

**Geophysical Magnetometer Survey at Thynghowe,
Hanger Hill, Sherwood Forest, Nottinghamshire, 2017.
(SK 599 683).**

Geophysical Survey Report

Andy Gaunt
Mercian Archaeological Services CIC
02/06/2017
Ref: ThynghoweGAU15001
Report MAS023



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Geophysical Magnetometer Survey at Thynghowe, Hanger Hill, Sherwood Forest, Nottinghamshire, 2017.

1. Summary

1.1. A geophysical magnetometer survey of the enclosure and surroundings adjacent to Hanger Hill known historically as Thynghowe was carried out for the Friends of Thynghowe and the Forestry Commission by Mercian Archaeological Services CIC (Mercian), in 2015 and 2016. The project detected anomalies and trends that represent archaeological remains preserved at the site. This geophysical magnetometer survey alongside the results of excavations by Mercian Archaeological Services CIC (Gaunt & Crossley 2014; Gaunt & Budge 2016; Gaunt, Crossley & Budge 2017 forthcoming), topographic survey (Gaunt 2011), LiDAR Survey (2012) and historic mapping has discovered a large number of archaeological features now confirmed at the site. These include: a *'thing mound'*, Warsop and Edwinstowe boundary stones, the *'Birklands Forest Stone'*, the Warsop and Budby parish boundary ditch and bank, a 75.0 metre - 77.5 metre diameter circular bank and ditch enclosure (internal bank and external ditch), a spread or mound of pot-boiler stones, two possible hearths, and a series of holloways identified as part of *'Nether Warsop Gate'*. This geophysical survey detected these holloways, possible hearths, pot-boiler stone spread, the circular enclosure, and part of the Budby/ Warsop parish boundary ditch. With the identification of the site of Thynghowe as a Viking *'thing'* site, and the existence of a circular enclosure cut into the slope of the *'thing mound'* on the northeastern side; the lower fills of this circular enclosure are suggested to be possibly Saxon or Medieval, posited here as a possible *'court*

circle', alongside the additional presence of holloways, and preserved archaeological remains make the site of Thynghowe of great importance not only regionally, and nationally, but potentially internationally. It is one of the few locations surviving where a Thing site can be pin-pointed in the landscape. It is also possible with the presence of the circular enclosure and mound that the site has preserved in situ 'assembly features' which may be unique in the Viking Diaspora in terms of preservation. The possible place name evidence relating to booths (discussed below) and the obvious placename evidence relating to a Thing site, alongside the clear survival of archaeological remains within a visible monument complex (presented here, expanding on Gaunt 2015) makes this site potentially highly significant.

2. Project Location, Topography and Geology

2.1. Site Location

The site is located near Hanger Hill (SK 599 683), in the parish of Budby, Nottinghamshire, and is adjacent to the boundaries of Edwinstowe and Warsop parishes.



Figure 1: Site Location. Contains Ordnance Survey data © Crown Copyright and database 2017.

2.2 Topography

Hanger Hill is situated on a ridge of high ground between the Maun Valley to the South and the valley of the River Meden to the north. The hill itself stands at a height of 96.0m Ordnance Datum Newlyn (ODN) and commands notable views over the Meden Valley to the north. The site would have been a significant feature in the landscape from this direction in antiquity. The site also commands views to the east, southeast and southwest (Gaunt 2011).

2.3 Geology

Hanger Hill is located on the Nottingham Castle Sandstone Formation - Sandstone, Pebbly (gravelly). This Sedimentary Bedrock formed approximately 246 to 251 million years ago in the Triassic Period. The local environment at the time of deposition was dominated by rivers; depositing mainly sand and gravel detrital material in channels to form river terrace deposits, with fine silt and clay from overbank floods forming floodplain alluvium, and some bogs depositing peat; includes estuarine and coastal plain deposits mapped as alluvium (www.BGS.ac.co.uk- accessed 08/07/2013).

3. Archaeological and Historical Background

3.1. The English Place Names Society volume for Nottinghamshire published in 1940 gives the derivation of Hanger Hill as '*formerly Thynghowe*'. Spellings include Thinghowe c1300 and Thingaw Hill in the early 17th century. The origin of the name of Thynghowe is þing haugr ('þ' is the Saxon letter *thorn* pronounced 'th'), meaning 'hill of assembly or

meeting place' (Gover, Mawer & Stenton 1940, p92).

3.2. A 14th century boundary perambulation of Birklands and Bilhaugh, possibly produced for the Forest Eyre of 1334 includes the place name Thynghowe. This is recorded in 'The Sherwood Forest Book', edited by Helen Boulton in 1964. Boulton in her footnotes for the perambulation, states "*Hanger Hill, formerly Thynghowe*" (Boulton 1964, 54). Parliamentary Hansard Papers record it as Thynghowe in 1793 debate on Crown holdings in Sherwood and the forthcoming enclosure changes.

3.3. Tyngough Assart adjoins the hill to the northwest, between Warsop and Budby, on an early 17th century map of Sherwood Forest. The map is probably part of the Crown Survey of Sherwood Forest in 1609 by Richard Bankes (PRO,MPF 295 [map 2] Mastoris & Groves 1997).

3.4. The location of Hanger Hill at the junction of a number of parishes may explain its original name. It has however also been suggested as a possible location for the meeting place of the Wapentake of Bassetlaw (Mallett, Reddish, Baker, Brookes & Gaunt 2012). An alternative site for the Bassetlaw Wapentake meeting place has been suggested as Beacon Hill in East Markham (Crook 1982).

3.5. Thynghowe may have alternatively been the meeting place for the district of Hatfield which formed the western half of the Wapentake of Bassetlaw (Mallett et al 2012).

3.6 In 2005 Thynghowe was rediscovered by Stuart Reddish and Lynda Mallett using an 1816 perambulation document.

3.7 The Friends of Thynghowe was subsequently formed to interpret, record, research and promote Thynghowe and its landscape. Recent work by the Friends of Thynghowe both at home and abroad has suggested that the site is a '*Thing*' site as seen in Scandinavia and throughout the Viking Diaspora, linking Thynghowe into a network of meeting sites stretching across Northern Europe and the Viking Diaspora (Reddish & Mallett 2012).

3.8. The Friends of Thynghowe instigated a topographic survey in January 2011 by Nottinghamshire County Council Community Archaeology (Gaunt 2011). Gaunt helped to place the site in its wider landscape context, as well as identifying a number of earthworks including a curvilinear bank and ditch feature adjacent to the summit of Thynghowe to the northeast side, investigated further as part of this survey. The wider landscape around Thynghowe was also subject to a Level-one Survey to record features and boundary stones detected by the group (Gaunt 2011).

3.9. In 2011 Stuart Reddish suggested an initial interpretation of the curvilinear ditch as a potential circular feature, and through research and comparison to other known Thing sites, suggested a possible use for the feature as a '*court circle*' or '*Lögrétta*' where laws would have been discussed. Reddish also suggested a possible use for the summit of Thynghowe as a law rock or '*Lögberg*', where laws would have been announced (Stuart Reddish, National Museum of Iceland presentation 2012).

3.10. Thanks to the efforts of the Friends of Thynghowe (which have been used as a case study in Sheffield Hallams

Heritage Woodlands Manual (Rotherham, Jones, Smith & Handley, 2008)), the site has now been included in a University College London (UCL) '*Landscapes of Governance*' project to record the meeting and assembly sites of Britain. A geophysical (magnetometer) survey was undertaken by Stuart Brookes and John Baker of UCL in 2011 (Baker & Brookes 2012) as part of that project.

3.11. A LiDAR survey of Thynghowe and the surrounding landscape was undertaken in 2012 by Geomatics Group-Environment Agency and the data was processed by a team consisting of Simon Crutchley of English Heritage, Peter Crow of Forest Research at the Forestry Commission, Amy Chandler, Hugh Mannall and Tim Yarnell, all of the Forestry Commission, Steve Horne and Lynda Mallett of the Friends of Thynghowe, Ian Major of the Sherwood Forest Trust and Stuart Reddish of Public Information Research Organisation. The results included the discovery of a trackway subsequently identified as '*Nether Warsop Gate*' by Gaunt from map source NRO ED 4 L. A series of ground-truthing sessions have taken place to record and interpret features on the ground that were detected by the recent LiDAR survey. The survey also confirmed the existence of the curvilinear earthwork that had been recorded in the topographic survey, and helped to suggest that the earthwork was originally part of a circular enclosure (*Thynghowe and the Forgotten Heritage of Birklands*, Heritage Lottery funded Project 2012). This investigation further supported the interpretations suggested by Reddish in 2011 regarding the possible use as a '*court circle*'.

3.12. A summary of the research and fieldwork up to end of 2011 has been published in the Transactions of the Thoroton Society as: Mallett, L., Reddish S., Baker, J., Brookes, S., &

Gaunt, A. 2012. *Community Archaeology at Thynghowe, Birklands, Sherwood Forest*. Transactions of the Thoroton Society 116 (Mallett et al 2012).

3.13. Map regression research by Steve Horne of the Friends of Thynghowe has recently identified the curvilinear earthwork adjacent to the summit of Thynghowe on the northeast side on a map of 1791 (NRO ED 4 L) and indicated that at this time it appeared to be part of a near circular feature. This proves that the feature was present as early as the late 18th century. The feature can be traced on its southern, eastern and western sides, but is not depicted on the northern side at this time. If the feature was a complete circle originally, it was not depicted as such in 1791.

3.14. Thynghowe has recently been added to the list of Thing sites across the Viking Diaspora and Scandinavia by the Thing Project (www.thingproject.eu), helping to confirm the importance attributed to the site by international academics. Stuart Reddish has lectured on the site in Shetland, Orkney, and The Faeroe Islands in 2010 as part of the European Thing Project. Stuart also lectured alongside Lynda Mallett at the National Museum of Iceland in 2012. Lynda Mallett and Stuart Reddish also recently presented (2017) to the Nova Scotia Archaeological Society at the University of St Mary's Nova Scotia in Canada. Their efforts have helped to bring the site of Thynghowe to the attention of the academic community around northern Europe and now North America.

3.15. Excavation of earthworks in the vicinity of Hanger Hill, known historically as Thynghowe, was undertaken in April 2013. The excavation was carried out for the Friends of Thynghowe and the Forestry Commission, by Mercian Archaeological Services CIC. The excavation took place over 3

days from the 23rd -25th April 2013 alongside volunteers from the Friends of Thynghowe who sieved 100% of the spoil generated. There were a further 3 days of recording by Mercian. The work involved the hand excavation of one 10m x 1.5m trench at right angles to the central section of a curvilinear earthwork consisting of a bank and ditch and an adjacent trackway. The location of the trench was at approximately SK5998 6841, about 50m to the northeast of the summit of Hanger Hill. The excavation was undertaken to investigate the nature of the earthwork; to understand its original shape and dimensions and to determine, if possible, the date of its construction and use. Also to determine, if possible, the age of the adjacent trackway. The excavations revealed that the bank and ditch were considerably larger than the visible surface remains suggested. Evidence from the excavation and the preceding topographic survey, LiDAR and historic mapping suggests the feature may have originally formed part of a circular enclosure with the bank on the inside of the ditch. If the earthwork was originally circular the internal bank suggests the site was designed to limit access to an internal space (Gaunt & Crossley 2014). This function of limiting access, plus the location of the feature at the extreme periphery of the Parish of Budby where the parish adjoins two others (often ancient meeting sites are at the periphery of landscapes (Mallett et al 2012)), and the spatial proximity to Hangar Hill suggests that it is not impossible that the enclosure may be associated with the possible Viking meeting site of Thynghowe (Gaunt & Crossley 2014). The only artefacts recovered from the excavation (except for CBM, iron and pottery all from the adjacent modern trackway) were Heat Shattered Pebbles. These seem to have been deposited after the ditch and bank were constructed. Their presence, combined with the environmental evidence, indicated that a Bronze Age or Early Medieval construction period for the

bank and ditch is not impossible and may even be most likely (Gaunt & Crossley 2014).

3.16. The area surrounding Thynghowe has been named the *Thynghowe Viking Heritage Area* by Mansfield District Council, recognising the work of the Friends of Thynghowe and acknowledging the importance of the site.

3.17. Excavations in 2016 have helped to show the ditch and bank of the circular enclosure to be of possible saxon or medieval origin. The excavation also targeted an area of anomalies detected by this magnetometer survey and showed the area to coincide with a spread of pot-boiler stones (dating forthcoming in Gaunt, Crossley & Budge 2017 forthcoming). *“Finds from Trench 1 included the proximal fragment of a soft hammer struck blade-like flake of Mesolithic (or early Neolithic) date and three other fragments of hard hammer struck flakes of Neolithic or Bronze Age date. The latter came from the lowest levels of the bank, and from the soil layer preserved outside of the enclosure on its southern side. The ditch was seen to cut into this soil. These finds therefore pre-date the construction of the earthwork”* (Gaunt & Budge 2016). *“Other finds from the trench included an abraded fragment of pottery, being the foot ring from an unglazed wheel thrown vessel likely of Roman date.”* (Gaunt & Budge 2016). The boundary ditch of Budby/Warsop was found to cut the ditch of the circular enclosure meaning the circular bank and ditch are earlier constructions (Budge & Gaunt 2016; Gaunt, Crossley & Budge 2017 forthcoming).

4. Research Aims and Objectives

4.1. The excavation of 2013 had shown that the curvilinear bank and ditch was a more substantial feature than first assumed, and was certainly of a substantial age. Ground conditions during the excavation enabled more of the earthwork to be traced, and it was decided that the feature should be examined further. The feature is depicted on historic mapping in 1791 as an almost complete circle. The objective of the survey was to investigate further the area of the 'circle' feature, concentrating on the area both 'inside' and around the 'circle'.

4.2. The survey also aimed to address questions about the extent of the Thynghowe site and to add to the interpretation of the monument and its landscape.

4.3. Information from the survey will form a key element in the formation of a management plan for the conservation of the site.

4.5. The project was designed with the aim of potentially addressing the following updated research agenda questions highlighted in the recent publication: (Knight, Vyner & Allen 2012). *East Midlands Heritage- An Updated Research Agenda and Strategy for the Historic Environment of the East Midlands:*

"Research Objective 3F: Identify monument complexes and prioritise for curatorial action".

"6.6 Early Medieval:

6.6.1.5 Demography and the identification of political and social groups: How can we refine our understanding of the chronology and process of Scandinavian immigration during ninth and tenth centuries?"

“6.6.4.1 Rural settlement patterns: What impact may Germanic and Scandinavian immigration have had upon rural settlement patterns, and how may place-name evidence contribute to studies of settlement evolution?”

“Research objective 6F: Identify cultural boundaries in the Early Medieval period.

4.6. The project forms part of Mercian Archaeological Services CIC’s research into the development of the landscape of Sherwood Forest.

5. Methodology

5.1. Geophysical Survey

5.1.1. Standards

The surveys and reporting were conducted in accordance with English Heritage guidelines, *Geophysical Survey in Archaeological Field Evaluation* (David, Linford & Linford 2008); the Institute for Archaeologists (IfA) Draft Standard and Guidance for archaeological geophysical survey (2010); the IfA Technical Paper No.6, *The use of geophysical techniques in archaeological evaluations* (Gaffney, Gater & Ovenden 2002); and the Archaeology Data Service Guide to Good Practice: *Geophysical Data in Archaeology* (draft 2nd edition, Schmidt & Ernenwein 2010).

5.1.2. Equipment

The survey was undertaken using a Bartington Grad601 fluxgate Gradiometer. This technique involves the use of hand-held magnetometers to detect and record anomalies in the vertical component of the Earth’s magnetic field caused by

variations in soil magnetic susceptibility or permanent magnetisation; such anomalies can be caused by archaeological features. The gradiometer works by measuring the earth's magnetic field at two separate sensors; one positioned 1 metre above the other. The lower of the two sensors is placed nearer to the ground surface and so is affected by magnetic variations in the soil. The signal is either higher or lower than the top sensors. This 'gradient' is recorded.

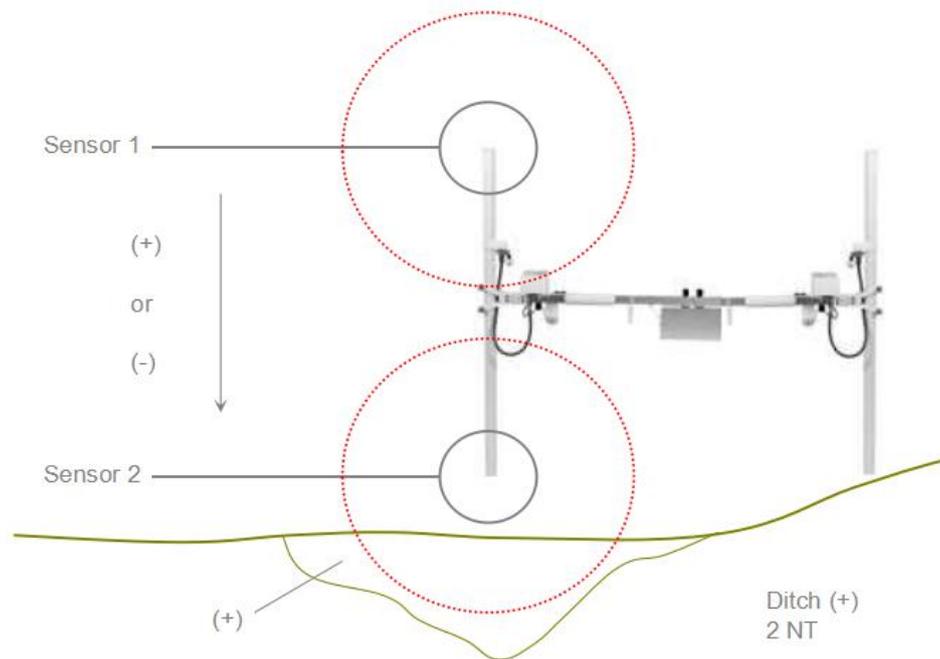


Figure 2: Fluxgate Gradiometer recording buried and in-filled ditch as a high magnetic anomaly. A. Gaunt © Mercian Archaeological Services CIC, 2017.

5.1.3. Magnetometry Fieldwork Methods

5.1.3.1. Survey Area

The survey area was chosen to maximise the coverage of the circular bank and ditch feature adjacent to the boundaries of Warsop, Edwinstowe / Birklands, and Budby parish boundaries (see figure 2). Conditions and vegetation cover meant that the survey was undertaken over two seasons in 2015 and 2016. A baseline was established parallel to the southern edge of the

study roughly parallel to the east-west forest track running along the north of Birklands wood. A right angle was then created from the southeastern corner to run northwards. This baseline and right-angle formed the basis of the survey with the survey starting in the southeast corner of the survey area. A 20m grid was then marked out established across the survey area using tapes and off-set measurements. The corners of grid squares were recorded to Ordnance Survey coordinates using a Leica Differential Geographic Positioning System (DGPS) survey instrument. DGPS is accurate to +/- 100mm (Crutchley 2010) which complies with English Heritage requirements for control of archaeological survey (Lutton 2003).

Ground conditions were very difficult due to the presence of Beech Plantation. This impeded movement and resulted in a large number of dummy readings being used to enable movement around trees.

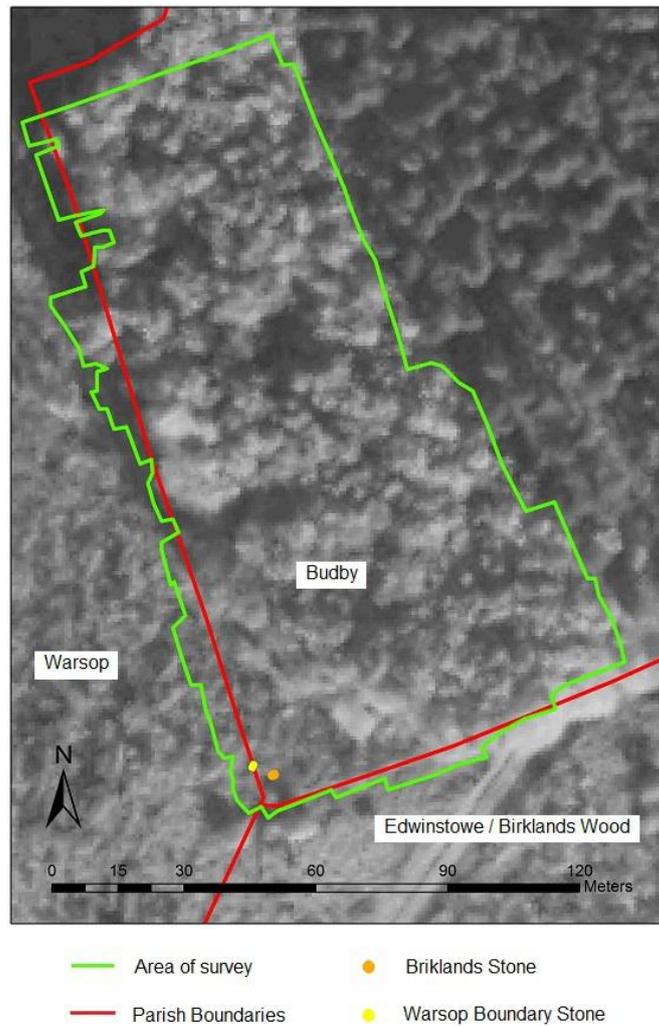


Figure 3: Location of Magnetometer Survey. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc

5.1.2.2.2. Measurements

Measurements of vertical geomagnetic field gradient were determined using Bartington Grad601 dual fluxgate gradiometer. A parallel traverse scheme was employed and data were logged in 20m grid units. The instrument sensitivity was nominally 0.03nT, the sample interval was 0.25m and the traverse interval was 1m.

5.1.2.2.3. Data

Data was downloaded on site onto a laptop for initial processing and storage. The data was then backed up onto Mercian's data network, with copies made of the data for processing.

5.1.2.3. Interpretation and archiving

5.1.2.3.1 Data processing

A combination of Snuffler version 1.14, and Geoplot v.3 software was used to process the geophysical data and to produce a continuous tone greyscale image of the raw (minimally processed) data. A plot of filtered data is also provided. The greyscale images and interpretations are presented below. A palette bar relates the greyscale intensities to anomaly values in nanoTesla.

5.1.2.3.2.

The following basic processing functions have been applied to the geomagnetic data:

5.1.2.3.2.1. Clip.

This clips data to specified maximum or minimum values; to eliminate large noise spikes; also generally makes statistical calculations more realistic.

5.1.2.3.2.2. ZMT

ZMT or Zero Mean Traverse. This sets the background mean of each traverse within a grid to zero; used for removing striping effects in the traverse direction and removing grid edge discontinuities.

5.1.2.3.2.3. Interpolate

This increases the number of data points in a survey to match sample and traverse intervals; in this instance the data have been interpolated to 0.25m x 0.25m intervals

5.1.2.3.2.4. Destripe

This is used to remove error caused during data collection, due to problems maintaining a regular pace walking traverses.

5.1.2.3.3. Anomaly types

A colour-coded geophysical interpretation plan is provided. Three types of geomagnetic anomaly have been distinguished in the data:

5.1.2.3.3.1. Positive

Positive magnetic regions of anomalously high or positive magnetic field gradient, which may be associated with high magnetic susceptibility soil-filled structures such as pits and ditches.

5.1.2.3.3.2. Negative

Negative magnetic regions of anomalously low or negative magnetic field gradient, which may correspond to features of low magnetic susceptibility such as wall footings and other concentrations of sedimentary rock or voids.

5.1.2.3.3.3 Magnetic Disturbance

Magnetic Disturbance high amplitude and can be composed of either a bipolar anomaly, or a single polarity response. It

represents magnetic interference from modern items such as fencing, vehicles or buildings. It is commonly found around the perimeter of a site near to boundary fences.

5.1.2.3.3.4. Dipolar

Dipolar magnetic paired positive-negative magnetic anomalies, which typically reflect ferrous or fired materials (including fences and service pipes) and/or fired structures such as kilns or hearths.

5.1.2.3.3.5. Bipolar

A bipolar anomaly is one that is composed of both a positive response and a negative response. It can be made up of any number of positive responses and negative responses. For example a pipeline.

5.1.2.3.3.6. Interpretation

Plot

A colour-coded archaeological interpretation plan is provided. Except where stated otherwise in the text below, positive magnetic anomalies are taken to reflect relatively high magnetic susceptibility materials, typically sediments in cut archaeological features (such as ditches or pits) whose magnetic susceptibility has been enhanced by decomposed organic matter or by burning.

5.2. Data preparation and analysis.

All data was processed in QGIS Geographic Information Systems

(GIS), including the production of maps and interpretation plots.

5.3. Archiving and reporting:

5.3.1. OASIS

An OASIS entry pertaining to the work has been created. The OASIS identifier for the project is OASIS ID - merciana2-285879.

5.3.2 Historic Environment Record

A copy of the report has been logged with the Nottinghamshire Historic Environment Record (HER).

5.3.3. Public Dissemination online

The report is also free to downloadable via our website.

6. Results

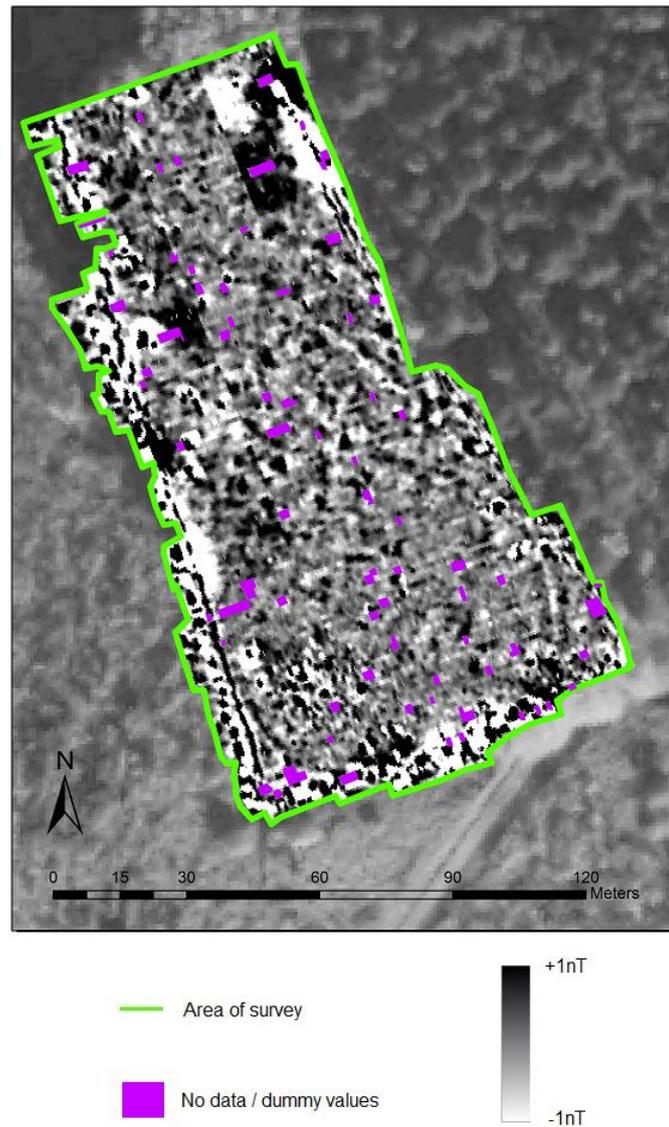


Figure 4: Results of Magnetometer Survey. Clipped to +/-1nT. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

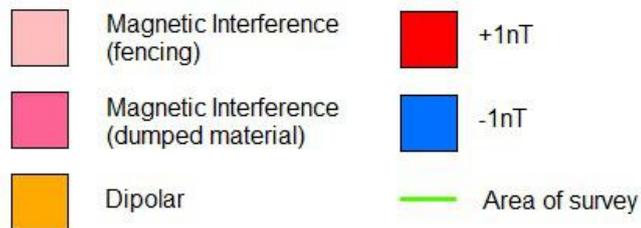
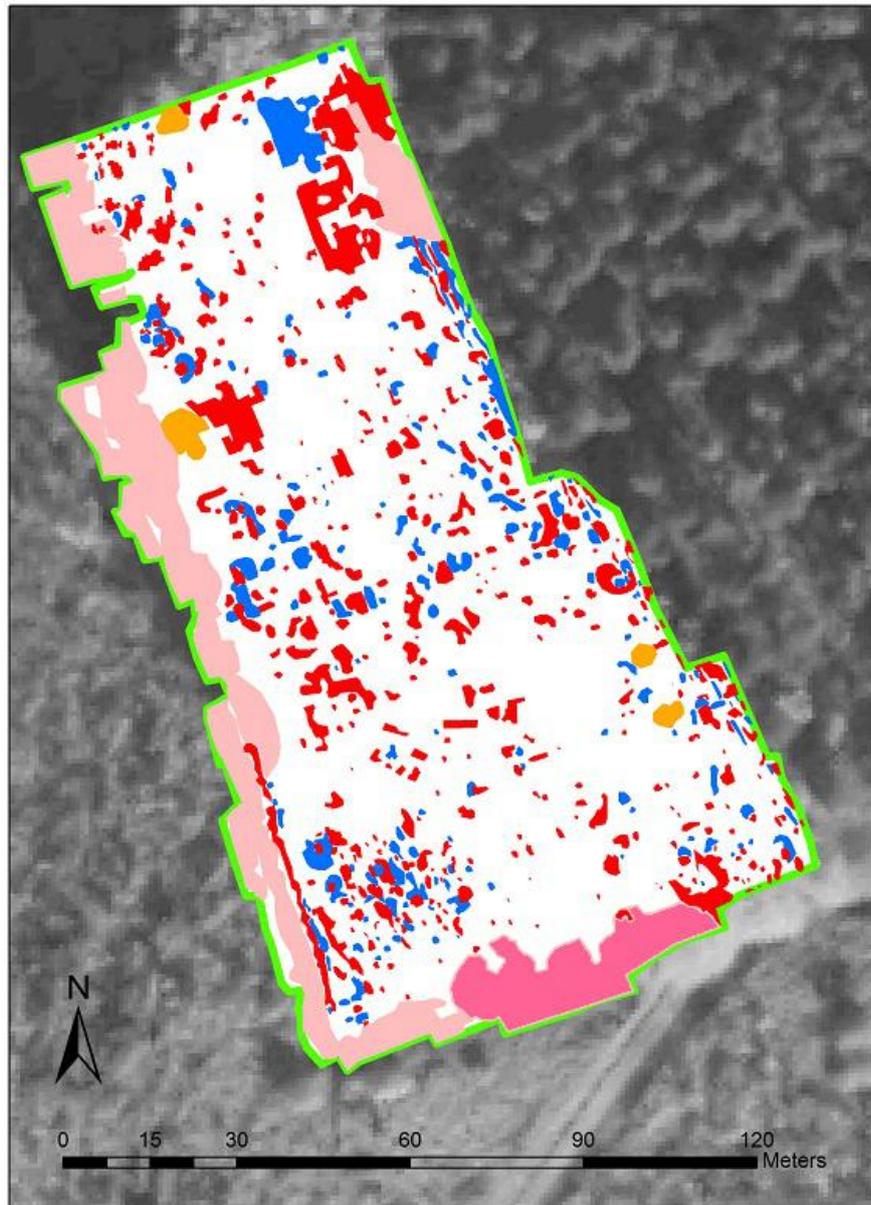


Figure 5: Results of Magnetometer Survey. High, Low, Dipolar and Magnetic Interference Anomalies. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

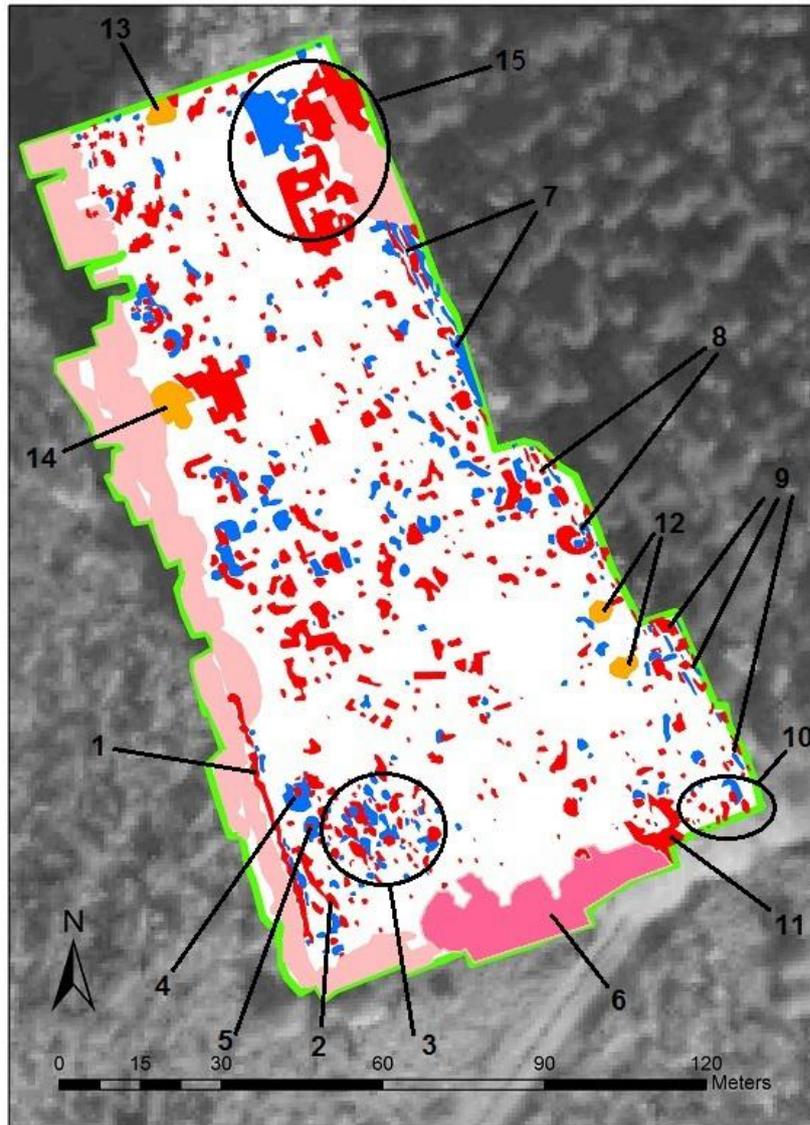


Figure 6: Labelled plot of results of Magnetometer Survey. High, Low, Dipolar and Magnetic Interference Anomalies. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

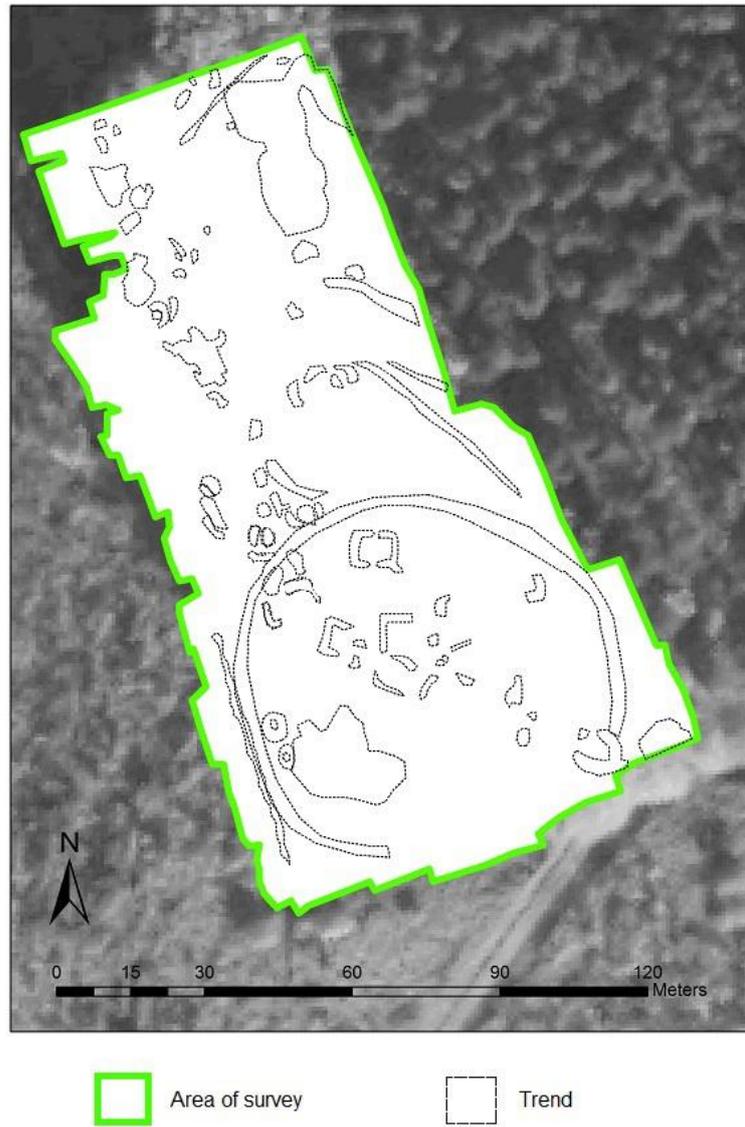


Figure 7: Trends in Magnetometer Survey data. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

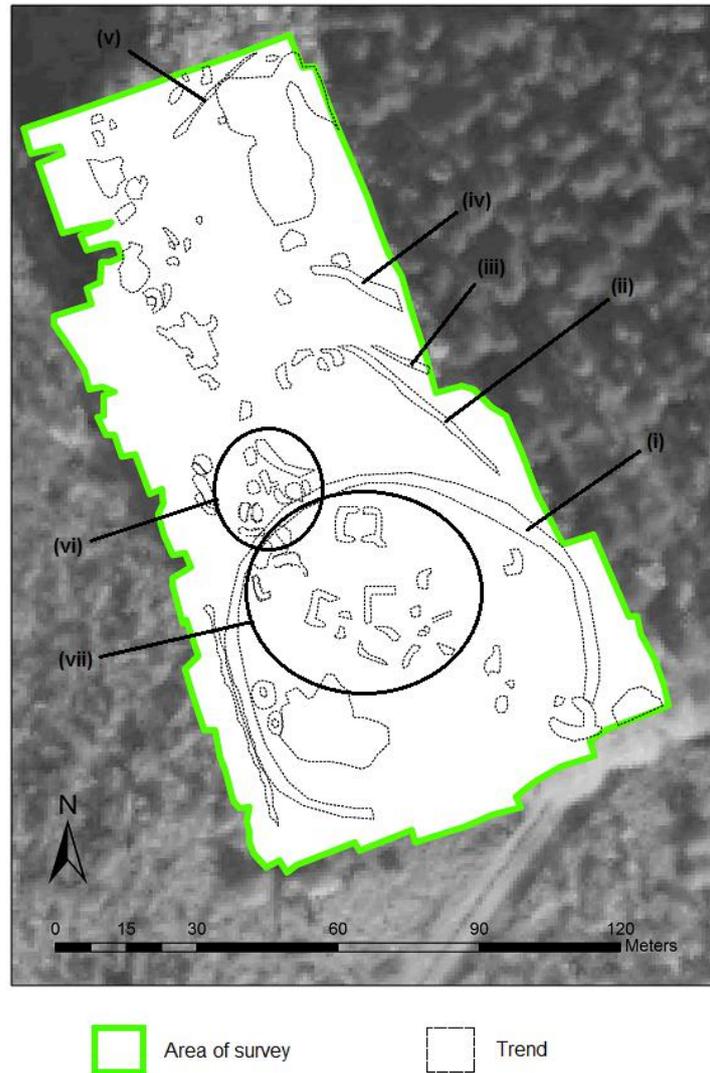


Figure 8: Trends in Magnetometer Survey data labelled. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

The results of the geophysical magnetometer survey are displayed in figure 4. Figure 4 shows the data from the survey clipped to $\pm 1\text{nT}$ (nano-tesla) displayed as a greyscale colour ramp with values of lower than -1nT in white, and larger than $+1\text{nT}$ in black. The value between $\pm 1\text{nT}$ are expressed in varying degrees of grey from light to dark. The survey detected high and low magnetic anomalies across the survey area displayed in figure 5, and labelled 1-15 in figure 6. Ground conditions (high density of trees and the presence of brambles

etc) made data collection difficult. Dummy readings were used where trees were larger than 0.25m in diameter. When trees were smaller, the machine was stopped, and restarted on the other side of the tree. Under these circumstances data collection was slow, and the ability to detect and interpret smaller and more subtle features may have been compromised. The ground disturbance caused by woodland growth and management may also have affected the ability to detect certain archaeological remains. The results discussed below focus on 15 high and low anomalies and areas of anomalies seen in figures 4, 5 and 6. As well as anomalies of $\pm 1\text{nT}$, the survey also detected a number of low parity features (under $\pm 1\text{nT}$) that do not show up on the high and low magnetic data plots in figures 5 and 6, but are clearly visible in the data. These were therefore plotted as in figure 7. These trends are labelled (i) - (vii) on the trends image in figure 8, where they are then discussed alongside the high and low anomalies. In the results below interpretations are provided alongside the results where they clearly coincide with visible earthworks, or where they have been proven through recent archaeological excavation.

Anomaly 1 in figure 6 is a linear high magnetic anomaly 49 metres long orientated roughly north- south. The anomaly lines up with a preserved earthwork bank and ditch which runs along the course of the boundary between Budby and Warsop. The anomaly recorded in the survey is a high magnetic response and probably represents magnetically enhanced soils in the ditch fill.

Anomaly 2 is a high magnetic curvilinear anomaly around 15 metres in length. This anomaly also lines up with surviving archaeological earthworks which form a curvilinear ditch and bank. The bank is preserved on the northeast of the ditch. The ditch is cut into the hillside of the summit of Hanger Hill on the

northeastern side. Again, here the high magnetic anomaly probably represents the magnetically enriched fill(s) of the ditch. Anomaly 2 forms part of trend (i) shown on figure 8. This feature will be discussed below in the conclusions. The feature has been shown by this survey to be a complete circular enclosure. The enclosure has been excavated (Gaunt & Crossley 2014, Gaunt & Budge 2016; Gaunt, Crossley & Budge 2017 forthcoming) and shown to be a ditch with an internal bank. In the data set it is obscured at the southern end by anomaly 6. Anomaly 6 is an area of magnetic interference. Observations on site suggest that anomaly 6 could be the result of dumped material along the northern edge of the forest trackway on the southern side of the survey area.

To the northeast of anomaly 2 is anomaly 3. This is an area of high and low magnetic anomalies. The area is roughly 20 metres by 25 metres in size, and has been shown through excavation to correspond with a spread of pot-boiler stones (these are discussed below in the conclusions section 7).

To the west of the area of anomaly 3 are two anomalies consisting of a high magnetic response surrounded by a low magnetic response. These anomalies are roughly circular in shape. Anomaly 4 is 6 metres north to south by 5 metres east to west. Anomaly 5 is 4.5 metres north to south by 3.5 metres east to west. In the unclipped data set the high magnetic centre of anomaly 4 has a polarity of +89.85nT. The high magnetic centre of anomaly 5 has a polarity of 58.10nT. It is possible they represent hearths or areas of former burning.

On the eastern side of the surveyed area are a series of intermittent high and low magnetic linear anomalies orientated north-northwest to south-southeast. They appear in the survey area as anomalies 7, 8 and 9. Field investigation and

excavation (Gaunt & Crossley 2014) have shown these anomalies to be wheel or track ruts caused by forestry machinery on the line of a forest trackway.

Anomaly 10 is an area of high magnetic anomalies. They are included in this section because this area has possible dumped material; including pieces of Limestone which are not part of the local geology of the area. To the west of these anomalies is anomaly 11; a “C”-shaped area of high magnetism. This high resistance anomaly seems to be associated with a small raised area topographically of a similar shape and size.

Anomalies 12, 13 and 14 are dipolar responses which may be caused by buried ferrous material or other magnetic metal.

Anomaly 15 represents an area of high and low magnetic anomalies in the northeastern corner of the survey area approximately 20 metres by 30 metres. This area coincides with a (possibly) natural depression which is boggy and also has standing water in the form of a large area of puddles visible during the fieldwork. This is the only area of standing water in the study area and is roughly at the base of the long northerly hill slope of Hanger Hill. Water may have become trapped here by the local topography, or a geological change resulting in a “spring-line” in the otherwise naturally well-drained local Sandstones, or some combination of these elements.

The areas displayed in pink represent magnetic interference caused by metal fencing. This is prominent on the western side of the surveyed area along the line of the boundary between Budby and Warsop, and also in the northeast of the section where the edge of a large compartment of pine wood to the east is separated from the forest track (anomalies 7, 8 and 9) and the beech grove which covers the surveyed area, by a small fallen wire fence.

Other than the high and low magnetic anomalies mentioned above, a number of trends are also visible in the data set in figure 4. These are displayed in figure 7 and labelled for discussion here in figure 8. The first of these; trend (i), has already been mentioned. The results of this survey are the first time that the circular enclosure has been recorded on the northern side and its significance is discussed further in section 7 below.

To the northeast of trend (i) are trends (ii) and (iii). These are subtle faint linear anomalies, parts of which are $\pm 1\text{nT}$ in polarity, but also which fall under the $\pm 1\text{nT}$ range. These trends line up with earthwork holloways visible on the ground. They are discussed below in section 7. It is possible that trend (iv) also represents a holloway, or a filled in ditch, but the trend seen in the data set does not relate to any archaeological earthworks on the ground. This is also the case in the northeast of the survey area where a possible northeast to southwest orientated linear can be seen in the data (trend (v)). No earthworks survive on the surface that could relate to this trend. These two trends (iv) and (v) could represent former ditches or holloways. On the northern edge of trend (i) is an area of circular high resistance anomalies (vi). This cluster of anomalies could represent archaeological remains. The polarity of the circular anomalies is under $+5\text{nT}$, suggesting they do not represent hearths or burning. It is possible that they represent pits, but some could also be the result of tree throws, where the subsequent hollow left by the former root ball is filled in with magnetically enriched top soil.

Within the area of the circular enclosure trend (i) is an area of linear anomalies forming right angles and angular shapes (vii). It is possible to believe that these features could represent archaeological remains, or robbed out remains of structures.

However, there is a possibility that they could also be natural features caused by the effects of woodland growth, or geological features.

7. Conclusions

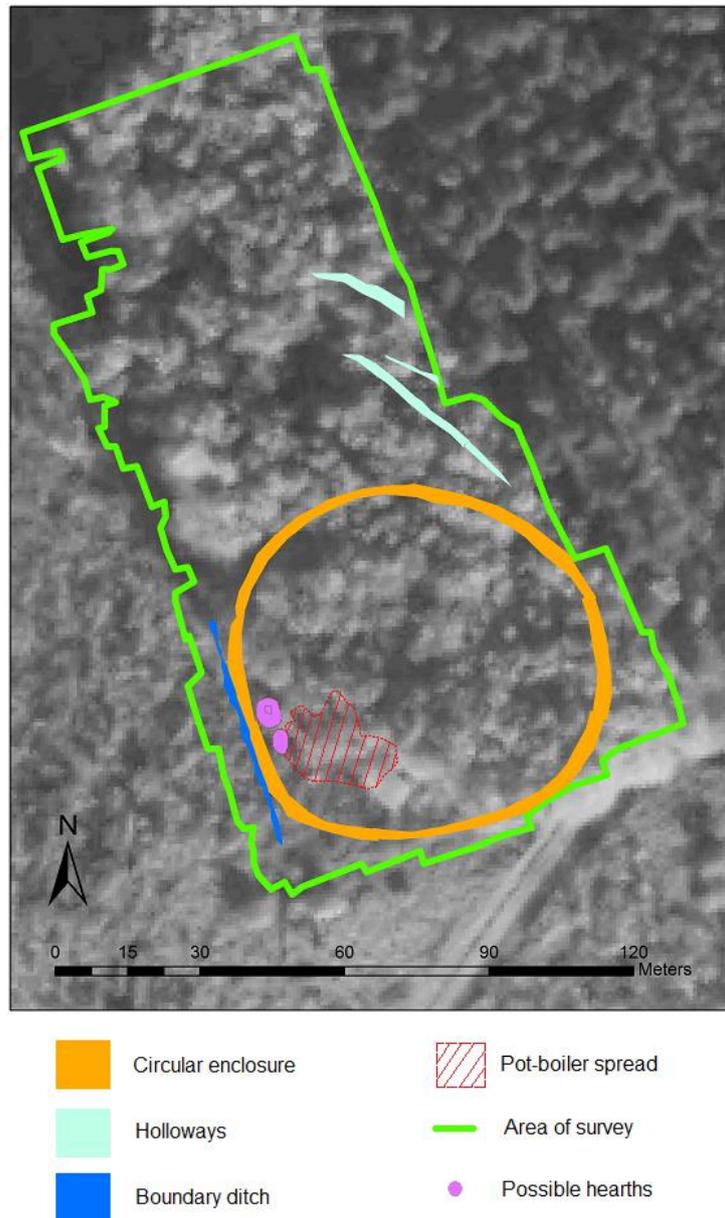


Figure 9: Interpretation plot of archaeological features at Thynghowe detected by magnetometer survey. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

The above results have shown the area of Thynghowe and its

immediate surroundings contain many preserved archaeological remains, and many potential archaeological features perhaps worthy of further investigation, and protection. Due to the difficult conditions associated with the data collection, not all of the anomalies and trends detected in the survey can be discussed in any great depth. However it is certainly the case that although at this stage not all these features can be ascribed any certain identification, many may represent preserved archaeological remains, and may benefit from further study. The following discussions concentrate on those anomalies and trends described above that can be shown to have anthropogenic origins. They are displayed in figure 9 above. However, it should also be considered that as well as the archaeological elements discussed below, the site may also have many more archaeological remains both recorded and not recorded as part of this survey.

Many of the anomalies and trends detected by this survey have been confirmed through excavation (Gaunt & Crossley 2014, Gaunt & Budge 2016, Gaunt, Crossley & Budge 2017 forthcoming), or can be evidenced through a mix of previous survey (topographic survey (Gaunt 2011), and LiDAR (2012)) and historic mapping. The following is a discussion of these archaeological remains and their possible significance.

Hanger Hill is the location of Thynghowe. Thynghowe means "*hill of assembly or meeting place*" (Gover et al 1940). Thynghowe has recently been added to the list of Thing sites across the Viking Diaspora and Scandinavia by the Thing Project (www.thingproject.eu), helping to confirm the importance of the site. Thing sites were an important aspect of Viking life and provided a central meeting place, fulfilling social and cultural functions (Roesdahl 1998, p268). Things provided a platform for the forming and reviewing of laws and for justice to

be carried out, disputes to be settled, and feuds to be avoided (Sanmark 2008, p178).

“The presence of thing organizations across the Scandinavian homelands as well as in the Norse colonies demonstrates their significance to Norse society. Medieval sources from Iceland and Scandinavia show a well-organized administrative system, where each district had its own assembly, although the nature of this system varied slightly between areas. Thing sites have been identified in the Viking settlements of the Orkney Islands, the Shetland islands, the Faeroe Islands, Iceland, the Hebrides, the Isle of Man, Ireland, mainland Scotland, and England. Naturally, not all of these sites have been identified in the landscape, but by place-name evidence only”. (Sanmark 2008, p178).

This last line is very important in relation to the significance of Thynghowe. It is possible at Thynghowe to stand on the actual site of the Thing, and it may also be possible to pin-point the location of ‘parts’ of the Thing monument. This potentially makes the site almost unique archaeologically. This will be further discussed in the forthcoming excavation report (Gaunt, Crossley & Budge 2017 forthcoming) and below in summary.

The Magnetometer survey has detected magnetic variations in the soils that represent archaeological features. As stated above due to the difficult conditions experienced during data collection attention focuses here on only a number of detected features known to be archaeological.

7.1 Historic Mapping

Historic map regression has been undertaken to try and understand the site of Thynghowe and its surrounding

landscape. One particular map from 1791 is discussed below, and the opportunity to describe and discuss the historic and archaeological elements shown on the map is also taken. The features depicted are then discussed where they relate directly to the site of Thynghowe.

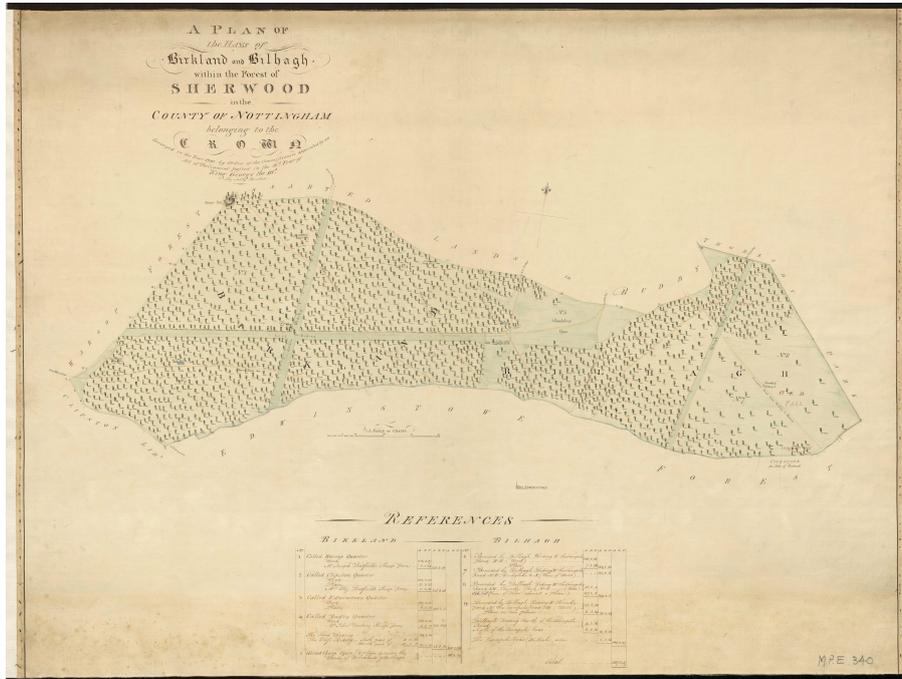


Figure 10: A Plan of the Hays of Birkland and Bilhagh (1793). Extract from Nottinghamshire: Sherwood Forest. 'A Plan of the Hays of Birkland and Bilhagh within the Forest of Sherwood in the County of Nottingham belonging to the Crown. Surveyed in the year 1791 by Order of the Commissioners appointed by an Act of Parliament passed in the 26th Year of King George the III. By John Renshaw' [National Archives MPE 1/340]. © Crown copyright. Reproduced courtesy of The National Archives Image Library.

The map reproduced in figure 10, shows the woods of Birklands and Bilhagh as surveyed by the crown in 1791 (National Archives MPE 1/340). The map is preserved in full colour and high detail, and has enabled a fresh look at some of the historic features as well as the identification of archaeological remains in the two woods. Some of the features recorded on the map are discussed below, and the opportunity is taken to correct any misinterpretations made in previous years from a black and white copy of the map stored at Nottinghamshire Archives (NRO ED 4 L).

The map depicts a number of trackways crossing the woods including '*Upper Warsop Gate*', '*Nether Warsop Gate*', '*Gleadthorpe Gate*' and '*Swinecote gate*' (modern day Swinecote Road, B6034), and two routes labelled '*Budby Bridle Way*', and '*to Budby*'. These trackways are an important part of the archaeology of the Sherwood Forest National Nature Reserve (SFNNR) and the adjacent Forestry Commission managed western half of Birklands wood.

'*Nether Warsop Gate*' survives as a V-shaped holloway in the SFNNR, and in the Forestry Commission managed western half of Birklands where it has been recorded on the ground and surveyed by the Friends of Thynghowe through '*ground-truthing*' following its detection in LiDAR data in 2012. '*Gleadthorpe Gate*' survives as a V-shaped holloway in the SFNNR. It was mapped on the ground in a Level-one survey, but was wrongly interpreted as part of '*Nether Warsop Gate*' (Gaunt & Gillott 2011, p16). The Level-one Survey also recorded the V-shaped holloway which represents the surviving archaeological remains of the trackway labelled '*to Budby*' (Gaunt & Gillott 2011, p16). The V-shaped nature of these holloways suggests pedestrian use.

Worthy of quick mention due to its importance is that this map contains perhaps the earliest known reference to the '*Major Oak*' bearing that name. In 2011 Gaunt pointed out that the map labels the location of the Major Oak as: "*a tree called Major Rooke*". Major Hayman Rooke was an Antiquarian who among other achievements illustrated and documented the Oak trees of Sherwood Forest in the 18th century. The Major Oak is named after Major Hayman Rooke. Gaunt suggested his theory that this is the earliest reference to the tree and Major Rooke in the Transactions of the Thoroton Society in 2011: "*Rooke's publication 'Remarkable Oaks' was not published until 1790. It*

was Rooke's association with this tree and the fame it gathered following his publication that helped the link to become established. Previously the tree had been known by a number of names. It should also be noted that on the slightly later map of Birkland and Bilhaugh surveyed by James Dowland for inclusion in Rooke's own 1799 publication 'A Sketch of the Ancient and Present State of Sherwood Forest in the County of Nottingham' the tree is unnamed (Rooke 1799)" (Gaunt & Gillott 2011, p16).

The 1791 map also shows the east to west orientated "*Long Riding*" and north-northeast to south-southwest orientated "*Cross Riding*" cut through the centre of Birklands wood, with what may be the "*Centre Tree*" in place at the crossing (unnamed). The map also shows "*Bilhaugh Riding*" cut through Bilhaugh wood on a similar orientation to the "*Cross Riding*" in Birklands.

The map shows Birklands wood divided into four quarters in the northwest '*Warsop Quarter*', in the northeast '*Budby Quarter*', in the southeast '*Edwinstowe Quarter*' and in the southwest '*Clipstone Quarter*'. As well as being divided by the rides, it is just possible that these areas may represent early common rights of pasture in the wood of Birklands.

Adjacent to Budby Quarter on the east side is '*Gleadthorpe Open*' a '*Plain between the Woods*' of Birklands and Bilhaugh.

The map depicts seven Warsop boundary stones on the western edge of Birklands wood. One is depicted on the summit of Thynghowe. A number of these stones have been recorded by The Friends of Thynghowe and can be seen as part of the Thynghowe trail which is available for download at: <http://www.thynghowe.org.uk/pdf/ThTrailGuide.pdf>.

Three Edwinstowe boundary stones are depicted on the western side of Birklands. One is situated on the summit of Thynghowe (Gaunt 2011), one is situated on the western boundary of Birklands, and a further stone is shown at the western head of Birklands (to the southwest). A further Edwinstowe boundary stone is seen at the southern tip of Birklands at the point where Birklands wood, Edwinstowe and Clipstone parishes join. A further six Edwinstowe boundary stones are illustrated along the northern edge of Birklands and Bilhaugh woods. One of these survives on the northern part of Bilhaugh Wood as stated in Gaunt and Gillott 2008, p17. Although true today, this is not historically correct; this stone was on the northern boundary of what was at that time part of 'Gleadthorpe Open', not Bilhaugh wood as stated in 2008.

7.2 Circular Enclosure

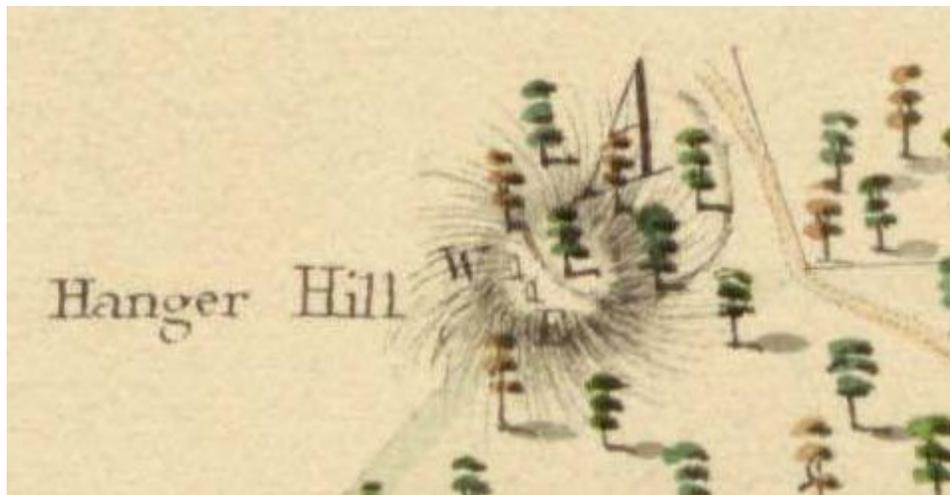


Figure 11: The summit of Hanger Hill in 1791. Detail from a Plan of the Hays of Birkland and Bilhagh (1793). Extract from Nottinghamshire: Sherwood Forest. 'A Plan of the Hays of Birkland and Bilhagh within the Forest of Sherwood in the County of Nottingham belonging to the Crown. Surveyed in the year 1791 by Order of the Commissioners appointed by an Act of Parliament passed in the 26th Year of King George the III. By John Renshaw' [National Archives MPE 1/340]. © Crown copyright. Reproduced courtesy of The National Archives Image Library.

As well as the above features the map also depicts Hanger Hill

on the northwestern edge of Birklands wood. The detail from the map of 1791 (figure 11) shows the summit of Hanger Hill. The boundary stones of Warsop and Edwinstowe are depicted and labelled “W” and “E” respectively. The summit is suggested by hachures drawn curving down slope to the left from the circular plateau of the hill. On the northeast side of the mound the map clearly shows the western, southern and eastern sides of the circular enclosure. It appears that by this time the northern part of the feature may have been less easy to trace on the ground, was in-filled, or was not seen as significant or part of the feature by the cartographer. The circular feature is depicted as overlying the northeastern slope of the summit of Hanger Hill. The feature was certainly prominent enough in the landscape to be recorded by the cartographer in the survey of Birklands wood in 1791 despite being outside the boundary of the woods themselves.

The map also appears to show the trackway of ‘*Nether Warsop Gate*’ altering its course at the northwestern end (deviating northward) apparently in order to pass around the circular feature. The holloway formed by ‘*Nether Warsop Gate*’ was detected in the magnetometer survey along this route around the circular enclosure and is shown in figures 9 and 14. This trackway is also recorded on a map of the boundaries of Warsop, Clipstone and Birklands from 1606 (Copy in Nottingham Archives WP/S/5). The trackway follows a similar detour on the northeastern side of Thynghowe. Although the circle is not shown on that map, the line of the holloway does suggest that it was deviating to avoid a feature along the same line as that shown in 1791. The map (WP/S/5) from 1606 also directly links the name Thynghowe with the summit of Hanger Hill.

The results of LiDAR survey undertaken by The Friends of

Thynghowe and Geomatic Groups Environment Agency in 2012 detected the circular enclosure, although the results do not show the feature fully complete on its northern side.

LiDAR Data 2012 - Friends of Thynghowe / Geomatics Group - Environment Agency

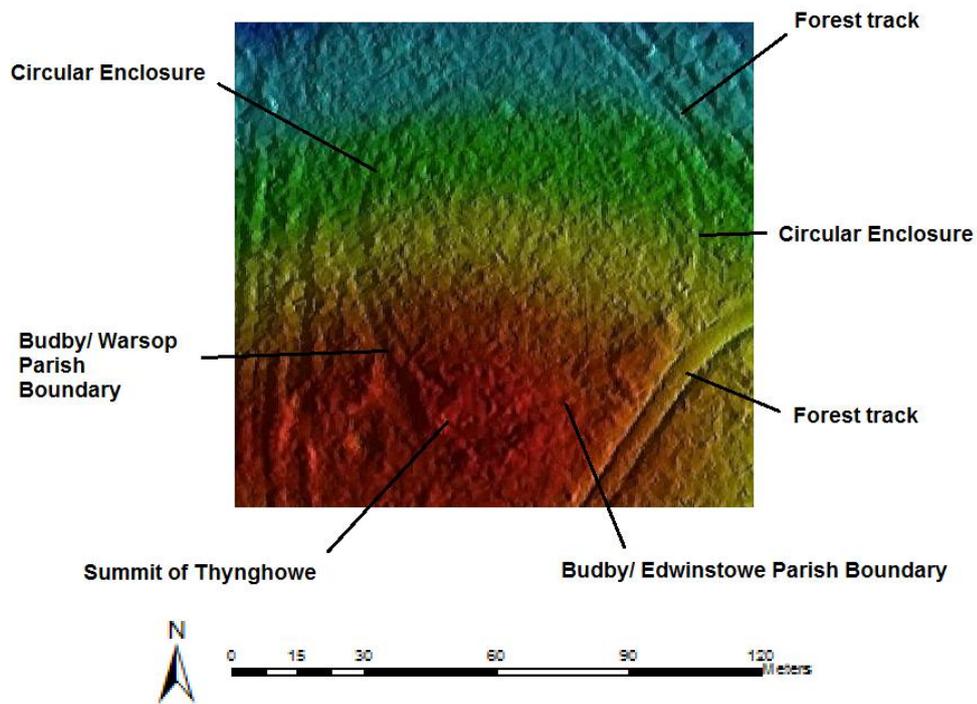


Figure 12: LiDAR data results 2012, courtesy of Friends of Thynghowe/ Geomatics Group Environment Agency. The shaded relief model shows high ground in red and low ground in blue.

The circular enclosure can clearly be seen in the magnetometer survey data set (see figure 4, 7, 8 and 9). The circle is not visible in the geophysical data set on its southern side possible due to being masked by dumped material (see figures 7 and 8 above). However, a combination of the Magnetometer survey, LiDAR data (figure 12 above), and the historic mapping evidence discussed above and in figure 11; enables the enclosure to now be mapped in full for the first time (see figure 13 below).

The circular enclosure can now be shown to be a roughly circular, slightly narrowing at the southwestern edge where it cuts the mound of Thynghowe. It is possibly slightly truncated on the western side by the later parish boundary ditch making the circle appear slightly straightened on this side. From northwest to south east the enclosure has a diameter of 77.5 metres, and from northeast to southwest 75 metres. The bank is internal to the ditch, and subtle earthworks survive to varying levels around much of the feature, with both bank and ditch preserved on the ground surface where it cuts into the mound of Thynghowe on the southwest side, and also on the eastern side (Gaunt 2011). Now that the circle has been fully interpreted it has become possible to trace it on the ground on the northern side as an ephemeral earthwork, which was not previously obvious.

It is important to note that the circular enclosure does not encircle the mound of Thynghowe, but instead lies adjacent to it. A recent publication wrongly states that at Thynghowe “*an enclosure encircles the hilltop which is located at the parish boundary between Edwinstowe and Warsop*” (Wright 2016, p20). Unhelpfully Wright does not present any references regarding his theories for Thynghowe. He also misses out Budby parish in his site description which as we shall see below is where the circle is actually located. The lack of referencing is problematic as at the time of Wright’s theories regarding Thynghowe his statements were contrary to all the available published material presented in archaeological journals (Gaunt 2015, pp22-25; Gaunt 2013, pp29-30; Mallett et al 2012, pp61-65) and in archaeological reports (Gaunt 2011; Gaunt & Crossley 2014) which clearly state the location of the circular enclosure and its associated earthworks (throughout their gradual piecing together) as adjacent to the mound on the northeast side, and

certainly not encircling the hill top. It is therefore difficult to understand how Wright came to his assertions, which considering all the evidence should be disregarded.

The fact that the circular enclosure does not encircle the mound of Thynghowe is potentially of paramount importance when attempting to ascribe a possible function and origin for this archaeological feature (see below, and figures 13 and 14 for the relationship of the circular enclosure to the mound and summit of Thynghowe). The circular enclosure, instead, actually cuts into the mound of Thynghowe on the northeastern side.

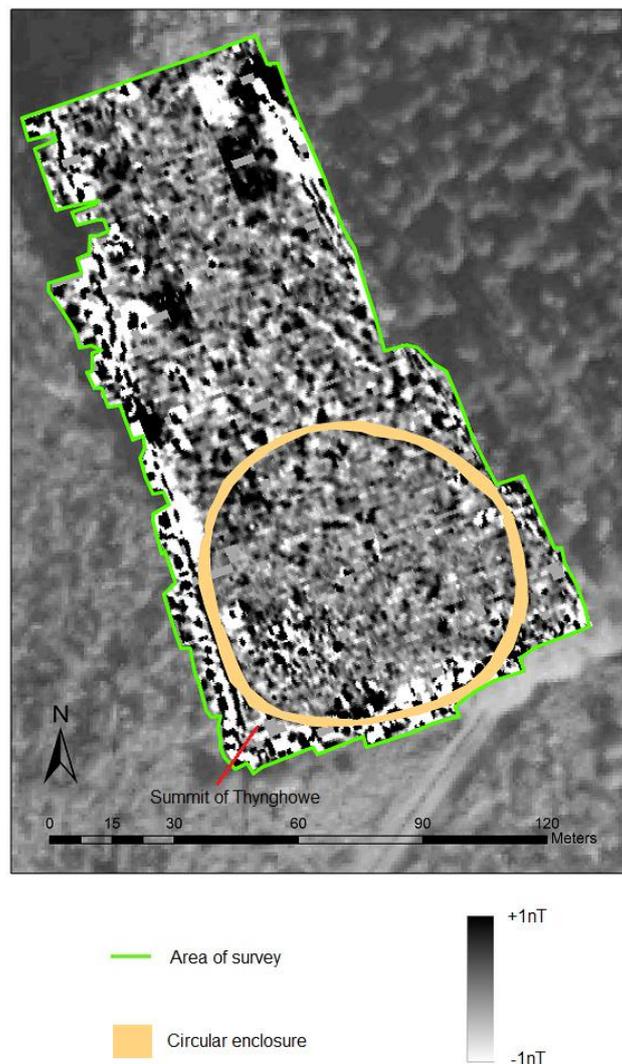


Figure 13: Outline of circular enclosure. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

The circular enclosure was excavated by Mercian Archaeological Services CIC in 2013 (Gaunt & Crossley 2014), and in 2016 by Mercian Archaeological Services CIC (Gaunt & Budge 2016; Gaunt, Crossley & Budge 2017 forthcoming).

Excavations showed the feature to consist of a ditch with an internal bank. These features were far more significant than the surviving earthworks immediately suggested. The bank as excavated in 2013 survives to a height of 0.52m above the original ground surface and has a width of up to 2.33m while the associated ditch is approximately 0.45m deep and 1.20m wide (Gaunt & Crossley 2014, p21).

The lower fills of the ditch are suggested as being Medieval or Saxon in origin according to the results of environmental sampling and soil geomorphology undertaken as part of and following these excavations: *“The pine rise at the top of the sampled profile (M5) is more recent and is a star of the pine rise (c. AD1650/1770), and this may be pollen from above in these loose sediments. The material below this is likely to be earlier, and could be of a Saxon/Medieval date.”* (Allen 2017, p5 in Gaunt, Crossley & Budge 2017 forthcoming).

With the circular enclosure fully confirmed through a combination of Magnetometer, LiDAR and historic mapping evidence, and shown to be of possible Medieval/ Saxon date; an origin and use of the circular feature can be posited.

7.3 Possible origin and use of the circular enclosure

As early as 2011 Stuart Reddish of the *Public Information Research Organisation (PIRO)* and Friends of Thynghowe;

suggested the circular feature could be a '*court circle*' as seen in other Thing sites (Reddish 2012).

A '*court circle*' or '*Lögrétta*' was known to exist at the Althing site at Þingvellir in Iceland. The Althing at Þingvellir was a Thing that operated on a national scale, as an early form of 'Parliament'. The Lögrétta was arguably the most important aspect of the Thing site at Þingvellir as this was where the laws were discussed (Bell 2010, p6).

The site of the Lögrétta at Þingvellir was moved on a number of occasions (due to changes in the course of the River Öxará). At present the site of the Lögrétta is still unknown (Bell 2010, p6). The following is a description of the Lögrétta or '*court circle*' at Þingvellir: "*While the Lögrétta had a fixed site... the other courts did not (Friðriksson, 1994:105) and therefore have left very little, if any, trace in the archaeological record. The term Vébönd, in the Jónsbók lawcode, originally meant 'Sanctuary Bands' and so the area inside was regarded as inviolate. These were ropes that were hung from posts around the Lögrétta and courts (Þórsteinsson, 1987:30), although these were particularly used for marking out the court circles. Egil's Saga contains a description of the Norwegian Gulapting, in which it describes the court as being placed on flat ground, with Hazel rods being used to hold a rope in a circle around the court. These were called 'Sanctuary Ropes' and the judges sat inside the circle (Friðriksson, 1994 p108). It would appear likely that the courts at Þingvellir were arranged in a similar way*" (Bell 2010, p6).

It is worth noting that the Lögrétta at Þingvellir was a "*physical construction of turf and stone in a defined location*". (Bell 2010, p6).

It is possible that the circular bank and ditch enclosure at Thynghowe was constructed as a '*court circle*' associated with

the *'thing mound'* into which it was directly cut.

If this is the case then this archaeological feature would be extremely rare if not unique; *"In no case in England can an enclosure be genuinely associated with an assembly mound, and such features are also rare in Nordic countries, mention of 'judge's rings' in Scandinavian written sources suggest some circular structures may have existed at some assembly places (Brink 2008, p26)"* (Mallett et al 2012, p65).

A full discussion of previously excavated Thing sites and archaeological landscape investigations will be undertaken in the forthcoming report for the 2015 excavations at Thynghowe (Gaunt, Crossley & Budge 2017 forthcoming). However, it is put forward here that the circular feature (which may be a *'court circle'*) could in fact be one of a number of *'assembly features'* (Sanmark 2008, p179) that may be present at Thynghowe and in the surrounding landscape.

7.4 Possible 'Assembly features' at Thynghowe

It is possible to list a number of features that are often (although not always) present at Viking assembly sites. Firstly, these include a *'thing mound'* (Sanmark 2008, p179) at Þingvellir this was known as the *'Lögborg'* or *'Law rock'*. At Þingvellir the *'law rock'* was the central point of the Althing, where sessions were opened and closed, announcements were made, and the *'Law speaker'* (*'Lögsgumaður'*) spoke the laws of the land (Bell 2010, p6). It is probable that the mound of Thynghowe *"the hill of assembly"* may have fulfilled this function. The top of the hill at Thynghowe is home to a stone which has been identified by Stuart Reddish as the *'Birkland Forest Stone'* depicted on the 1606 map (copy Nottinghamshire archives WP/S/5) (Reddish

pers comm). This stone is shown in plate 1 and its location can be seen in figures 3 (above) and 15 (below). Reddish is of the opinion that this stone formed part of the '*law rock*' and '*thing mound*' at Thynghowe. The Birkland stone may once have been a more prominent standing stone. Standing stones are also suggested as '*assembly features*' (Sanmark 2008, p179).



Plate 1: Birklands forest stone on summit of Thynghowe



Plate 2: Warsop Stone on boundary of Warsop/ Budby, now fallen over.



Plate 3: Edwinstowe boundary stone at Thynghowe, stone not in situ.

Alongside the above; '*assembly features*' also include runestones, route ways, and '*thing booths*' (Sanmark 2008, p179). No runestones have been discovered at Thynghowe. It is possible that '*Nether Warsop Gate*' may represent a route way associated with the Thing (Mallett et al 2012, pp64-65); with the Old Scandinavian '*Gata*' meaning street (Gover et al 1940, p14), but its dating is not known through excavation. It is not possible to ascribe a Viking period date to this feature at the present time. However, as a trackway it can be shown to be at least early 17th century in age from the mapping mentioned above, and movement between Warsop and Edwinstowe would have been required from the times the settlements were formed. Both settlements were in existence by the time of the Norman conquest (Morris 1977), and Saxo-Norman pottery found in Edwinstowe by Mercian Archaeological Services CIC is dated to between the 10th to 12th century (Gaunt 2014), making it plausible that the track way was in place in Viking times.

At Þingvellir '*thing booths*' were known as '*Þingbúðir*' literally 'Þing' (Thing) 'búðir' (booth). These structures were the buildings which housed the delegates attending the Thing (Bell 2010, p8). '*Thing booths*' are found at many Thing sites (Bell 2010; Sanmark 2008). They consisted of turf or stone walls over

which a tent or canvass was erected (Bell 2010, p8).

No Thing Booths have been detected in this geophysical survey, and no structures in the vicinity have been discovered that could be interpreted as such to date. However again Stuart Reddish has noted that Booths in Iceland are spelled 'búð' (Reddish, 2012). It is perhaps a co-incidence, but one worthy of mention, that the site of Thynghowe is located at the southwestern corner of Budby lordship. Budby contains the name element 'Bud'. Although the 'Bud' element is what first draws this comparison it should be noted that the place name for Budby is first recorded in Domesday Book as *Butebi* in 1086. It also appears as *Buttebi* in 1168; *Butheby* 1234; *Butteby* 1280, 1287, 1294, 1330; *Boteby* 1252, 1276, 1287, 1297; *Botheby* 13th century and *Budby* 1433 and *Budeby* 1444. The derivation is presumed to come from a Scandinavian personal name 'Botti', 'Butti', 'Botte', or 'Butte', with the name ending 'by' being the Old Scandinavian for 'farm' (Gover et al 1940, p91-2). Reddish had posited that Budby may mean 'the Booth Farm' (Stuart Reddish pers comm). Although the 'Bud' element is suggested to emerge in the 14th century, it is still possible that the 'Butebi' of Domesday, 'Buttebi' or 'Butheby' or any of the early forms could derive from the name for 'Booth', and it is possible in-light of the proximity to a Thing site that the derivation of the placename Budby may now need to be reconsidered.

7.5. Other archaeological remains

The area indicated as a 'pot-boiler spread' on figures 9 and 14 was proven by excavation to be a deposit of pot-boiler pebbles and cobbles also referred to as Heat Shattered Pebbles: "*Heat Shattered Pebbles (HSPs), sometimes referred to as Heat Affected Stones or Fire Cracked Pebbles, are a category of*

artefact resulting from the utilisation of naturally occurring pebbles by humans. They are not deliberately manufactured but acquire their diagnostic characteristics as a, probably undesirable, side effect of the use to which they were put. HSPs were employed as a heat transfer system for the purpose of boiling liquids, often without the use of a ceramic or metal container. Diagnostic features of HSPs are irregular crazing to the surface and irregularly fractured edges. These features are generated as a result of thermal shock arising when the heated pebble is deposited in the liquid to be warmed and as a result suffers a rapid cooling. A further feature that may occur on HSPs is a reddish or pinkish surface, which is a result of the oxidation of iron in the stone when the fire in which it is heated has an oxidising atmosphere” (Budge p43 in Gaunt & Crossley 2014). It is possible these stones were associated with cooking or brewing (Budge p48 in Gaunt & Crossley 2014). Due to the lack of clear dating evidence for these pot-boiler stones from excavation, SUERC have been contracted to undertake thermoluminescence dating on a sample of the pot boilers to attempt to date their last heating. The dates will be published shortly (Gaunt, Crossley & Budge 2017, forthcoming).

Environmental evidence suggests the stones may have been deposited in this layer while still hot, but the absence of charcoal suggest the stones were not heated in situ (Allen 2017b). With this deposit proven to contain pot-boiler stones not heated in situ, the possible hearths detected in the magnetic survey adjacent to the spread may be related (see figures 9 and 14).

7.6 Thynghowe Monument Complex

As a result of the archaeological investigations and continuing

study at the site of Thynghowe and in the surrounding landscape by The Friends of Thynghowe working alongside Mercian Archaeological Services CIC, and other experts over the last 13 years it is now possible to discuss a monument complex in existence at the site of Thynghowe, Hanger Hill. The site has now been the subject to an array of archaeological techniques including: map regression, topographic earthwork survey (Gaunt 2011), geophysical surveys (Baker & Brookes 2012; Gaunt 2017), LiDAR survey (2012), level-one survey (Gaunt 2011), ground-truthing and surveying (2012 onwards), excavations by Mercian Archaeological Services CIC (Gaunt & Crossley 2014; Gaunt & Budge 2016; Gaunt, Crossley & Budge 2017 forthcoming), landscape analysis (Gaunt 2011) and academic publication (Mallet et al 2012). A series of archaeological elements have now been confirmed at the site. These are: a '*thing mound*', Warsop and Edwinstowe boundary stones, the Birklands Forest Stone, the Warsop and Budby parish boundary ditch and bank, the circular bank and ditch enclosure, a spread or mound of pot-boiler stones, two possible hearths, and a series of holloways identified as part of '*Nether Warsop Gate*'. Although at the time of writing the full results of scientific analysis and archaeological excavations are not yet available to the author or therefore fully published (Gaunt, Crossley & Budge 2017 forthcoming) something of their dating and their spatial and stratigraphic relationships can be discussed.

Environmental analysis and soil geomorphology suggest a Medieval or even Saxon date for the circular enclosure. This feature cuts into the mound or summit of Thynghowe on the northeastern side of the mound making the mound an earlier construct stratigraphically. As yet no absolute date is known for the mound, but in terms of relative dating; it is earlier than the

circular enclosure that cuts it. It is possible that the Thing site or any meeting site using the mound utilised an already existing structure, and Bronze Age flints have been found during recent excavations (Gaunt & Budge 2016; Gaunt, Crossley & Budge 2017 forthcoming).

The circular enclosure is in the southwestern-most corner of Budby parish. It is situated directly adjacent to both the boundaries of Budby and Warsop on the west and Budby and Edwinstowe/ Birklands on the south. The boundary between Budby and Warsop is shown to alter its course at a right angle in order to head up to the top of Thynghowe/ Hanger Hill from the north. This orientation of the boundary is depicted in this way as early as George Sanderson's 1835 map of *Twenty miles around Mansfield*. It is possible the boundary is earlier. Excavations have shown that the circular enclosure ditch is cut by the parish boundary ditch where the two meet on the western part of the survey area, showing the circle to be older than the current parish boundary (Gaunt, Crossley & Budge 2017 forthcoming).

The circular enclosure is within Budby parish which a re-assessment of the placename could indicate was the home to '*thing booths*'.

The mound of Thynghowe/ Hanger Hill summit, is quarried away on the western and southern sides where it sits within both Edwinstowe and Warsop parishes (Gaunt 2011). This quarrying artificially steepens these two sides of the mound, while leaving intact the northeastern slope of the hill/ mound; into which the circular enclosure is cut in the Budby parish. The dating of this quarrying is uncertain. Therefore assuming that these alterations were part of deliberate 'sculpting' of the site for a particular purpose would be premature. Especially in relation

to the use of the site as a meeting place. However, it could be significant that the Warsop boundary stone, now fallen, (shown in plate 2, and on figures 3 and 14) is on the line of the boundary. This may therefore have been its original location. This could suggest that the quarrying of the sides of the mound took place before the boundary stone was placed on this boundary line. The 1791 map shows the boundary stone in situ and the 1835 map shows the boundary on the current alignment. This could suggest the steepening of the mound on at least the western side was undertaken before the 1791 map was produced.

However, the hachures on the 1791 map suggest the hill was still circular at that time, and may therefore not support this theory, if the cartographer was depicting the shape of the hill accurately. For now the dating of the steepening of the sides of the mound will remain unproven.

It may be significant that the mound is steepened on the western and southern sides, and is left intact on only the northeastern slope. This slope is the part within Budby, and is where the circular enclosure is also found. It is tempting to speculate that this is not entirely accidental, but without scientific dating it would be wise to remain cautious.

The stone on top of the mound (identified by Stuart Reddish as the Birkland Forest Stone) is not located on the boundaries of the parishes, and is therefore presumably not there to demarcate any of the parish boundaries. This could lend support to Reddish's theory that it is an earlier stone with a different function.

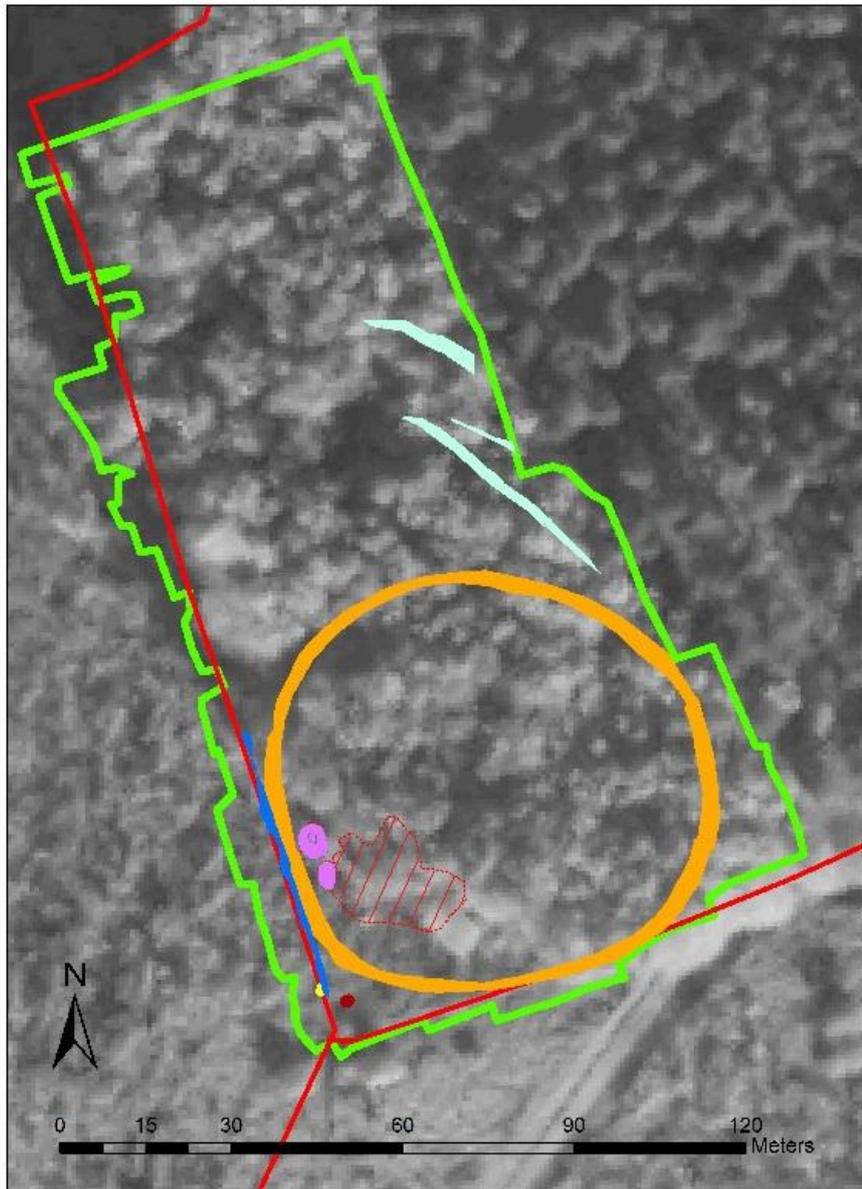


Figure 14: The Thynghowe Monument complex. Contains OS data © Crown copyright [and database right] 2017. Contains Image © Google Earth. Image © 2017 Getmapping plc.

As well as the features discussed above this survey has also shown a large number of trends and anomalies within and around the circular enclosure that may be archaeological features. Unfortunately, the ground conditions during data collection have limited the understanding of these features. In future years should the site be cleared it may be worth undertaking further geophysical prospection of the area in and around the circular enclosure. Also, as clear-felling or shrub clearance takes place similar geophysical surveys, combined with other archaeological techniques would be advisable on all sides of the summit of Thynghowe.

With the identification of the site of Thynghowe as a Viking Thing site, and the existence of a circular enclosure cut into the slope of the *'thing mound'* on the northeastern side; the lower fills of which environmental evidence suggests are potentially Saxon or Medieval, and posited use of this feature as a *'court circle'*, and the additional presence of holloways, and preserved archaeological remains (pot-boiler deposits) make the site of Thynghowe of great importance, not only regionally, and nationally, but potentially internationally.

It is one of the few locations surviving where a Thing site can be pin-pointed in the landscape. It is also possible with the presence of the circular enclosure and mound that the site has preserved in situ *'assembly features'* which may be unique in the Viking Diaspora in terms of preservation. The possible place name evidence relating to booths and the obvious placename evidence relating to a Thing site, alongside the clear survival of archaeological remains within a visible monument complex makes this site potentially highly significant.

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[National Archives MPE 1/340] Plan of the Hays of Birkland and Bilhagh (1793). Extract from Nottinghamshire: Sherwood Forest. 'A Plan of the Hays of Birkland and Bilhagh within the Forest of Sherwood in the County of Nottingham belonging to the Crown. Surveyed in the year 1791 by Order of the Commissioners appointed by an Act of Parliament passed in the 26th Year of King George the III. By John Renshaw'. © Crown copyright. Reproduced courtesy of The National Archives Image Library.

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10. Disclaimer:

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the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency it is often not possible to classify all anomaly sources; while there will be degrees of certainty for others. Where possible an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports.