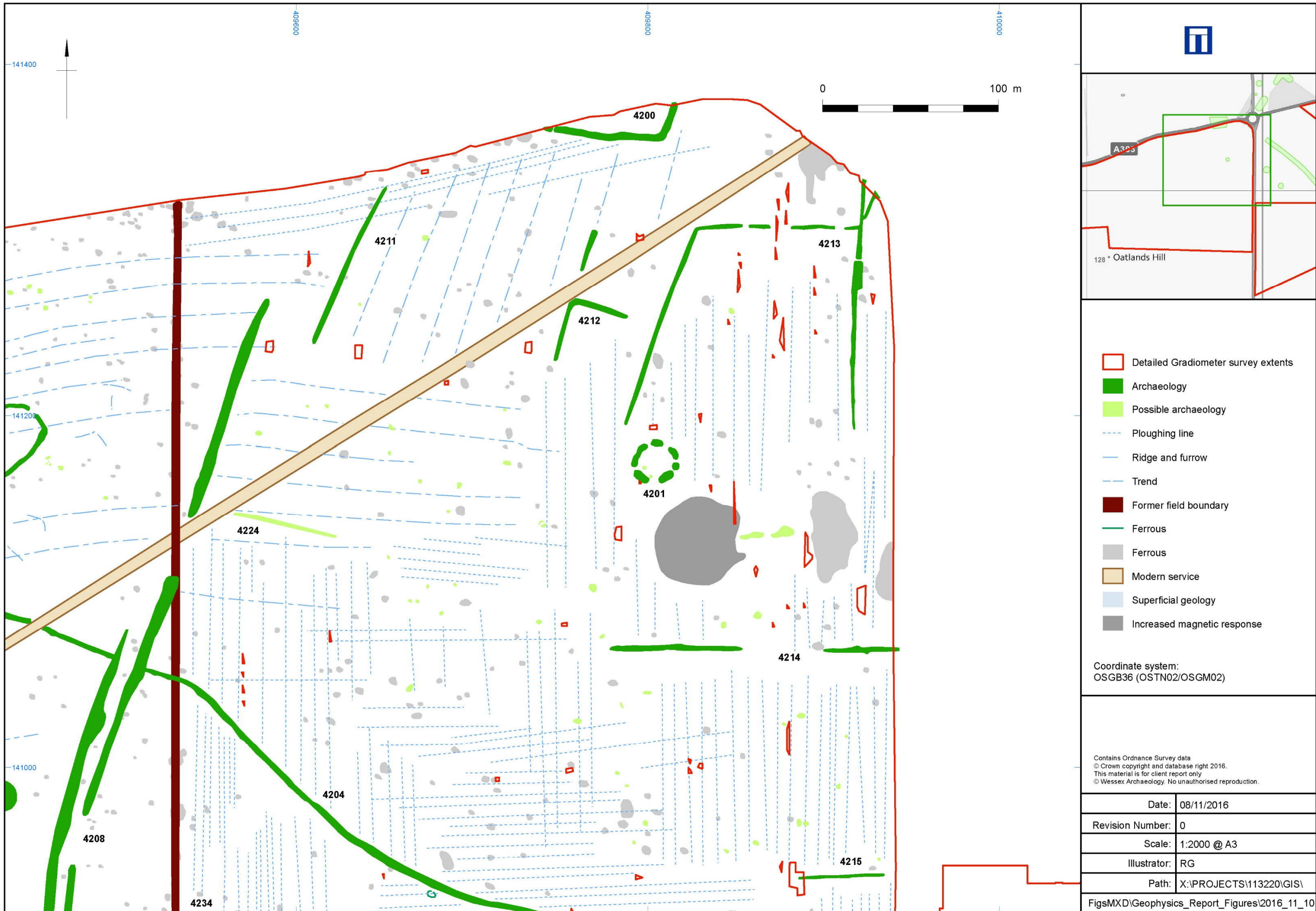


▭ Detailed Gradiometer survey extents
▭ Archaeology
▭ Possible archaeology
--- Ploughing line
--- Ridge and furrow
--- Trend
▭ Former field boundary
▭ Ferrous
▭ Ferrous
▭ Modern service
▭ Superficial geology
▭ Increased magnetic response

Coordinate system:
 OSGB36 (OSTN02/OSGM02)

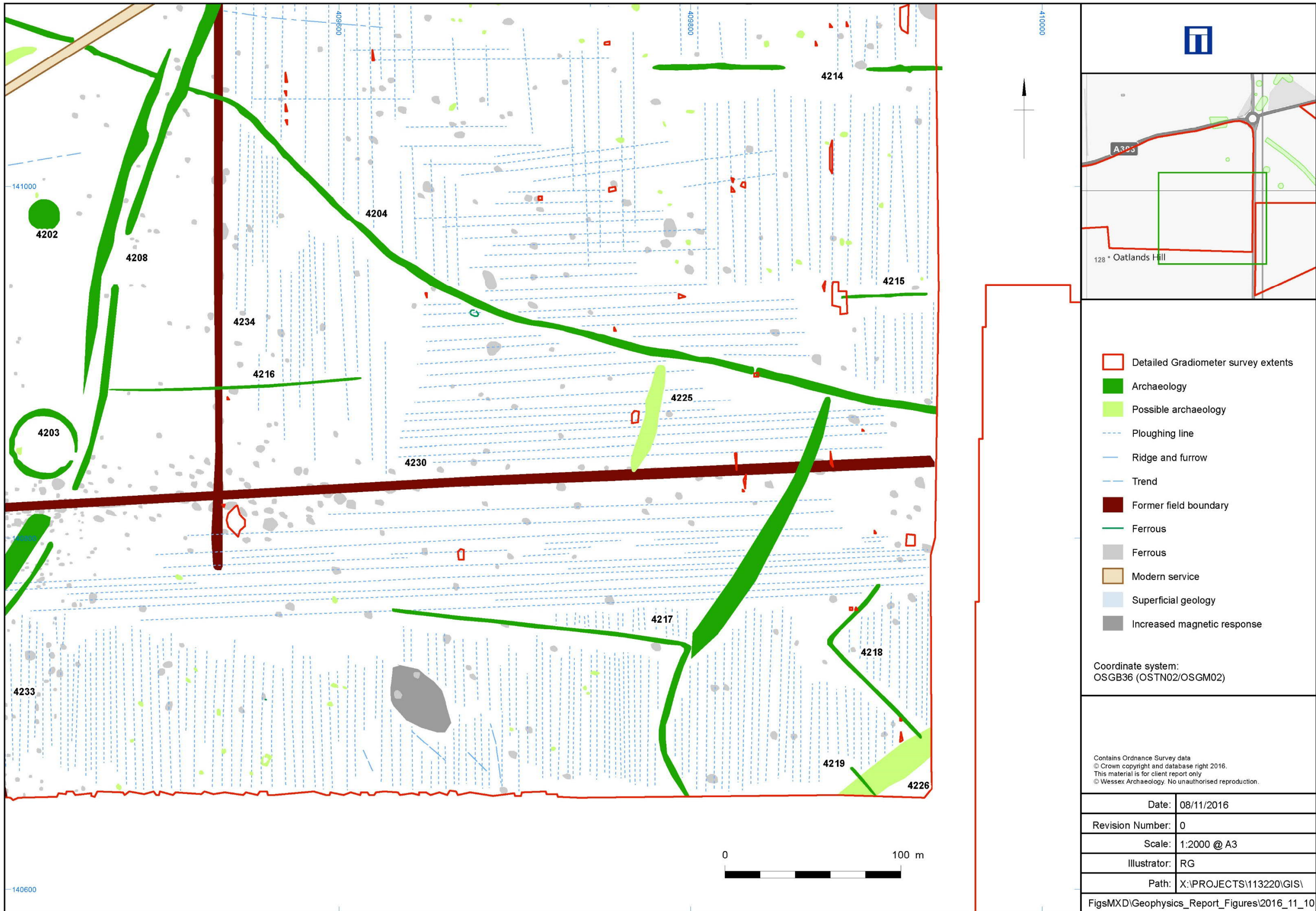
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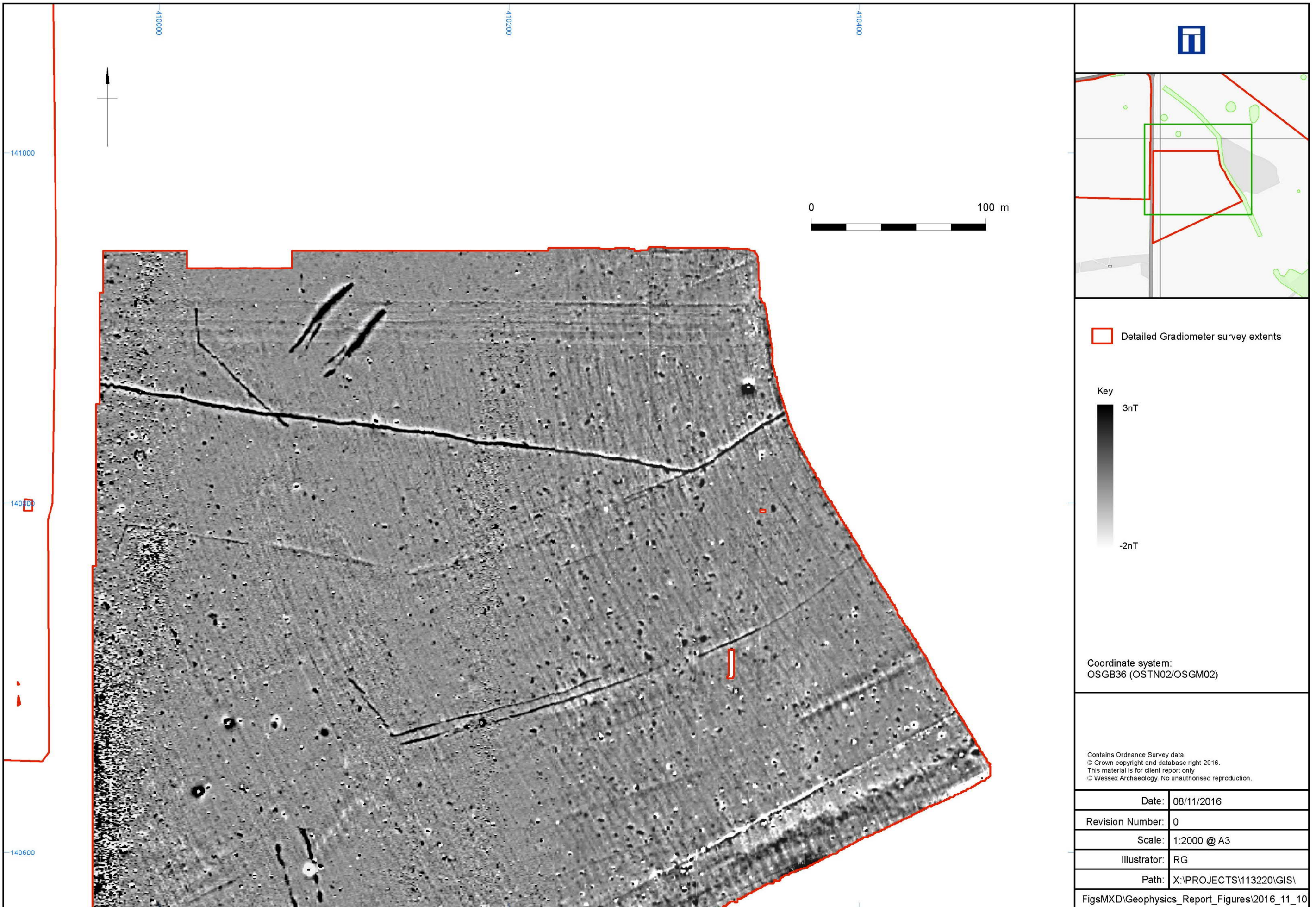
SW3 north east: Interpretation

Figure 16



SW3 south east: Interpretation

Figure 17



SW2 north: Greyscale plot

Figure 18



SW2 south: Greyscale plot



- Detailed Gradiometer survey extents
- Archaeology
- Possible archaeology
- Former field boundary
- Modern service
- Ridge and furrow
- Ploughing
- Trend
- Ferrous
- Increased magnetic response
- Superficial geology

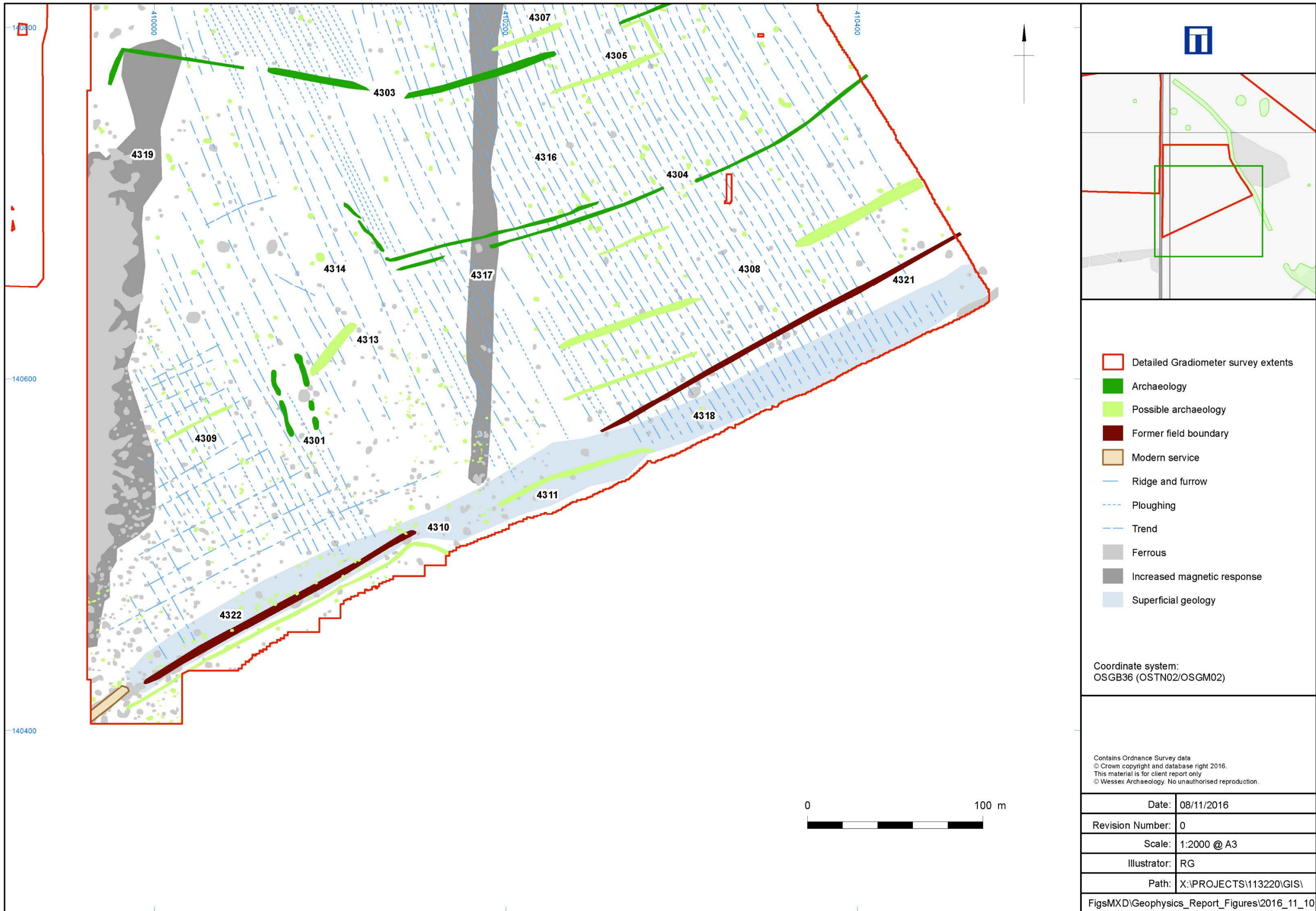
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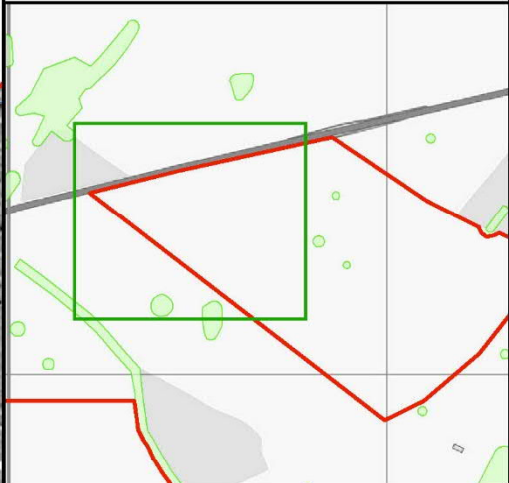
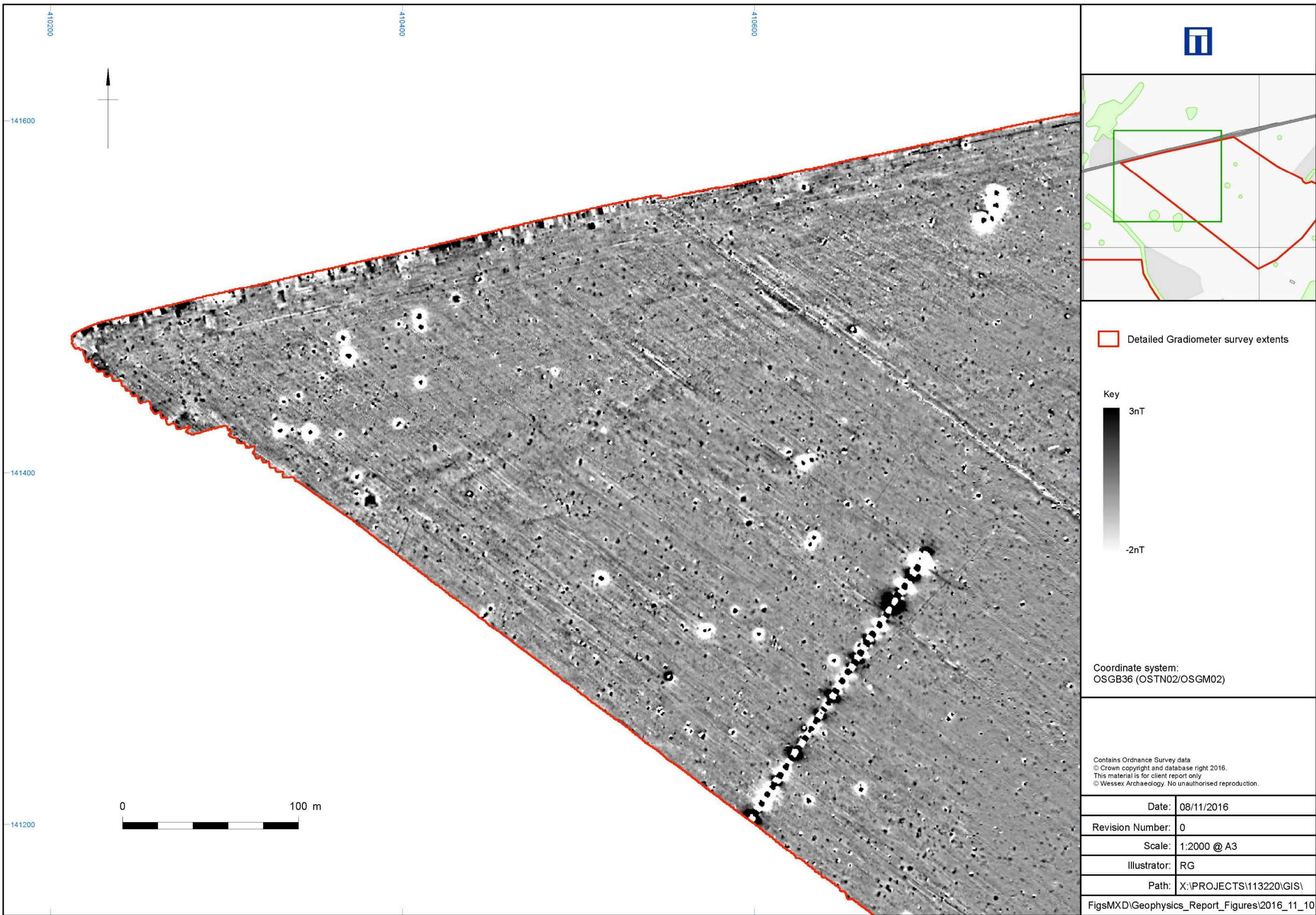
SW2 north: Interpretation


Figure 20



SW2 south: Interpretation

Figure 21



 Detailed Gradiometer survey extents



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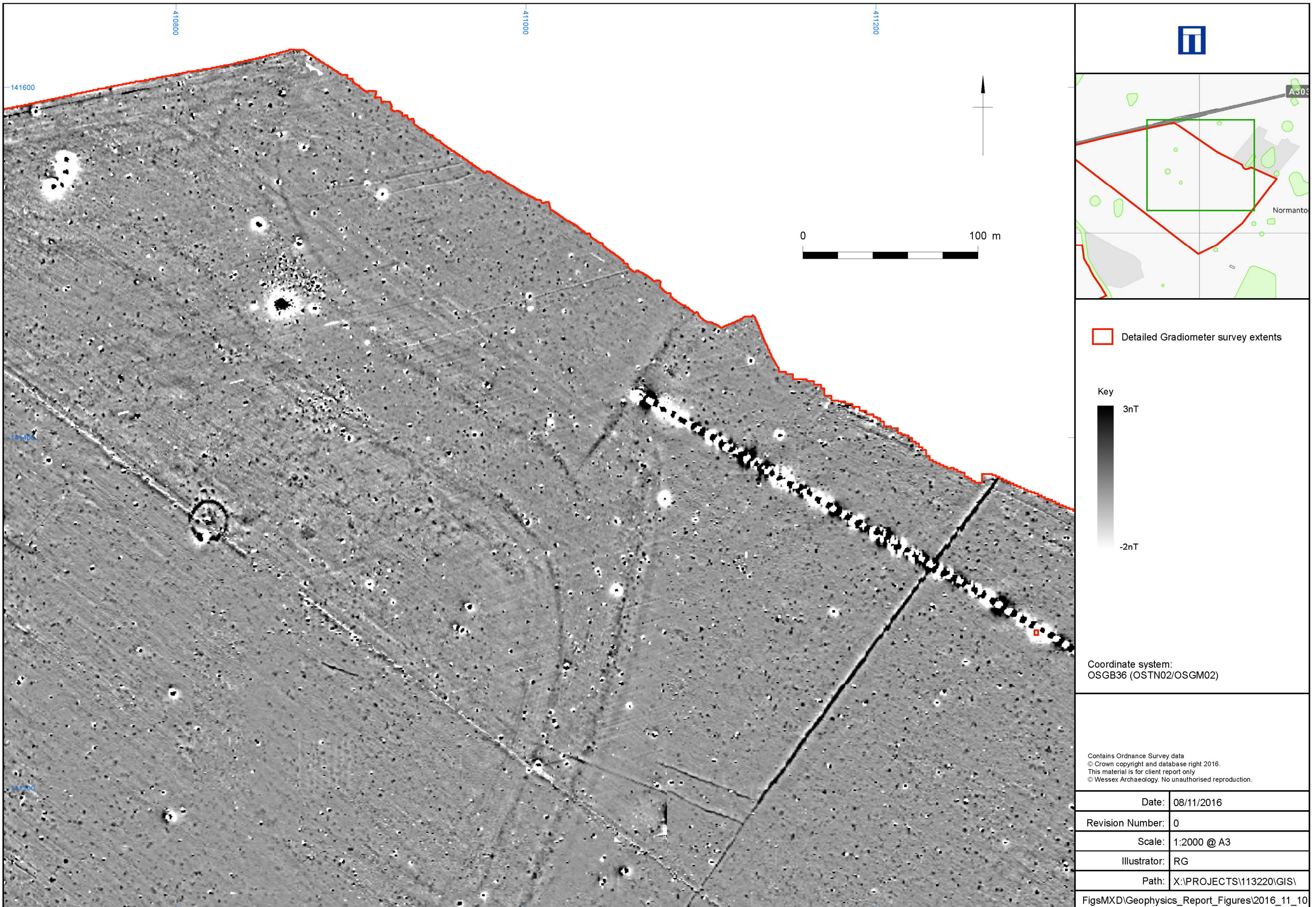
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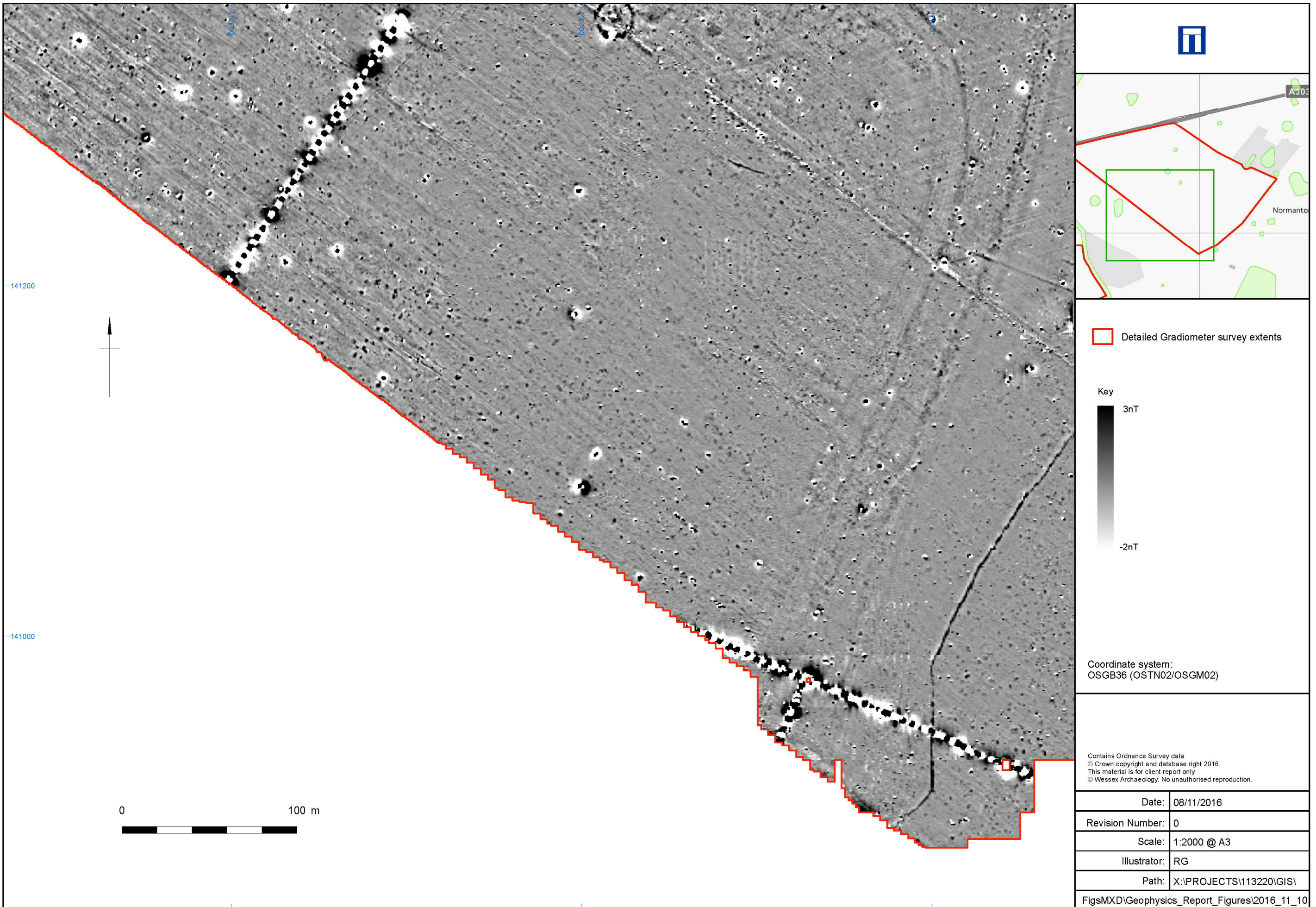
SW1 north west: Greyscale plot

Figure 22



SW1 north east: Greyscale plot

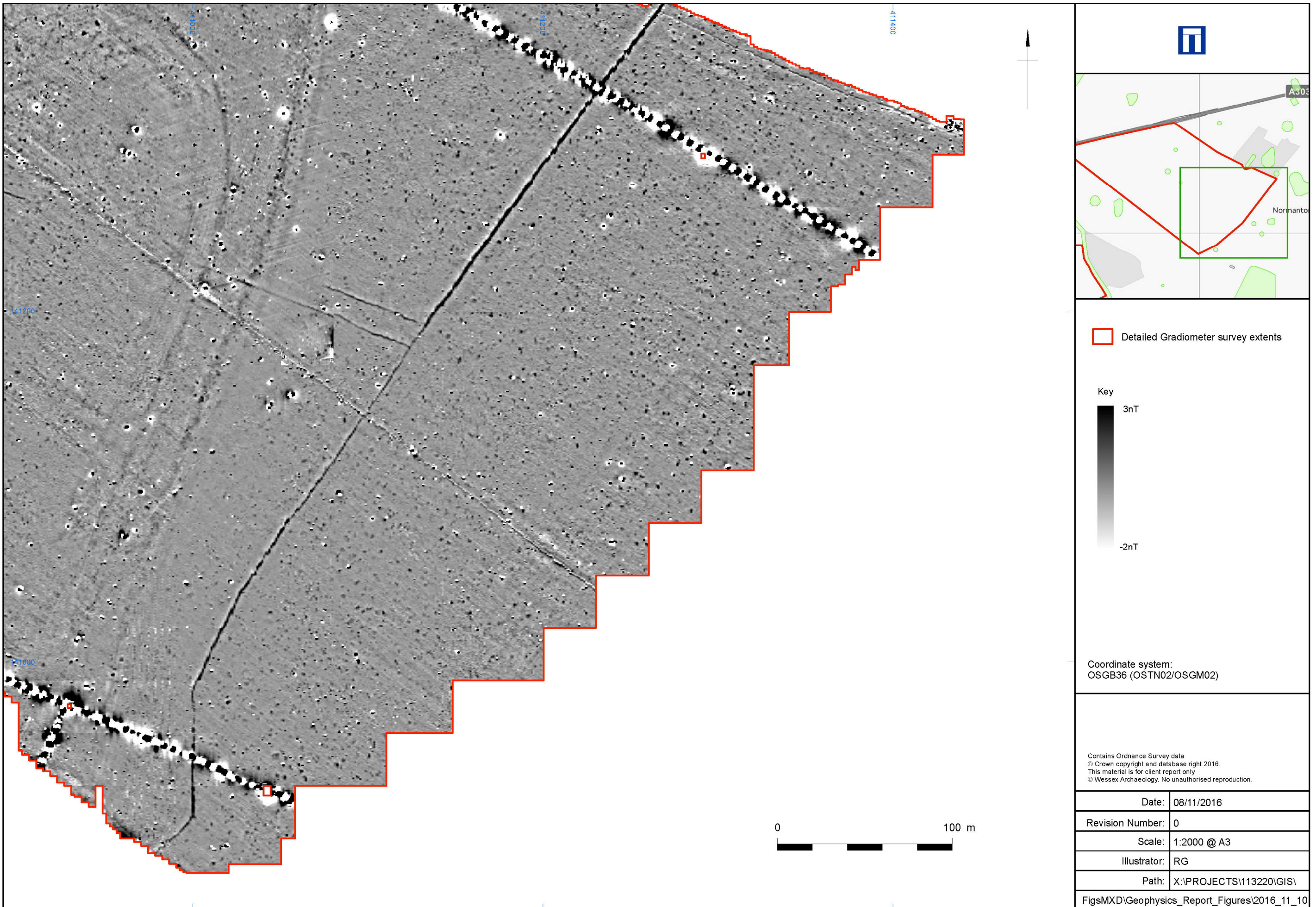
Figure 23



SW1 south west: Greyscale plot

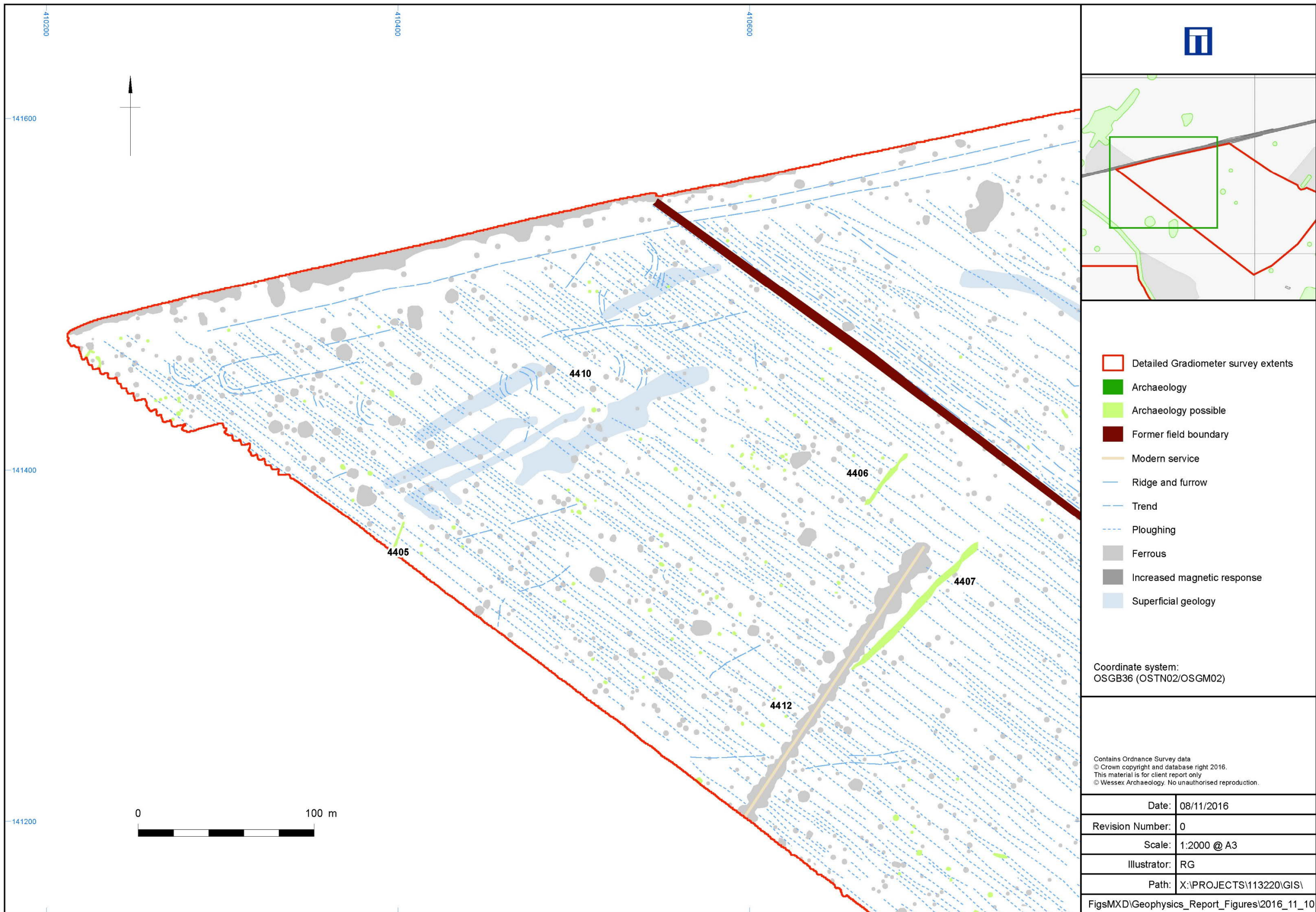
Figure 24

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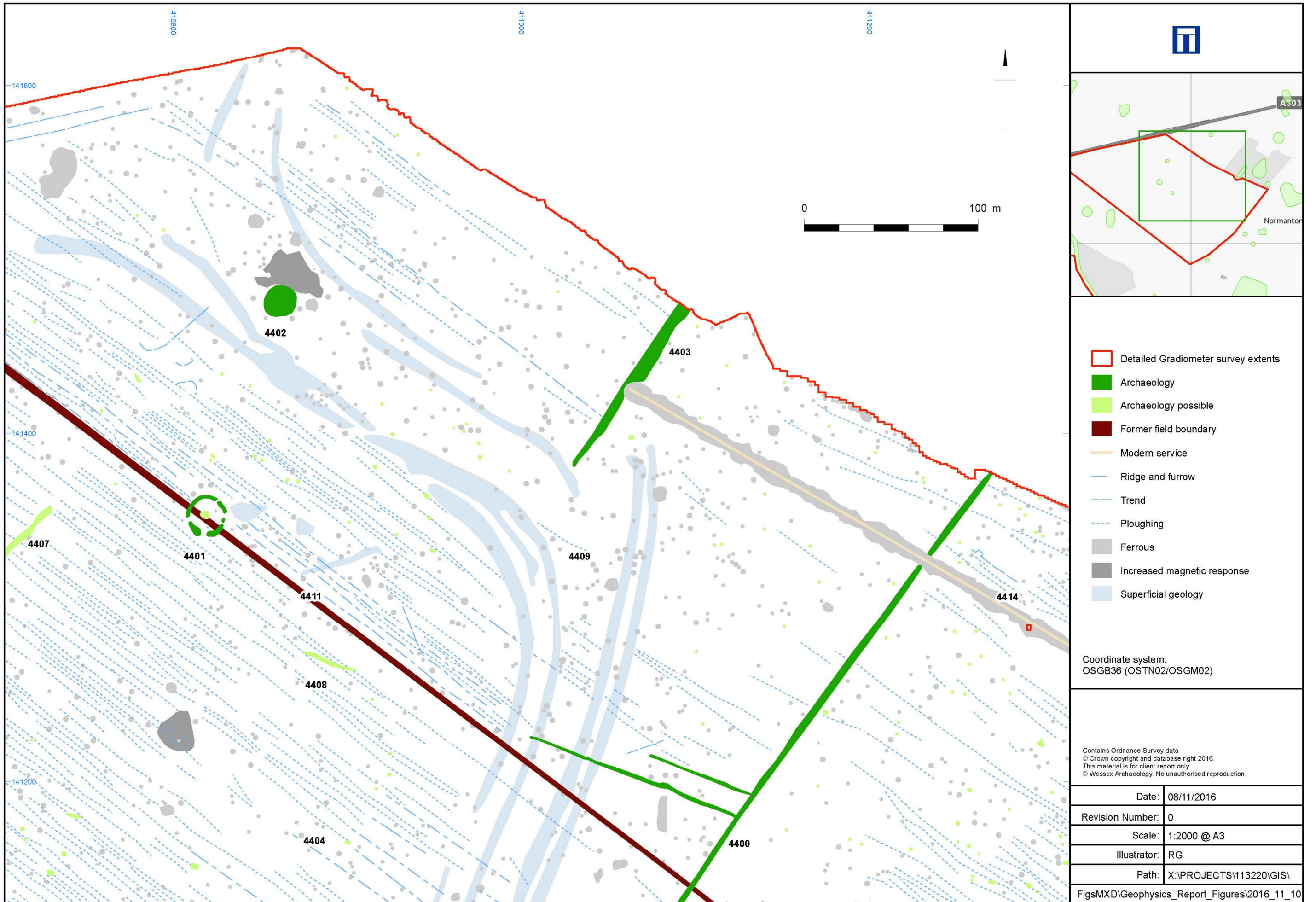
SW1 south east: Greyscale plot

Figure 25



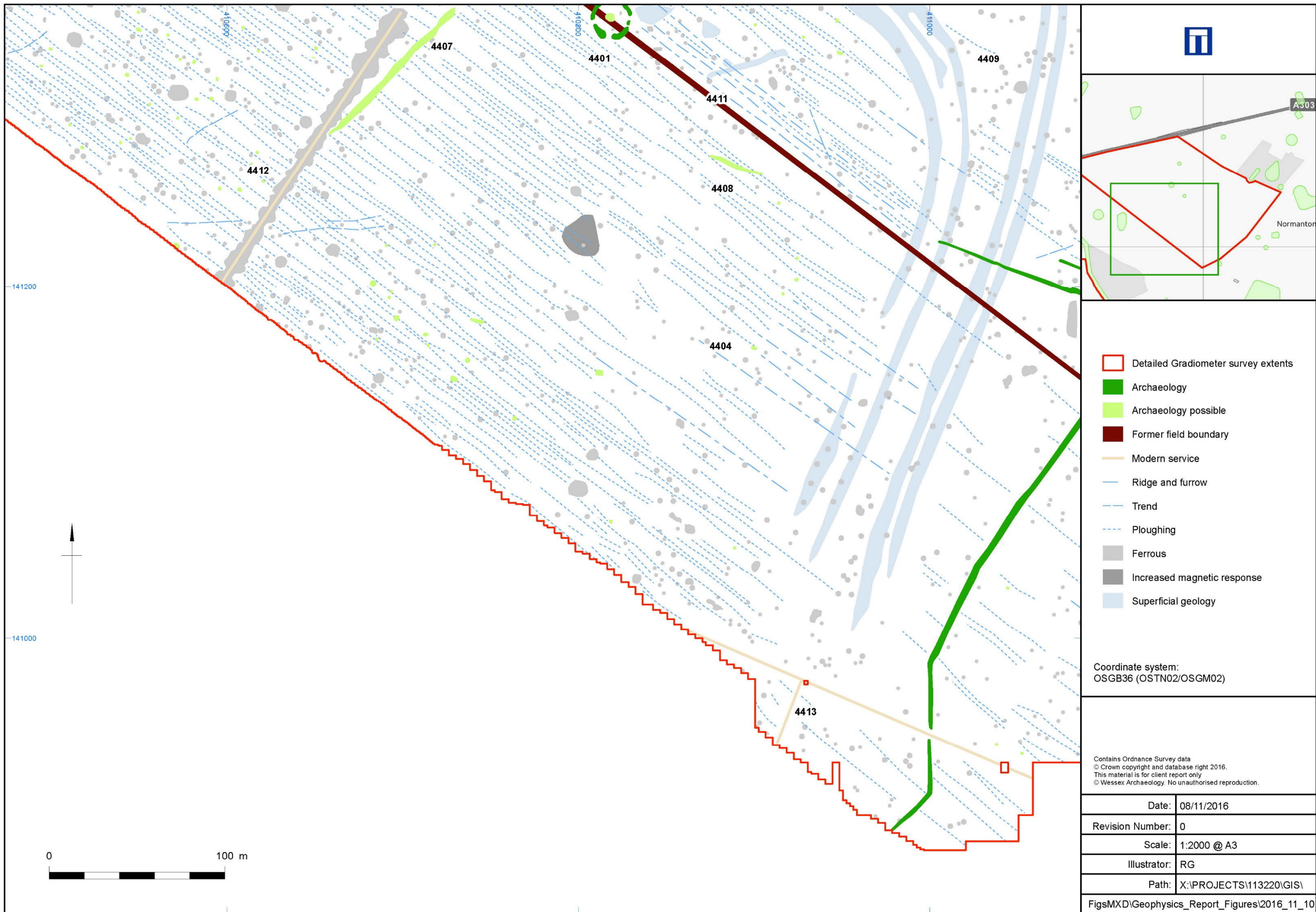
SW1 north west: Interpretation

Figure 26



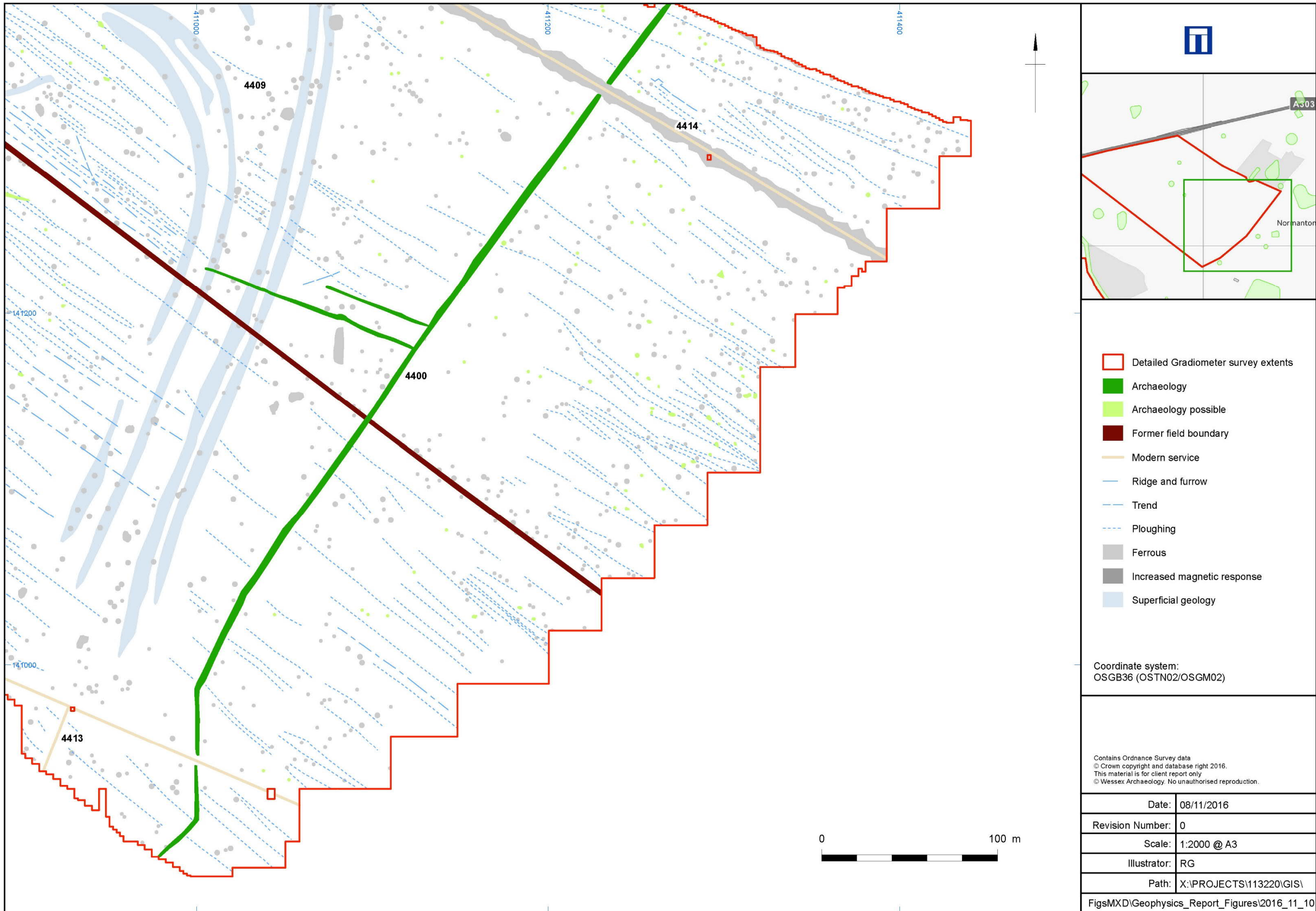
SW1 north east: Interpretation

Figure 27



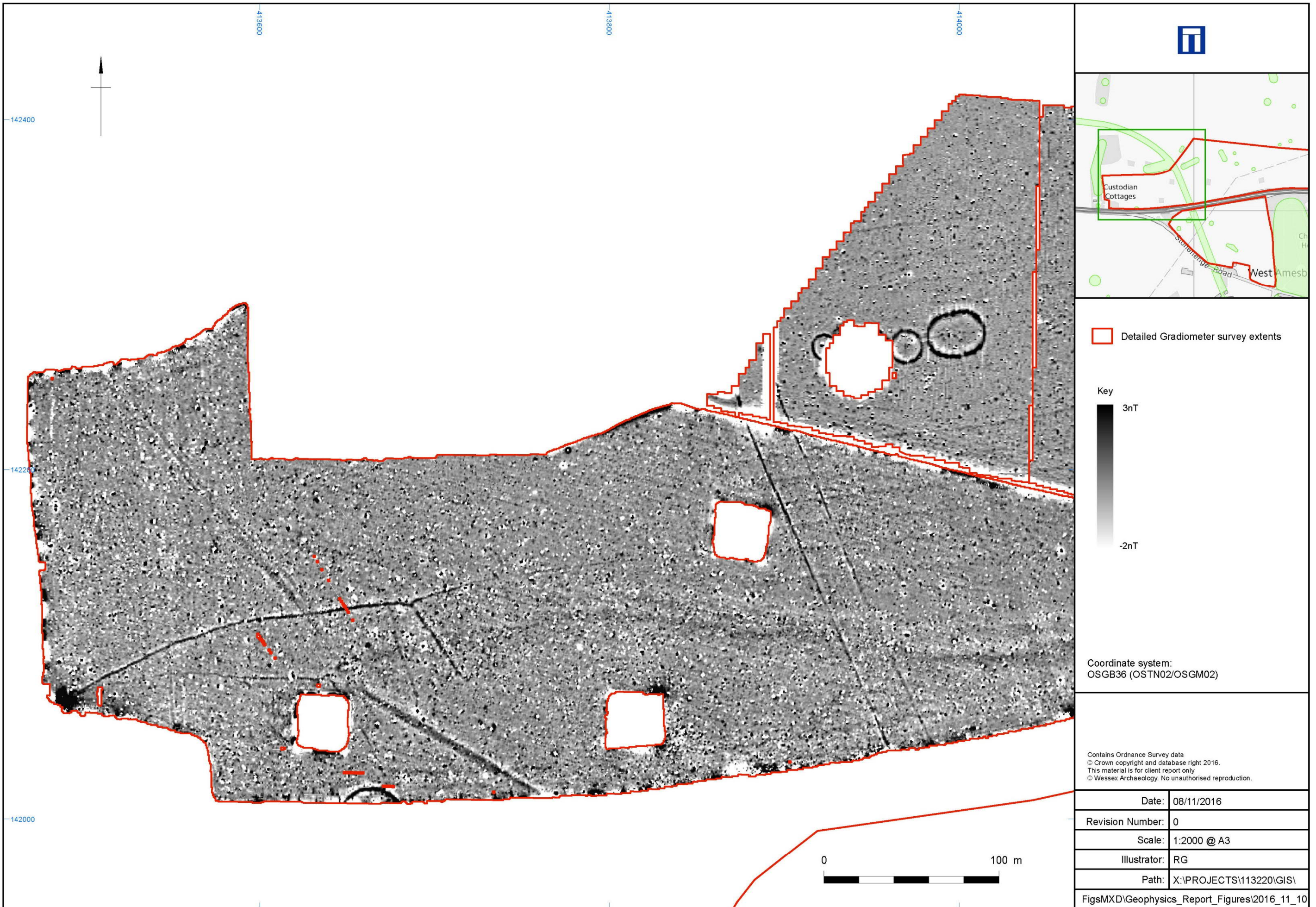
SW1 south west: Interpretation

Figure 28



SW1 south east: Interpretation

Figure 29

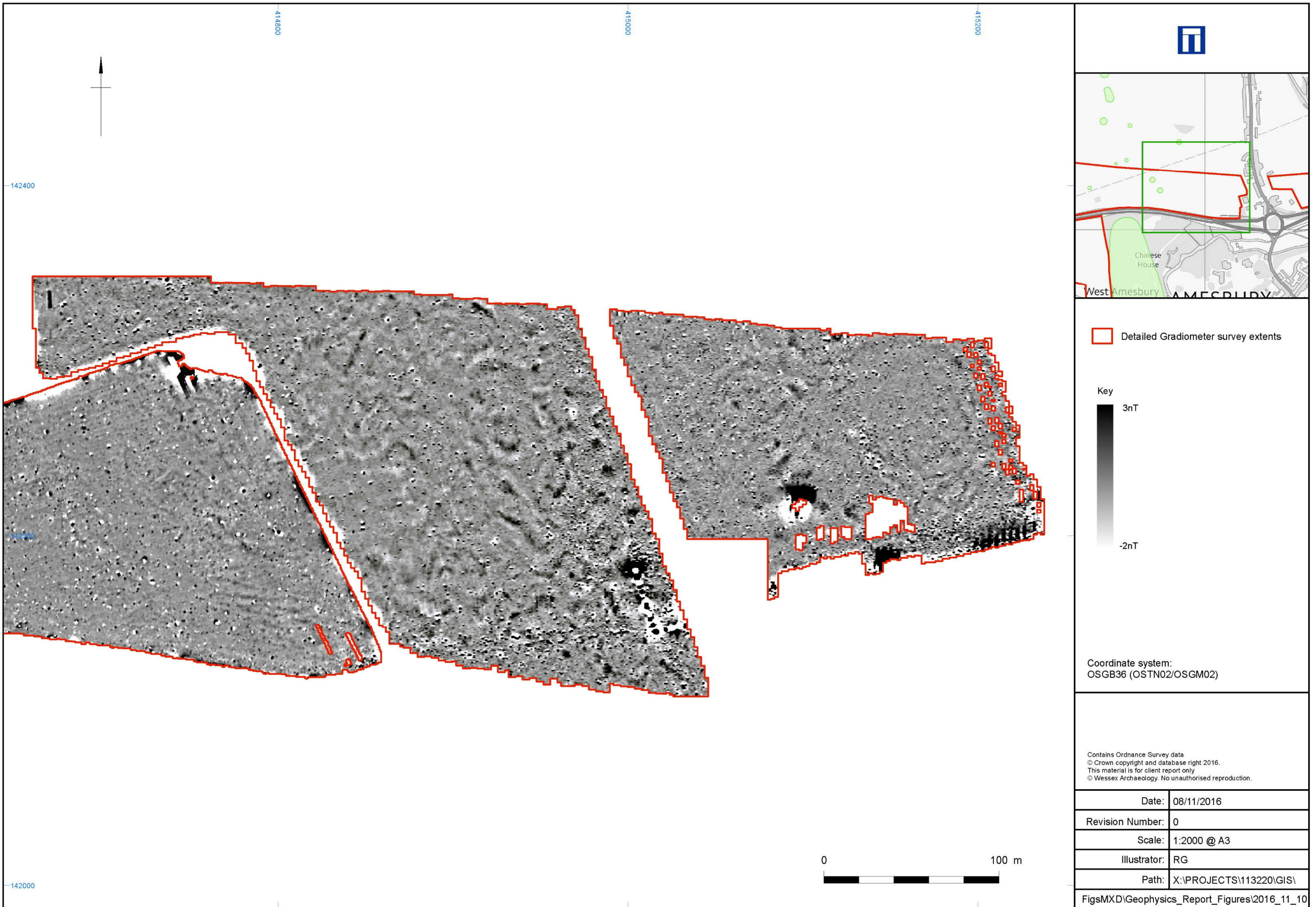


NE2 east: Greyscale plot

Figure 30

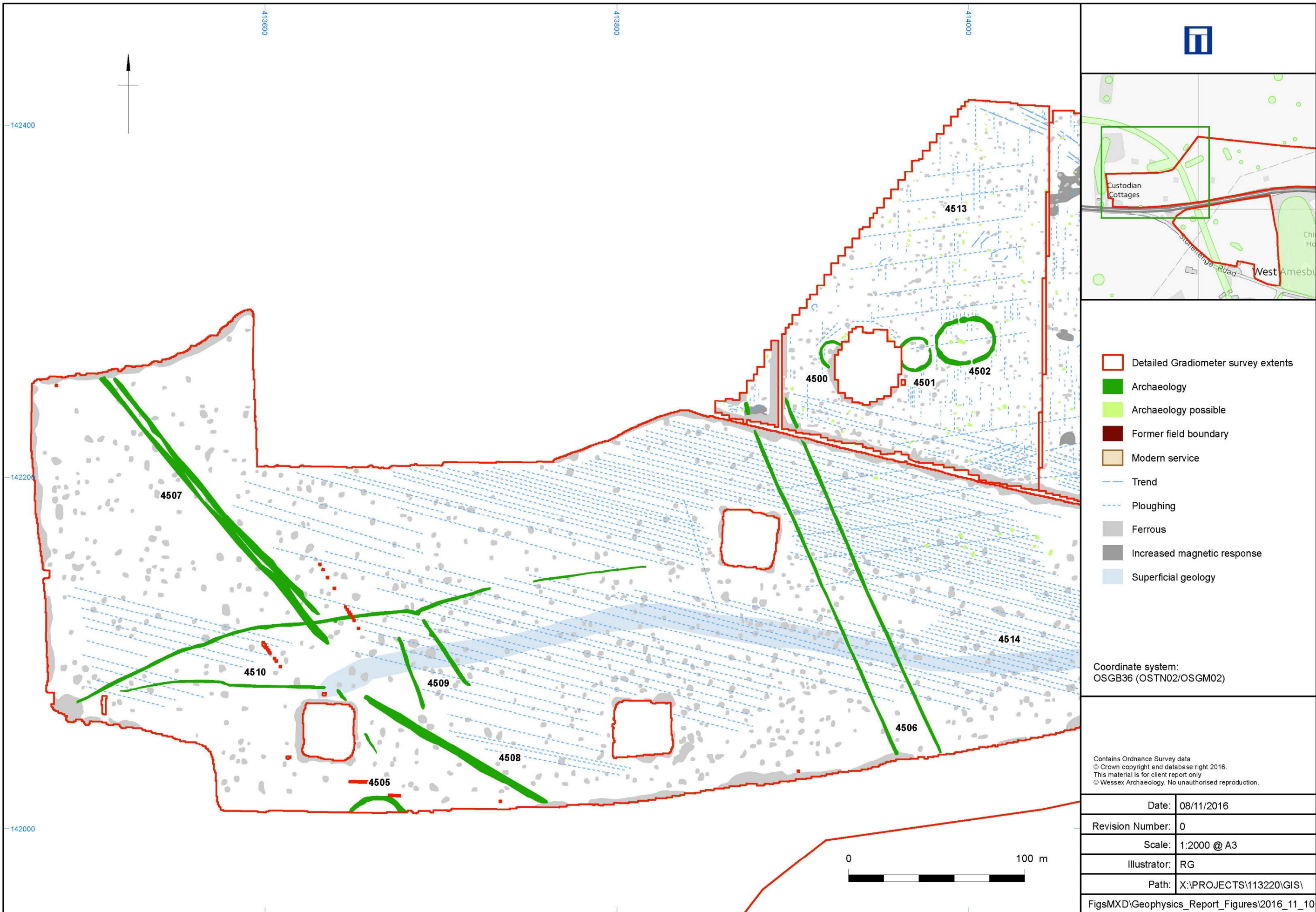


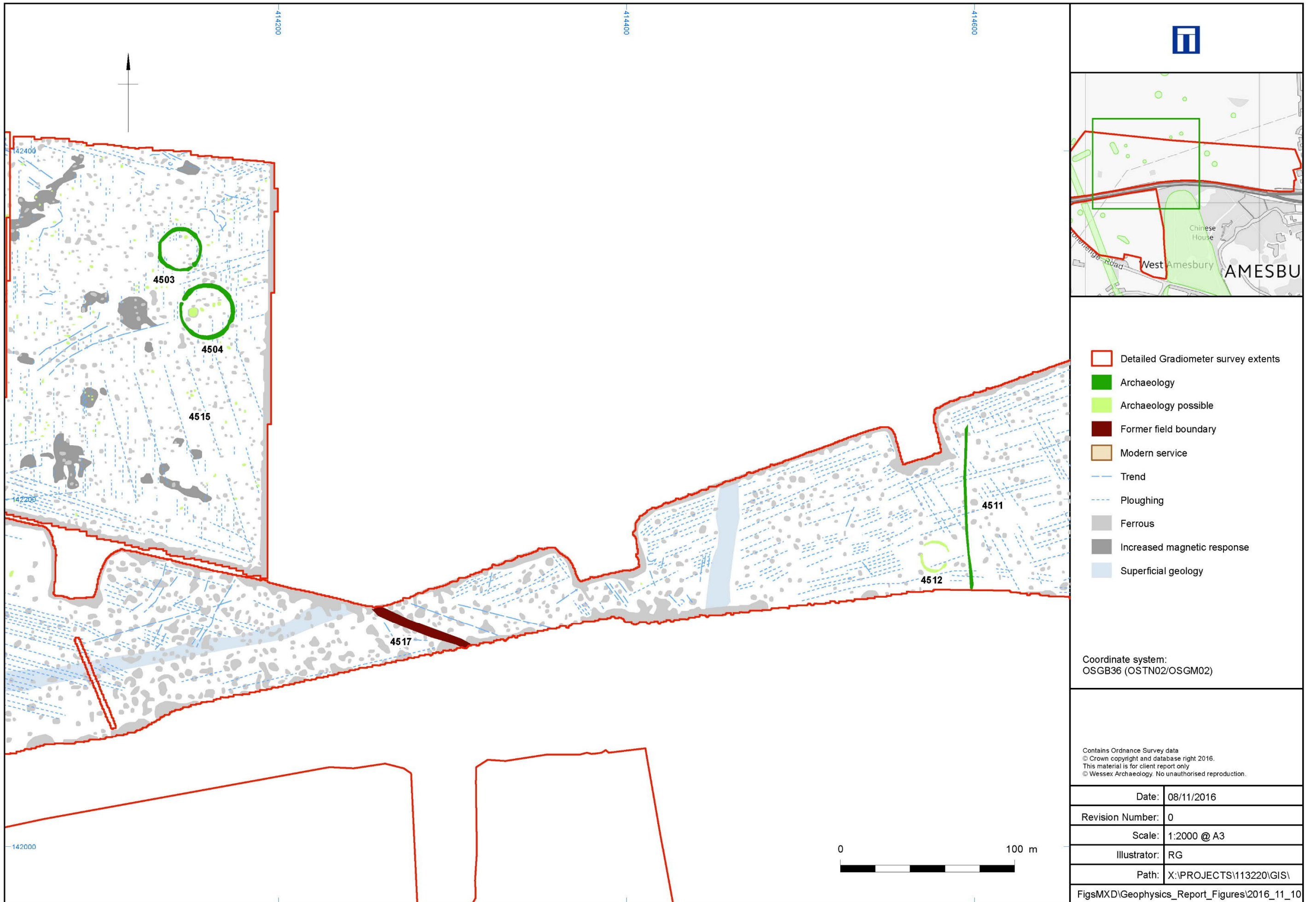
NE2 central: Greyscale plot



NE2 east: Greyscale plot

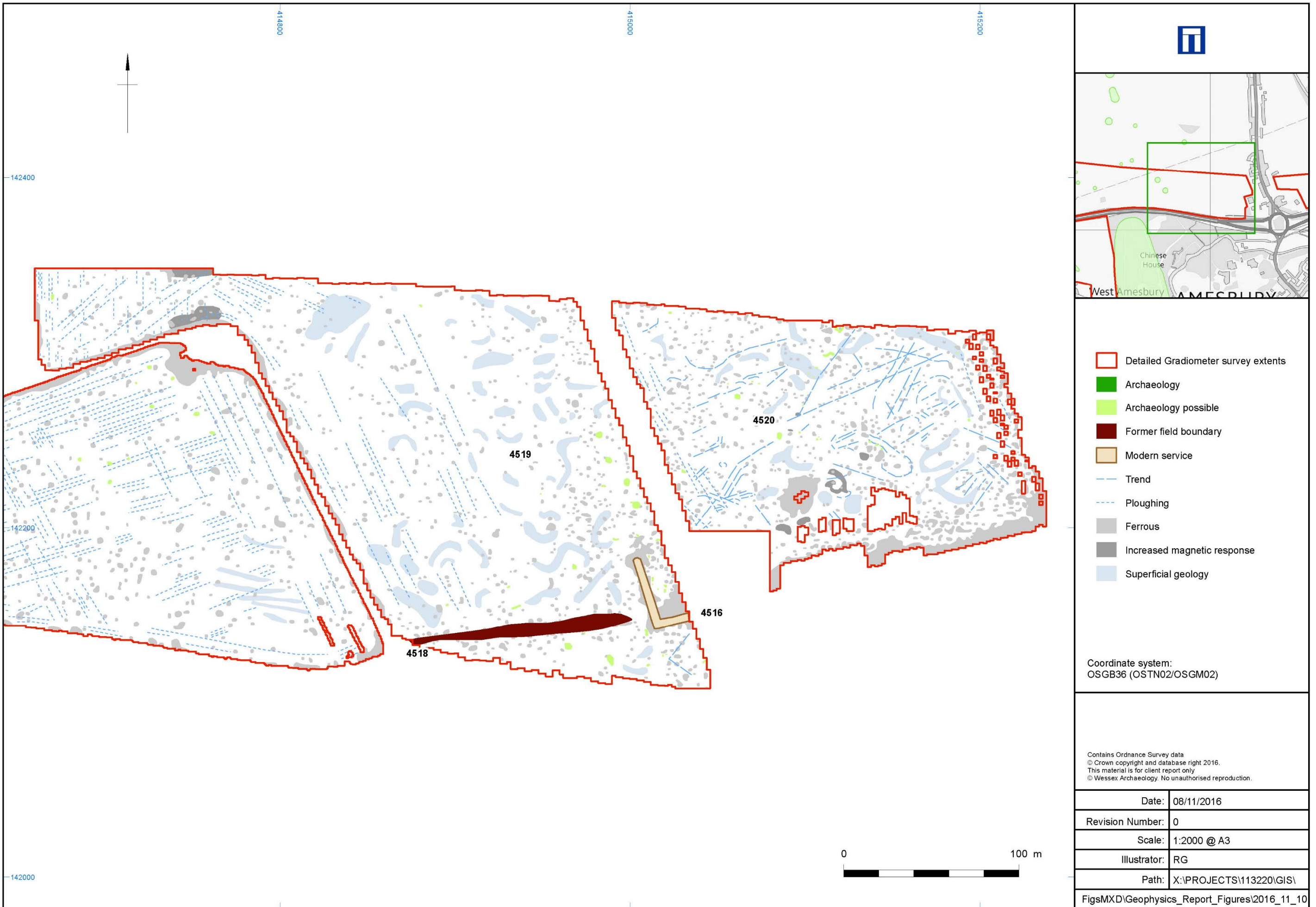
Figure 32





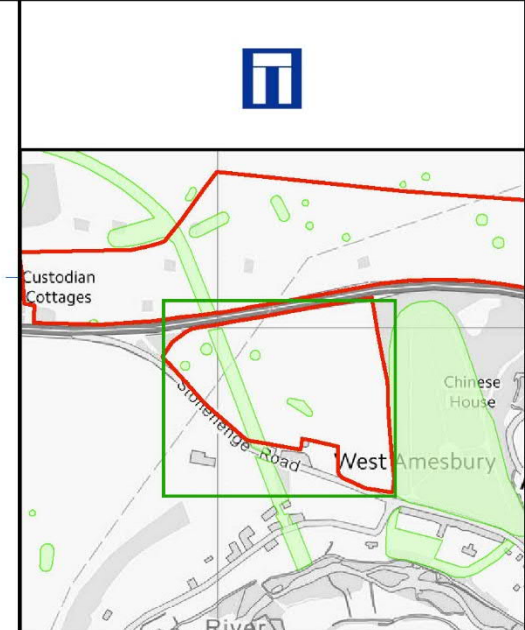
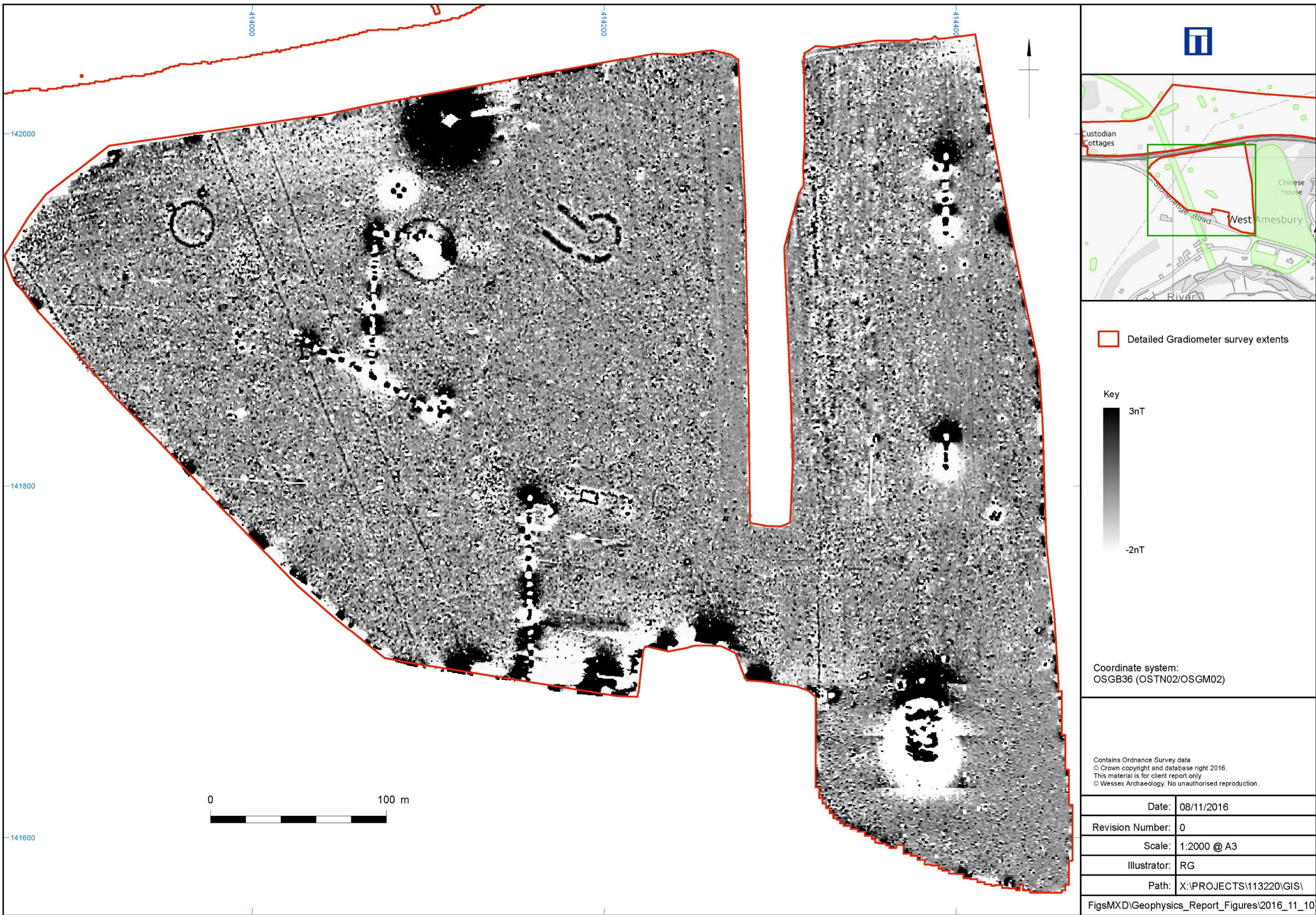
NE2 central: Interpretation

Figure 34



NE2 east: Interpretation

Figure 35



Detailed Gradiometer survey extents



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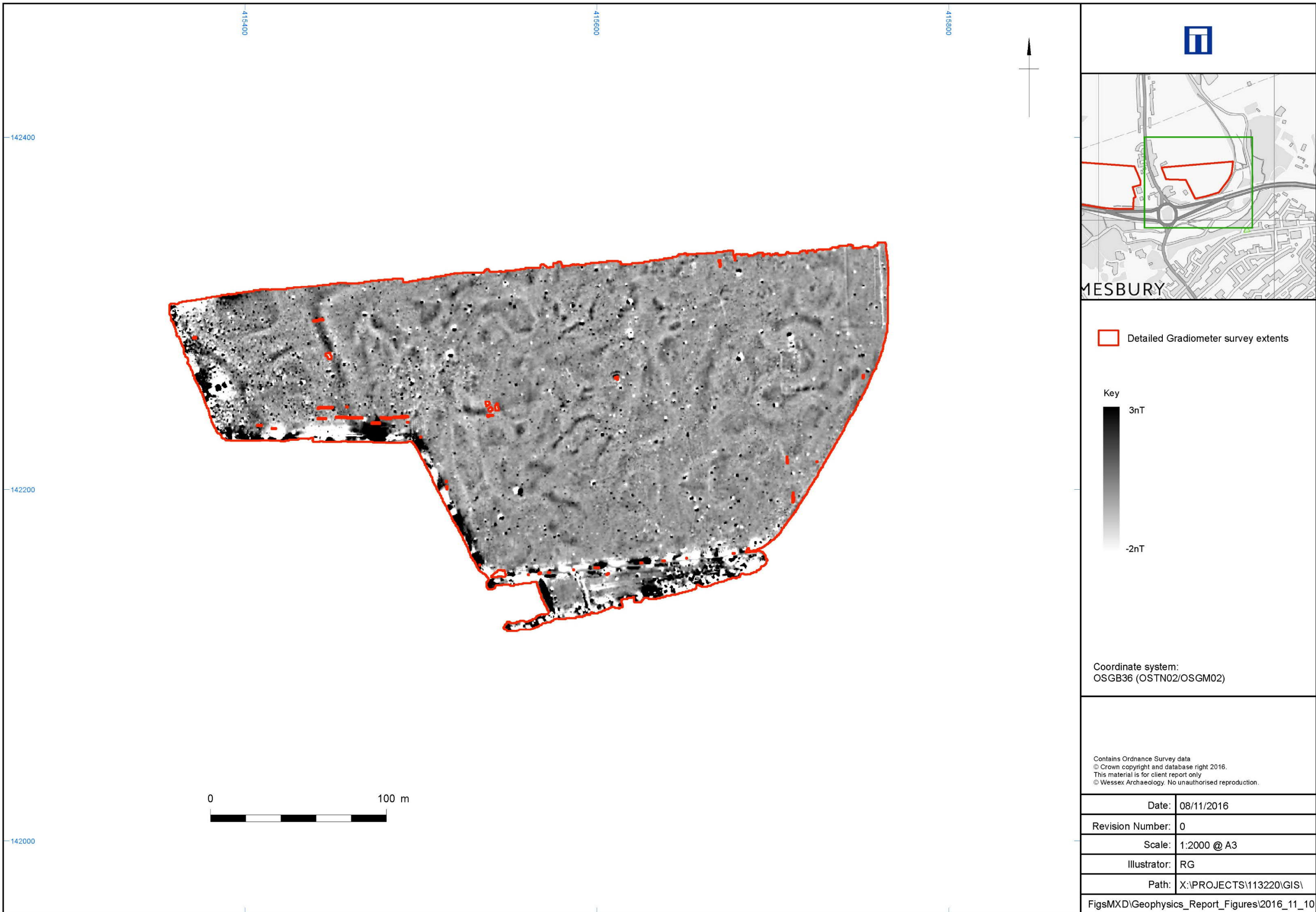
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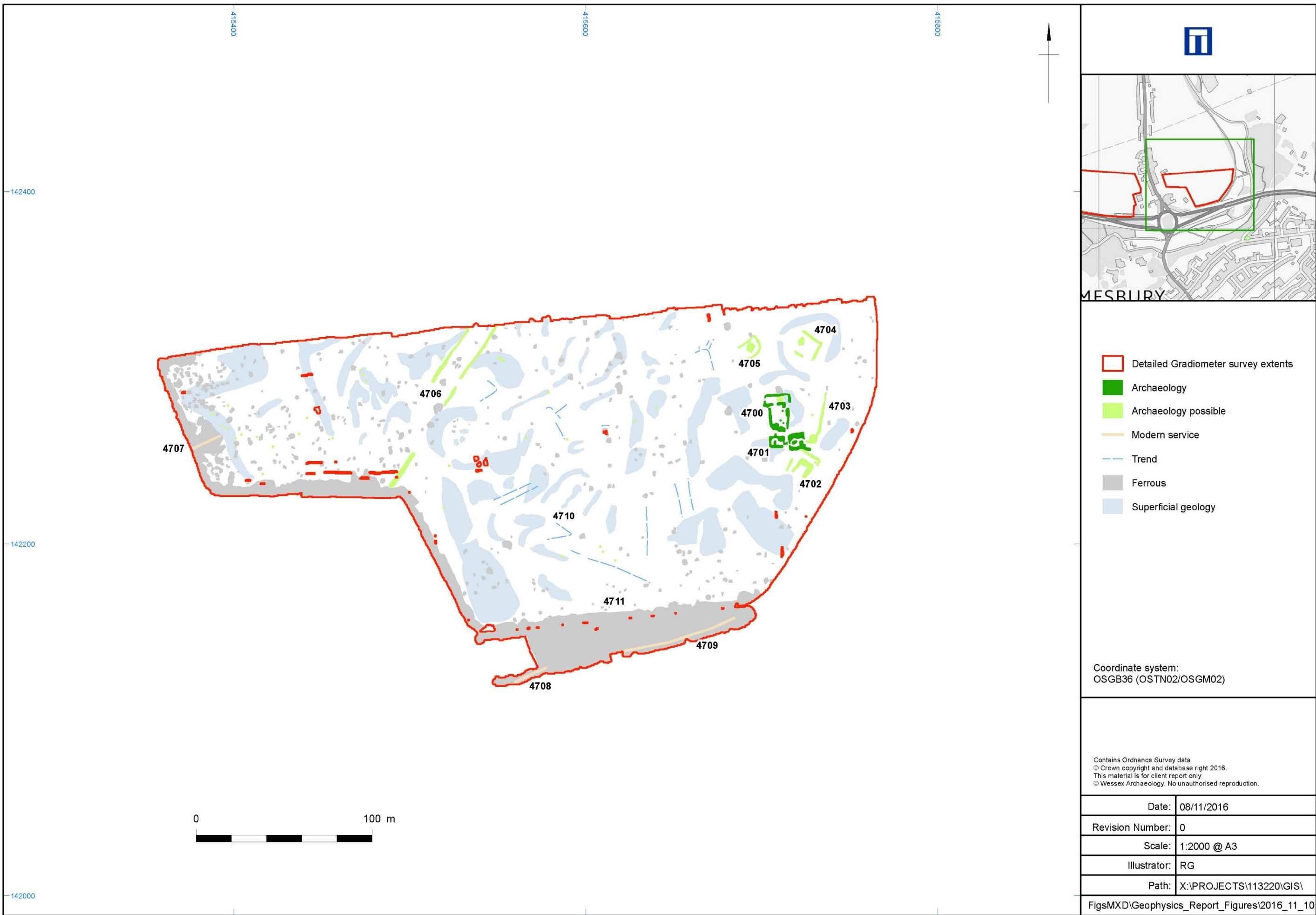
SE1: Greyscale plot

Figure 36





NE1: Greyscale plot



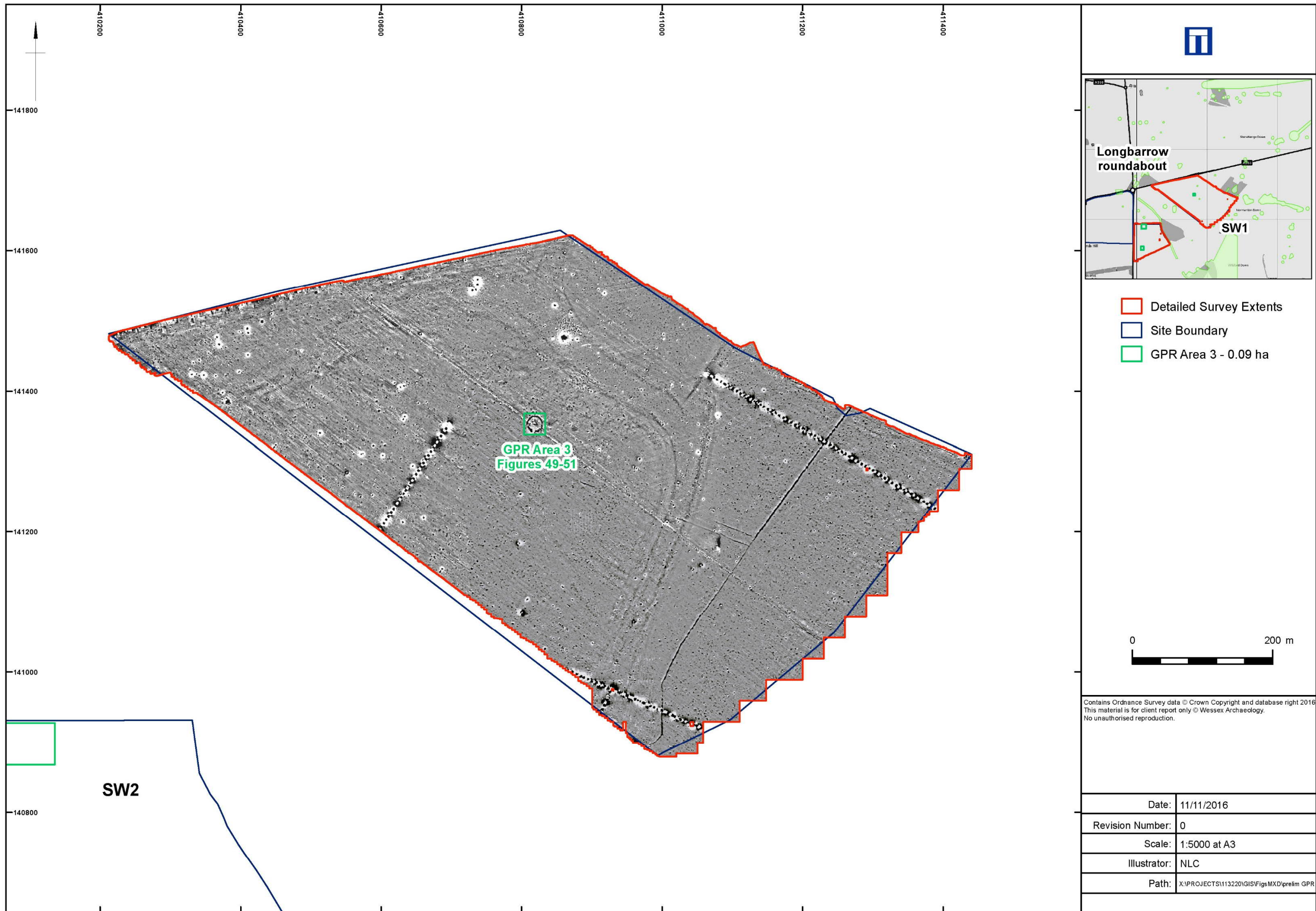
NE1: Interpretation

Figure 39



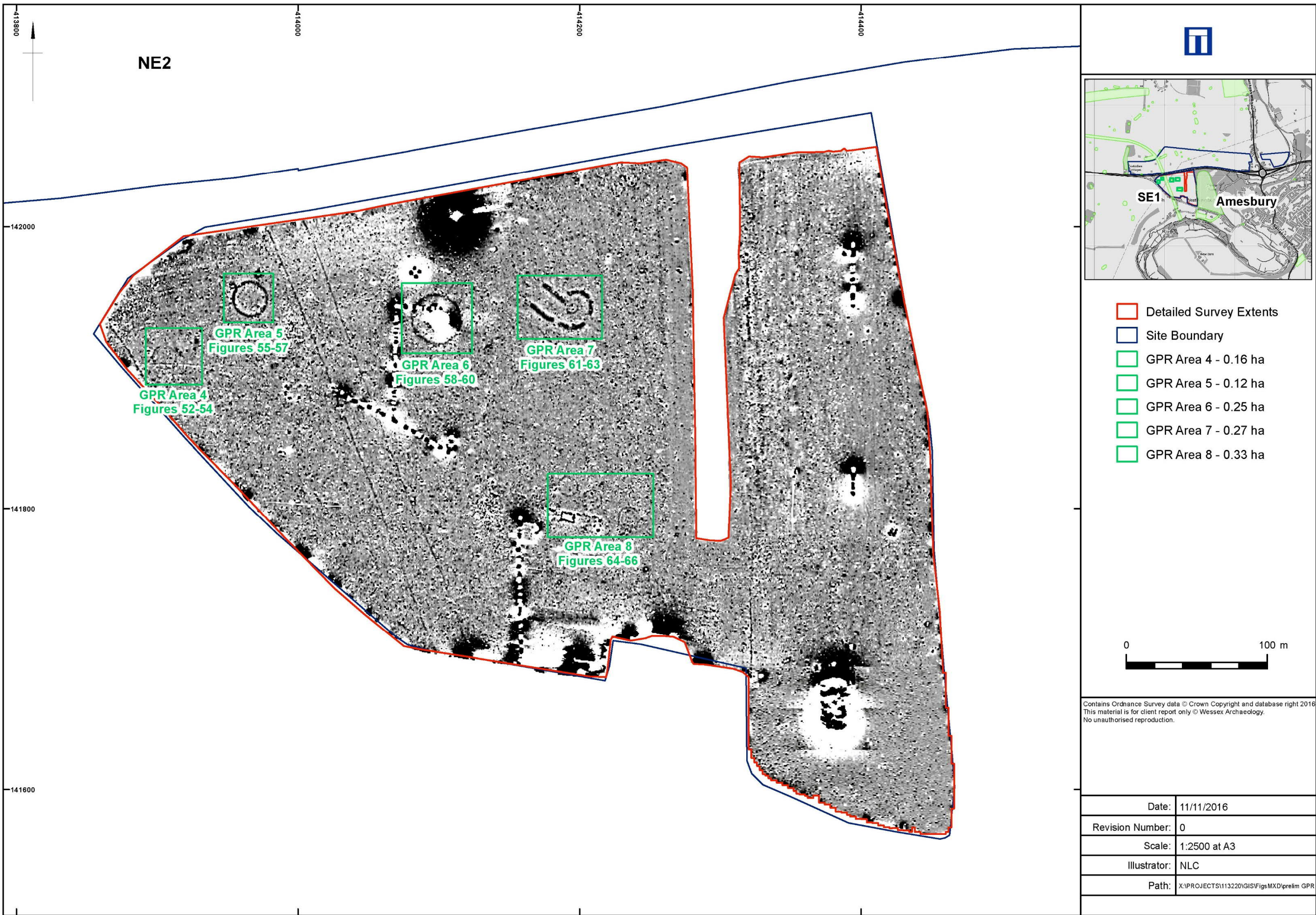
Location of GPR areas 1 and 2 - SW2

Figure 40



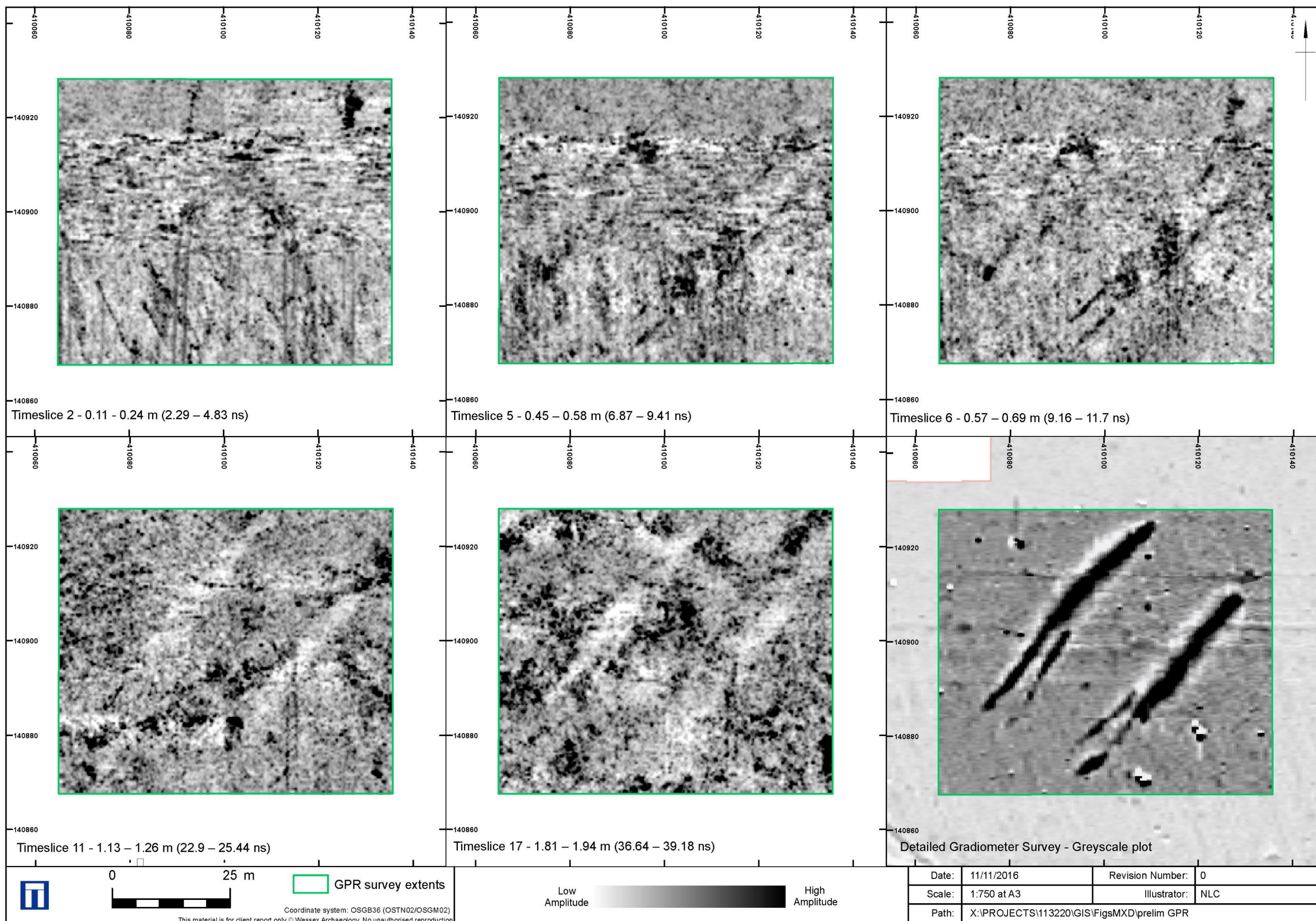
Location of GPR Areas SW1

Figure 41



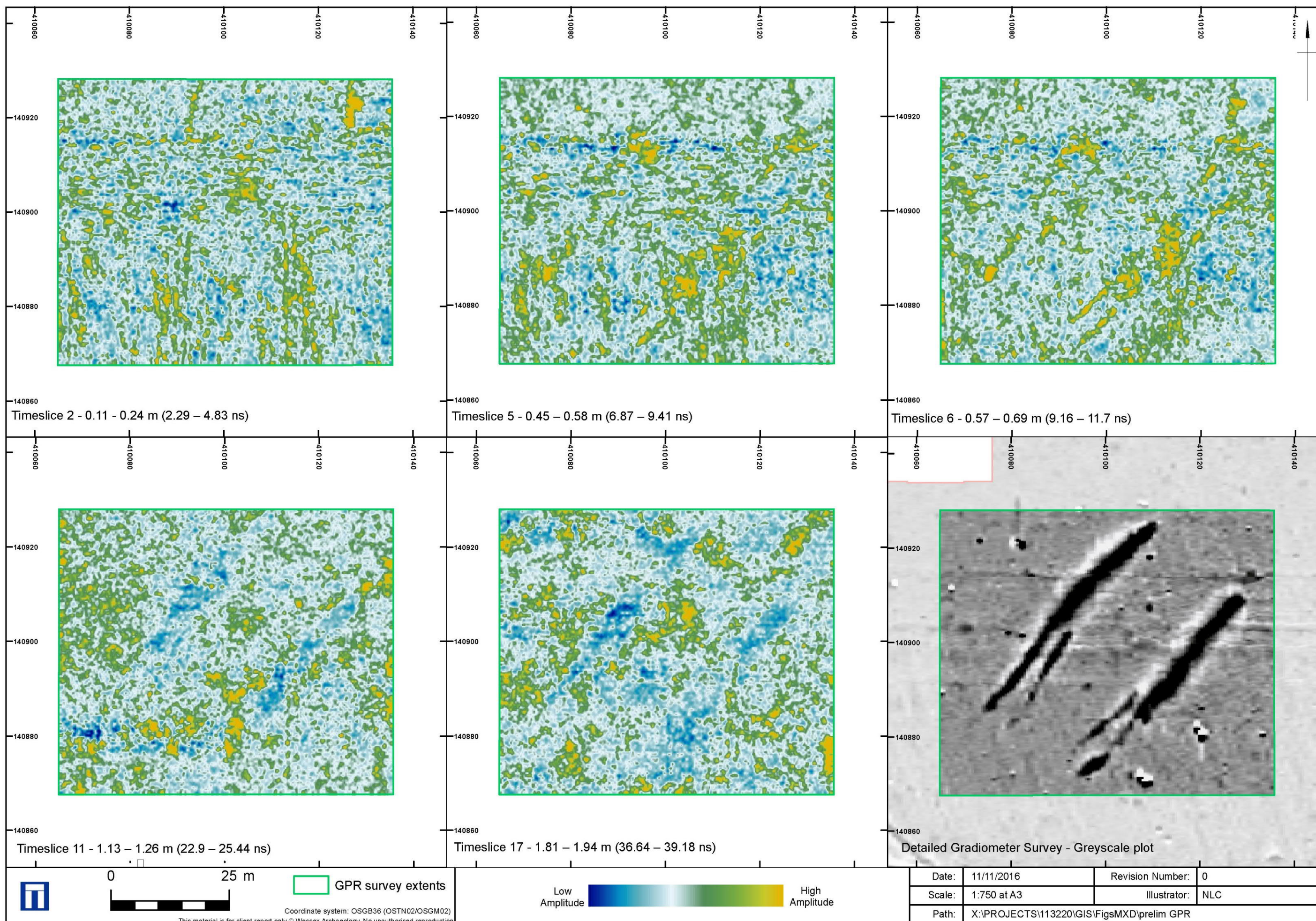
Location of GPR areas 4 - 8 - SE1

Figure 42



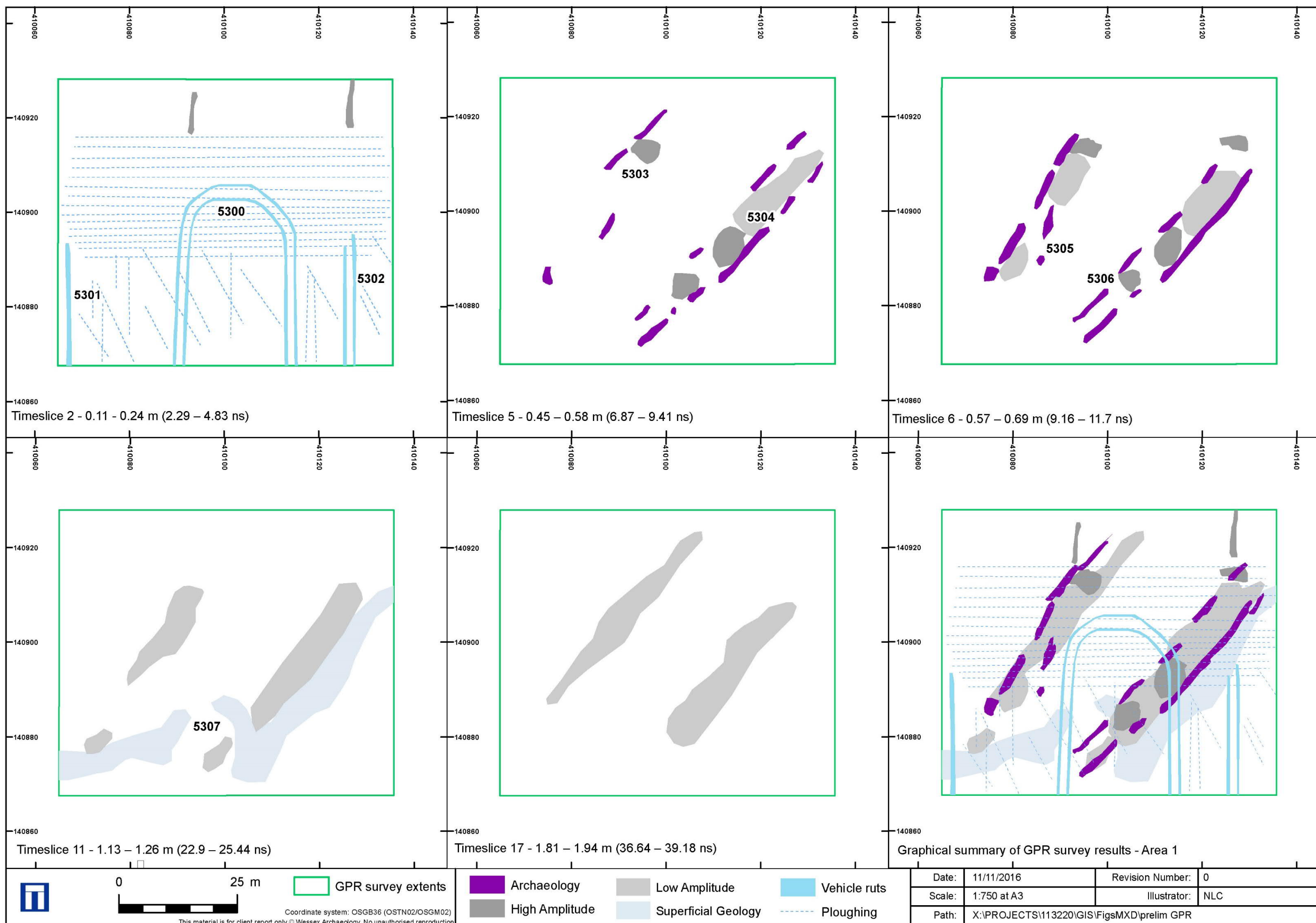
GPR Survey results: Area 1 - Greyscale plot

Figure 43

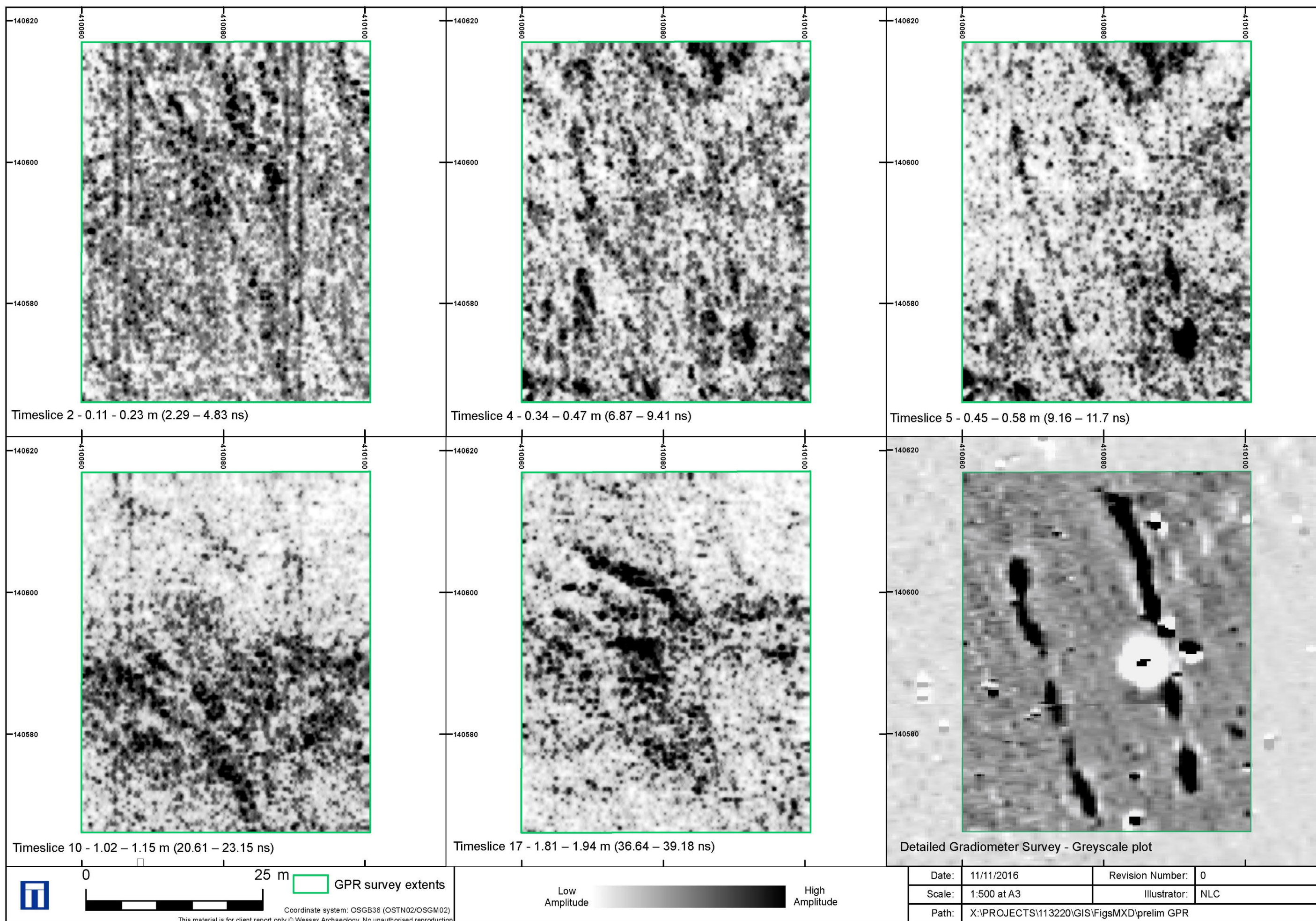


GPR Survey results: Area 1 - Colourscale plot

Figure 44

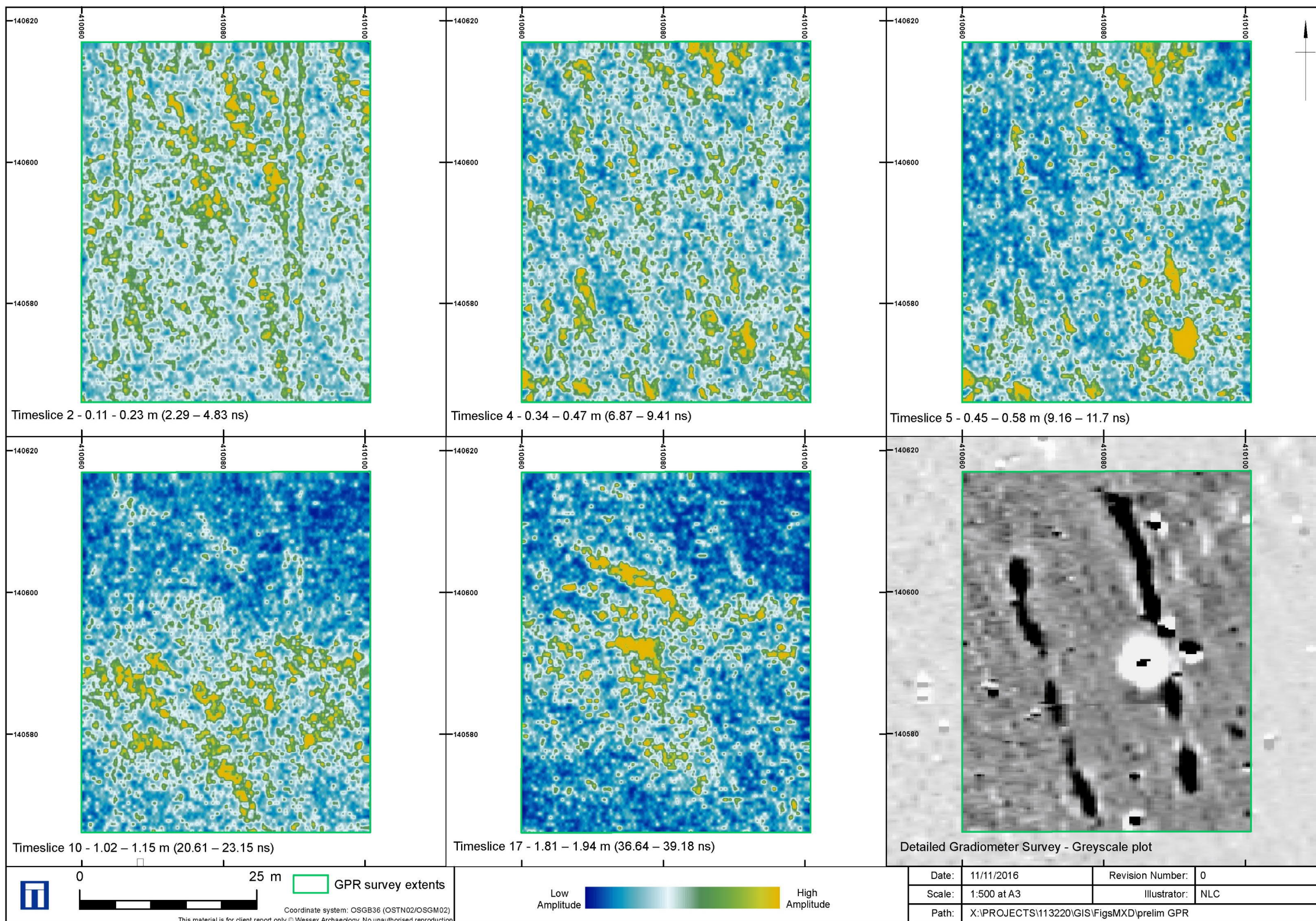


GPR Survey results: Area 1 - Interpretations



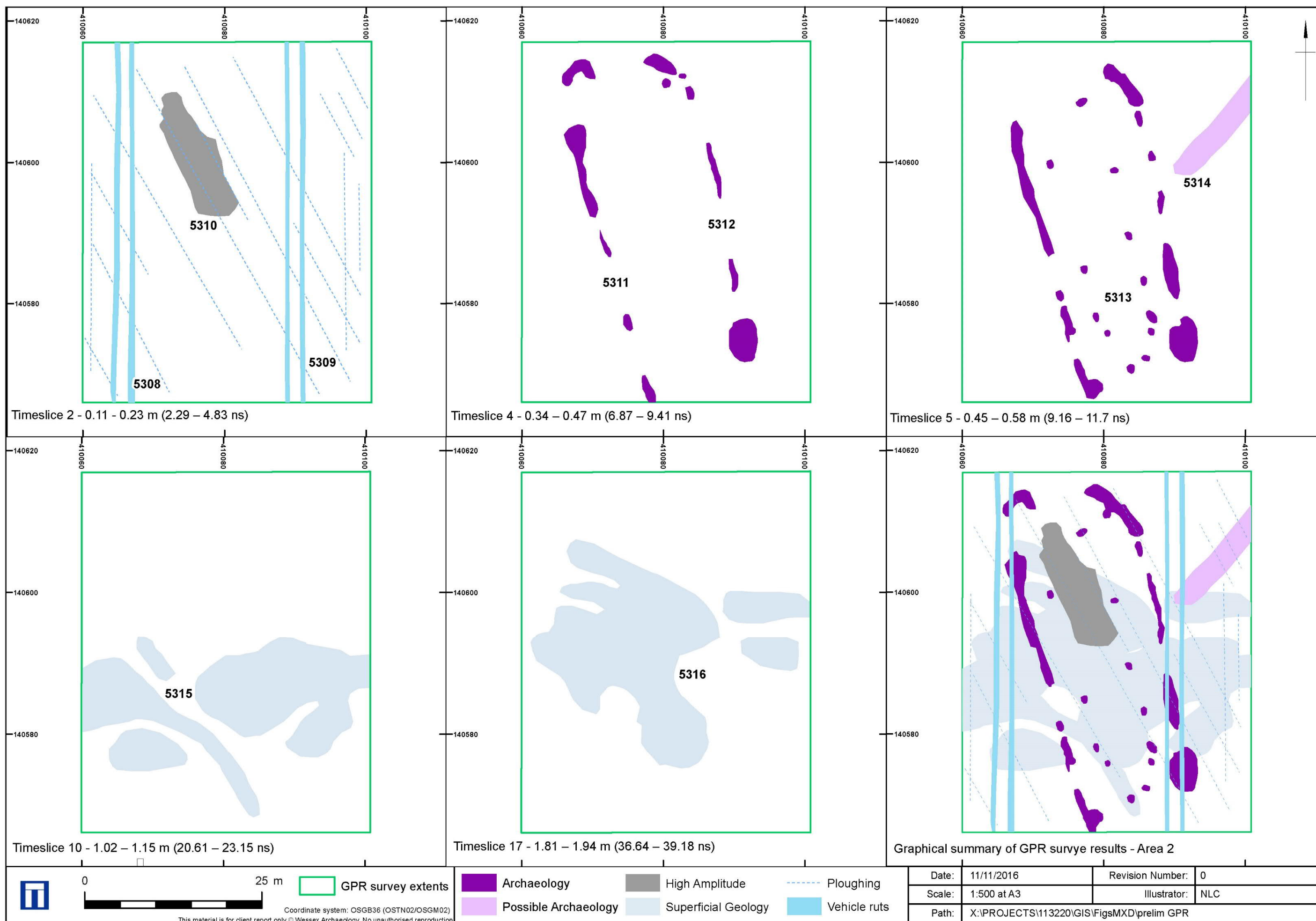
GPR Survey results: Area 2 - Greyscale plot

Figure 46



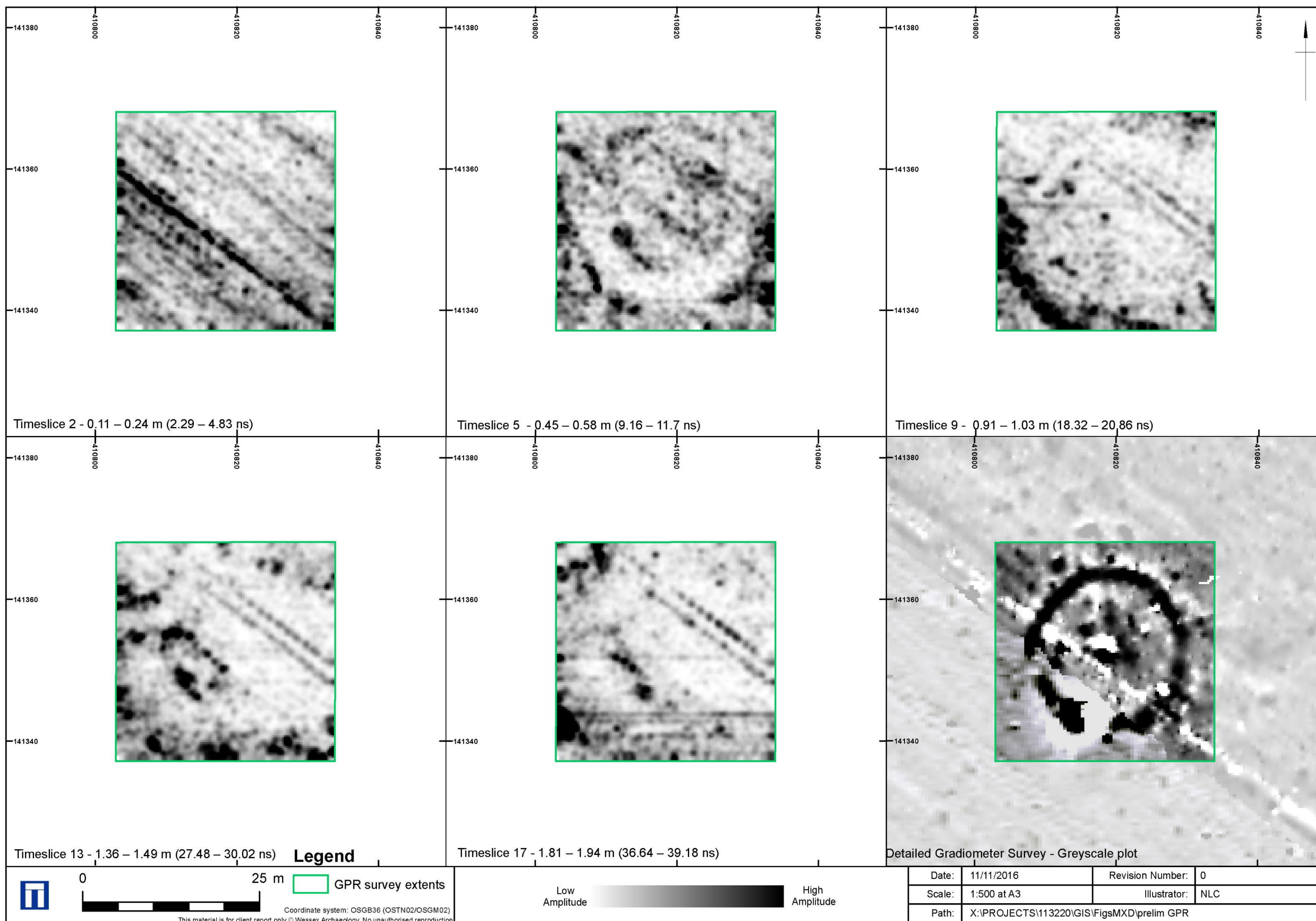
GPR Survey results: Area 2 - Colourscale plot

Figure 47



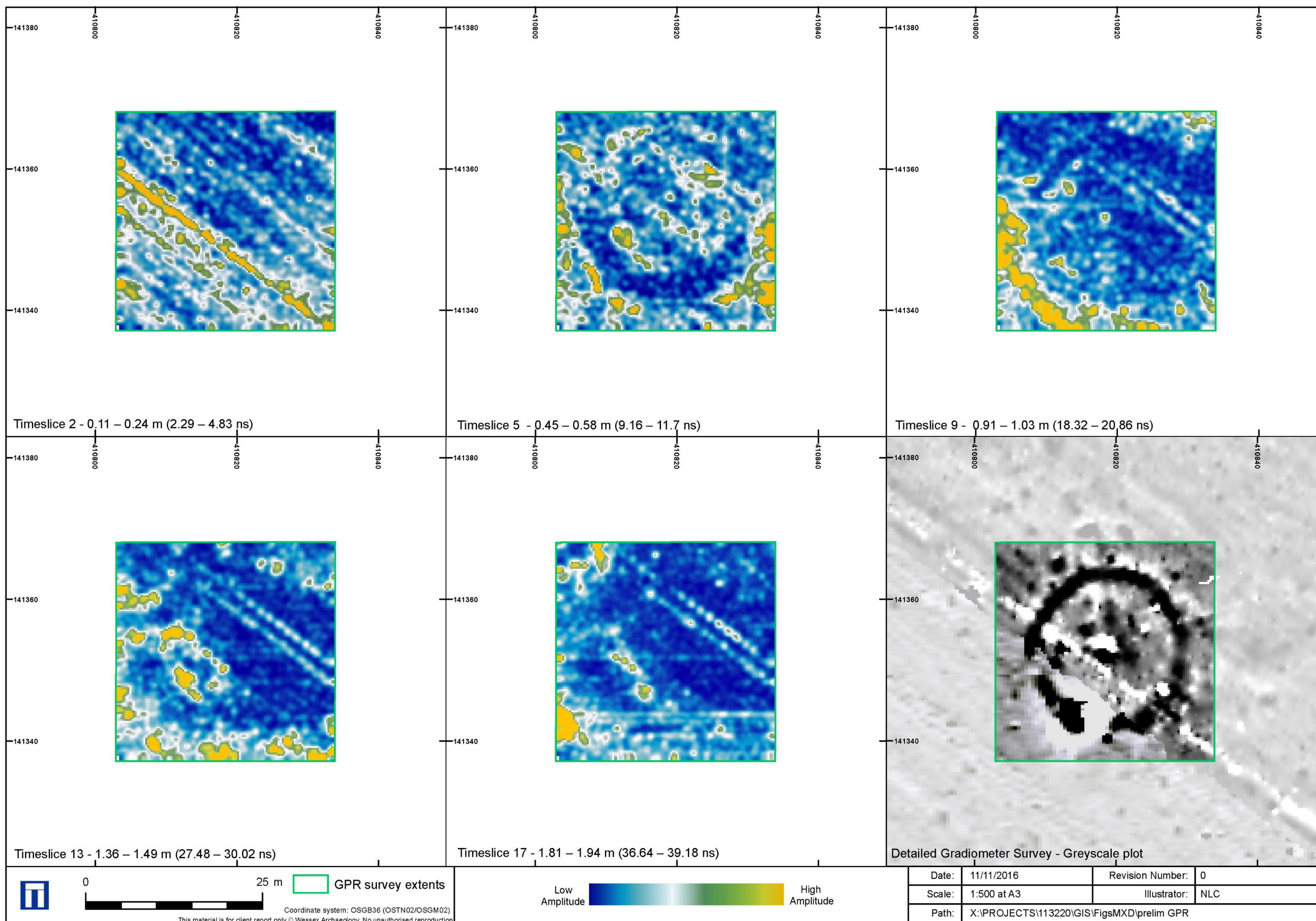
GPR Survey results: Area 2 - Interpretations

Figure 48

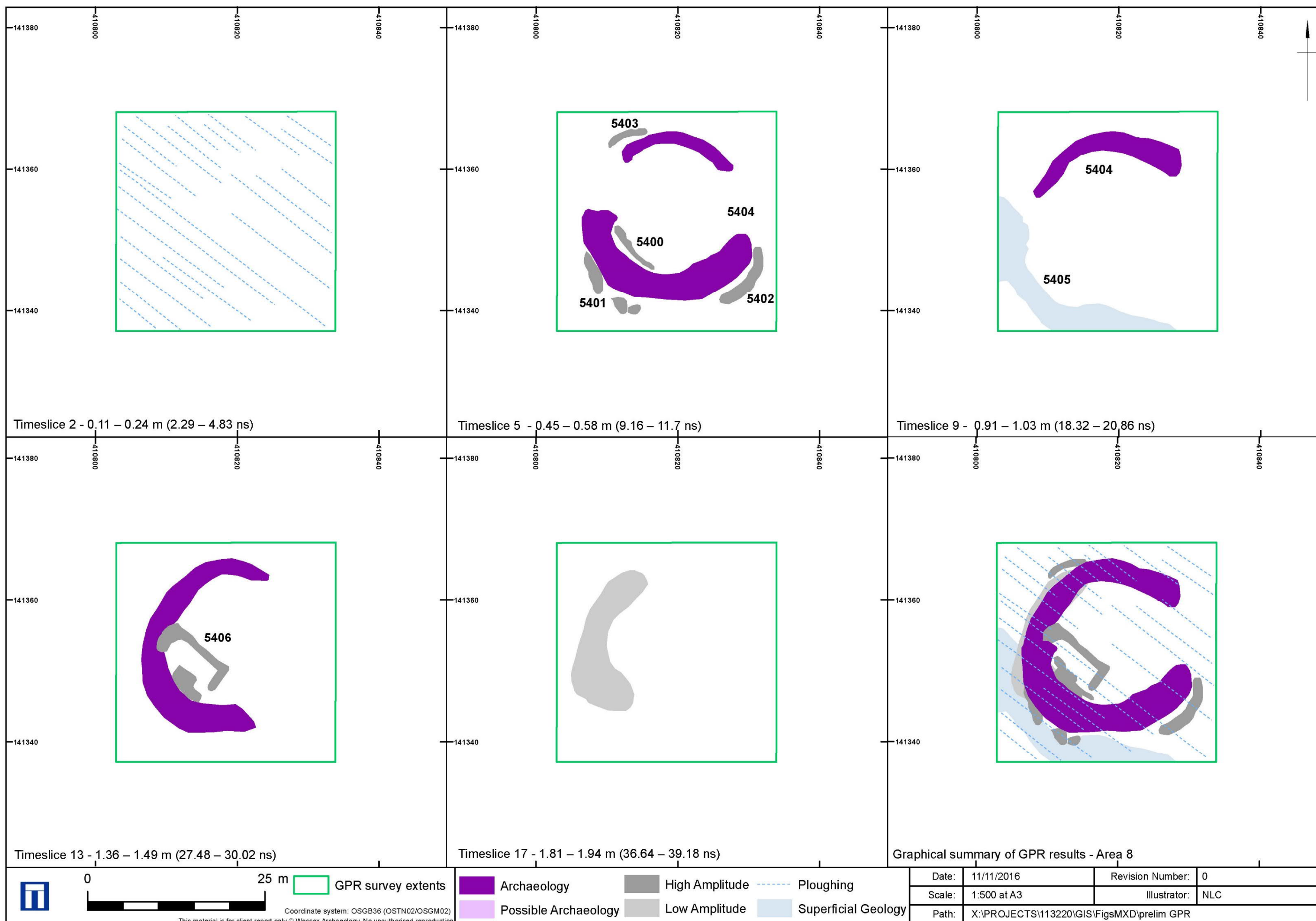


GPR Survey results: Area 3 - Greyscale plot

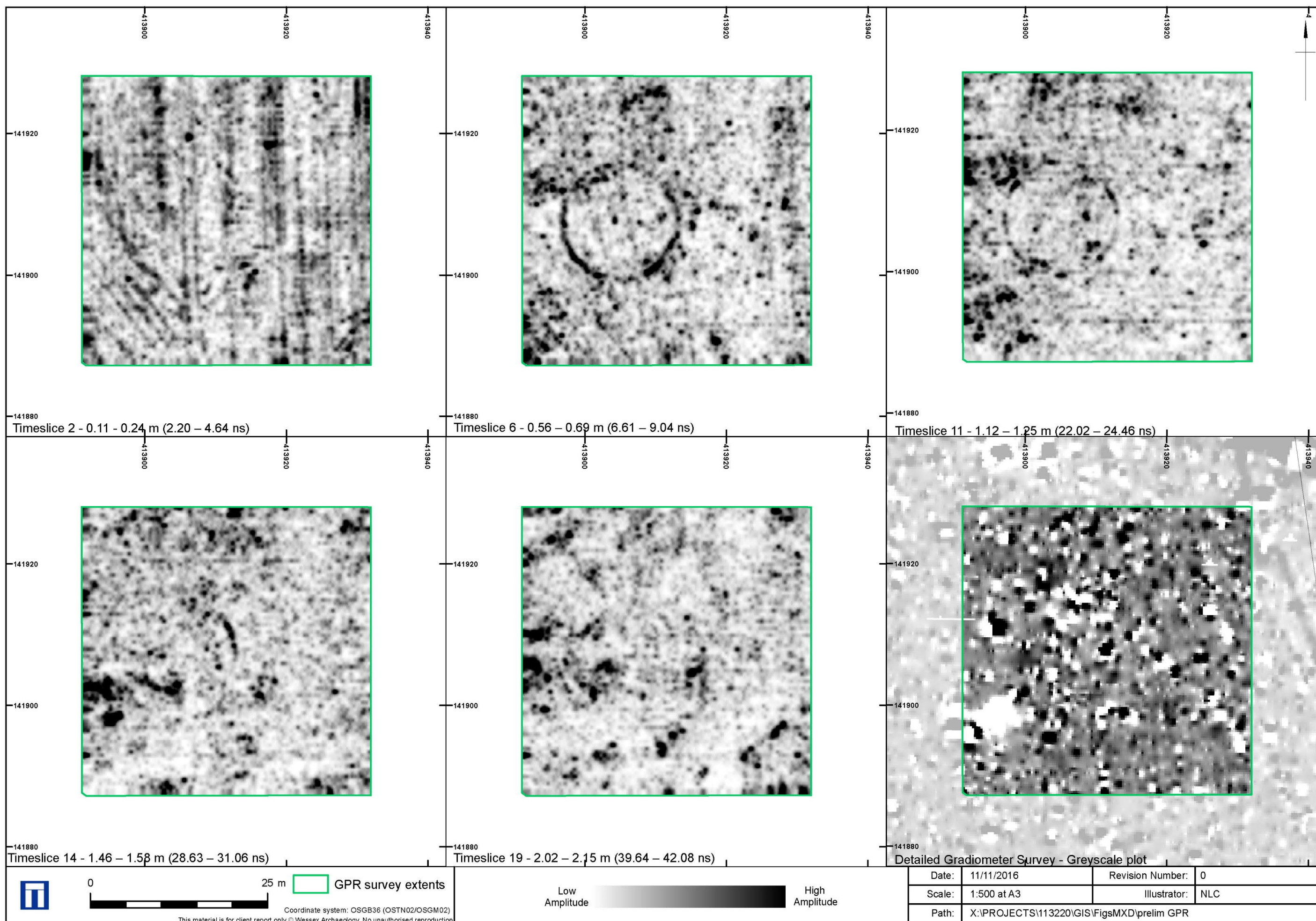
Figure 49



GPR Survey results: Area 3 - Colourscale plot

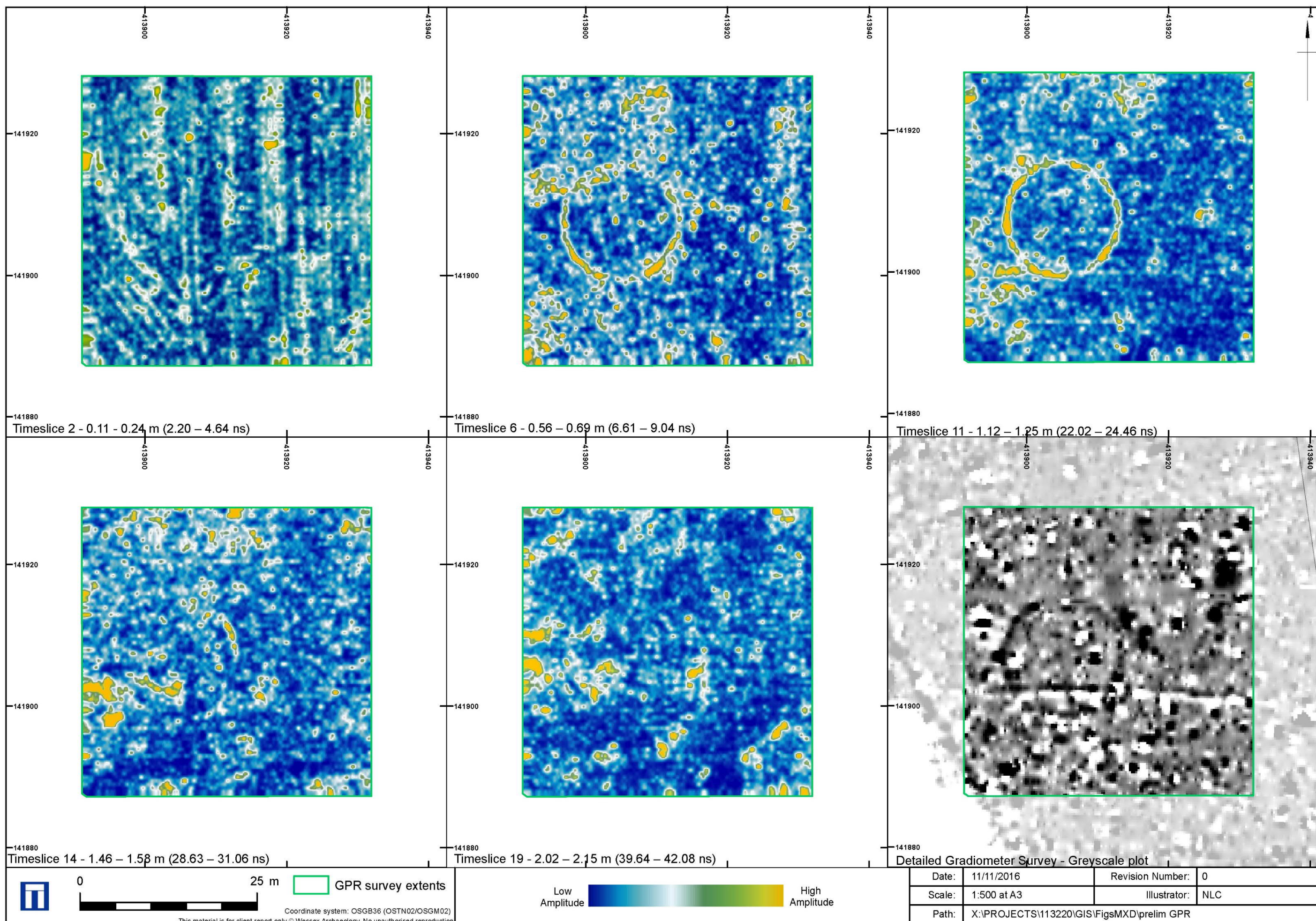


GPR Survey results: Area 3 - Interpretation

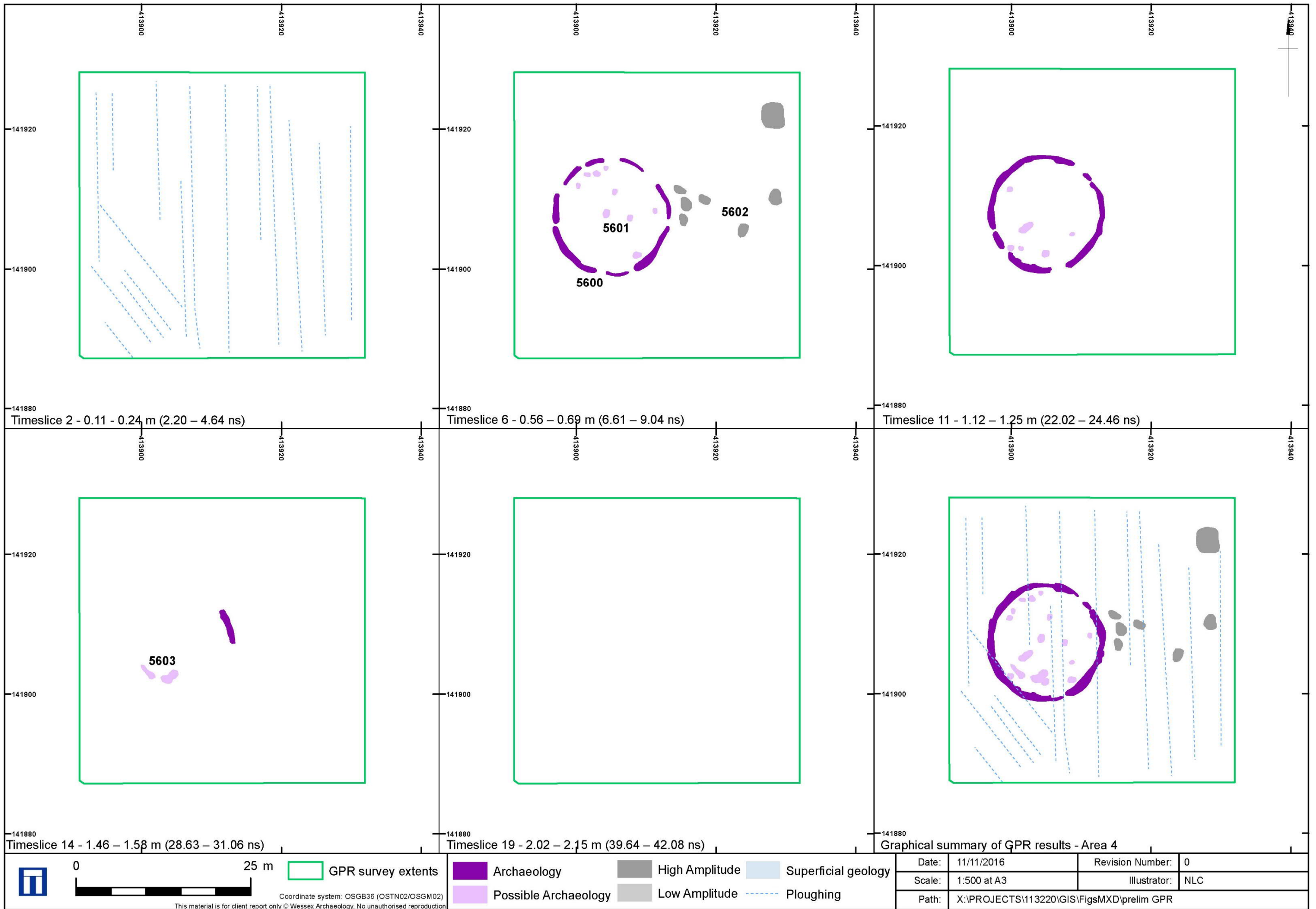


GPR Survey results: Area 4 - Greyscale plot

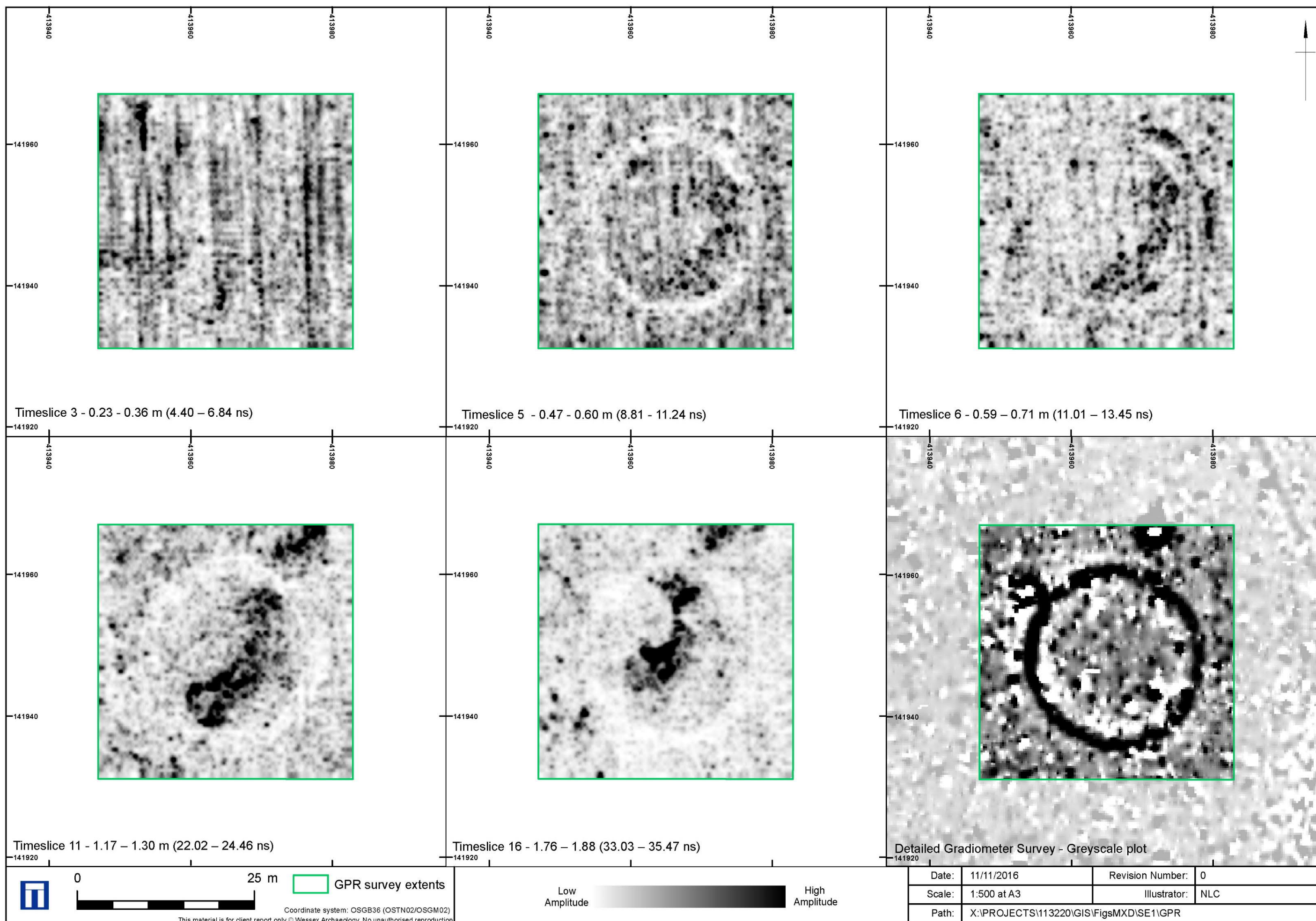
Figure 52



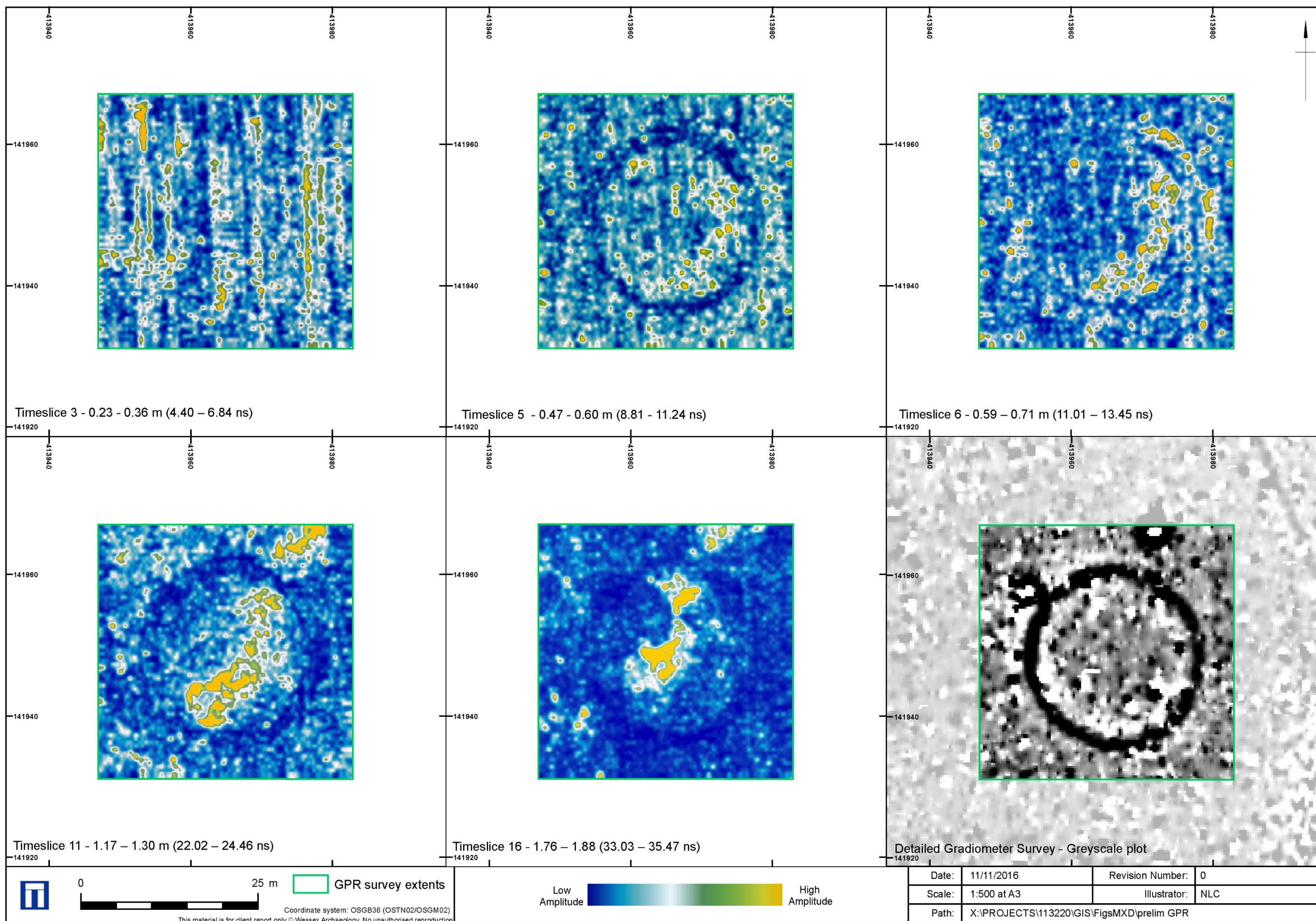
GPR Survey results: Area 4 - Colourscale plot



GPR Survey results: Area 4 - Interpretation

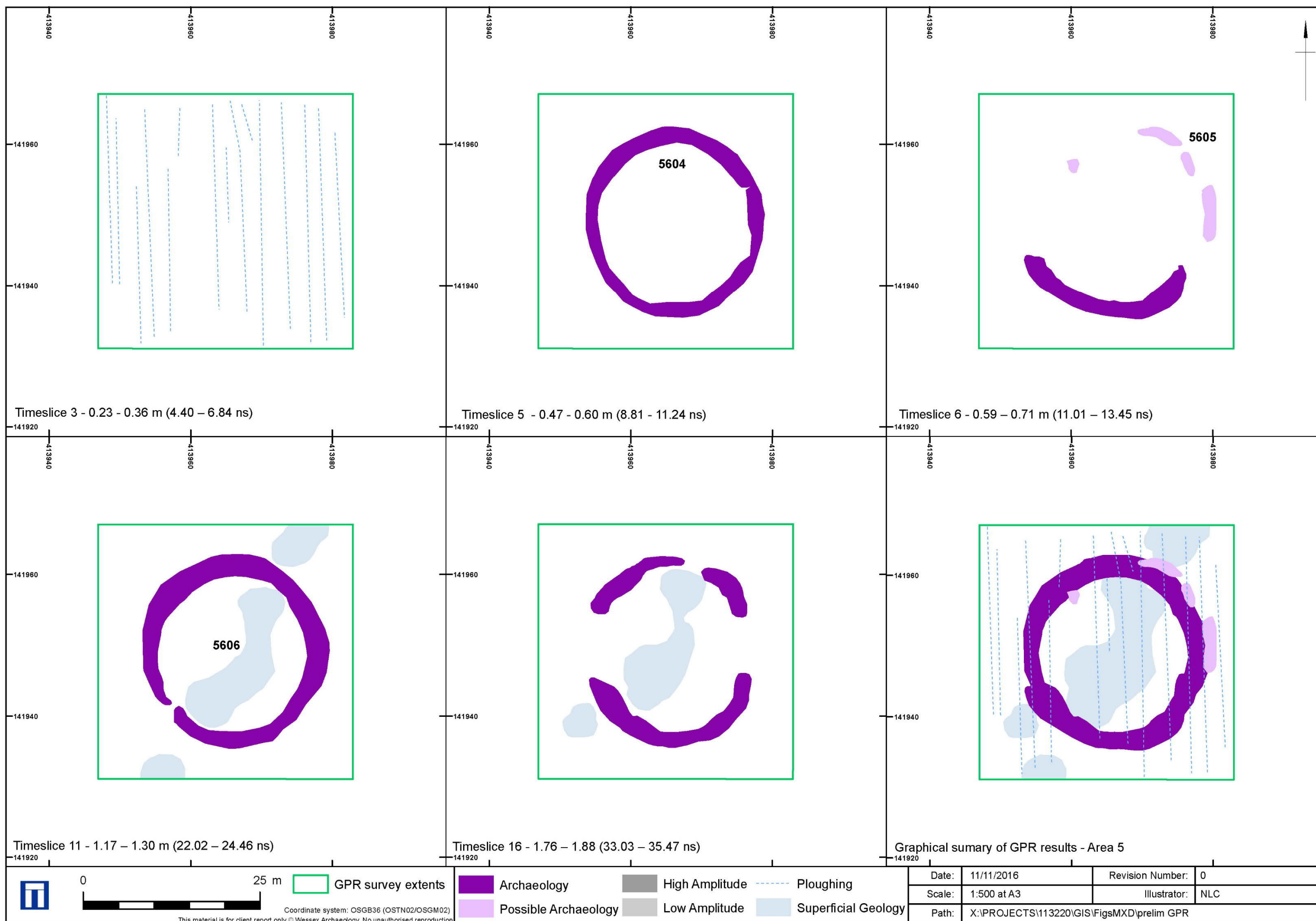


GPR Survey results: Area 5 - Greyscale plot



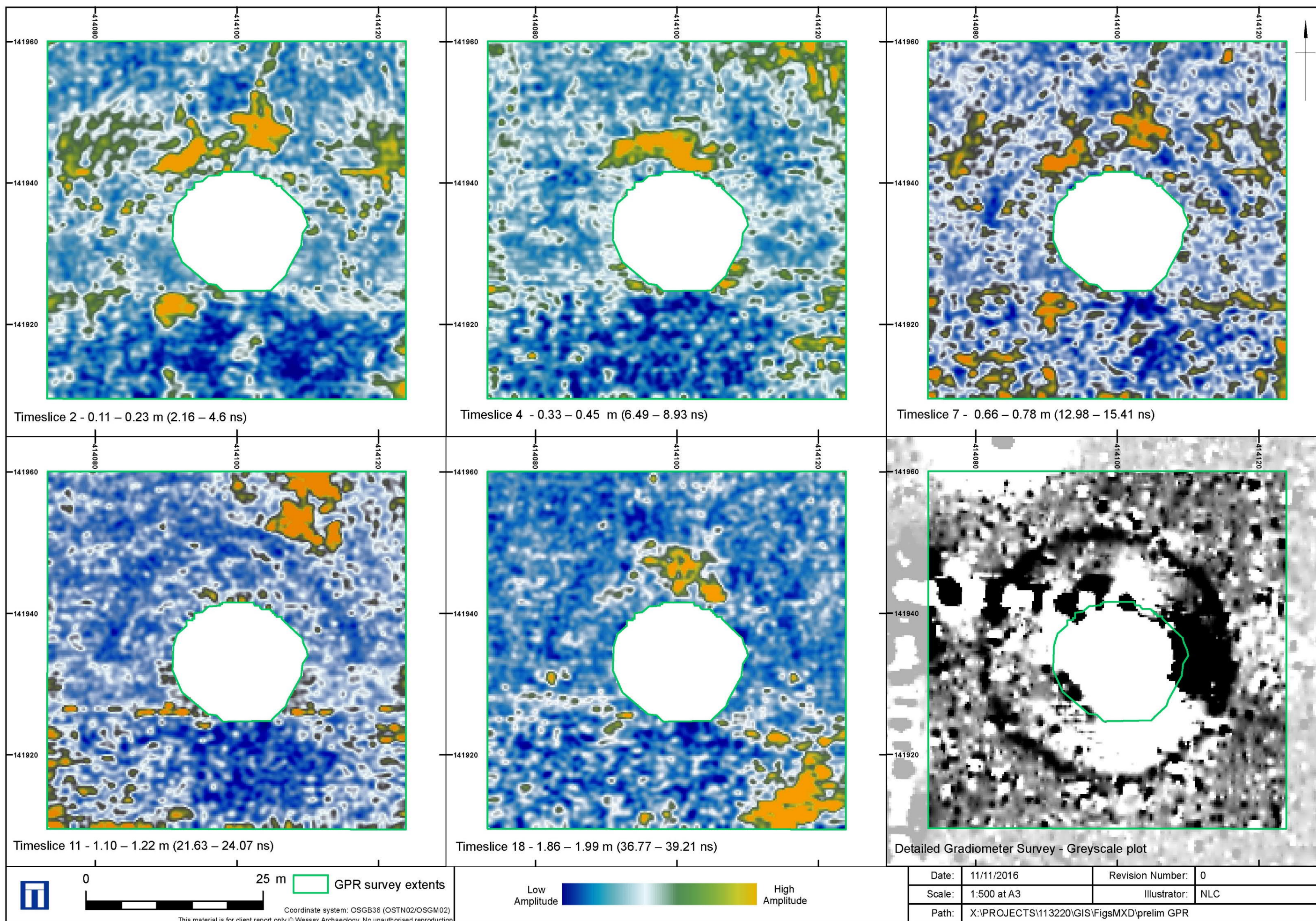
GPR Survey results: Area 5 - Colourscale plot

Figure 56

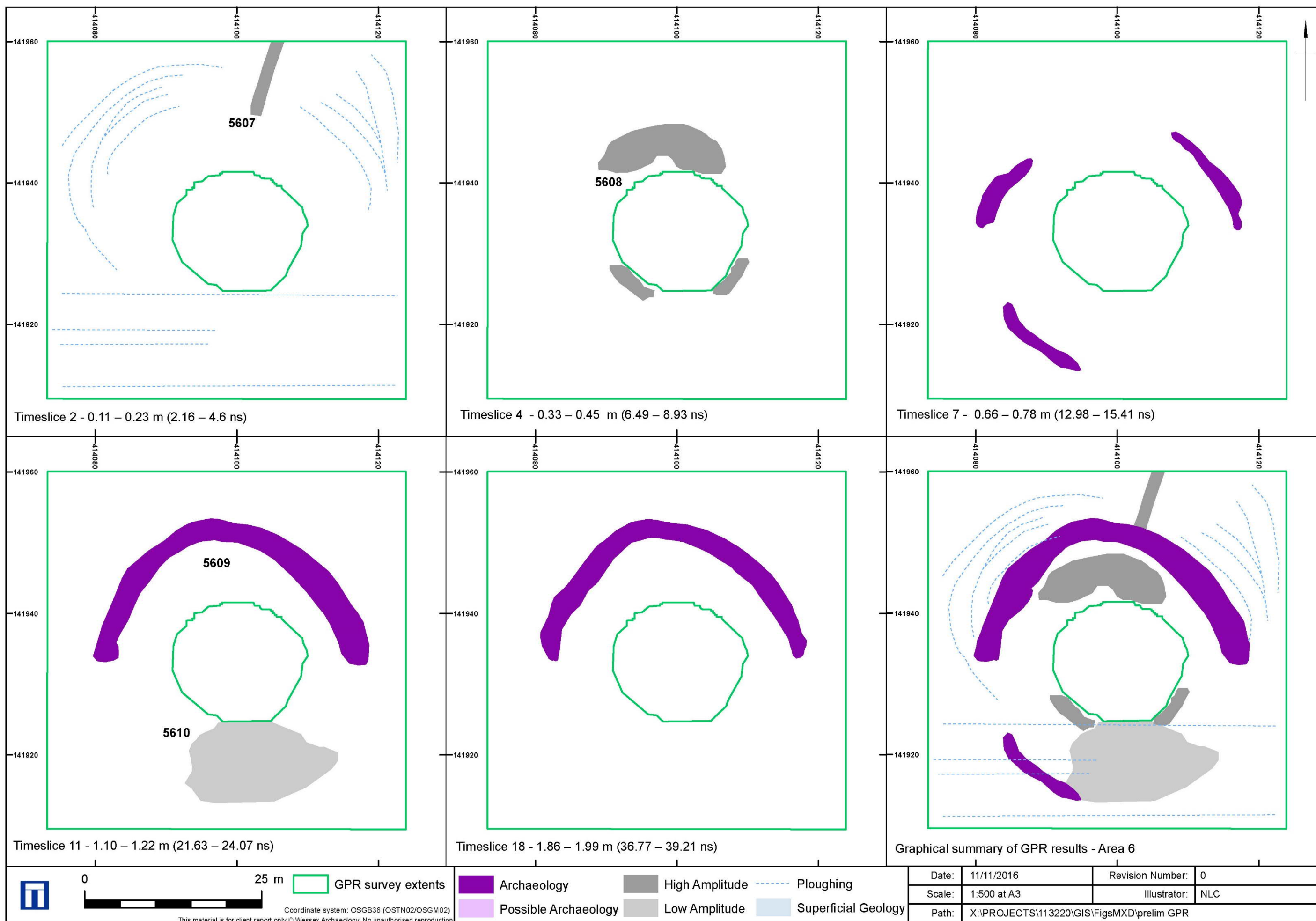


GPR Survey results: Area 5 - Interpretation

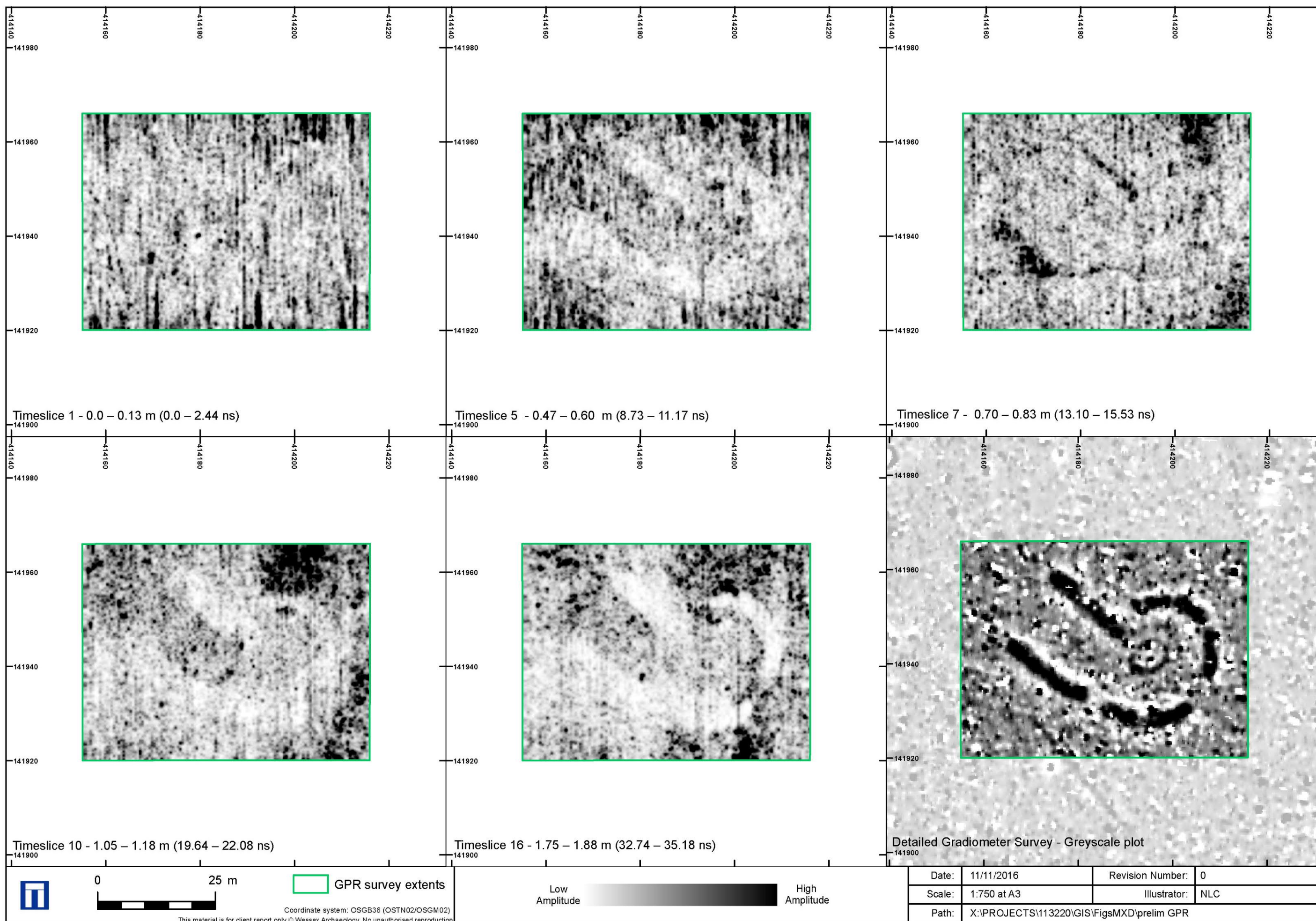
Figure 57



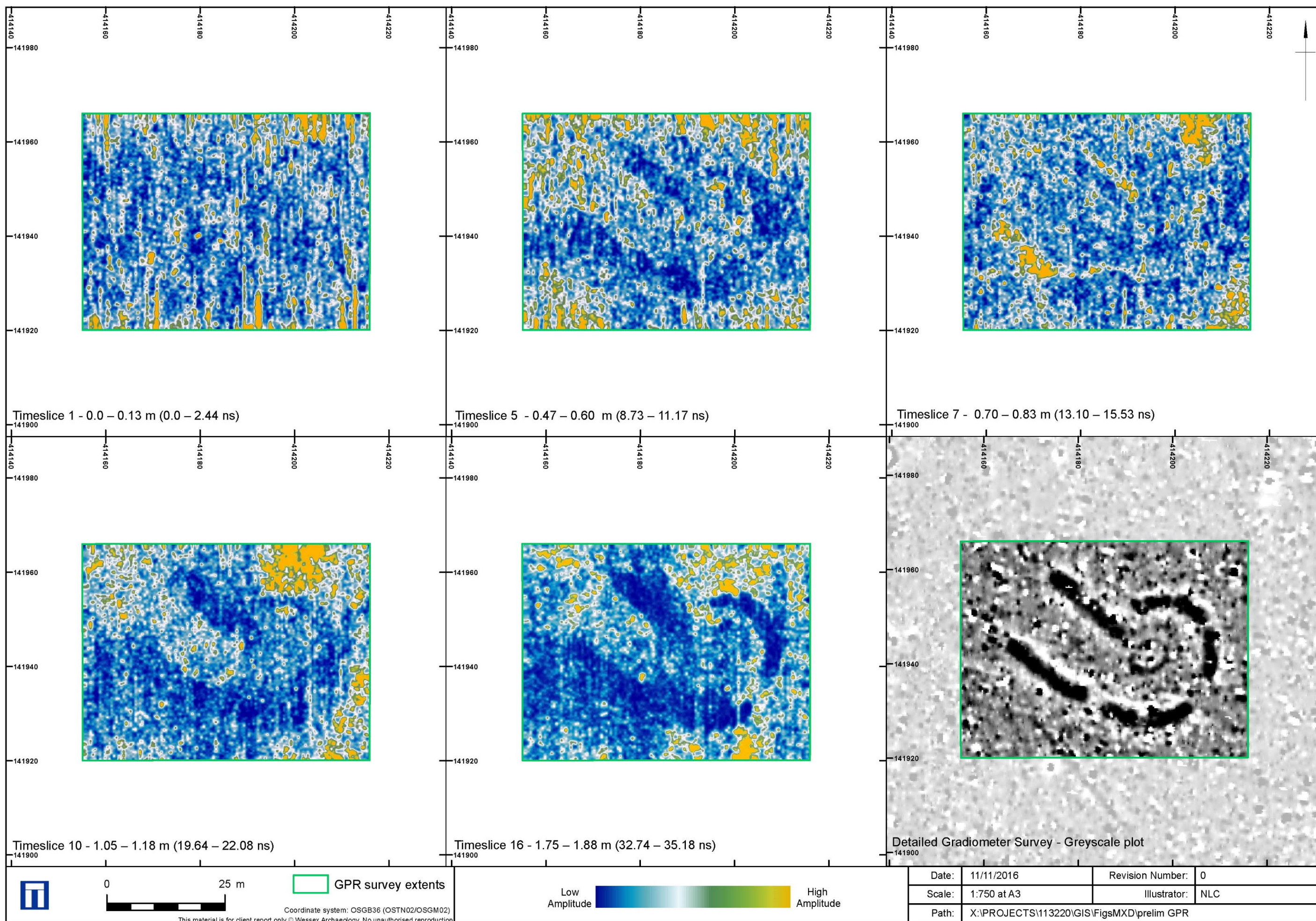
GPR Survey results: Area 6 - Colourscale plot



GPR Survey results: Area 6 - Interpretation

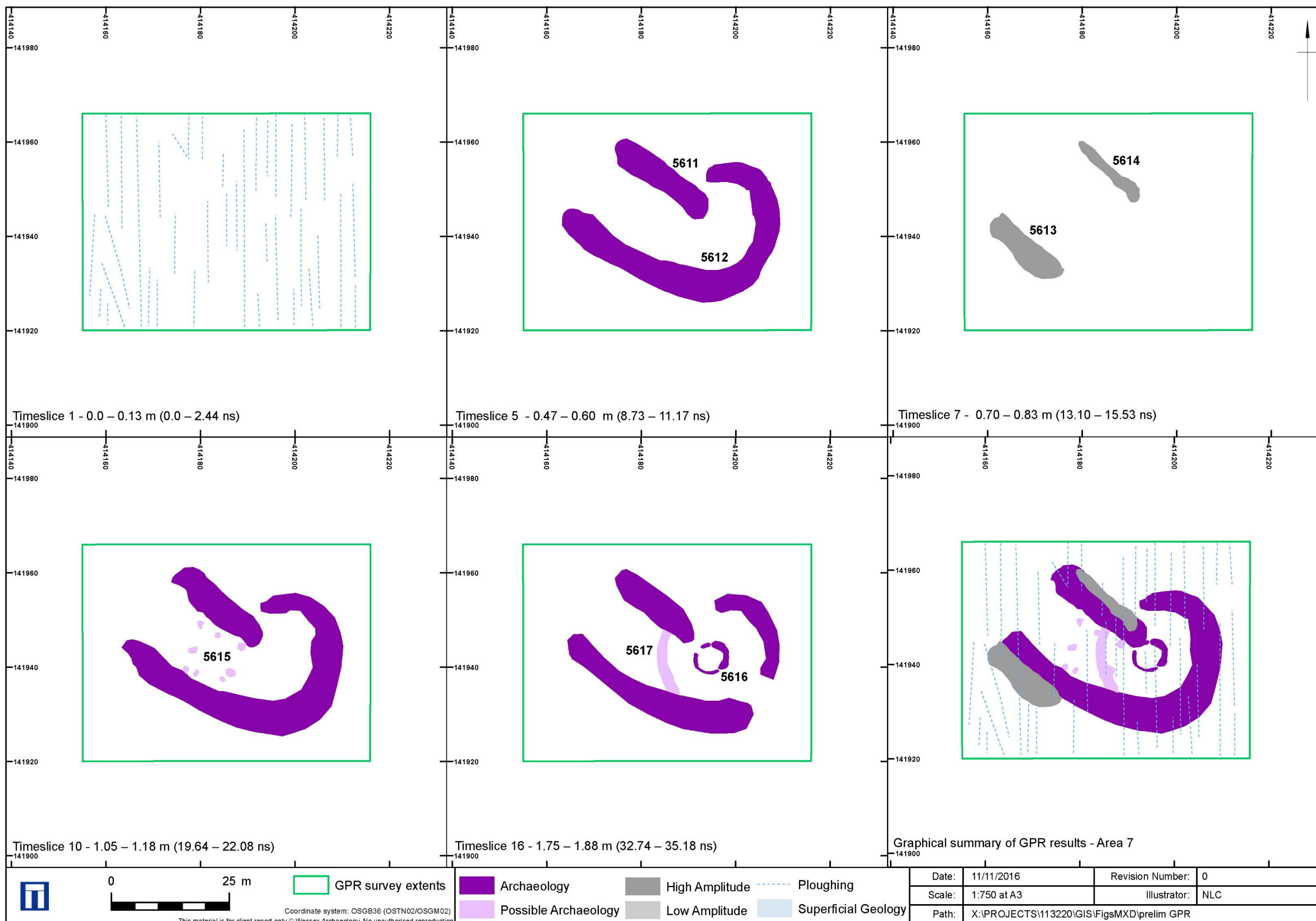


GPR Survey results: Area 7 - Greyscale plot



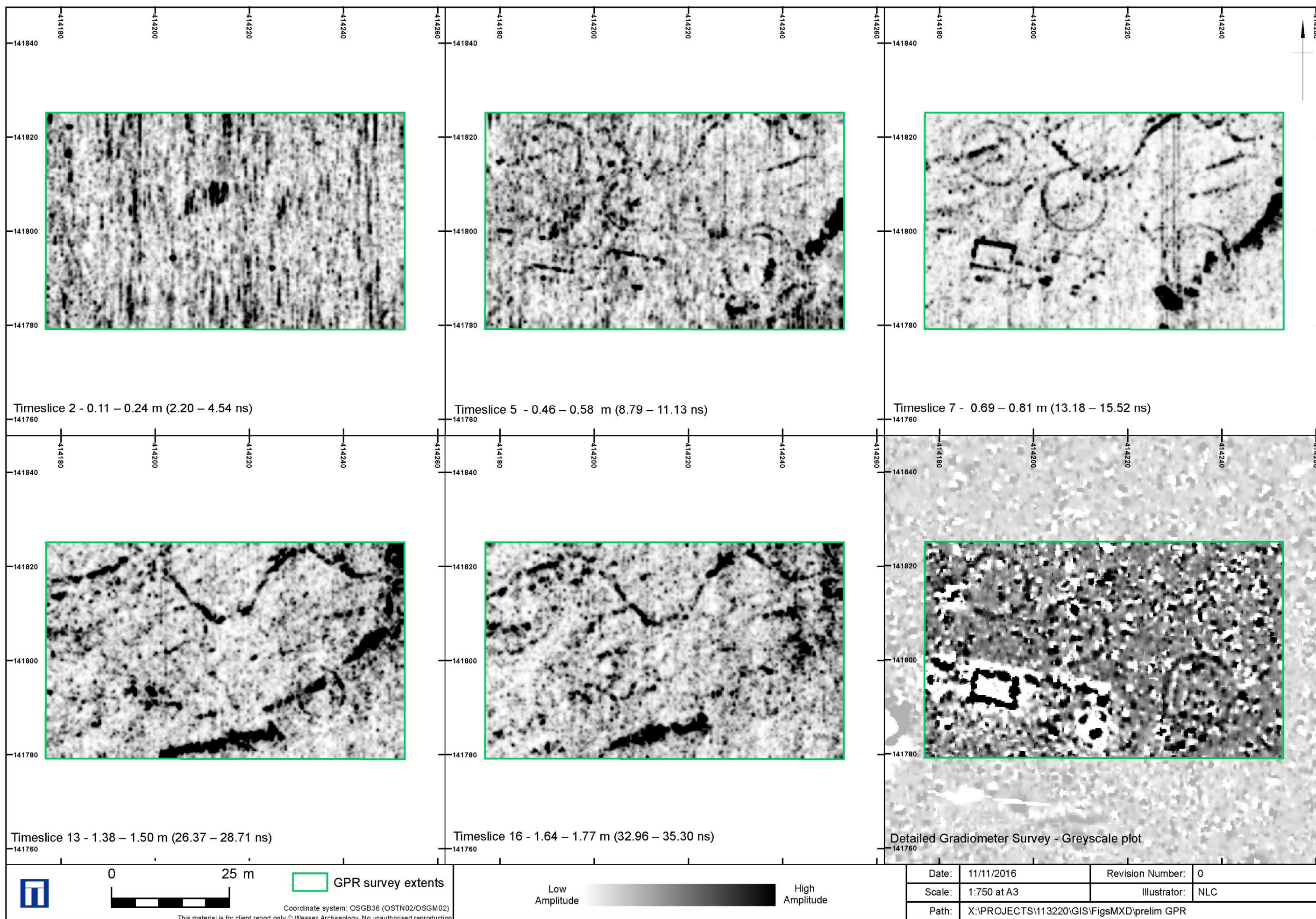
GPR Survey results: Area 7 - Colourscale plot

Figure 62



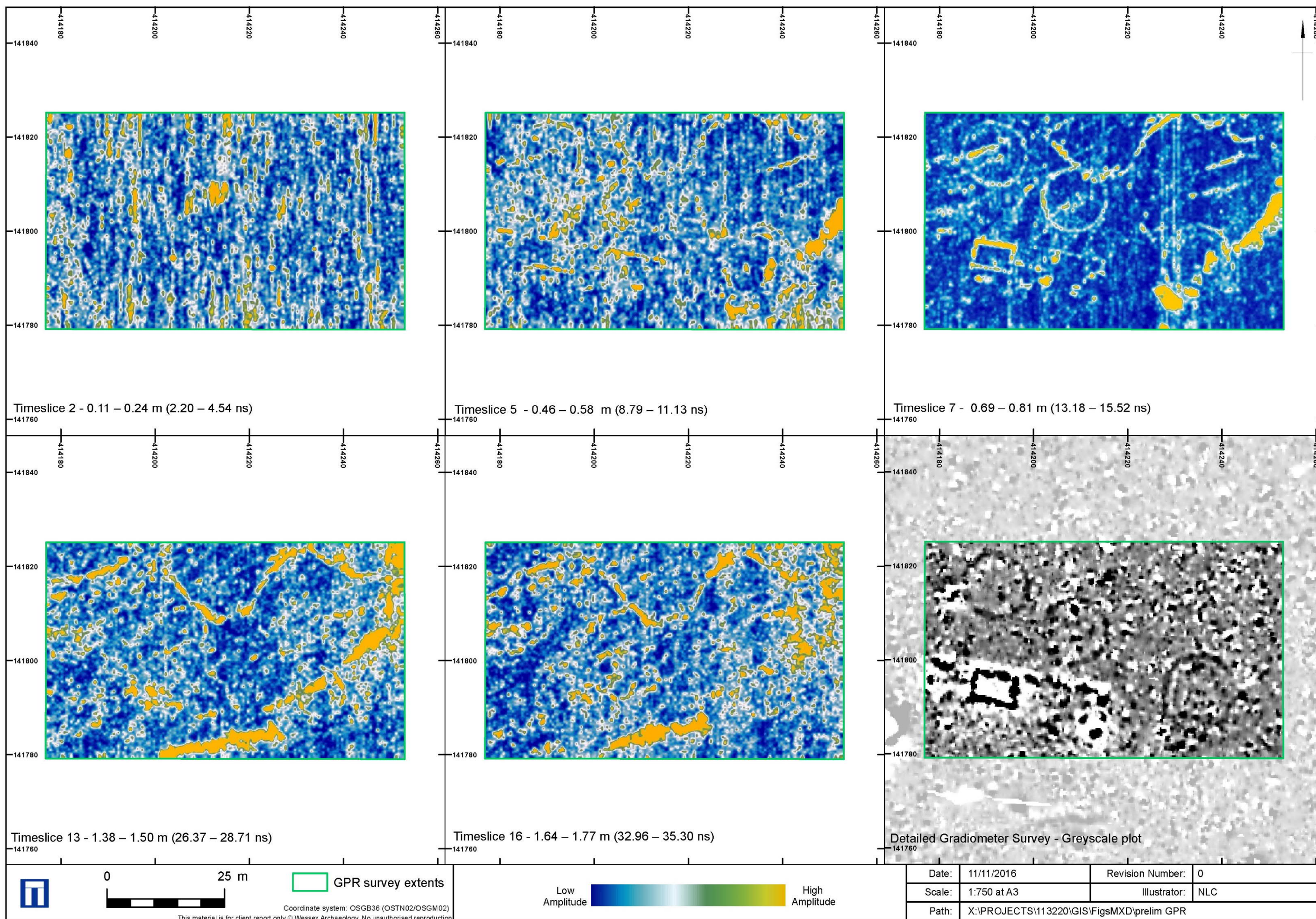
GPR Survey results: Area 7 - Interpretation

Figure 63



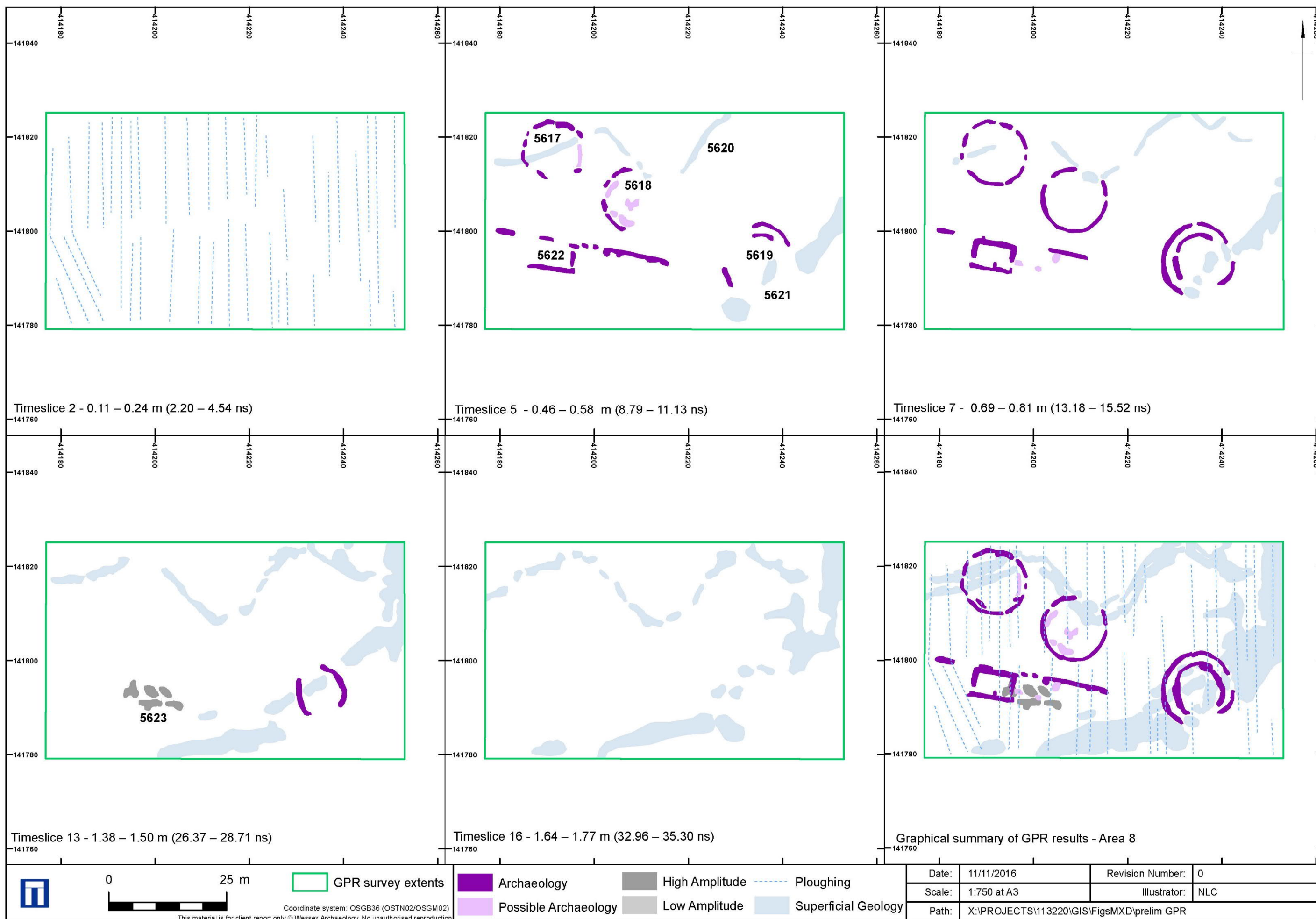
GPR Survey results: Area 8 - Greyscale plot

Figure 64



GPR Survey results: Area 8 -Colourscale plot

Figure 65



GPR Survey results: Area 8 - Interpretations

Figure 66

Abbreviations List

AAJV	Arup Atkins Joint Venture
ClfA	Chartered Institute for Archaeologists
GPR	Ground Penetrating Radar
GPS	Global Positioning System
WCAS	Wiltshire Council Archaeological Service
WHER	Wiltshire Historic Environment Record
WHS	World Heritage Site

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Appendices

Appendix A Gradiometer Survey Equipment and Data Processing

A.1 Survey methods and equipment

- A.1.1.1 The magnetic data for this project was largely acquired using a non-magnetic cart fitted with 4x Bartington Grad-01-1000L magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m separation, and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.
- A.1.1.2 The gradiometers have an effective resolution of 0.03 nT over a ± 100 nT range, and measurements from each sensor are logged at a rate of 6 hz (intervals of sub 0.25 m). All of the data are stored on a Leica Viva CS35 tablet controller using the data acquisition program MLGrad 601. This also collects readings streamed by a Leica GS14 GNSS receiver, which is fixed to the cart at a measured distance from the sensors.
- A.1.1.3 The use of the non-magnetic cart has several advantages over the use of the Bartington Grad 601-2 fluxgate gradiometer instrument. Perhaps chief amongst these is that it has a higher sample rate resulting in higher resolution dataset. The addition of the GPS receiver also negates the need to establish a survey grid prior to the survey and therefore increases efficiency. Mounting the instrument on the cart also reduces the occurrence of operator error caused by inconsistent walking speeds and variation in traverse position due to varying ground cover and topography.
- A.1.1.4 Wessex Archaeology undertakes two types of magnetic surveys: scanning and detail. When not using the handheld Bartington 601-2 dual magnetic gradiometer, both types depend upon the establishment of an accurate 20 m or 30 m site grid, which is achieved using a Leica Viva RTK GNSS instrument and then extended using tapes. The Leica Viva system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02 m in real-time and therefore exceed the level of accuracy recommended by Historic England [16] for geophysical surveys.
- A.1.1.5 Scanning surveys consist of recording data at 0.25 m intervals along transects spaced 10m apart, acquiring a minimum of 80 data points per transect. Due to the relatively coarse transect interval, scanning surveys should only be expected to detect extended regions of archaeological anomalies, when there is a greater likelihood of distinguishing such responses from the background magnetic field.
- A.1.1.6 The detailed surveys consist of 20 m x 20 m or 30 m x 30 m grids, and data are collected at 0.25 m intervals along traverses spaced 1m apart. These strategies give 1600 or 3600 measurements per 20 m or 30 m grid respectively, and are the recommended methodologies for archaeological surveys of this type [16].
- A.1.1.7 Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to

0.125 m intervals along traverses spaced up to 0.25 m apart, resulting in a maximum of 28800 readings per 30 m grid, exceeding that recommended by Historic England [16] for characterisation surveys.

A.2 Post-Processing

- A.2.1.1 The magnetic data collected during the detail survey are downloaded from the Bartington system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.
- A.2.1.2 As the scanning data are not as closely distributed as with detailed survey, they are georeferenced using the GPS information and interpolated to highlight similar anomalies in adjacent transects. Directional trends may be removed before interpolation to produce more easily understood images.
- A.2.1.3 Typical data and image processing steps for the non-magnetic cart fitted system may include:
- Smooth – Applying a smooth function removes any small scale spiking or ‘fuzziness’, generally caused by internal system noise. This effectively ‘destripes’ the data and reduces the appearance of dominant anomalous readings.
 - Spline interpolation – Gridding the data with splines allows the application of minimum and maximum data values and reduces oscillations for potential fields such as gravity or magnetic.
- A.2.1.4 Typical data and image processing steps for the dual magnetic gradiometer system may include:
- Destripe – Applying a zero mean traverse in order to remove differences caused by
 - directional effects inherent in the magnetometer;
 - Destagger – Shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
 - Despike – Filtering isolated data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings (generally only used for earth resistance data).
- A.2.1.5 Typical displays of the data used during processing and analysis:
- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies.
 - Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.

Appendix B GPR Survey Equipment and Data Processing

B.1 Survey methods and equipment

- B.1.1.1 The ground penetrating radar (GPR) data were collected using a cart mounted shielded antennae with central frequencies suitable for the types of target being investigated. Lower frequency antennae are able to acquire data from deeper below the surface, whereas higher frequencies allow high resolution imaging of near-surface targets at the expense of deep penetration. The exact make and model of equipment varies.
- B.1.1.2 The depth of penetration of GPR systems is determined by the central frequency of the antenna and the relative dielectric permittivity (RDP) of the material through which the GPR signal passes. In general, soils in floodplain settings may have a wide range of RDPs, although around 8 may be considered average, resulting in a maximum depth of penetration c. 2.5m with the GPR signal having a velocity of approximately 0.1m/ns.
- B.1.1.3 The GPR beam is conical in shape, however, and whilst most of the energy is concentrated in the centre of the cone, the GPR signal illuminates a horizontal footprint, which becomes wider with increasing depth. At the maximum depth of the antenna, it becomes impossible to resolve any feature smaller than the horizontal footprint for the corresponding depth. The size of the footprint is dependent upon central frequency, and its size increases as the central frequency decreases.
- B.1.1.4 The vertical resolution is similarly dependent upon the central frequency; for the 300MHz antenna, features of the order of 0.05m may be resolved vertically. Antennae with lower frequencies can therefore penetrate more deeply but are less resolute in both horizontal and vertical directions. Choice of antenna frequency is guided largely by the anticipated depth to the target and the required resolution.
- B.1.1.5 GPR data for detailed surveys are collected along traverses of varying length separated by 0.5m with cross lines collected running perpendicular to these traverses at wider separations. The data sampling resolution is governed by the data logger and a minimum separation of 0.05m between traces is collected for all surveys.

B.2 Post-Processing

- B.2.1.1 The radar data collected during the detail survey are downloaded from the GPR system for processing and analysis using commercial software (GPR Slice). This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.
- B.2.1.2 Typical data and image processing steps may include:
- Gain – Amplifies GPR data based upon its position in the profile, which boosts the contrast between anomalies and background. A wobble correction is also applied during this step;

- Background Filter - is used to remove banding noises that are seen across the radargrams
- Bandpass – Removes GPR data lying outside a specified range, which removes high- and low-frequency noise.

B.2.1.3 Typical displays of the data used during processing and analysis:

- Timeslice – Presents the data as a series of successive plan views of the variation of reflector energy from the surface to the deepest recorded response. The variation in amplitude is represented using a colour scale with red indicating high amplitude and blue indicating low amplitude responses.
- Radargram – Presents each radar profile in a vertical view with distance along the profile expressed along the x axis and depth along the y axis. The amplitude variation is expressed using a greyscale.

Appendix C Relative Velocity to depth conversion for GPR Areas 1 – 8

Table 5-1 Velocity values for all GPR Areas

Area	Velocity m/ns
SW2 – Area 1	0.108
SW2 – Area 2	0.107
SW1 – Area 3	0.099
SE1 – Area 4	0.102
SE1 – Area 5	0.106
SE1 – Area 6	0.101
SE1 – Area 7	0.107
SE1 – Area 8	0.105

Table 5-2 Relative velocity to depth conversion based on a dielectric constant of 9.0 for the 400 MHz antenna at SW2 – GPR Area 1

Time Slice	Time (ns)	Depth (cm)
1	0.0 - 2.34	0.0 – 0.13
2	2.16 – 4.5	0.12 – 0.24
3	4.32 – 6.65	0.23 – 0.36
4	6.47 – 8.81	0.35 – 0.48
5	8.63 – 10.97	0.47 – 0.59
6	10.79 – 13.13	0.58 – 0.71
7	12.95 – 15.29	0.70 – 0.83
8	15.11 – 17.45	0.82 – 0.94
9	17.27 – 19.60	0.93 – 1.06
10	19.42 – 21.76	1.05 – 1.18
11	21.58 – 23.92	1.17 – 1.29
12	23.74 – 26.08	1.28 – 1.41
13	25.90 – 28.24	1.4 – 1.52
14	28.06 – 30.40	1.52 – 1.64
15	30.22 – 32.55	1.63 – 1.76
16	32.37 – 34.71	1.75 – 1.87
17	34.53 – 36.87	1.86 – 1.99
18	36.69 – 39.03	1.98 – 2.11
19	38.85 – 41.19	2.1 – 2.22
20	41.01 – 43.16	2.21 – 2.33

Table 5-3 Relative velocity to depth conversion based on a dielectric constant of 7.86 for the 400 MHz antenna at SW2 – GPR Area 2

Time Slice	Time (ns)	Depth (cm)
1	0.0 – 2.54	0.0 – 0.13
2	2.29 – 4.83	0.11 – 0.24
3	4.58 – 7.12	0.23 – 0.35
4	6.87 – 9.41	0.34 – 0.47
5	9.16 – 11.7	0.45 – 0.58
6	11.45 – 13.99	0.57 – 0.69
7	13.74 – 16.28	0.68 – 0.81
8	16.03 – 18.57	0.79 – 0.92
9	18.32 – 20.86	0.91 – 1.03
10	20.61 – 23.15	1.02 – 1.15
11	22.9 – 25.44	1.13 – 1.26
12	25.19 – 27.73	1.25 – 1.37
13	27.48 – 30.02	1.36 – 1.49
14	29.77 – 32.31	1.47 – 1.6
15	32.06 – 34.6	1.59 – 1.71
16	34.35 – 36.89	1.7 – 1.83
17	36.64 – 39.18	1.81 – 1.94
18	38.93 – 41.47	1.93 – 2.05
19	41.22 – 43.76	2.04 – 2.17
20	43.51 – 45.8	2.15 – 2.27

Table 5-4 Relative velocity to depth conversion based on a dielectric constant of 8.88 for the 400 MHz antenna at SW1 – GPR Area 3

Time Slice	Time (ns)	Depth (cm)
1	0.0 -2.44	0.0 – 0.12
2	2.21 – 4.65	0.11 – 0.23
3	4.42 – 6.86	0.22 – 0.34
4	6.64 – 9.07	0.33 – 0.45
5	8.85 – 11.28	0.44 – 0.56
6	11.06 – 13.5	0.55 – 0.67
7	13.27 – 15.71	0.66 – 0.78
8	15.48 – 17.92	0.77 – 0.89
9	17.70 – 20.13	0.88 – 1.0
10	19.91 – 22.34	0.99 – 1.11
11	22.12 – 24.56	1.1 – 1.22
12	24.33 – 26.77	1.21 – 1.33
13	26.54 – 28.98	1.32 – 1.44
14	28.76 – 31.19	1.43 – 1.55
15	30.97 – 33.4	1.54 – 1.66
16	33.18 – 35.62	1.65 – 1.77
17	35.39 – 37.83	1.75 – 1.88
18	37.6 – 40.04	1.86 – 1.99

19	39.82 – 42.25	1.97 – 2.09
20	42.03 – 44.24	2.08 – 2.19

Table 5-5 Relative velocity to depth conversion based on a dielectric constant of 9.26 for the 400 MHz antenna at SE1 – GPR Area 4

Time Slice	Time (ns)	Depth (cm)
1	0.0 -2.44	0.0 – 0.12
2	2.2 – 4.64	0.11 – 0.24
3	4.4 – 6.84	0.22 – 0.35
4	6.61 – 9.04	0.34 – 0.46
5	8.81 – 11.24	0.45 – 0.57
6	11.01 – 13.45	0.56 – 0.69
7	13.21 – 15.65	0.67 – 0.80
8	15.42 – 17.85	0.79 – 0.91
9	17.62 – 20.05	0.90 – 1.02
10	19.82 – 22.26	1.01 – 1.14
11	22.02 – 24.46	1.12 – 1.25
12	24.22 – 26.66	1.24 – 1.36
13	26.43 – 28.86	1.35 – 1.47
14	28.63 – 31.06	1.46 – 1.58
15	30.83 – 33.27	1.57 – 1.70
16	33.03 – 35.47	1.68 – 1.81
17	35.23 – 37.67	1.80 – 1.92
18	37.44 – 39.87	1.91 – 2.03
19	39.64 – 42.08	2.02 – 2.15
20	41.84 – 44.04	2.13 – 2.25

Table 5-6 Relative velocity to depth conversion based on a dielectric constant of 8.24 for the 400 MHz antenna at SW1 – GPR Area 5

Time Slice	Time (ns)	Depth (cm)
1	0.0 -2.44	0.0 – 0.13
2	2.2 – 4.64	0.12 – 0.25
3	4.4 – 6.84	0.23 – 0.36
4	6.61 – 9.04	0.35 – 0.48
5	8.81 – 11.24	0.47 – 0.60
6	11.01 – 13.45	0.59 – 0.71
7	13.21 – 15.65	0.70 – 0.83
8	15.42 – 17.85	0.82 – 0.95
9	17.62 – 20.05	0.94 – 1.07
10	19.82 – 22.26	1.05 – 1.18
11	22.02 – 24.46	1.17 – 1.30
12	24.22 – 26.66	1.29 – 1.42

13	26.43 – 28.86	1.40 – 1.53
14	28.63 – 31.06	1.52 – 1.65
15	30.83 – 33.27	1.64 – 1.77
16	33.03 – 35.47	1.76 – 1.88
17	35.23 – 37.67	1.87 – 2.00
18	37.44 – 39.87	1.99 – 2.12
19	39.64 – 42.08	2.11 – 2.24
20	41.84 – 44.04	2.22 – 2.34

Table 5-7 Relative velocity to depth conversion based on a dielectric constant of 9.13 for the 400 MHz antenna at SE1 – GPR Area 6

Time Slice	Time (ns)	Depth (cm)
1	0.0 - 2.44	0.0 – 0.12
2	2.16 – 4.6	0.11 – 0.23
3	4.33 – 6.76	0.22 – 0.34
4	6.49 – 8.93	0.33 – 0.45
5	8.65 – 11.09	0.44 – 0.56
6	10.82 – 13.25	0.55 – 0.67
7	12.98 – 15.41	0.66 – 0.78
8	15.14 – 17.58	0.77 – 0.89
9	17.31 – 19.74	0.88 – 1.0
10	19.47 – 21.9	0.99 – 1.11
11	21.63 – 24.07	1.10 – 1.22
12	23.79 – 26.23	1.21 – 1.33
13	25.96 – 28.39	1.31 – 1.44
14	28.12 – 30.56	1.42 – 1.55
15	30.28 – 32.72	1.53 – 1.66
16	32.45 – 34.88	1.64 – 1.77
17	34.61 – 37.05	1.75 – 1.88
18	36.77 – 39.21	1.86 – 1.99
19	38.94 – 41.37	1.97 – 2.10
20	41.1 – 43.26	2.08 – 2.19

Table 5-8 Relative velocity to depth conversion based on a dielectric constant of 8.88 for the 400 MHz antenna at SW1 – GPR Area 7

Time Slice	Time (ns)	Depth (cm)
1	0.0 - 2.44	0.0 – 0.13
2	2.18 – 4.62	0.12 – 0.25
3	4.37 – 6.80	0.23 – 0.36
4	6.55 – 8.98	0.35 – 0.48
5	8.73 – 11.17	0.47 – 0.60
6	10.91 – 13.35	0.58 – 0.71

7	13.10 – 15.53	0.70 – 0.83
8	15.28 – 17.71	0.82 – 0.95
9	17.46 – 19.90	0.93 – 1.06
10	19.64 – 22.08	1.05 – 1.18
11	21.83 – 24.26	1.17 – 1.30
12	24.01 – 26.45	1.28 – 1.41
13	26.19 – 28.63	1.4 – 1.53
14	28.37 – 30.81	1.51 – 1.64
15	30.56 – 32.99	1.63 – 1.76
16	32.74 – 35.18	1.75 – 1.88
17	34.92 – 37.36	1.86 – 1.99
18	37.11 – 39.54	1.98 – 2.11
19	39.29 – 41.72	2.1 – 2.23
20	41.47 – 43.65	2.21 – 2.33

Table 5-9 Relative velocity to depth conversion based on a dielectric constant of 8.65 for the 400 MHz antenna at SE1 – GPR Area 8

Time Slice	Time (ns)	Depth (cm)
1	0.0 - 2.34	0.0 – 0.12
2	2.20 – 4.54	0.11 – 0.24
3	4.39 – 6.73	0.23 – 0.35
4	6.59 – 8.93	0.34 – 0.47
5	8.79 – 11.13	0.46 – 0.58
6	10.99 – 13.33	0.57 – 0.70
7	13.18 – 15.52	0.69 – 0.81
8	15.38 – 17.72	0.80 – 0.93
9	17.58 – 19.92	0.92 – 1.04
10	19.78 – 22.11	1.03 – 1.16
11	21.97 – 24.31	1.15 – 1.27
12	24.17 – 26.51	1.26 – 1.39
13	26.37 – 28.71	1.38 – 1.50
14	28.56 – 30.90	1.49 – 1.61
15	30.76 – 33.10	1.61 – 1.73
16	32.96 – 35.30	1.72 – 1.84
17	35.16 – 37.50	1.84 – 1.96
18	37.35 – 39.69	1.95 – 2.07
19	39.55 – 41.89	2.07 – 2.19
20	41.75 – 43.95	2.18 – 2.30

Appendix D Geophysical Interpretation

D.1.1.1 The interpretation methodology used by Wessex Archaeology separates the anomalies into four main categories: archaeological, modern, agricultural and uncertain origin/geological.

D.1.1.2 The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Possible archaeology – used for features which give a response but which form no discernible pattern or trend.

D.1.1.3 For the interpretation of GPR datasets two additional categories are also employed:

- High Amplitude – used for features which give a notably high amplitude response but display no discernible patterns.
- Low Amplitude – used for features which give a notably low amplitude response but display no discernible patterns.

D.1.1.4 The modern category is used for anomalies that are presumed to be relatively modern in date:

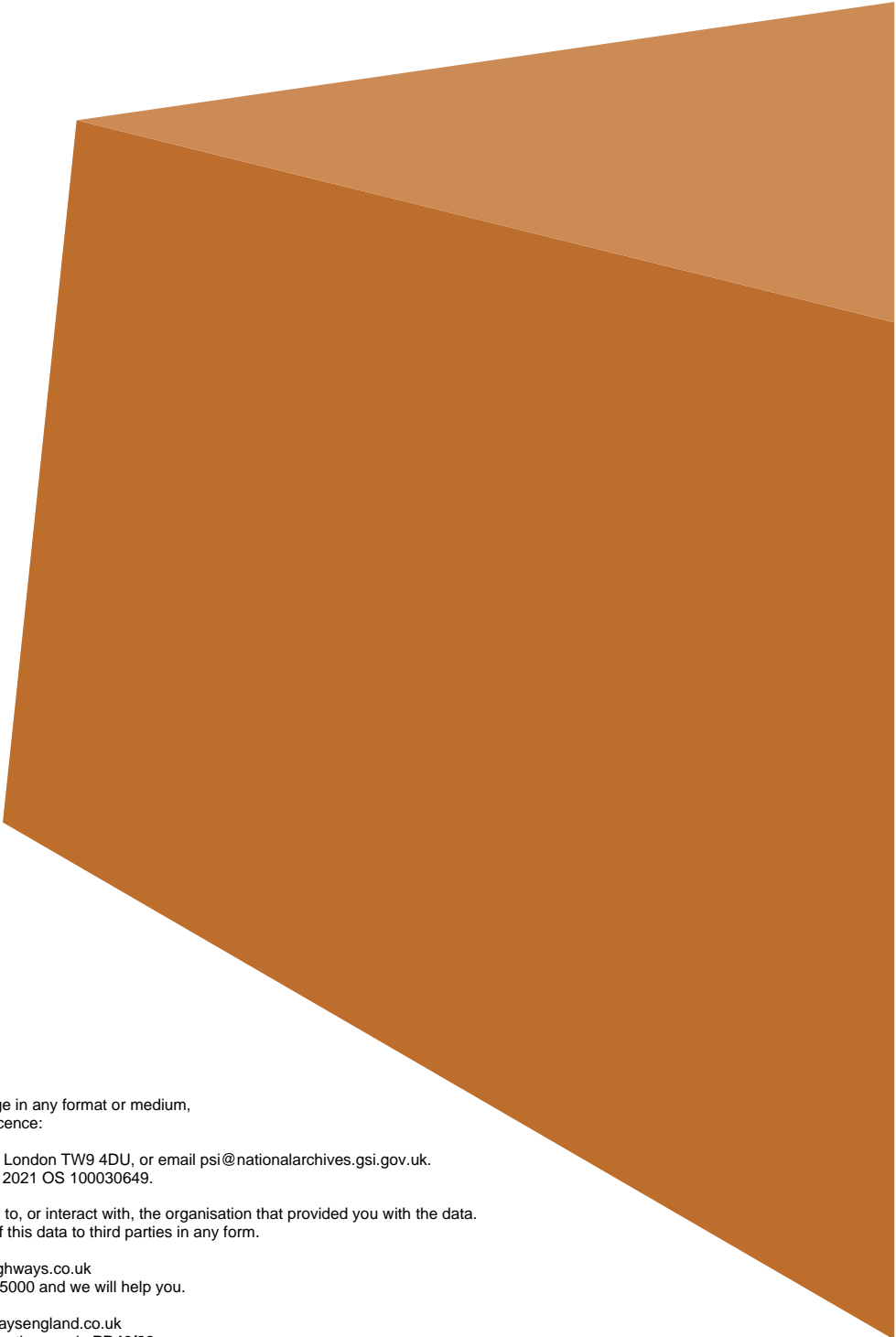
- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Coherent ferrous – used for anomalies caused by ferrous material that can be directly linked to a specific or known modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

D.1.1.5 The agricultural category is used for the following:

- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

D.1.1.6 The uncertain origin/geological category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative or broad bipolar (positive and negative) anomalies.



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