Castle Hill, Laughton-en-le-Morthern, Non-invasive Survey.

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Report produced on behalf of Dr Duncan Wright

Work funded by Castle Studies Trust.

Castle Studies Trust
Advancing the Understanding of Castles

Non-technical summary

Over four days in March and April 2018 two forms of non-invasive archaeological assessment were carried out on three areas of open ground associated with the castle and settlement of Laughton-en-le-Morthern. The work was done on behalf of Dr Duncan Wright and was funded by the Castle Studies Trust. The primary aim of the work was to assess the potential survival of archaeological features in: the scheduled area comprising the motte and inner castle bailey, as indicated by the substantial upstanding earthworks (area A); the area to the south of the castle motte which may have comprised another bailey or enclosure associated with the castle (area B); and a large paddock belonging to Old Hall farm, which constituted the largest area of open street frontage available for survey. The scheme consisted of an earth resistance survey, undertaken by Sam Bromage and Duncan Wright and focussed within the three areas outlined above. This was augmented by a topographical survey carried out by Adam Stanford, of Aerial-Cam Ltd and SUMO Aerial Surveys, using aerial photogrammetric data collected via drone.

The work confirmed the presence of potential features in all three of the investigated areas. Of particular note is the sub-rectangular linear feature identified in Area B which may well indicate the presence of structural remains, possibly pre-dating the construction of the upstanding scheduled earthworks. Further anomalies likely indicating features contemporary to the castle's occupation were identified in area A; whilst in Area C to the east a number of anomalies suggestive of potentially significant features were also identified, despite difficult ground conditions.

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Acknowledgements

The project would like to thank Dr Hugh Willmott for his help in carrying out the fieldwork. Thanks is also due to the landowners who granted the project access to their property; Mr Mark Ferris and family for their time and enthusiasm whilst work was being done on the castle site and in their garden, and Mr Charlie Shepard for his kind cooperation during the survey of the Old Hall Farm paddock.

1. Introduction

Over four days in March and April 2018 a non-invasive archaeological assessment was carried out on land associated with the castle and settlement of Laughton-en-le-Morthern, Rotherham, South Yorkshire. The scheme of works comprised an earth resistance survey, undertaken by Sam Bromage and Duncan Wright, focussed within three distinct investigation areas (figure 1). This survey was augmented by a topographical survey carried out by Adam Stanford, of Aerial-Cam Ltd and SUMO Aerial Surveys, using aerial photogrammetric data collected via drone.

1.1 Site location and topography

The castle (OS NGR SK 51615 88203) is located at the western limit of the village of Laughton-en-le-Morthern, immediately to the west of the church of All Saints. The paddock belonging to Old Hall Farm (OS NGR SK 51751 88127) is situated approximately 150m to the east of the castle and makes up a substantial portion of the village's main street frontage (see figure 1).

The land which constitutes areas A and B is largely level apart from the obvious extant earthworks and sits at approximately 133m above ordnance datum (aOD), rising slightly to the south. The paddock is again largely level at 132m aOD, but drops off to the north via a steep bank down to a height of 129m aOD.

1.2 Soils, geology and land-use

The site is situated on a prominent outcrop of sedimentary dolostone bedrock (British Geological Survey 2018). No superficial geology is recorded but the soil type across all three investigation areas can be described as a slowly permeable, seasonally wet, acid loamy clay (Cranfield University 2018).

In terms of land-use each of the three investigation areas currently has a different utility. Area A comprises the scheduled area and so is not productively exploited, but is maintained by the landowner. Area B is not scheduled and is maintained as a large recreational garden, incorporating planted beds, trees and areas of open lawn. Area C is a paddock belonging to Old Hall Farm and is regularly utilised as pasture for cattle.

2. Archaeological and Historical Background

The village of Laughton-en-le-Morthern predates the Norman conquest and there is reference in Domesday to a hall or manor belonging to Earl Edwin of Mercia. The settlement was of regional significance occupying a prominent point in the landscape, overlooking the Rother Valley to the north and commanding a near 360° view over the surrounding area. The church of All Saints, substantially re-developed in the 14th century, is also Saxon in origin and a pre-conquest porticus survives in the form of the present church's north door (Ryder 1982, 71-2).

The proximity of the Saxon church to the Norman castle site makes it likely that this was also the location for the earlier Saxon hall. It is possible that the hall, and perhaps the church, were slighted at some point before 1070 following Edwin's active resistance to the conquest and his role in the northern revolt of 1068 (Holland 1969, 2; Thomas 2008, 148). The castle was likely established in its motte and bailey form soon after this, once it had been granted to Roger de Busli, who developed the holding as part of the Honour of Tickhill (Historic England 2018).

The castle site was first scheduled in 1928 with the most recent amendment to that scheduling taking place in 1991. This was in acknowledgement of the castle at Laughton-en-le-Morthern being one of the best preserved motte and bailey sites in the region, despite the loss of much of the outer bailey, and so being of considerable archaeological potential. Historic England have also noted the specific importance of the site in that, being largely undisturbed, earlier Saxon deposits may also survive *in situ* (Historic England 2018).

Following the abandonment of the castle, the focus of power in Laughton apparently migrated to the manor house immediately to the south. The developmental history of the manor is not explicitly evident, although there was clearly a substantial post-medieval house situated immediately to the north of the current Old Hall Farm. The platform of this house is still present as a clear earthwork.

There has been no direct excavation or survey of any of the investigation areas examined as part of this project. However, in 2007 an archaeological evaluation was carried out at Rectory Farm by Archaeological Services WYAS ahead of the construction of a residential development. This identified a series of Saxon and medieval features and recovered artefacts potentially indicative of nearby high status occupation (WYAS 2007).

3. Aims and Objectives

The primary aim of this scheme of non-invasive survey was to ascertain the specific archaeological potential of the three investigation areas, highlighting any likely features. Specifically, the scheme was designed to quickly and effectively assess the likely survival of any structural remains relating to the Saxon or medieval occupation of the site.

This project has also served as a 'proof of concept' trial for this method of archaeological prospection in relation to the identification of Saxon sites otherwise obscured by subsequent Norman development. The success of this secondary aim will not be commented on further here, but will be fully examined in a subsequent report.

4. Methodology

This section will outline the methodology used in carrying out the earth resistance survey, and in the processing of its results. All work has been done in line with the accepted English Heritage guidelines (English Heritage 2008)

As a third party carried out the topographical survey, the methodology used will not be commented on, but its results will be referred to in the following section (see section 5).

4.1 Environmental conditions, resultant problems and solutions

The weather conditions varied significantly over the course of the survey. Area A was surveyed in the dry following a day of heavy rain, area B in torrential rain, and area C on a very hot, dry day.

The ground conditions were consistent across areas A and B, both being covered with a reasonable depth of topsoil with few obvious inclusions. Area C was again well covered with topsoil but the ground was very stony, especially in its northern-most third. This resulted in a high proportion of 'false' readings being recorded where the superficial soil inclusions affected the apparent earth resistance.

The issue was compensated for to some extent in processing by carrying out a manual de-spike, where 'false' readings were normalised to the readings immediately adjacent to them, prior to further processing. Although not ideal, this did render the area C data set usable if not as clear, or as reliable, as the data sets recorded for areas A and B.

4.2 Techniques and equipment used

4.2.1 Earth resistance

An earth resistance survey effectively uses a resistance meter to measure the resistance offered by the ground at a specific point when an electrical current is passed through it. In broad terms the lower the moisture content of the soil the higher the resistance and vice versa. If a number of points are taken across an area the individual readings can be combined and represented to give a geo-referenced, grey-scale readout indicating areas of high or low resistance, usually described as anomalies (For a more in-depth description see English Heritage 2008).

4.2.2 The equipment

The resistance meter used for this survey was an RM Frobisher TAR-3, incorporating a mobile twin probe array. The mobile twin probes were set at a fixed separation of 0.5m and the static probes were located at least 15m outside of the grid being surveyed. When the static probes required moving, a control reading was taken to ensure that once moved the background resistance remained consistent.

4.2.3 Resolution

The survey was carried out at a resolution of 0.25m along 1m transects. Effectively meaning that across a 20m by 20m grid there would be 20 transects and 80 points taken along each transect. This is a very high resolution for resistance survey and one that results in a read-out that appears as though it is made up of a series of 'letterbox' pixels. This can be problematic for interpretation so it is usual to interpolate the final readout so as to produce a smoother image.

4.2.4 Grid layout and recording

The three investigation areas were approached independently in terms of grid layout, this is visualised in figure 2. Across the survey three separate sizes of grid were used, one 10m by 10m grid on top of the motte (A2), ten complete and three partial 20m by 20m grids across areas B and C (B1, B2, C1 to C11), and one 30m by 30m grid in the inner bailey (A1). The positions of these grids were recorded using a GPS enabled drone camera, allowing the incorporation of the grid layout into a GIS model.

4.2.4 Processing and presentation

All data was recorded and subsequently downloaded. Once downloaded all data processing was done using the geophysics processing freeware Snuffler v1.21 (Sussex Archaeology © 2001-2016). Each data set underwent an initial manual de-spike removing obvious outliers, replacing them with readings appropriate to adjacent readings. They were then passed through an automated de-spike filter, which replaced any remaining outliers with either the maximum or minimum readings across the dataset. Following this the data was either clipped or de-spiked again, depending on the effectiveness of the first filter. Finally the data was interpolated once to reduce interpretive bias that may result from the high resolution of the survey.

This data was then presented using ESRI ArcMap v10.4.1 (ESRI Inc. © 1999-2015). All data sets were geo-referenced using an ordnance survey base map.

5. Results

This section will present the results of the earth resistance survey already described (figure 3). Where possible it will also compare those results with any relevant earthworks identified from provisional analysis of the digital topographical model (figure 4).

5.1 Area A - Scheduled area, including the extant earthworks of the motte and inner bailey

A 30m by 30m grid was surveyed within the inner bailey (figure 2, A1), whilst readings were also taken from a single 10m by 10m grid situated on the motte's top (figure 2, A2). The results of these two surveys are presented in detail in figure 5.

Numerous high resistance anomalies were identified in grid A1, indicating the presence of both linear and discrete features. Three of these anomalies can be attributed to either the extant bank which defines the inner bailey to the north, east and west, or the ditch which rings the motte and limits the inner bailey to the south (figure 5, HR1). Any discrepancy between the location of these anomalies and the upstanding earthworks could indicate deposits of associated eroded material.

Two interesting parallel feature were identified running east to west across the middle of the surveyed area (figure 5, HR2 and HR3). This comprised a linear high resistance anomaly (figure 5, HR3), punctuated by a series of discrete higher resistance anomalies which are mirrored by a parallel line of likely associated high resistance anomalies to the south (figure 5, HR2). These all correlate with a continuous earthwork, evident both on the ground and on the topographic survey which apparently continues beyond the extent of the surveyed area to the west.

Two further high resistance anomalies were also identified (figure 5, HR4 and HR5). Both of these are discrete and it is uncertain as to what they may represent, however both correlate approximately to slightly raised, irregular features, evident both on the ground and on the topographic survey. It is possible that these are archaeological but the shallow depth of topsoil observed throughout the village and the high frequency of bedrock outcrops across the site, might suggest that they are instead geological.

There were two low resistance anomalies identified (figure 5, LR1 and LR4); The first of these comprised a linear running approximalte north-south and turning at right angles to the west, reducing in strength; the second is a linear narrower than the first that again runs approximately east-west but which pis apparently limited by the

bailey enclosure. Most likely these are archaeological in nature and it is possible that they indicate the presence of one or more structures or phases of construction.

The only other identified anomalies in grid A1 were a number of distinct areas of low resistance (figure 5, LR2), which if archaeological likely represent some form of discrete cut feature.

Two anomalies were identified in grid A2 on top of the motte, one high resistance and one low resistance. The high resistance anomaly (figure 5, HR6), irregular in shape and situated towards the centre of the motte, is likely related to its construction. The low resistance anomaly (figure 5, LR3), is still irregular but may be considered curvilinear, possibly representing a returning linear cut feature. Unfortunately the steep sided motte made any further survey impossible.

5.2 Area B - Garden outside of the scheduled area

Two adjacent grids were surveyed in this area, each measuring 20m by 20m (figure 2, B1 and B2). The results of this survey are presented in detail in figure 6.

The only high resistance anomaly of note covers much of the south-western portion of the survey area (figure 6, HR1). It may be geological, being close to a severe drop to the west (figure 3), however it may also be evidence of a now levelled earthwork similar to that that still rings the northern bailey.

Cutting through this high resistance feature are two near-parallel low resistance features (figure 6, LR1). These are likely archaeological and probably represent two linear cut features of unknown utility. A further curvilinear anomaly also apparently cuts the area of high resistance (figure 6, LR2), although this is much less distinct than either of the two parallel anomalies.

The most intriguing anomaly identified in area B is a complex linear, which runs east - west, and then turns north before returning back on itself to the east (figure 6, LR3). It seems likely that this feature is associated with a structure of similar shape, although no associated earthworks are evident. This may be due to comparatively recent landscaping, associated with the maintenance of a residential property and its garden. If true this may also explain why the feature becomes less distinct in the north-eastern portion of the surveyed area, the area closest to the house.

There are also two discrete instances of very low resistance (figure 6, LR4), however no associated earthworks have so far been identified.

5.3 Area C - Paddock belonging to Old Hall Farm

Area C constituted the majority of the total area surveyed comprising eight full and three partial 20m by 20m grids. As already described in section 4.1 the ground conditions did impact negatively on the results of the earth resistance survey of this area, however it was still possible to identify a number of anomalies. These anomalies are detailed in figure 7.

Towards the southern end of the paddock were a number of interrelated anomalies, both of high and low resistance. The first of the two low resistance features is a narrow, regular linear, turning to form three sides of a rectangle and orientated approximately northeast – southwest (figure 7 LR1). The second low resistance anomaly is a curvilinear (figure 7, LR2), which intersects the southernmost side of the rectilinear already described. This encloses an area of higher resistance (figure 7, HR4). Finally there is a further area of higher resistance to the northeast of these (figure 7, HR1), which is both regular and sub-rectangular. None of these features correlate with any evident earthworks, though all are suggestive of potential archaeological features.

The central portion of the study area is dominated by several irregular low resistance anomalies and two large high resistance anomalies (figure 7, LR3 and HR2). These are indistinct but correlate with a series of earthworks that were noted both on the ground and in the topographic survey.

Immediately to the north of these features is an area of distortion caused by the land dropping away steeply to the north. The reason for this slope is unclear although it is very regular in both shape and angle, approximately mirroring a land division indicated on early 20th century OS mapping.

The northern-most portion of the area was the most affected by the adverse ground conditions but an area of high resistance and two low resistance anomalies can still be identified (figure 7, LR4 and HR3). The area of high resistance is irregular but does correlate with an earthwork identified by the topographical survey but which was not evident on the ground. The two low resistance anomalies are both irregular curvilinears and may be archaeological, representing moderately sized cut features.

6. Summary

In summary, this non-invasive archaeological assessment of land associated with the castle and settlement of Laughton-en-le-Morthern has demonstrated that there is significant potential for the survival of *in situ* archaeological remains. All three of the specific investigation areas produced results suggestive of structural remains, as well as other more ambiguous anomalies. The detailed topographic survey provided another level of information which may be further applied to the interpretation of this site in subsequent reports, but which has been useful as a comparative tool during the composition of this initial assessment. In order to properly understand the results of this project it is advised that a scheme of excavation be carried out, in order to determine the nature, date and chronology of the potential features described above.

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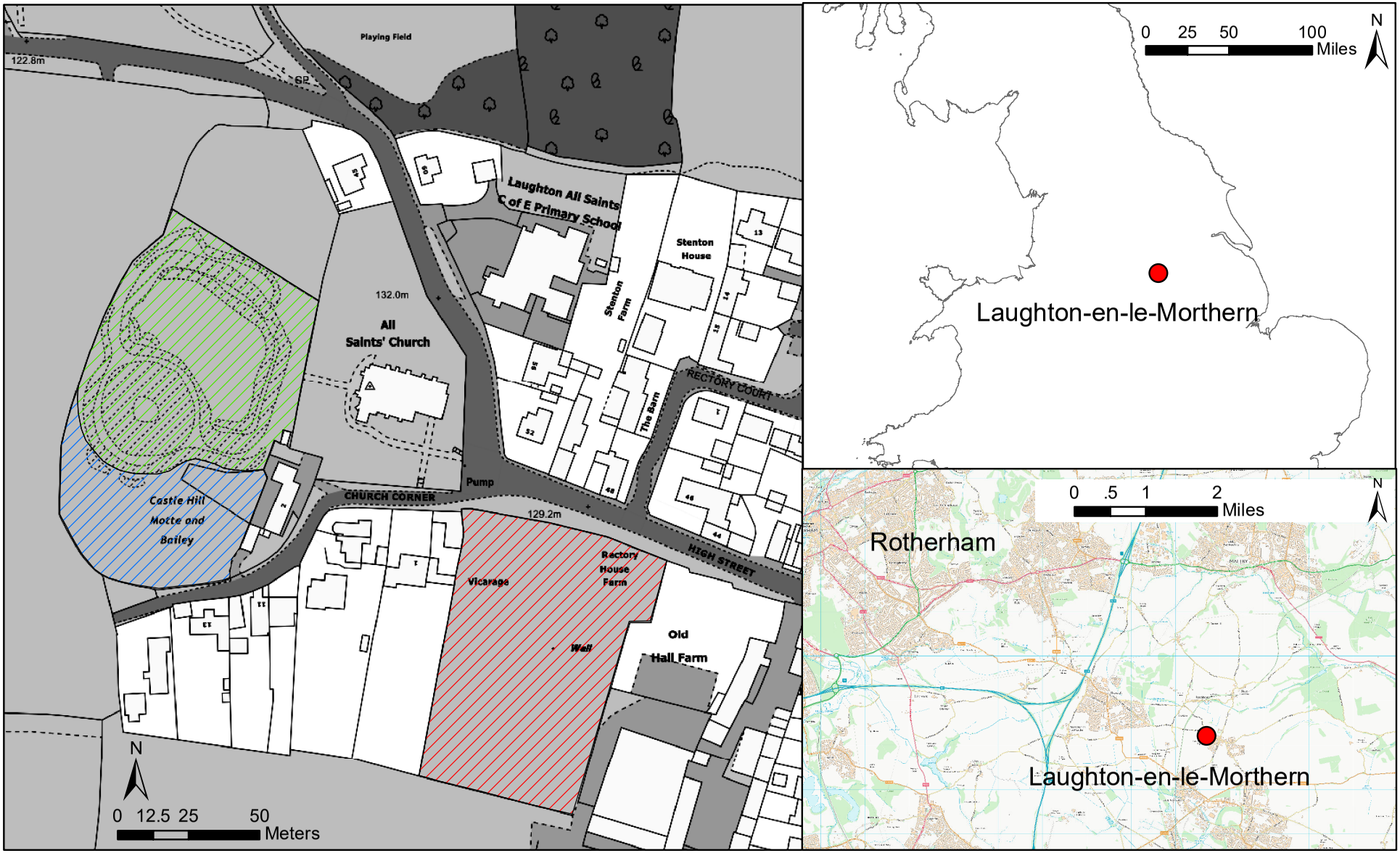
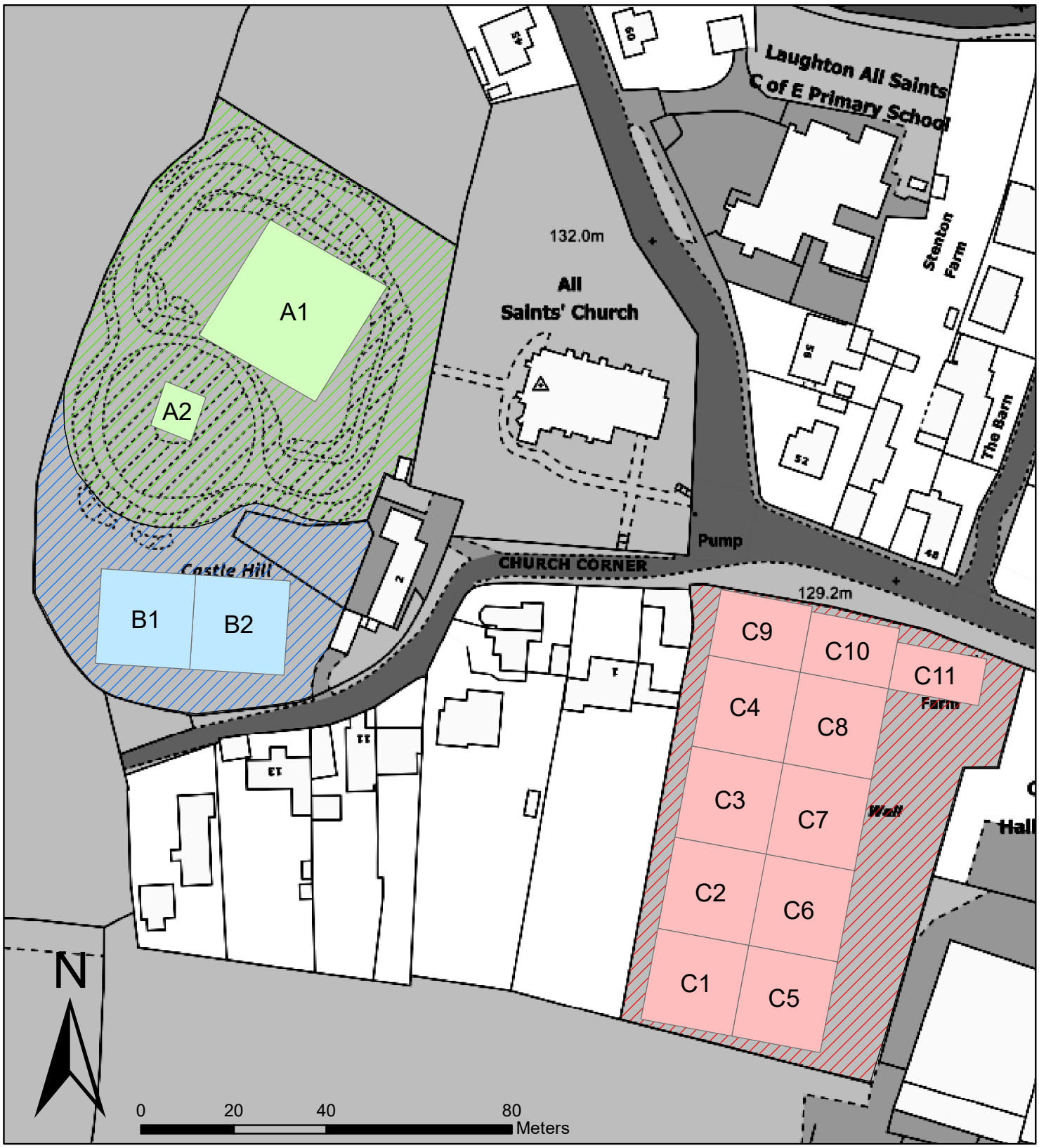


Investigated Areas

- Area A - Scheduled area, including earthworks of motte and inner bailey
- Area B - Garden outside of scheduled area
- Area C - Old Hall Farm paddock

Figure 1: The national and regional location of Laughton-en-le-Morthern, as well as the specific locations of the three investigated areas.



Investigated Areas

- Area A - Scheduled area, including earthworks
- Area B - Garden outside of scheduled area
- Area C - Old Hall Farm paddock

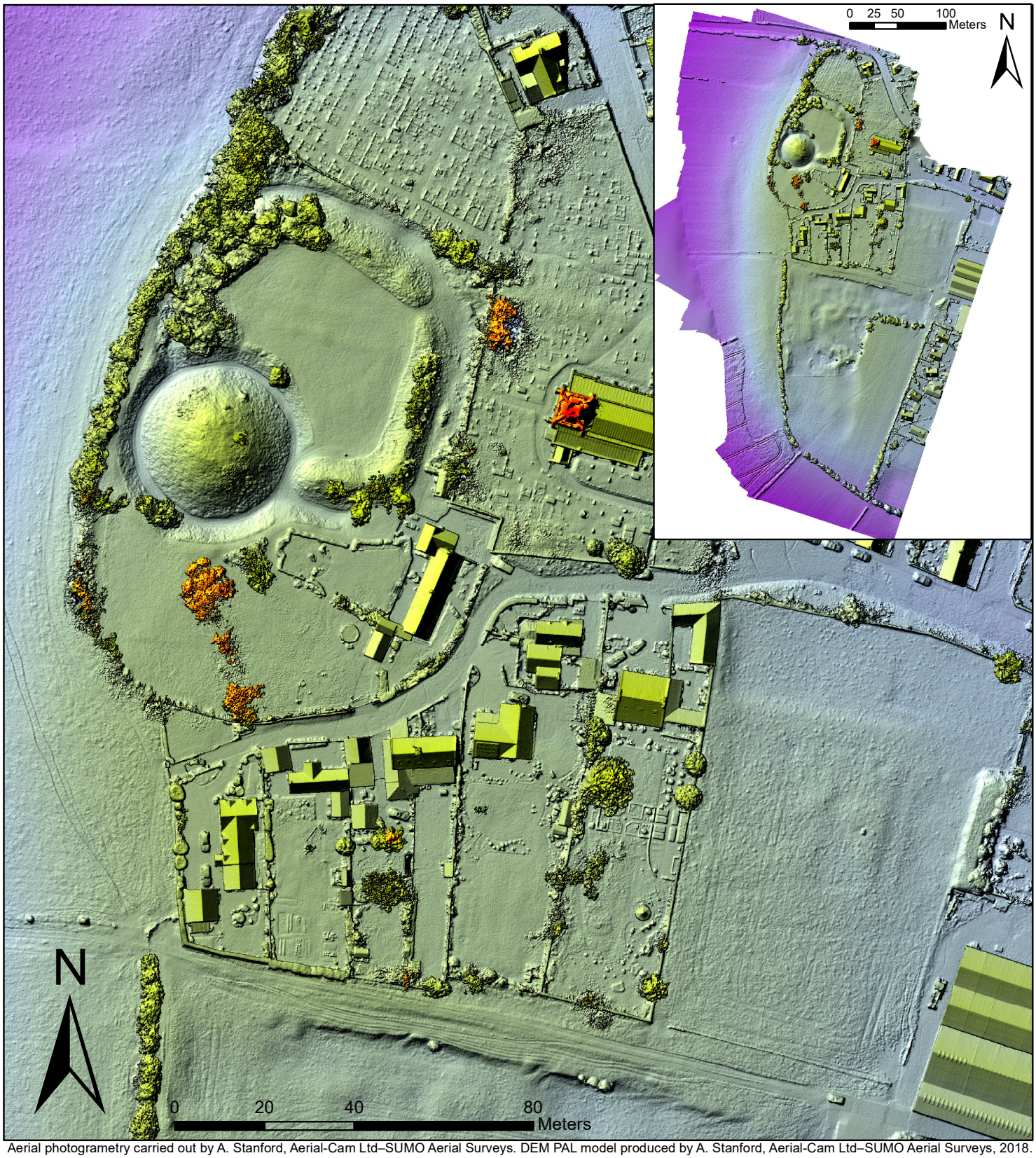
Figure 2: The three investigated areas with the layout of the earth resistance survey grids overlain.

Background mapping based upon LCM2015 © NERC (CEH) 2011. Contains Ordnance Survey data © Crown Copyright 2007, Licence number 100017572.

Investigated Areas

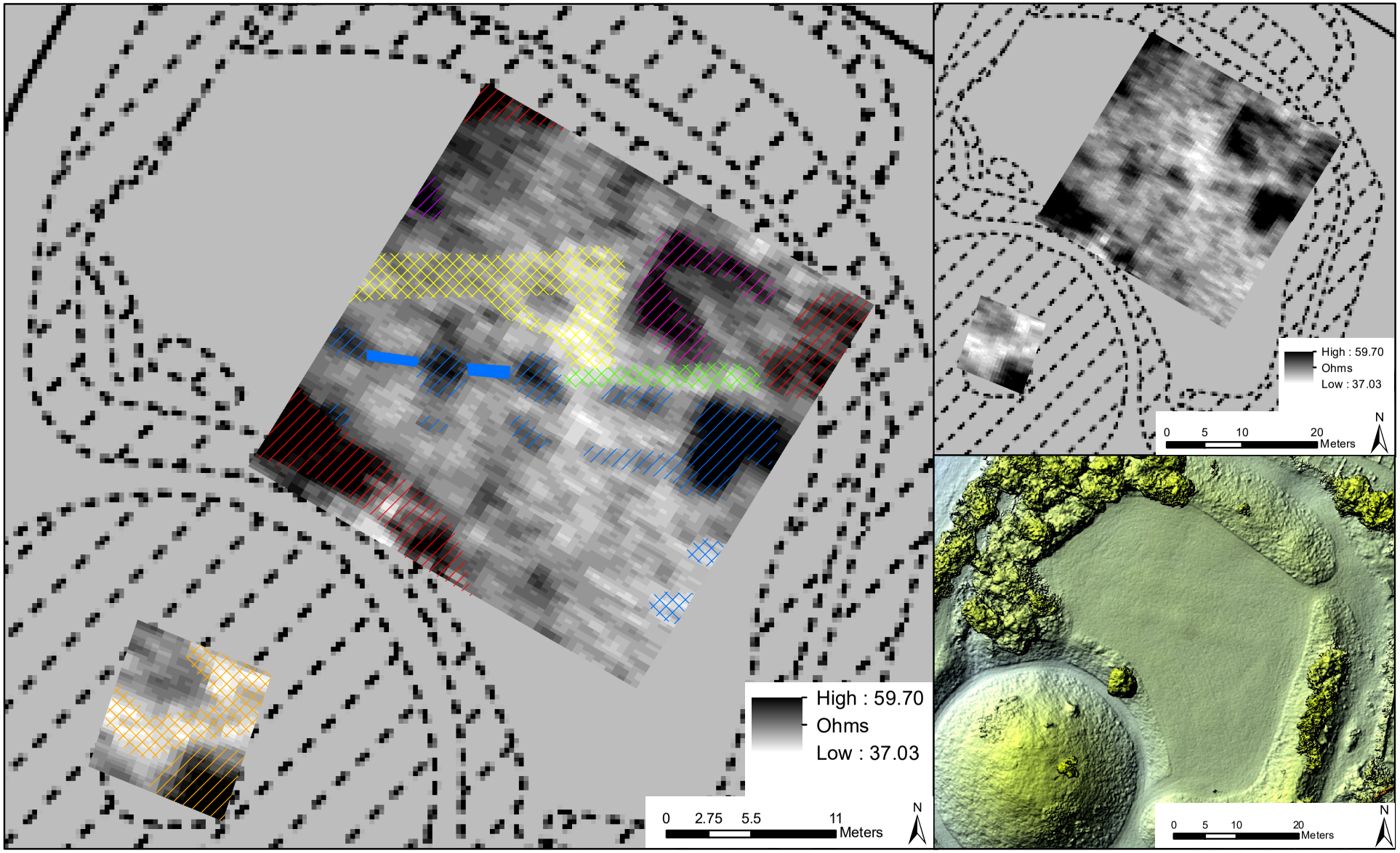
- Area A - Scheduled area, including earthworks
- Area B - Garden outside of scheduled area
- Area C - Old Hall Farm paddock

Figure 3: The three investigated areas with the results of the earth resistance survey overlain.



Aerial photogrametry carried out by A. Stanford, Aerial-Cam Ltd–SUMO Aerial Surveys. DEM PAL model produced by A. Stanford, Aerial-Cam Ltd–SUMO Aerial Surveys, 2018.

Figure 4: A 3D digital elevation model (DEM) of the three investigation areas. Inset, an overview of the whole survey, it is worth noting the pronounced escarpment on which Laughton-en-le-Morthern is situated.



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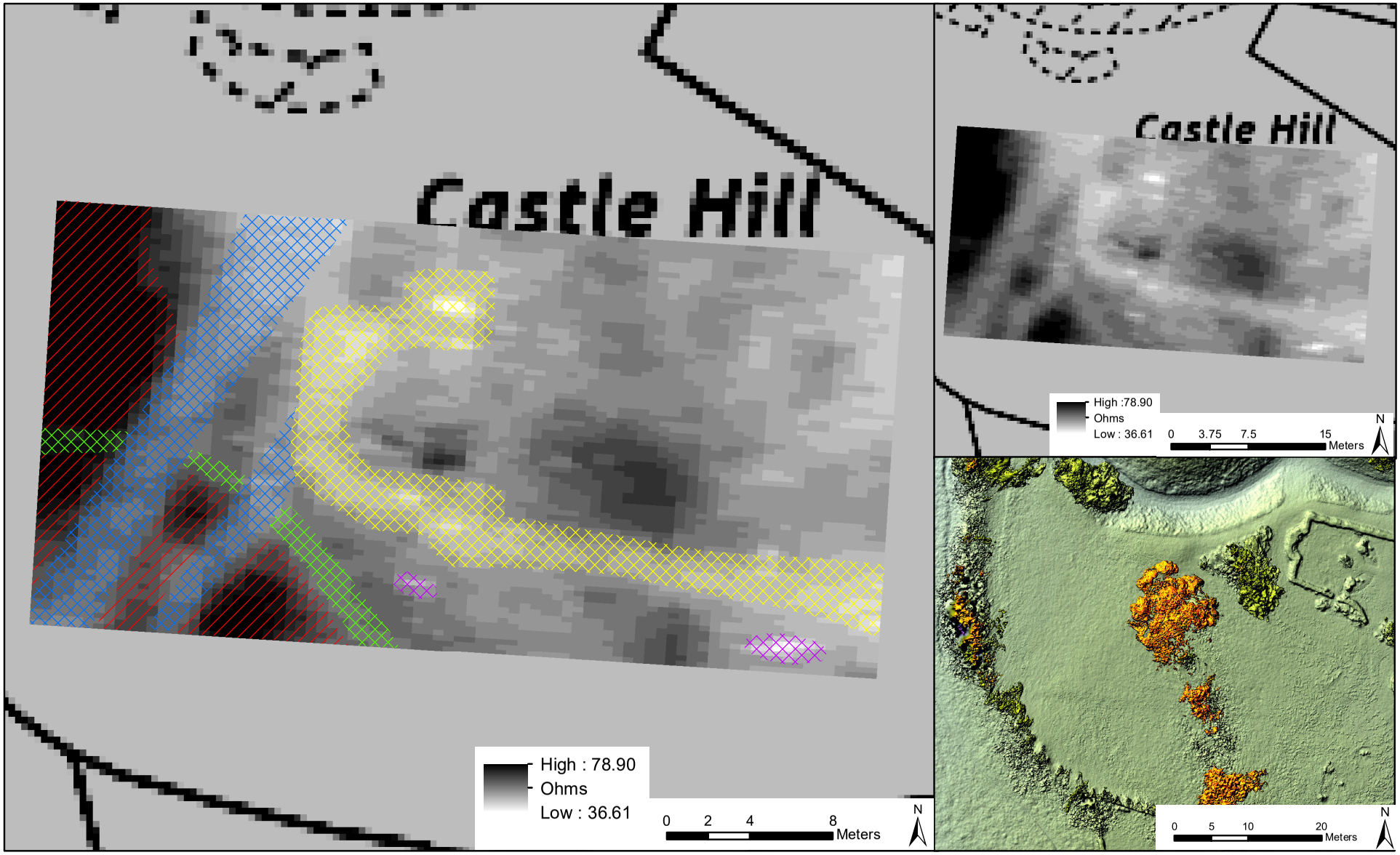
High and Low resistance features

HR 1 HR5 LR3
HR2 HR6 LR4
HR3 LR1
HR4 LR2

Figure 5: The results of the earth resistance survey of area A with High resistance (HR) and low resistance (LR) anomalies overlain. Inset top, the results of the earth resistance survey of area A. Inset bottom, a 3D representation of the DEM of area A.



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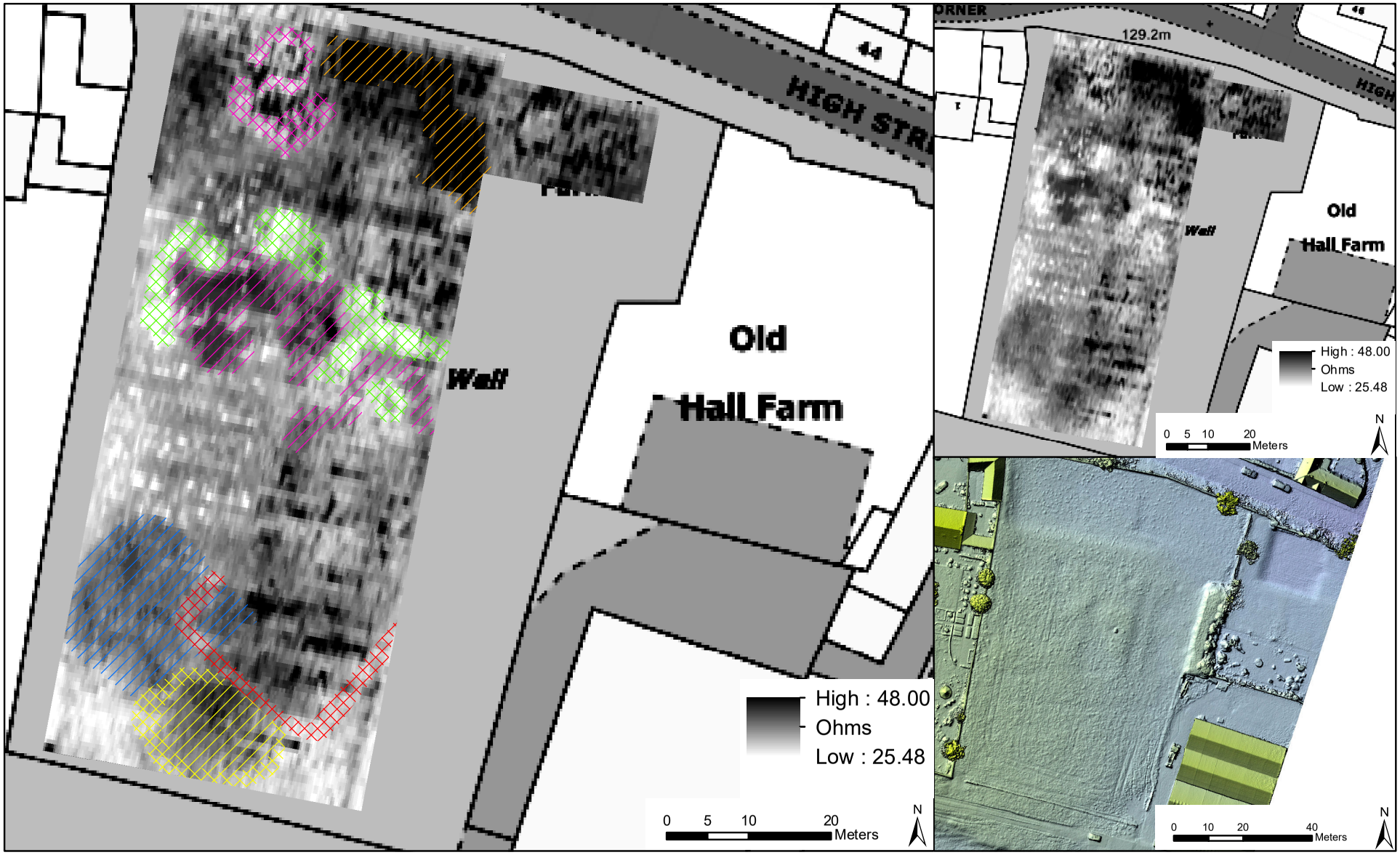
High and Low Resistance Anomalies

HR1
LR1
LR2
LR3
LR4

Figure 6: The results of the earth resistance survey of area B with high resistance (HR) and low resistance (LR) anomalies overlain. Inset top, the results of the earth resistance survey of area B. Inset bottom, a 3D representation of the DEM of area B.



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High and Low Resistance Anomalies

LR1 LR4 HR3
LR2 HR1 HR4
LR3 HR2

Figure 7: The results of the earth resistance survey of area C with high resistance (HR) and low resistance (LR) anomalies overlain. Inset top, the results of the earth resistance survey of area C. Inset bottom, 3D representation of the DEM of area C.

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