



Geophysical Survey Report No. 37

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Cranfield Church, Co. Antrim

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With Ruth Logue & Grace McAlister



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Summary of results

An evaluation resolution electrical resistance survey was carried out over a total area of 0.14 hectares in the vicinity of Cranfield Church (ANT 049:049), Co. Antrim. The underlying Basalt geology prohibited the application of magnetic gradiometry.

Two areas were surveyed. Area A (c. 1,200 m²) is located to the west of the early Christian church site. The long, narrow survey area will hopefully intersect the path of any ecclesiastical enclosure still remnant as sub-surface features. These enclosing features, often ditches, banks or palisades, often encompass some Early Medieval church sites. Electrical resistivity should identify the water-logged fill of a cut ditch feature or higher resistance material associated with a bank or stony ditch fill. Area B (c. 160 m²) is a narrow strip of electrical resistance survey immediately to the north of the church. Local tradition records a tunnel running, south to north, from the north of the church to the enclosing bank. This is associated on the ground with an area of grass parching during hot weather. The immediate conclusion is that this may be a souterrain. The multiple, parallel probe array (1m + 0.5m x 2) will allow two depths of resistivity readings to be gathered simultaneously. Together it is hoped that this probe array will identify any hollows at a depth usually associated with souterrains.

Evidence for archaeologically significant geophysical responses were limited. However a coupling of high and low resistivity readings (A_2 & A_5) to the northern limit of area A could be the remnants of an enclosing bank and ditch which focuses on the early church site.

Site Specific Information

Site Name: Cranfield Church

Townland: Cranfield

SMR No: ANT 049:049

Grid Ref: J 05446 85245

County: Antrim

Date of Survey: 28th November – 2nd December 2016

Surveyors Present: Siobhán McDermott, Grace Macalister & Ruth Logue Centre for Archaeological Fieldwork, School of Natural and Built Environment, Queens University, Belfast.

Size of area surveyed: 0.14 hectares

Weather conditions: Mild

Solid Geology: Upper Basalt Formation: Antrim Lava Group

Drift Geology: Diamicton till

Current Land Use: Pasture and graveyard

Intended Land Use: N/a

Survey methodology overview

*Survey type:*¹

Electrical resistance

Instrumentation:

Geoscan RM85

Probe spacing:

One meter beam with multiple three probe array taking three readings (1m + 0.5m x 2)

Grid size:

30m x 30m

Traverse interval:

1m/0.5m

Sample Interval:

1m

Traverse Pattern:

Zig-zag

Lecia CS15 differential GNSS

Survey grid setup:

Established with differential GNSS

Survey Internal Accuracy:

Survey grade accuracy (<3cm)

Georeferencing:

The EDM data will be used to georeference the geophysical survey datasets exported from Geoplot v.3 in ArcMap 10.3.

Data processing:

The geophysical data was processed in Geoplot v. 3 software. The primary processes applied were high pass filtering (HPF) to remove geological 'background' noise and low pass filtering (LPF) which helps to eradicate minor spikes in the data. The datasets were also interpolated which creates a smoothing effect.

Visualisations:

The datasets were visualised within Geoplot v.3 using shade, trace, dot density and relief plots. Processed datasets and bitmap graph plots were exported from Geoplot v.3 and imported into ArcGIS 10.3. Once georeferenced statistical analysis were carried out on the rasters within ArcGIS 10.3 and they were interpreted in relation to the First, Second and Third Edition Ordnance Survey maps of the area and the 2016 orthorectified aerial photographs.

¹ Magnetic gradiometry survey was also trialled but the underlying Basalt geology prevented the machine being correctly balanced.

Digital archive:

The geophysical datasets were collected, processed and archived in accordance with Archaeological Data Services best practice.²

² Schmidt, A. & E. Ernenwein, 2011, Guide to good practice: Geophysical data in Archaeology [Online]
http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc

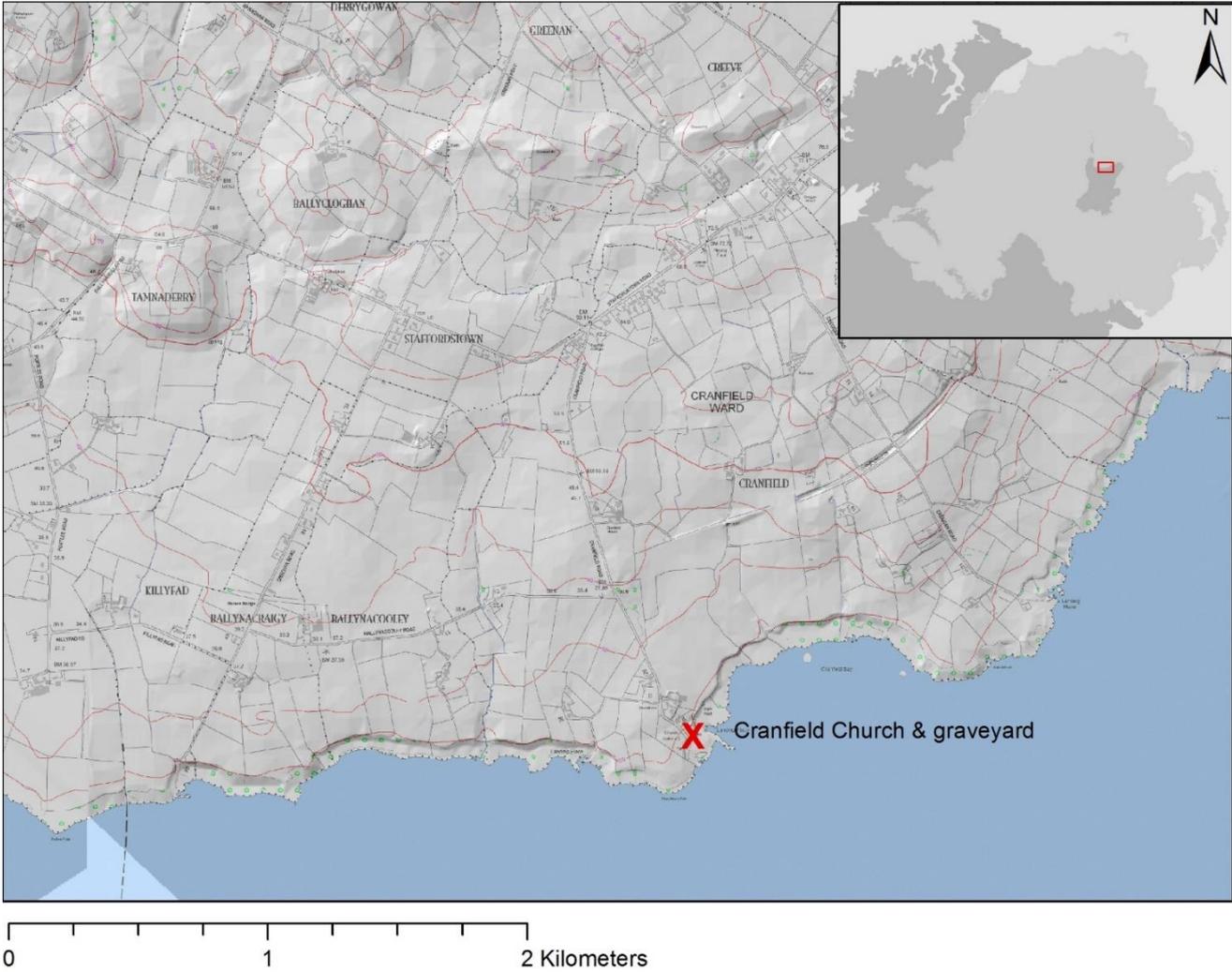


Figure 1 Location and landscape setting of the geophysical survey marked in red (OSNI 10km vector data layered over 5km DEM Hillshade).*

Introduction

An evaluation resolution electrical resistance survey was carried out over a total area of 0.14 hectares in the vicinity of Cranfield medieval church. The conserved ruins of the small church are situated towards the north of the sub-rectangular graveyard. The SMR record states that there is 'no indication on the ground of an early enclosure'. However evaluation of recent aerial imagery led the author to suggest that the northern sunken pathway which traditionally gave access to the church site and the associated holy well could be the remnants of such an enclosure. The pathway of this possible enclosure was interpolated from the sunken pathway to the north of the church swooping round to meet the southern shoreline. Effectively annexing the church site with the southern and eastern limits of the enclosure delineated by the shoreline of the lough itself.

Cranfield Church is situated about 4km south east of Randallstown on the northern shores of Lough Neagh. The surrounding landscape is characterised by a meandering, reed-bed shoreline which backs onto flat, open, low-lying pasturelands. The shoreline to the south and east of the enclosure has change significantly since the mid-20th century. The water level has dropped, marshland receded and the addition of a large carpark, toilet facilities, tarmacked pathways and approach road have radically altered the shoreline character (Figure 15). Just under 100m to the north east of the church site is a large holy well and associated rag trees. A tarmacked pathway leads from the carpark to the well although the original route, mapped on the 2nd Ed OS (

Figure 9), appears to run along the edge of the fields extending from the sunken pathway which was the original entrance to the graveyard. The extension which originally led up to the well is not sunken.

The graveyard has an overall diameter of c. 68m SE - NW. Its northern limits is bounded by a bank and ditch, created by a sunken path which cuts through the land to the north, clockwise from the north through to the south the graveyard is raised above the surrounding shoreline to a maximum height of c. 1.5m. The western limit of the graveyard is a dense straight hedgerow alongside, and outside, of which a modern roadway has been inserted at some stage since the 1980s to give access to the public carpark and toilets.

The field in which area A was surveyed is level slopping gently for the north towards the south west. Area B to the immediate north of the graveyard contains no funerary monuments. This is a typical distribution pattern for early medieval parochial centres reused for 18th-century internments. However, a small cairn of clearance material from the destruction of part of the northern bank is evident in this area (Figure 13).

Electrical resistance data was gathered at two probe-spacing's (1m + 0.5m) to facilitate the interpretation of the depth and nature of the geophysical anomalies recorded. A graveyard survey including transcribing the inscriptions and photographing the funerary monuments was undertaken as the same time.

Historical & archaeological background

Little is known about the site itself. It appears in the early 14th-century taxation list of Conon diocese under the name *Crewill*.³ The location is perhaps associated with the ninth century monastery *Cremcaill*.⁴ While the present building is believed to date to the 13th century.⁵ The holy well to the north-east of the church has been associated with religious pilgrimage and curative properties from at least the late 17th century.⁶ Although the church fabric may be 13th century the possibility of an earlier foundation suggests that some enclosing features could be present. There are believed to be more than 5,500 pre-Norman churches in Ireland. These enclosing elements appear in the archaeological record as banks, ditches and palisade helping to delineated early ecclesiastical sites.⁷ Apart from a church and enclosure other diagnostic features of an early medieval ecclesiastical site include the presence of bullan stones, stone crosses or cross decorated slabs, founder's tomb and holy well.⁸ So far, apart from the holy well, none of the other features have been identified at Cranfield.

It is noteworthy that Cranfield townland, as recorded by the 1st Ed OS with four historical sub-divisions ignored, occupies the whole area of Cranfield parish (Figure 14). The location of a termon cross is recorded on the 2nd & 3rd Ed OS maps c. 1,800m to the north of the church site on the northern boundary of the townland. Using the available aerial and map resources, in conjunction with fieldwork, it was proposed that the ecclesiastical enclosure might have been incorporated into the northern sunken pathway which originally gave access to the site. The eastern extension of the path is mapped by the 2nd Ed OS survey of the area running SW – NE along the southern edge of the bordering field above the water level. This feature of the relict pilgrimage landscape has been obscured by the tarmacked path leading from the carpark passed the well which is a modern addition. Further works to the north of the church has seen the destruction of part of the northern enclosing bank as a large break was made in it to allow heavy plant access.

Geophysically there is no evidence for the tunnels associated with an area of crop parching to the north of the church. However two anomalies A_2 and A_5 are worth further investigation and may be the geophysical signature of the heavily eroded remains of some enclosing elements perhaps associated with the church site or the earlier monastic foundation.

³ Calendar of Documents, relating to Ireland, preserved in Her Majesty's Public Record Office, London, volume 5 (1302 – 1307), (London, 1875 – 1886), p 210.

⁴ R.I. Best & H.J. Lawlor (Eds), *The martyrology of Tallaght* (London, 1931), p 47. For a full evaluation of the placename see <http://www.placenamesni.org/resultdetails.php?entry=5604>.

⁵ Northern Ireland Sites & Monuments Record ANT 049:049 [Online] SM7-ANT-049-049.pdf available at: http://appsc.doeni.gov.uk/ambit/docs/ANT/ANT_049/ANT_049_049/Public/SM7-ANT-049-049.pdf, (Accessed January 2017).

⁶ S. Lewis, *A topographical dictionary of Ireland* (London, 1837), p. 431 – 2; J. Richardson, *The great folly, superstition and idolatry of pilgrimages in Ireland* (Dublin, 1727), pp 65 – 6.

⁷ A. O'Sullivan, F. McCormick, T. Kerr & L. Harney, *Early Medieval Ireland, AD 400 – 1100: The evidence from archaeological excavations* (Dublin, 2014), pp 354 – 360.

⁸ G. Stout & M. Stout, *Excavations of an Early Medieval Secular Cemetery at Knowth Site M, County Meath* (Bray, 2008), p. 71.

Description and interpretation of anomalies (Figure 4)

Table 1 Description and interpretation of archaeological anomalies.

Code	Description	Interpretation
A_1	Collection of high resistance anomalies which form a band c. 1.2m wide running the width of the survey area. The anomaly is traceable for a distance of c. 30m running south-west to north-east in the westernmost quarter of the survey area. It is captured in both depths (0.5m & 1m probe spacing).	It follows the path of a field boundary mapped by the 2 nd Edition Ordnance Survey (Figure 9 & Figure 10) onwards and visible in the aerial imagery (Figure 11). It is most likely a relict field boundary and not of archaeological significance.
A_2	A cluster of higher resistance readings which appear to form a band, c. 5.5m wide, running NE to SW in the eastern third of the survey area. It is traceable for a distance of c. 23.5m.	In the raw data A_2 appears to form part of A_4 situated to the immediate east. However processing with High Pass Filter removed the readings associated with A_4 emphasising A_2 & A_5 (see Figures 5 – 6). The resistance data for A_2 is irregular and it is possible that it is a false anomaly created by the presence of A_5 and its spatial relationship with A_4. In the shade relief plot of the processed electrical resistance data the lower resistance returns associated with A_5 are more evident. If, however, A_2 is a true geophysical feature then it could be the relict of a bank which has been eroded by ploughing. The topography of the field is flat. It is noteworthy that it follows the path of the projected enclosure interpolated from the surviving graveyard boundary.
A_3	Two straight parallel higher resistance linear features running to the west and perpendicular to A_1 in the westernmost quarter of the survey area. They have a width of about c. 1.2m and can be traced for a maximum distance of about 10m.	The two anomalies associated with A_3 are evident on the 0.5m probe spacing data and not the deeper 1m probe spacing. It is likely they only occur in the top 0.3m of the soil horizon and are probably related to modern agricultural practices predating the removal of the field boundary. The field boundary itself is likely to be no earlier than mid-19 th century.
A_4	Anomalous area of high resistance readings on the north eastern edge of the survey area.	Associated with an entranceway, around which some stone chippings were noted during survey. The feature has a great area in the 0.5m probe spacing and was removed by the HPF. It is non-archaeological in nature.

A_5	A anomalous, low resistance, linear feature running SSW – NNE for a distance of c. 11.5m with a width of c. 2.5m. It appears to run parallel to A_2.	The anomaly A_5 is emphasised by HPF, which produces bipolar readings with a near zero mean. The mean zonal reading for the feature A_5 after HPF is -1.45 significantly lower than the other anomalies present. As with A_2 it also follows the possible path of the enclosure as interpolated from the existing field boundaries. This may represent a ditch in-filled with material which has a greater moisture content than the surrounding soil matrix.
B_1	Anomalous area of higher resistance, measuring c. 8.2m W – E, c. 1.6m N – S, situated to the north of the medieval church. The feature increases in area but remains equally anomalous in form in the 1m probe spacing survey.	Oral tradition details a tunnel that runs from the north of the church to the outer bank of the enclosure. The path of the tunnel is associated with an area of parching to the north of the church. A small cairn of debris, probably related to the modern entrance that was created in the northern bank of the enclosure to gain access for heavy plant by the council, sits in the middle of area B. The anomalous nature of the feature and its greater area in the deeper 1m survey suggest it is probably an area of near surface geology. This would also explain the grass parching. The use of near surface geology to act as a foundation plinth for the construction of the medieval church would not be out of keeping with the architectural form of the time. ⁹

⁹ *Early Medieval Ireland, AD 400 – 1100*, pp 153 – 54.

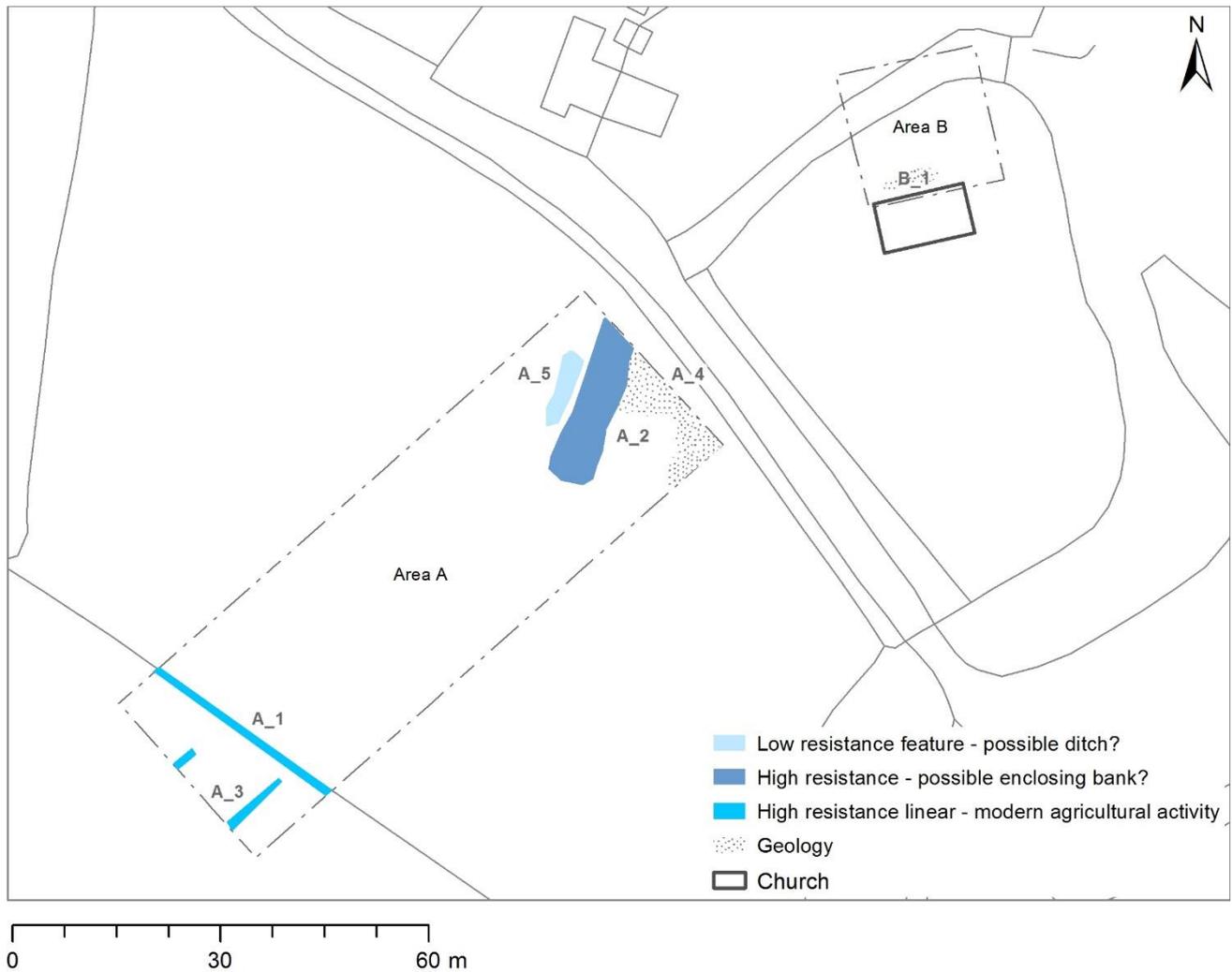


Figure 2 Interpretation diagram with geophysical anomalies identified

Discussion

The paired anomalies A_2 & A_5 plotted following the projected path of the possible enclosure and could be the remnants of enclosing features related to the early medieval history of the site. If so then the higher resistance returns of A_2 suggest that the area was enclosed by a rammed earth bank and an external cut ditch. This is similar in form to the northern bank of the church yard and the sunken pathway if we imagine the pathway to be a ditch. They would have formed an enclosure c. 77m SW – NE by c. 62m SE – NW, enclosing an area of about 4,400 m².

Recommendations

Targeted excavation of the features A_2 & A_5 should establish if they are early medieval in character.

If the hypothesis is correct then that would mean the northern bank of the church yard and the sunken pathway are relict features of this early medieval landscape. As such there is an immediate onus on the landowner to reinstate the bank to its former character. The destruction of part of the bank to gain heavy plant access, and the depositing of the cairn of clearance material, is unacceptable.

Acknowledgements

This survey was commissioned by Lough Neagh Landscape Partnership. A special thank-you to Dr Liam Campbell for all his assistance and enthusiasm. Thank-you to Grace McAlister and Ruth Logue, Centre for Archaeological Fieldwork, Queen's University Belfast, for their assistance on the survey.

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Appendix one: Georeferenced geophysical survey grid

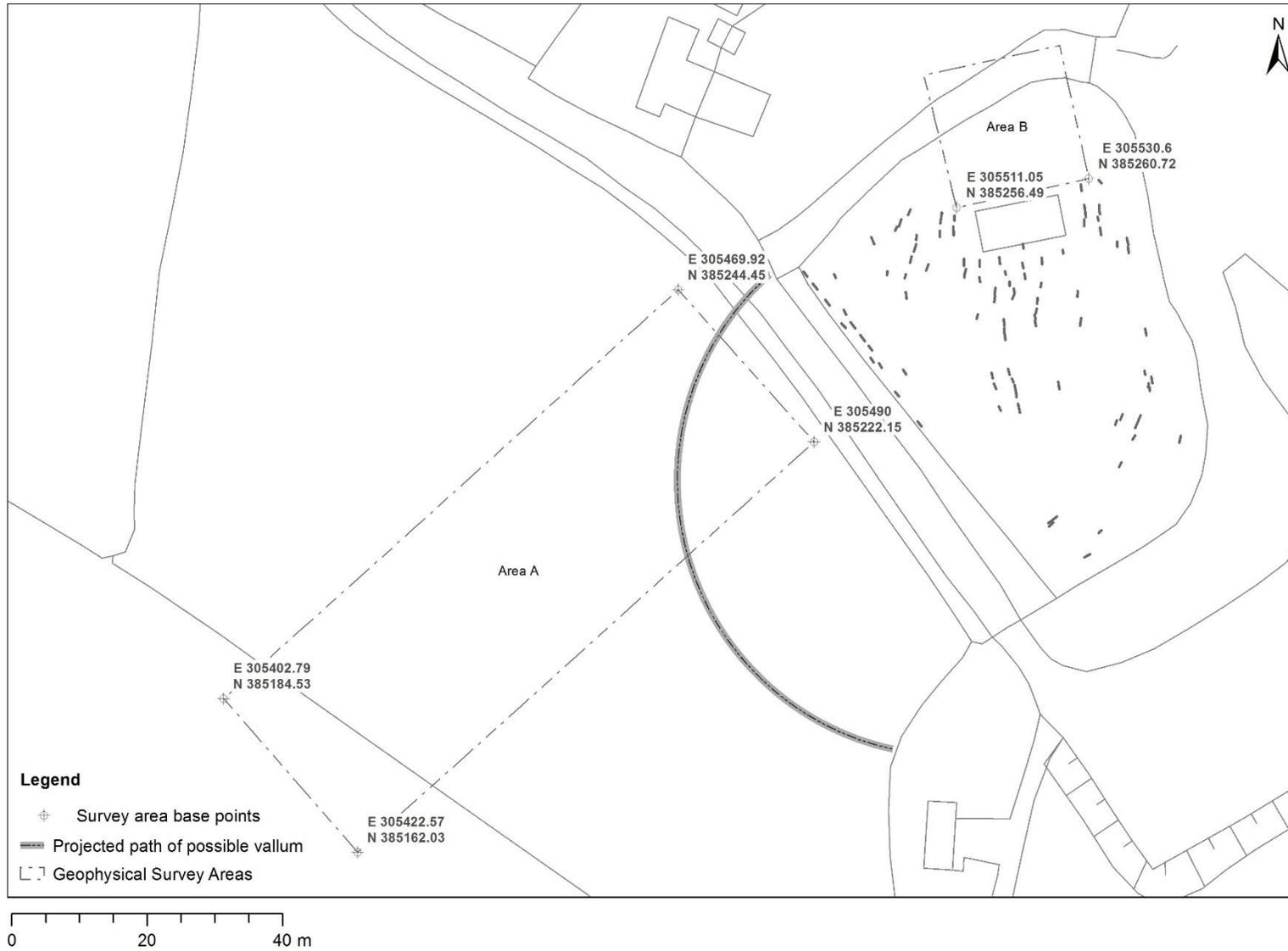


Figure 3 Irish National Grid coordinates for geophysical survey grid baseline.*

Appendix two: Raw geophysical survey plots

Area A

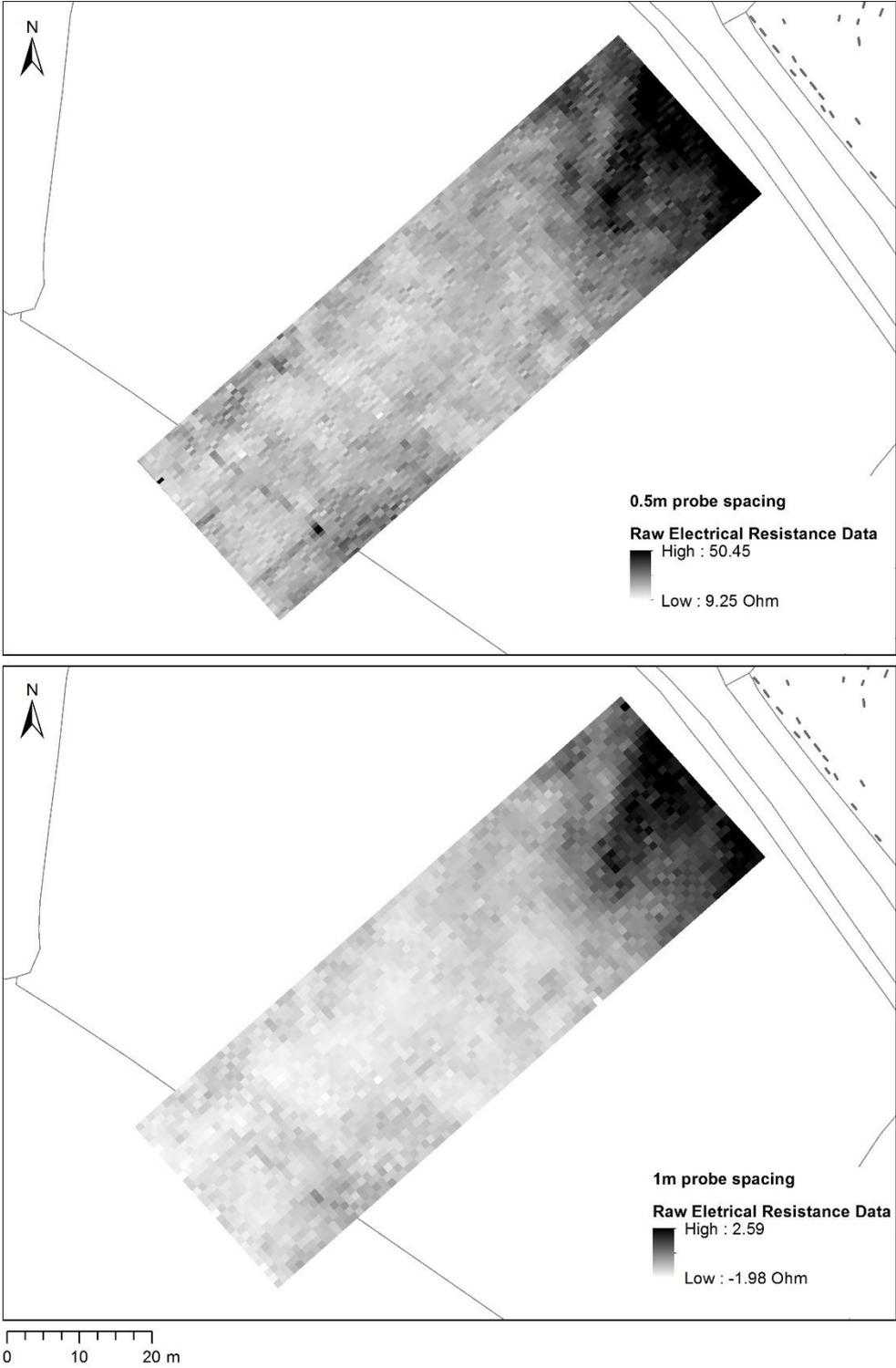
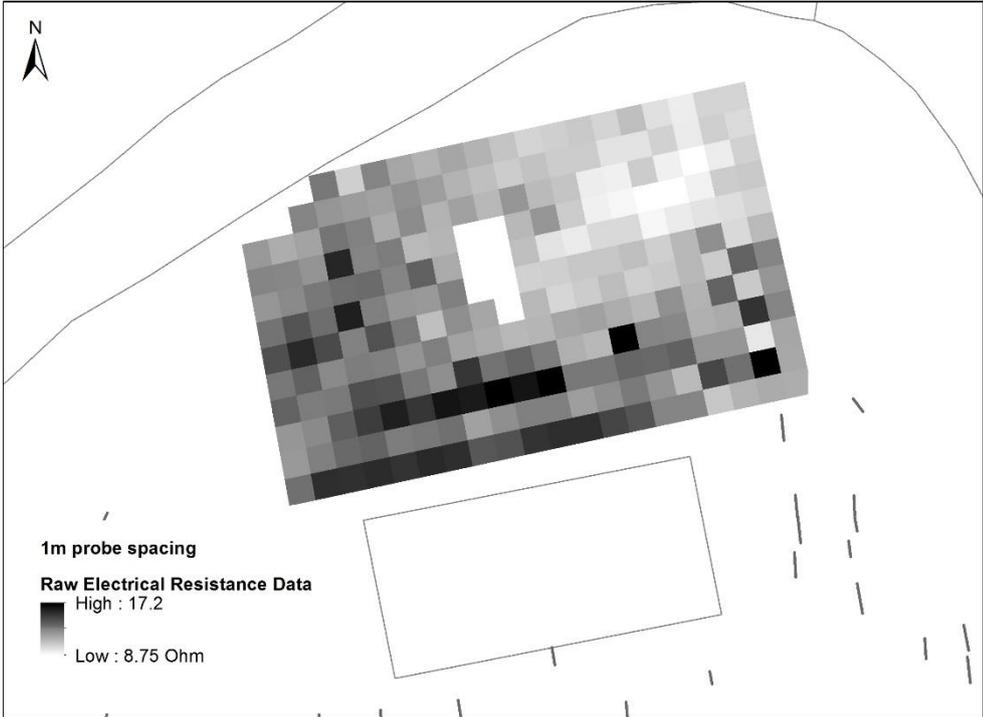
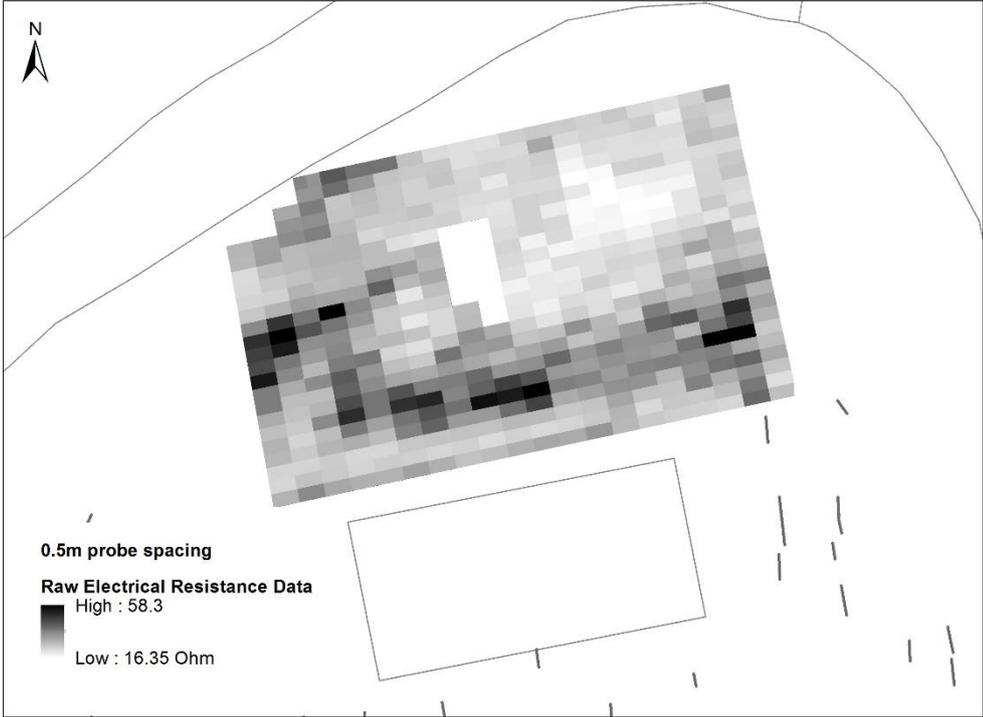


Figure 4a (top) Greyscale plot of raw data for gathered with 0.5m probe spacing. Data clipped +/- 3 Std Dev. Statistics: Mean: 14.7 Ohm, Std Dev.: 3.37.*

Figure 4b (bottom) Greyscale plot of raw data for gathered with 1m probe spacing. Data clipped +/- 3 Std Dev. Statistics: Mean: 8.8 Ohm, Std Dev.: 1.68.*

Area B



0 5 10 m

Figure 5a (top) Greyscale plot of raw data gathered with 0.5m probe spacing.* Data clipped +/- 3 Std Dev. Statistics: Mean: 27 Ohm, Std Dev.: 6.83.*

Figure 5b (bottom) Greyscale plot of raw data gathered with 1m probe spacing.* Data clipped +/- 3 Std Dev. Statistics: Mean: 12.14 Ohm, Std Dev.: 1.72.*

Appendix three: Processed geophysical survey plots

Area A

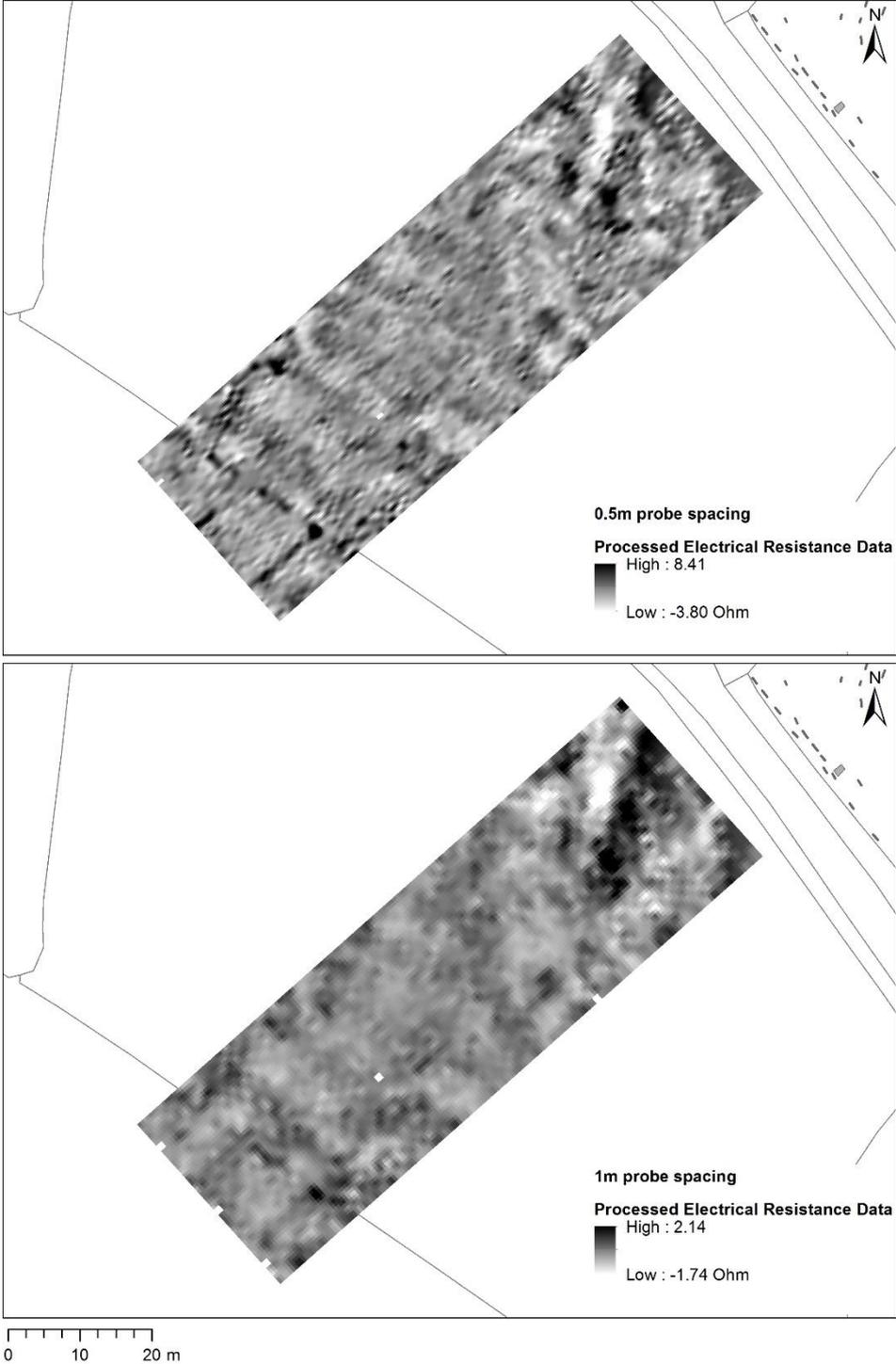


Figure 6a (top) Greyscale plot of processed data gathered with 0.5m probe spacing. Clipped to +/- 3 Std Dev. HPF (Gaussian weighting applied X = 10, Y = 10), LPF (Gaussian weighting applied x1 on x-axis), and sin(x)/x interpolation on x-axis x2 and y-axis x 1. Statistics: Mean: -0.02 Ohm, Std Dev: 0.84.*

Figure 6b (bottom) Greyscale plot of processed data gathered with 1m probe spacing. HPF (Gaussian weighting applied X = 10, Y = 10), LPF (Gaussian weighting applied x1 on x-axis & y-axis), and sin(x)/x interpolation on x- and y-axis. Statistics: Mean: -0.01 Ohm, Std Dev: 0.35.*

Area B

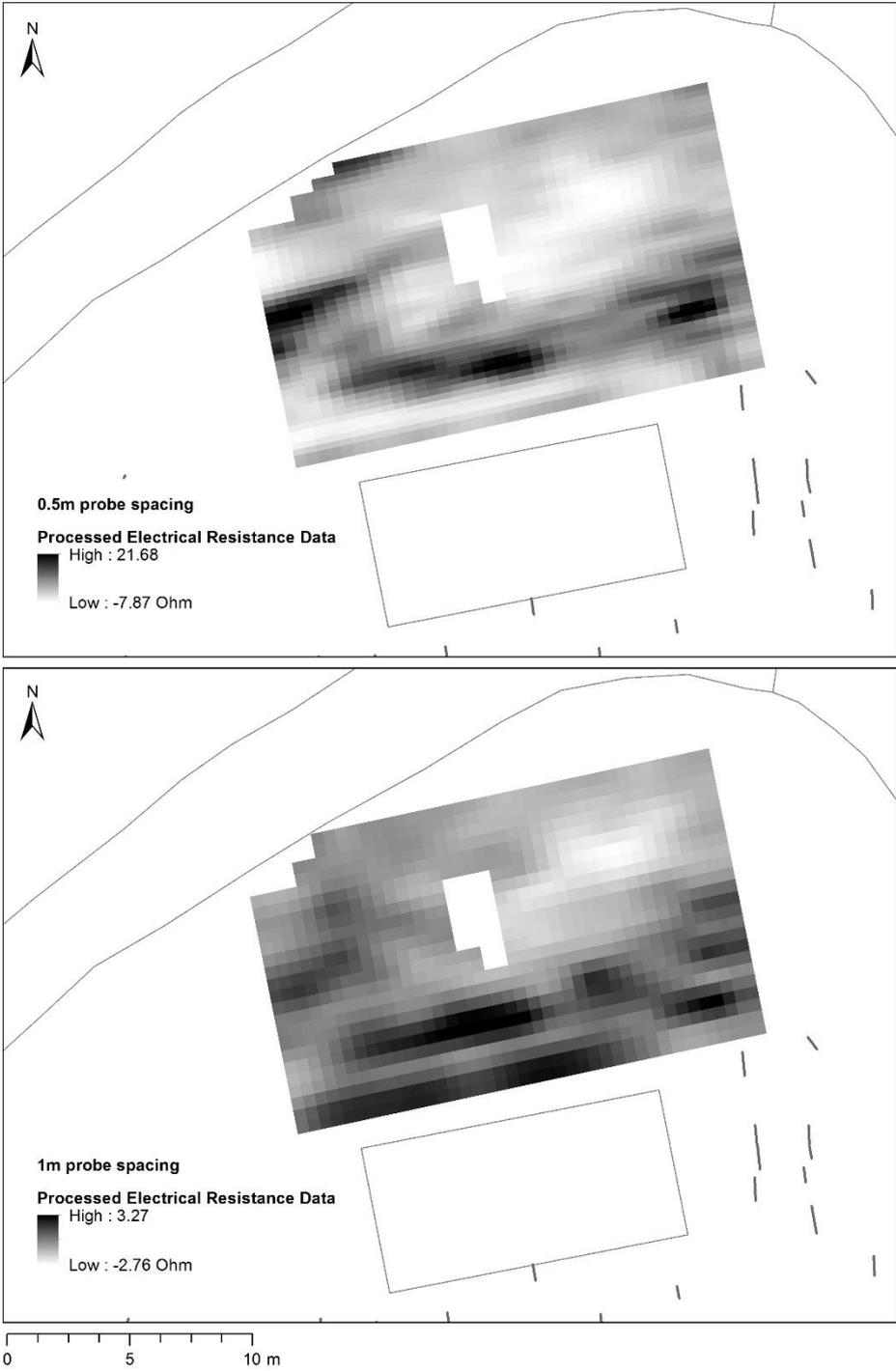


Figure 7a (top) Greyscale plot of processed data gathered with 0.5m probe spacing. HPF (Uniform weighting applied X = 10, Y = 10), LPF (Gaussian weighting applied x2 on x-axis, x1 on y-axis), and $\sin(x)/x$ interpolation on x- and y-axis. Statistics: Mean: 0.10 Ohm, Std Dev: 5.09.*

Figure 7b (bottom) Greyscale plot of processed data gathered with 1m probe spacing. HPF (Uniform weighting applied X = 10, Y = 10), LPF (Gaussian weighting applied x1 on x-axis, x1 on y-axis), and $\sin(x)/x$ interpolation on x- and y-axis. Statistics: Mean: -0.28 Ohm, Std Dev: 1.13.*

Appendix four: Historical mapping

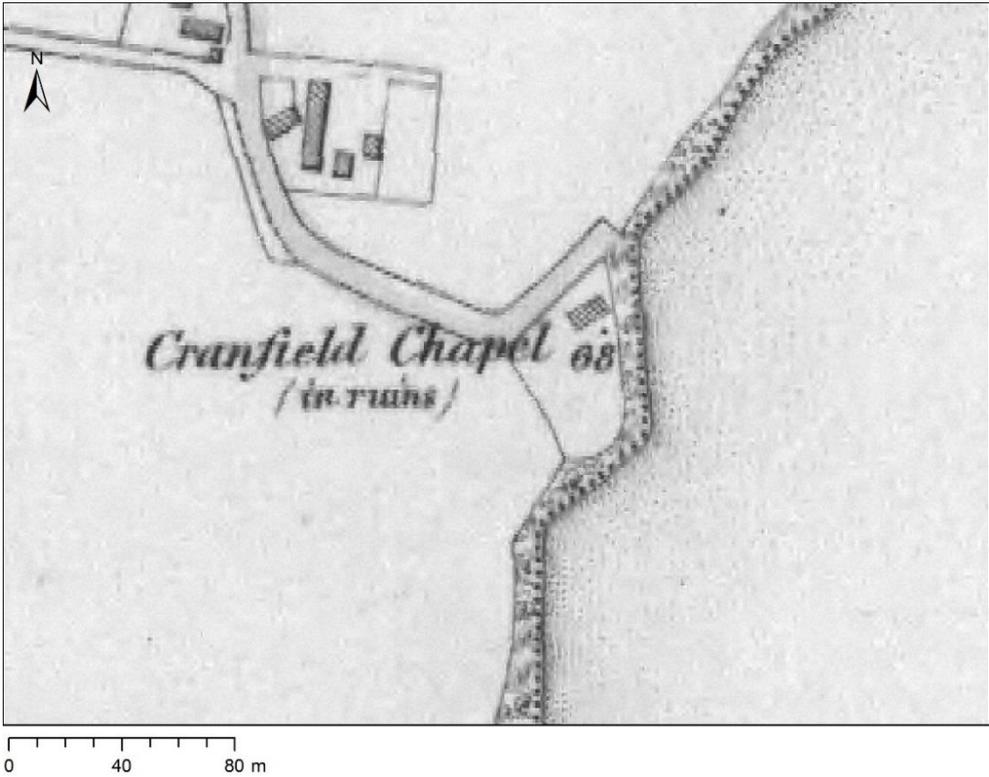


Figure 8 Cranfield church, and immediate hinterland as depicted on the 1st Ed Ordnance Survey map series, c. 1831-3.*



Figure 9 Cranfield church, and immediate hinterland as depicted on the 2nd Ed Ordnance Survey map series, c. 1853-58.*

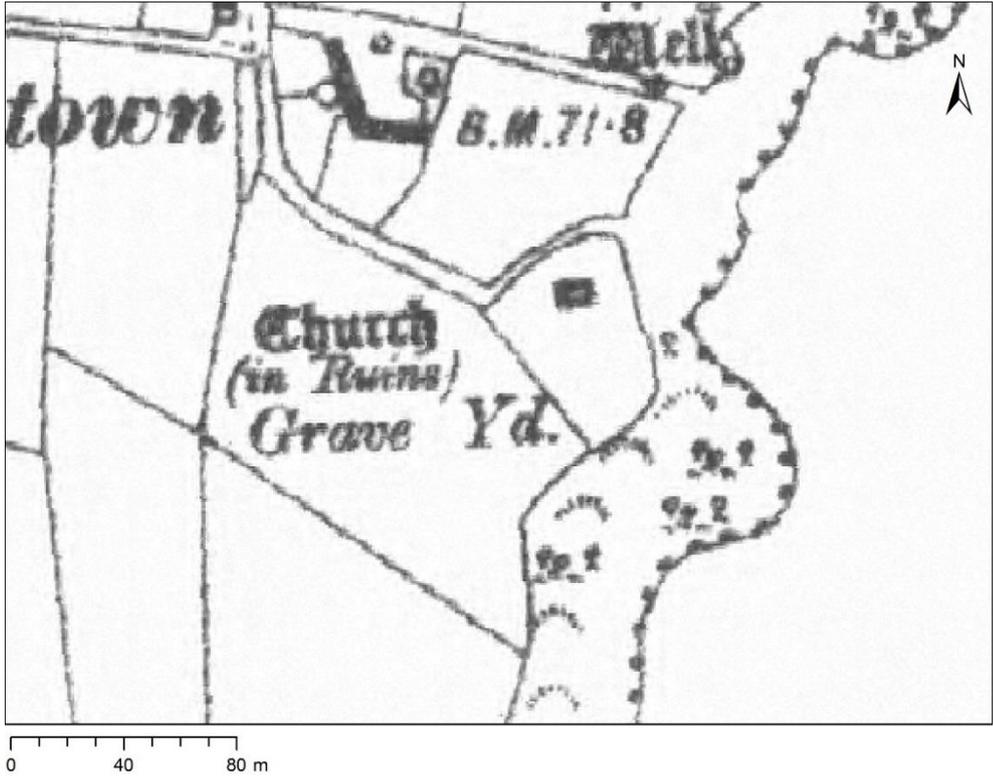


Figure 10 Cranfield church, and immediate hinterland as depicted on the 3rd Ed Ordnance Survey map series, c. 1900 – 6.*



Figure 11 Cranfield church, and immediate hinterland as captured in the 2016 (May 1026) ortho-rectified aerial photograph series.*

Appendix five: Additional images



Figure 12 Sunken pathway taken from the north looking south west onto the carparking near the modern entrance into the graveyard. The bank enclosing the northern limits of the church yard is to the left.



Figure 13 Destruction to the northern enclosing bank of the church yard to allow access to heavy plant with clearance cairn of material left in graveyard. View from church yard looking north.

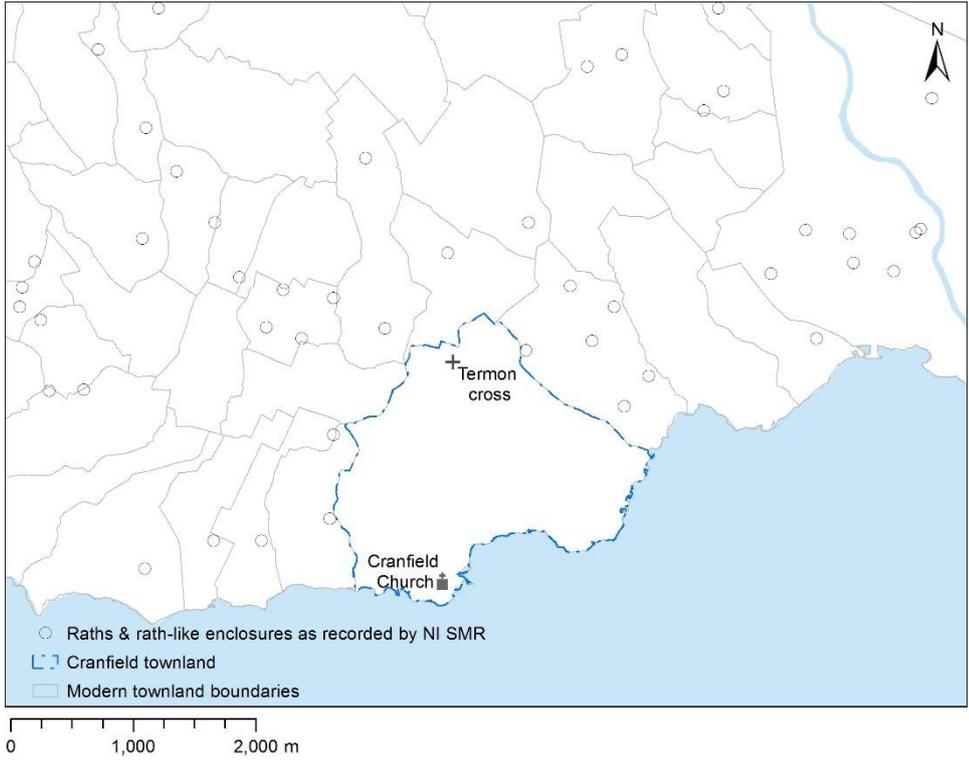


Figure 14 Cranfield townland in its Early Medieval archaeological context. Note the absence of raths within the confines of the medieval parish which is the same area as that now contained within the modern townland.

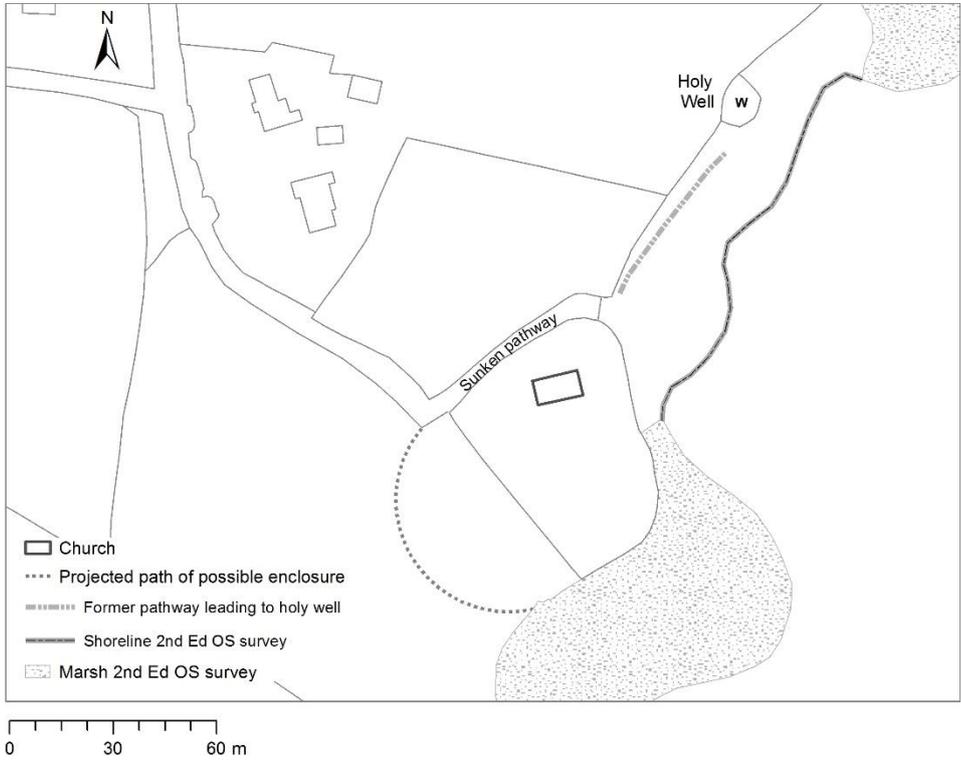


Figure 15 Reconstruction of the earlier pathways and shoreline of Cranfield prior to drastic remodelling of the landscape in the late 20th century.