Aggregates Levy Sustainability Fund

THORNBOROUGH HENGES

AIR PHOTO MAPPING PROJECT

(ALSF 3897 MAIN)

MANAGEMENT OVERVIEW: SUMMARY OF RESOURCES AND RESULTS

English Heritage AMIE Parent Collection UID:	EHC01/052
English Heritage AMIE Event UID:	1404468
Project dates:	November 2004 – March 2005
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CONTENTS

SUMMARY

The Thornborough Henges Air Photo Mapping Project was funded by the Aggregates Levy Sustainability Fund (ALSF), as disbursed through English Heritage, and operated by Archaeological Services WYAS.

An area of 100km^2, centred on the nationally important prehistoric henge complex at Thornborough in North Yorkshire was surveyed to NMP standards from existing air photographs. Digital maps, at a nominal scale of 1:10,000, and supporting records were created by a small team of aerial investigators. This team was contracted by Archaeological Services WYAS and based with English Heritage's Aerial Survey and Investigation at Tanner Row, York.

The project identified and mapped sites varying in date and type ranging from a Neolithic cursus to military remains from the twentieth century. New AMIE records were created for 153 monuments or monument groups and a further 41 amendments or enhancements were made to existing records.

All requests to consult the project data should be directed to the National Monuments Record, English Heritage, National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon, SN2 2GZ

INTRODUCTION

The Thornborough Henges Air Photo Mapping Project was instigated to inform English Heritage's Conservation Plan, which is currently being drawn up for the setting of the Thornborough henges. The Conservation Plan is necessitated not only by the unique character of this landscape but also by the considerable threats it faces from aggregate extraction. Extraction has been active in this area throughout the second half of the twentieth century and in June 2004 planning proposals were submitted for a 40 hectare extension of the quarry at Ladybridge Farm, to the north-east of the henges.

This work will also contribute to English Heritage's National Mapping Programme. The National Mapping Programme (NMP) is ongoing and is generating a comprehensive record of the archaeology that is visible on air photographs for the whole of England. To date, approximately 32% of the country has been covered by the programme.

This project has produced maps and records of the visible archaeological features for an area centred on the nationally important prehistoric henge complex at Thornborough in North Yorkshire. Overall the project comprises four OS 1:10 000 scale quarter sheets and covers an area of 100km$^{2.}$.

Work was undertaken by a small team of aerial investigators who were contracted by Archaeological Services WYAS (ASWYAS) and based with English Heritage's Aerial Survey and Investigation (AerSI) at Tanner Row, York.

This project was scheduled to run from the 10th November 2004 to the 15th February 2005. In January 2005, at the request of English Heritage the project remit was expanded to include consideration of certain geological features and the timescale was extended until 2nd March 2005.

This report is a brief overview of the results of the project. Readers requiring a more comprehensive account of the NMP mapping should consult the entire data set.

AIMS AND OBJECTIVES

The rationale and archaeological background for this project are set out in full in the original project design (ASWYAS 2004).

In brief, the aim of this project was to produce an accurate map and record of features from all periods that are visible as crop marks, soilmarks and earthworks on existing air photographs. This would comply with the standards of the National Mapping Programme and be the first comprehensive and specialist consideration of the air photographs for the henge monuments and multi-period landscapes in their local environs.

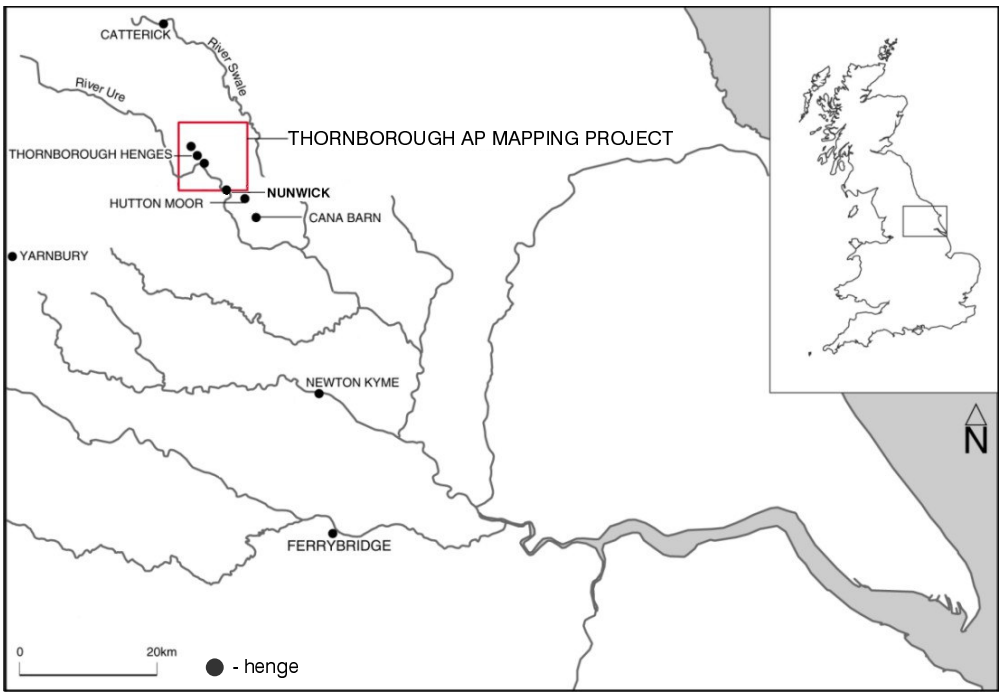
This work provides an overview, which has so far been lacking, in which to consider the impact of the Ladybridge Farm proposal, not only in the context of the contemporary monuments but also of activity from the later prehistoric periods to the early twentieth century.

SCOPE OF THE SURVEY

Geographical scope of the survey

The Thornborough Henges AP Mapping Project lies entirely within the county of North Yorkshire and covers parts of Harrogate and Hambleton districts. It covers four whole and contiguous 1:10 000 scale quarter sheets (SE27NE, SE28SE, SE37NW, SE38SW), a total area of 100 km^2.

Figure 1. Location map of the Thornborough AP Mapping Project area and other Yorkshire henges.



The area is approximately centred on the three henge monuments at Thornborough and spans part of the interfluve between the Rivers Ure and Swale. The River Ure meanders through the south-west quadrant of the project area. The landscape is gently undulating with the ground rising to the west and south-west and falling towards the River Swale in the east. The area around the henges is relatively flat and low lying, being between 40-45m AOD.

The belt of Magnesian Limestone that runs between Nottingham and the north-east coast crosses the western half of the project area and is overlain in parts by Permian and mudstones. The south-west corner of the project area lies on Millstone Grit and the eastern half on Permian and Triassic Mudstones.

The project area is rural in character with large areas of arable and improved pasture interspersed with small patches of woodland and small villages and hamlets. However the large-scale gravel extraction has increasingly become a feature of the landscape and has gradually taken up more of the area of the landscape surrounding the henges.

Archaeological Scope

The aim of the National Mapping Programme is to increase our understanding of the historic environment. It achieves this by identifying, interpreting and recording all probable and possible archaeological features that are visible on air photographs as crop marks, soilmarks, parchmarks and earthworks. The *NMP Sphere of Interest* draft report (RCHME 1997) documents in full the scope of the NMP. The main aspects relevant to the landscapes of the Thornborough Henges Air Photo Mapping Project are summarised below:

Earthwork archaeology

All extant earthworks identified as archaeological in origin were recorded.

Levelled archaeology

All crop mark, parchmark and soilmark features identified as archaeological in origin were mapped.

Post medieval and modern field boundaries

Field boundaries (upstanding or levelled) that are visible on air photographs but that are also depicted on First Edition Ordnance Survey or later edition maps were not mapped.

Medieval and post medieval ridge and furrow

All extant, vestigial, soilmark and crop mark evidence of ridge and furrow visible on air photos was mapped. Using a simple graphical depiction the extent of the original furlongs (as far as these could be deduced) and the direction of ploughing were delineated. Remains were characterised as either medieval ridge and furrow, post-medieval ridge and furrow and post-medieval narrow ridge and furrow such as steam rigg.

The state of preservation was evaluated from the most recent photography and the visible remains were distinguished in the system of AutoDESK Map 2004® layers and conventions between those that were extant and those that had probably been levelled. It should be noted that the date of the most recent photography does vary considerably. Furthermore earthwork ridge and furrow may survive but be imperceptible on the most recent photographs because of inappropriate lighting conditions. In such cases ridge and furrow will be recorded as levelled even though this may be an erroneously interpretation; this is standard NMP recording practise as established by English Heritage and cannot be ameliorated for individual projects.

Industrial features and extraction

Large-scale disused and active quarry complexes (> 2 hectares) were recorded by a simple outline of their greatest visible extent though some details such as trackways and spoil heaps were recorded as seen. Smaller quarries (1-2 hectares) were recorded if they were not mapped on the relevant Ordnance Survey First Edition six inch to one mile sheet or if they impacted on other archaeological features. Very small quarries (< 1 hectare) were not recorded unless they were thought to be of pre-medieval data. The remains of pre-modern coal extraction and associated features were recorded.

20th century military features

As it is within the brief of English Heritage to record former military features constructed up to and within the Cold War period these features were mapped where visible. In general the presence of complex and extensive sites such as army camps was denoted by a simple outline though selective features within these sites were occasionally mapped "as seen".

Buildings

The foundations of buildings visible as earthworks or ruined stonework were recorded. Standing roofed or unroofed buildings or structures were generally not recorded unless they had a particular association in the context of industrial or military sites.

Extension of the archaeological scope

In a departure from the standard NMP specification and the original design of this project, air photo mapping and interpretation was extended to include certain geological features. English Heritage had identified palaeochannels as having significance to the archaeological landscapes and requested that these were considered. It was agreed by English Heritage that the Thornborough Henges AP Mapping Project team would digitise field mapping data produced by the Swale-Ure Washlands project under the auspices of the Geography Department at the University of Durham. This information was supplied as 1:25 000 scale hand-annotated maps that covered approximately 60% of this project's area. An initial assessment of this field mapping data suggested that the available air photographs could contribute greater detail, particular of lesser channels in the low-lying area around the henges. Here, geomorphological features believed to be palaeochannels appear as great swathes of slower ripening crop. So, in addition to digitising the field mapping data the team undertook to rectify and map possible palaeochannels from the best air photographs for an the area between SE 275 800 to SE 300 805.

SOURCES

Air photographs

The available photographs in the following collections were examined for the Thornborough Henges AP Mapping Project:

- English Heritage's National Monuments Record (NMR)
- Heritage Environment Record (HER), NYCC
- Unit for Landscape Modelling (ULM) (formerly known as CUCAP)

The NMR supplied the majority of the specialist oblique photography for this project. These can be categorised into four main groups: the Crawford Collection, CUCAP duplicates, Derrick Riley photographs and the work English Heritage's own aerial investigators. The Crawford Collection prints are exceptionally early examples of aerial photography dating from the first three years of the 1930s and 1945. These offer an unparalleled insight into the condition of the henge monuments in the first half of the twentieth century. The CUCAP duplicates in the

NMR collection date mainly to the 1950s, these prints were not re-requested from the Unit for Landscape Modelling (formerly known as CUCAP). Derrick Riley reconnoitred this project's area in the 1970s. Based on the evidence of the photographs he took, it appears that most of Riley's forays into this landscape were limited to one or two visits per year but in the dry July of 1976 he visited the area on at least 6 different days. There was then a hiatus of some ten years before reconnaissance in the area began again, firstly under the auspices of the RCHME and later by English Heritage. Many of English Heritage's recent photographs have focused on recording excavations in progress. While these have been useful for revealing sub-surface deposits in plan, this does duplicate information that is recorded in greater detail by archaeologists on the ground. Greater priority should be given to those landscapes that are visible only as crop marks and soilmarks.

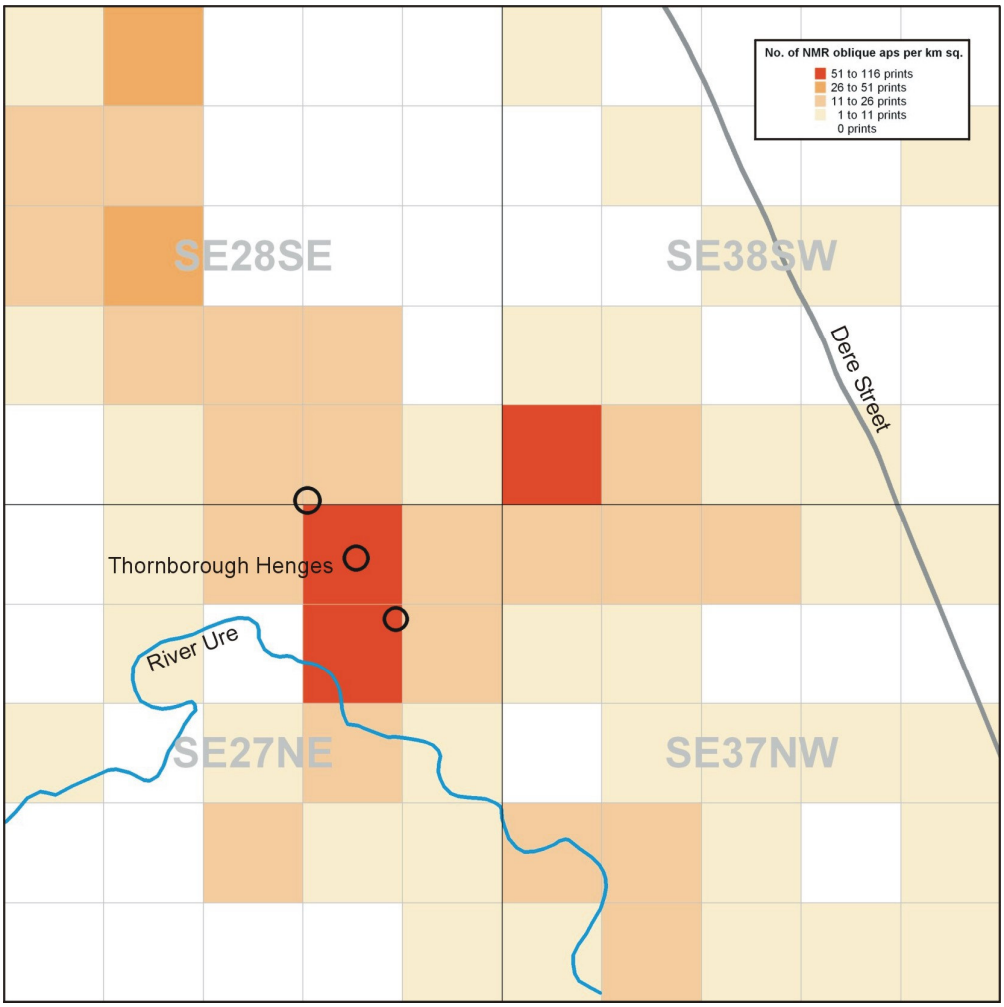


Figure 2. The distribution of specialist oblique photographs by kilometre square.

The distribution of specialist oblique air photographs is heavily biased towards the area of the two exposed henges, the third is largely under woodland and thus less photographed (see Figure 2). Nearly a quarter of all the oblique photographs cover

the two square kilometres in which the Central and Southern henges sit. Other major foci are the villa in Snape with Thorpe and boundaries and enclosure complexes in Kirklington-cum-Upsland and Well. Many areas are without any specialist oblique coverage in this collection.

The vertical photographs available from the NMR span the period between 1940 and 1994. Coverage for each decade from the 1940s to the 1970s is relatively comprehensive. However sorties from the 1980s and 1990s cover only the southern half of the project so there is little record of significant recent changes such as quarrying in the northern half of the project.

Oblique photographs were also kindly loaned from the collection of the North Yorkshire HER. These included photographs taken by Derrick Riley, Anthony Crawshaw, Peter Addyman and NYCC photographers as well as a some prints duplicated from the ULM and the NMR. The coverage offered by this collection was of variable quality but was significant in some locations where the NMR and ULM coverage was lacking, particularly along and to the east of Dere Street.

This project was carried out in collaboration with Cambridge University's Unit for Landscape Modelling (ULM): their contribution being the loan of material from their Air Photo Library. This library kindly loaned nearly three hundred oblique photographs and 8 vertical photographs from this collection. As noted above some ULM photographs were duplicated in the NMR and these were not requested again from this library. As with the distribution of the NMR obliques there is a heavy bias in the ULM oblique coverage towards the area of the henges: at least two-thirds of these photographs were taken of henges and features lying in their immediate environs. Beyond the henge complex ULM oblique coverage is relatively sparse. Prints from just two vertical sorties were consulted from this collection. The ULM has flown a couple of other sorties in this area but does not hold print copies of these photographs.

The table below quantifies the holdings of each collection, within which there is considerable duplication. Reference numbers for the NMR loans are given by quarter sheet in Appendix 4 and full contact details for each collection are given in Appendix 5. Lists of all the photographs consulted will be kept by the project team and are available on request.

Collection Name	**No. of oblique photographs**	**No. of vertical photographs**
NMR	716	1013
ULM	296	8
NY HER	241	None consulted

Existing records

The National Monuments Record database (AMIE) was routinely consulted. This process was assisted by the output from English Heritage's GIS, which facilitates graphic representation of the records with attached summary data.

Data for the project areas from the Historic Environment Record (HER) of North Yorkshire were made available by Nick Boldrini, HER Officer for North Yorkshire County Council. Where possible the NMR records that were created or enhanced by this project were concorded with the existing HER records.

Dr Jan Harding, School of Historical Studies, University of Newcastle Upon Tyne, kindly supplied the project with data generated from his ongoing investigations in the area. This included plans from geophysical survey, topographic survey, excavation, field walking, some historic excavations and some basic transcriptions from air photographs. The material supplied was over and above the information already widely available on the website of the ALSF-funded The Neolithic Monument Compex of Thornborough project (http://thornborough.ncl.ac.uk).

Other online resources consulted include the draft desk based assessment prepared for the Nosterfield area by Field Archaeology Specialists for Mike Griffiths Associates (Roe 2003).

METHODOLOGY AND RECORDING

Mapping Methods

All the available air photographs from the specified sources were examined under magnification and stereoscopically where possible. Photographs selected for transcription (rectification and mapping) were scanned at a suitable resolution, this was usually 300dpi, and output as uncompressed TIFF format images (.TIF). Where permission to scan was not forthcoming from the copyright holder the necessary information was traced onto acetate sheets and these were scanned and rectified.

Scanned images were rectified using the specialist software AERIAL5.24. Control information was mostly derived from the Ordnance Survey Land-Line™ 1:2500 scale vector maps, which were also used as a base for mapping. Height information from the OS Land-form Profile™ (5m vertical interval, 1:10 000 scale) was used to create Digital Terrain Models in AERIAL where the topography rendered this necessary. Accuracy for the Ordnance Survey raster 1:2500 maps is in the range of ±2m and rectification of photographs is normally within ±2.5m.

Rectified images were produced from AERIAL5.24 in uncompressed TIFF format at a resolution of 300 dpi and a scale of 1:2500. A World file (.TFW) was created alongside each TIFF file and the control information was retained in the AERIAL RDA file (.RDA).

Individual digital drawings were created for each map quarter sheet in Autodesk Map 2004®. The rectified image was placed into the relevant map drawing, the information in the World file determined the image's correct position and scale. The archaeological features were then traced from the photograph into the standard NMP layers using the established NMP conventions (see Appendix 1).

Recording Strategy

There are three strands to the NMP recording strategy. The main strand is the creation of new or the enhancement of existing monument records in the National

Monument Record's AMIE database. In the AMIE database the record entries or enhancements generated by this project record the key locational information, the monument types present and their dating, the nature of the evidence, a free text description of the monument or monument group, the source of record information (i.e. photograph, bibliographic or cartographic references) and administrative details such as concordance with SMR records, record authorship, and links to events and archives.

These records are linked, via the monument UID to the second strand, the graphical representation of the archaeological monuments in Autodesk Map 2004®.

To assist in the management and querying of the actual map data in the Autodesk Map 2004® environment and in English Heritage's planned GIS a summary of some of the database information is attached to each individual mapped feature. Two tables of data are attached to each feature, the content of these tables is listed Appendix 2.

PROJECT MANAGEMENT

The mapping and recording for the project was carried out by Matthew Oakey and Daniel van den Toorn, both ASWYAS. Alison Deegan coordinated and monitored the project for ASWYAS, Ian Roberts was ASWYAS Project Manager and Dave MacLeod, AerSI was English Heritage's Project Officer.

The project started on 10th November 2004 and was completed on the 2nd March 2005. This included an extension to the original project timetable of 24 person days to allow the project team to map and document the visible palaeochannels as requested by English Heritage.

SUMMARY OF PROJECT RESULTS

The principal products of this project are the maps and NMR records. The following is a brief overview of the project's results and is not intended as a comprehensive account of the archaeology of the project area. Decision-making based on the outcomes of this project should be informed by the entire data set and should not rely on this précis. NMR Monument UIDs are provided to facilitate access to the relevant NMR record.

Quantification of results

This project created 153 new AMIE (NMR) records and made amendments or enhancements to at least another 41 records. Of the new and amended records 163 were not previously recorded in North Yorkshire's Historic Environment Record as digitised monument records.

The predominant forms of evidence were earthworks and crop marks. A small proportion of remains survived as ruined buildings or structures. The form of evidence is simply a record of the nature of the monument on the photograph from which it is recorded and is not intended to be an indication of current condition of

the monument. A full list of the types of monuments represented in this project is given in Appendix 4.

Overview of results by period

Geomorphological features

Figure 3. Channel floor and other possible palaeochannel forms identified by field mapping and from air photographs

The field mapping undertaken by the School of Geography at the University of Durham for the ALSF-funded Swale-Ure Washlands Project identified major channel floor forms along the present course of the River Ure and in the far south-west of this project's area (See Figure 3). This project identified a complex network of possible palaeochannels in the area around the henges on the available air photographs. It should be noted that the interpretations from the photographs have not been verified by any ground survey and their validity remains to be tested.

Dr W. Mitchell from the School of Geography at the University of Durham has indicated that the palaeochannels that are visible around the henge complex are probably associated with fan aggradation during the late glacial. He doubts that these waterways were visible to the earliest settlers, even as relict channels and suggests that by the Neolithic the River Ure was close to its current position.

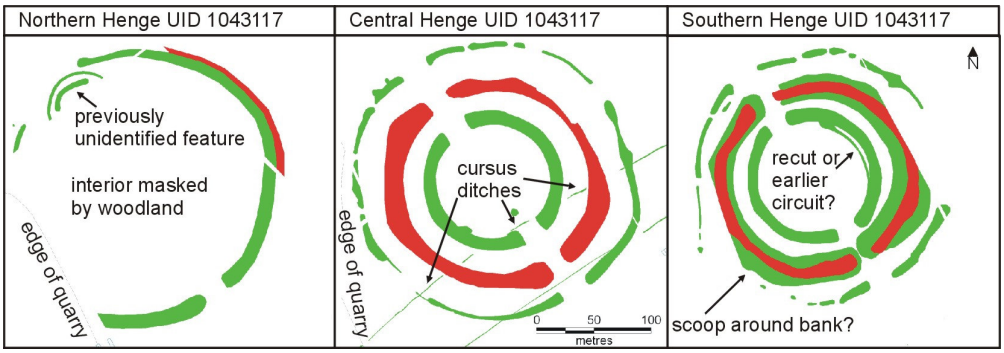
However geomorphological evidence from Hanson's Quarry, a little further downstream, may suggest that lateral movement of the river continued until relatively recently (Neil Campling, North Yorkshire County Archaeologist pers comm.)

Known and possible Neolithic monuments

Probably the earliest monument recorded by this project is the cursus that sweeps a gentle arc over 950m between the River Ure and Thornborough village (UID 52053). The south-western terminus, now destroyed was recorded on pre-quarrying photographs but its north-western extent is unknown. A number of crop marked ditches are visible on the south-western side of Thornborough village and though these follow the approximate alignment of the cursus they are not thought to be part of this monument (cf Roe 2003 DBA no. 1) (UID 1406088). This project has not been able to substantiate the claim of a second cursus to the east of the Northern Henge (cf Roe 2003 DBA no. 51).

The known cursus is overlain by one of the three henges, each probably constructed in the Neolithic period. This project has revealed hitherto unknown details about all three enclosures, including the Northern Henge which is largely concealed by woodland (see Figure 4).

Figure 4. The Thornborough Henges from air photographs



Excavations have suggested that at least two other monuments date to the Neolithic period: a multi-ditched barrow and a small oval or "mortuary" enclosure (http://thornborough.ncl.ac.uk) (UIDs 52060, 1406084). The latter is characterised by a sub-oblong plan and segmented ditches. A feature of similar plan and size has been newly documented by this project to the south-west of the Southern Henge (UID 1406079).

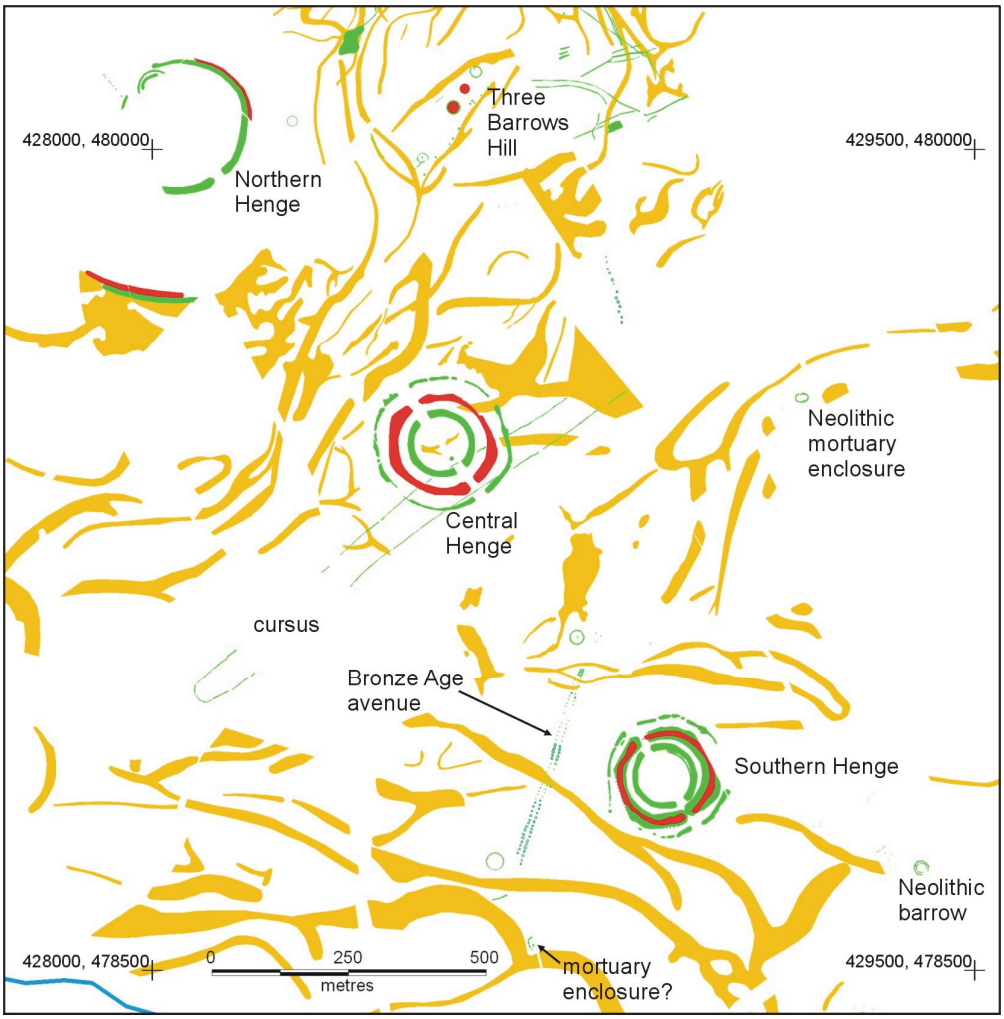
Known and possible Bronze Age features

Monuments of known or possible Bronze Age date are more widely distributed across the project area than those recognised as being of Neolithic date. Most are the ring ditches that once surrounded the mounds of probable burial monuments although some mounds do survive.

Dr Jan Harding has suggested that the avenue of pits running to the north-west of the Southern Henge may also be of early Bronze Age (http://thornborough.ncl.ac.uk) (UID 52090). Significant sections of this avenue have been excavated but as yet no radiometric dates are available to confirm this

attribution. The avenue comprises rows of paired pits set 6-10 metres apart. There is considerable variation in size between different pairs and the northern end terminates with nine pairs of elongated pits lain end to end. Excavations have shown that some pits were packed with stone to support timber uprights. Significantly it has been possible to detect the presence of post packing around individual pits in two other unexcavated single alignments in the project area (UIDs 1406156 & 1406077). This shared characteristic may suggest that such alignments are of similar date to the avenue. All of the pit alignments are characterised by relatively small, round to oval pits that are often unevenly spaced; these are quite unlike the arrangements of large, regular rectangular pits that are usually dated to the Iron Age or later.

Figure 5. Extract from the NMP mapping of pre-medieval features and possible palaeochannels for the area around the Thornborough Henges.



There is a close spatial relationship to be observed between the known and possible Neolithic and Bronze Age monuments and the bands of slower ripening crops that may represent relict channels (See Figure 5). However, given the dense and confusing network of possible palaeochannels within this area some

coincidence between monuments and channels is to be expected. As discussed above, current opinion is split as to whether any such channels were active or indeed visible in the Neolithic and Bronze Age so it is impossible to deduce whether the positioning of monuments alongside these features was a conscious choice of the monument builders. The main significance of the palaeochannels in this archaeological landscape is that crop marks of levelled archaeological features do not show up in these areas of already greatly retarded crop ripening. In effect the palaeochannel crop marks may mask or camouflage the presence of any monuments. As the palaeochannel mapping demonstrates there are plenty areas of slower ripening crop where monuments on the scale of some of the barrows and the mortuary enclosures as well as more ephemeral features such as pit clusters or timber circles could be completely obscured and their presence undetected from the air.

Aside from the pit alignments, on current evidence the earliest visible land division appears to be the system of boundaries uncovered at Nosterfield Quarry (UID 1406689). These have been suggested to be Bronze Age in date and are probably contiguous with the long crop marked boundaries recorded further south (http://thornborough.ncl.ac.uk) (UID 1320581). Together these suggest a system of long parallel land units running along the slopes that descend from the higher ground to the east to the flat environs of the henges. Interestingly in the section excavated at Nosterfield two pit alignments run counter to the trend of the ditched boundaries but to the south several of the long boundaries appear intermittently as pits rather than ditches.

Iron Age and Roman landscapes

Elsewhere evidence of land division and communication is widespread but incoherent and whilst largely attributed to the Iron Age and Roman period as the Nosterfield example indicates some elements may be earlier. The apparent incoherence is probably due to the very fragmentary nature of the crop marked landscapes which are heavily interrupted by quarries, areas of pasture and less permeable soils and geology and furthermore have received less specialist reconnaissance than the area around the henges.

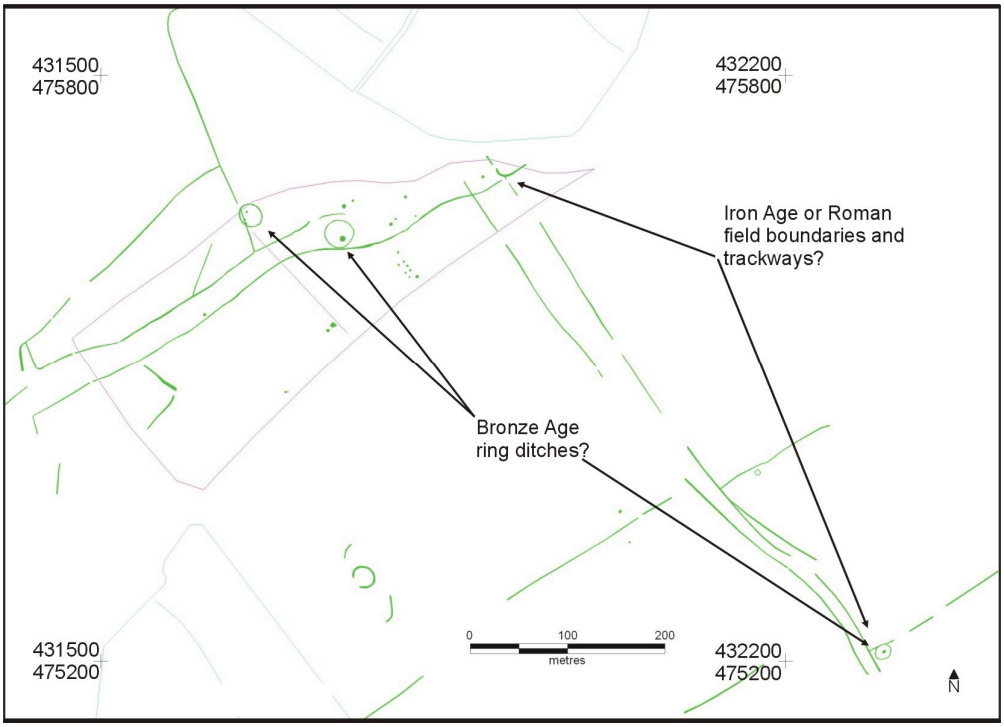
In the parishes of Well and Snape with Thorpe there is a relatively regular arrangement of large rectilinear land units defined by single ditches and possible double-ditched trackways (UID 1086053). Covering areas of 8-12 hectares it is unlikely that these units represent single fields and probable that some other form of subdivision was employed. Several rectilinear enclosures abut the boundaries and trackways of this system; some are probably the sites of settlement though only one contains evidence of a possible hut circle.

In Kirklington-cum-Upsland an altogether more complex arrangement of boundaries and trackways is visible (UID 1407601). It is difficult to identify any contiguous field system within this area and it is probable that groups such as these comprise several different phases and their complexity may be an indication of some quite significant re-organisation of land division.

Approximately 35 rectilinear enclosures were recorded within the project area; the majority were associated with linear boundaries or trackways. Most are probably the site of some Iron Age or Roman period settlement but alternative uses may include stock enclosures and sites of industry and craft. Evidence for crop marked domestic structures is exceptionally sparse and may indicate widespread use of a form that leaves little visible trace, such as post-built rather than gullied round houses.

It is interesting to note that fields, boundaries, trackways and enclosures of possible Iron Age or Roman date appear to be absent from the low-lying flat area on which the henges sit, although crop marks of earlier monuments do show in this area. On this limited evidence it appears that the area immediately around the henge monuments was not settled or cultivated during these periods, though this may have been a reaction to the localised environmental conditions rather than the presence of the earlier monuments. Beyond this area there is a close spatial association between the burial monuments of probably Bronze Age date and probable later boundaries and trackways. For example in Norton Conyers and Hutton Conyers parishes there is cluster of crop marks outlining a series of linear features and at least three circular enclosures (UID 1114294). The enclosures are possibly the remains of Bronze Age burial monuments and the linear features later trackways and boundaries. Each ring ditch is cut or abutted by a linear boundary, possibly up to the edge of a former burial mound within the ring ditch. It appears that the system of boundaries and trackways was laid out with respect to the extant mounds and absorbed them into the later agricultural landscape.

Figure 6. Possible Bronze Age ring ditches and later boundaries and trackways at Norton Noyers and Hutton Conyers



Also of purported Iron Age date are the remains of a large, substantial rectilinear enclosure known as Castle Dikes at North Stainley (UID 52079). The enclosure is defined by a massive ditch and bank on three sides and a small valley to the north but the local topography offers little other advantage. A Roman villa is known to lie within the enclosure and some elements are visible as parchmarks. Although it is probably not contemporary with the villa's construction it is not certain that Castle Dikes originated as an Iron Age Hill Fort as suggested by the NMR record, it may, as the NYHER suggests, have been built to defend the villa (NYM21030).

The remains of another villa and associated features are visible at Snape with Thorpe (UID 52266). The villa structure itself is square in plan, consists of at least six internal cells and measures 22m by 20m. It lies squarely within a rectilinear enclosure that in turn is associated with an arrangement of small fields and paddocks. The latter is quite different to the systems of land division recorded to the immediate east and to the south where the visible boundaries are less incoherent but appear to define very large units of land. Within the fields to the south of the villa there is a parchmark that may indicate the corner of another previously undetected building or structure.

Other known Roman period features visible with the project area include a kiln and a possible temporary or marching camp. The kiln, uncovered at Nosterfield was visible on photographs taken during excavations and it is unlikely that this feature would have been detectable from the air if it had continued to be under crop (UID 1406689).

The photographic evidence for a possible camp to the north of Pickhill is limited to a single photograph taken by Peter Addyman and the crop marks are rather poor. Interestingly though two local placenames: Roman Castle Farm and Roman Hills also point to a Roman presence here. It appears that this feature has not been previously documented. Overall just 130 metres of ditch are visible but the smooth rounded corner it takes is typical of Roman marching or temporary camps (UID 1407499). This site is located approximately 1.7km east of Dere Street and the site of the large fort at Healam Bridge.

Medieval and post-medieval landscapes

The remains of several medieval nucleated settlements survive in the project area. The most extensive are the earthwork remains at East Tanfield amongst which the hollow-way and individual building plots and tofts are clearly visible (UID 52069). However significant finds have also been made in Selingford Park where parchmarks have revealed the probable location of a former stone-built chapel and other structural features amongst earthworks (UID 52066). Although a medieval settlement is known to have existed at Howgrave it has been suggested that the earthworks recorded by the project on the western edge of the living settlement are probably the remains of a later garden landscape (Neil Campling North Yorkshire County Archaeologist pers comm.) (UID 53665).

Other significant remains of probable medieval date include the unusual curvilinear moat at Upsland and the square motte at Pickhill (UIDs 53659 & 53913).

Ridge and furrow is widely distributed across the project area, in fact over one eighth of the land surface has some crop marked or earthwork trace of former ploughing. However few of these remains can be directly attributed to the medieval period. Furlongs that are thought to be medieval date are concentrated around some of the known settlements of that date (eg UID 1407653). The majority of the ridge and furrow recorded from the air photographs is probably of post-medieval and perhaps even later date although it does appear that in some cases the ploughing followed the layout of earlier ridges.

Modern features

Twentieth century features of note include a bombing range near Snape with Thorpe and the extensive ordnance factory near Melmerby (UIDs 1406633 & 1407523). Photographs taken in 1945 and 1946 have also revealed a large number of temporary ordnance stores distributed along the verges of the road network throughout the project area (eg UID 1406168).

This project has also documented the extent of large extraction sites as a record of their impact on the archaeological landscape. Although undoubtedly now out of date, the overview from the latest available photographs indicates that some 2.5% of the land surface of the project area had been quarryiED. Of course this loss has not been evenly distributed across the project area but has focused on the area around the Thornborough Henges (eg UID 1406612 & 1406136).

DATA ARCHIVING AND DISSEMINATION

Copyright

The copyright of the air photo mapping and associated records produced by this project lies with English Heritage. Licence to use this data has been extended to the North Yorkshire HER.

With permission from the copyright holders, this project scanned a large quantity of photographs. Copyright of this digital data is retained by the original copyright holders.

Project Archive

This project produced four Autodesk Map® 2004 drawing files, one for each whole quarter sheet. These will be deposited with the NMR archive and AerSI shall also retain digital copies. In addition hard-copies of each map, printed at 1:10 000 scale, in colour will also be archived in the NMR. The records that were created or enhanced by this project are part of the National Monuments Records AMIE database.

All requests to consult the project data should be directed to the NMR (see Appendix 5 for address).

There is no precedent for the formal archive deposition of other digital data associated with the project: the scanned image files (.TIF), rectified image (.TIF) files, World files (.TFW), AERIAL rectification files (.RDA) and lists of consulted material (.XLS). For the time being this information will be retained by AerSI.

Project dissemination

During the course of the project the team were in contact with a number of heritage partners and stakeholders on an informal basis as follows:

- Keith Emerick Inspector of Ancient Monuments, English Heritage
- Neil Campling, County Archaeologist, North Yorkshire
- Dr Jan Harding, School of Historical Studies, University of Newcastle upon Tyne.
- Representatives from the Friends of Thornborough group

On the 25th February the project team presented a summary of results to the Inspector of Ancient Monuments and North Yorkshire's County Archaeologist.

On completion of the project North Yorkshire HER will be supplied with map data in MAPINFO format. The transfer from Autodesk Map to MAPINFO has retained the attached data table structure and content with the addition of fields recording the original layer name, author, date of completion, and, where a concordance has been made, SMR record numbers. The NMR records created and amended by this project will be supplied to the HER in a digital rich text format (RTF) as an accompaniment to the mapping.

A brief overview of the project's results will be posted at www.arch.wyjs.org.uk.

BIBLIOGRAPHY

Roe, A. 2003. *Draft Desk Based Assessment: In depth research into the Nosterfield area.* Prepared for Mike Griffiths & Associates. available at http://www.archaeologicalplanningconsultancy.co.uk/mga/projects/noster/speciali/envass/envappa.html

RCHME 1997. The National Mapping Programme – Sphere of Interest. Internal draft document.

Roberts, I. and Deegan, A. 2004. The Thornborough Henges Air Photo Mapping Project. ALSF Project Design.

http://thornborough.ncl.ac.uk

APPENDIX 1

Autodesk Map MAP® Layer content and drawing conventions

Layer Name	Layer content	Attached data tables	Layer colour	Linetype
0	none (AutoDESK map requirement)	none	7 (white)	CONTINUOUS
BANK	closed polygons for supra-surface earthen features such as banks, platforms, mounds and spoil heaps	MONUMENT & MONARCH	1 (red)	CONTINUOUS
BANKFILL	solid fill for bank layer polygons	MONUMENT & MONARCH	1 (red)	NA
DITCH	closed polygons for cut or wear features such as ditches, ponds, pits or hollow-ways	MONUMENT & MONARCH	3 (green)	CONTINUOUS
DITCHFILL	solid fill for ditch layer polygons	MONUMENT & MONARCH	3 (green)	NA
EXTENT OF AREA	closed polygons outlining complex or extensive remains such as mining or army camps	MONUMENT & MONARCH	2 (yellow)	DASHEDX2
GRID	grid lines at 1km intervals	NONE	7 (white)	CONTINUOUS
KEYLAYOUT	Title boxes, key & copyright statement for printing maps all in paper space. Only appears in drawing layouts.	NONE	7 (white)	CONTINUOUS
MONUMENT_ POLYGON	closed polygons encircling all the features comprised within a single NMR record.	MONARCH ONLY	7 (white)	CONTINUOUS
RIGARREWK	polyline showing the direction of ploughing in outlines of extant ridge and furrow	MONUMENT & MONARCH	4 (cyan)	CONTINUOUS
RIGARRLEVEL	polyline showing the direction of ploughing in outlines of levelled or crop mark ridge and furrow	MONUMENT & MONARCH	6 (magenta)	ACAD_ISO03 W100
RIGDOTSEWK	closed polygon defining the furlongs or extent of area of extant ridge and furrow	MONUMENT & MONARCH	4 (cyan)	DOTX2

Layer Name	Layer content	Attached data tables	Layer colour	Linetype
RIGDOTSLEVEL	closed polygon defining the furlongs or extent of area of levelled or crop mark ridge and furrow	MONUMENT & MONARCH	6 (magenta)	DOTX2
STRUCTURE	for all stone, concrete, metal and timber features, structures and erections	MONUMENT & MONARCH	7 (white)	CONTINUOUS
THACHURE	polyline t-hachure convention to schematise sloped features indicating the top of slope and direction of slope.	MONUMENT & MONARCH	5 (blue)	CONTINUOUS
VIEWPORT	an administrative layer to allow printing	NONE	7 (white)	CONTINUOUS

APPENDIX 2

Autodesk Map 2004® Attached Data Tables

MONUMENT DATA TABLE

The Monument Data Table consists of five fields that are input directly through Autodesk Map®. The content of the MONARCH, PERIOD, TYPE and EVIDENCE fields duplicate that of the related fields in AMIE. In this context the PHOTO field identifies the photograph from which the feature was actually traced. This may not reflect the reference given in AMIE as the latter is intended for the "best illustrative" photograph of the archaeology.

Field name	**Field content**	**Sample data for the Northern Henge**
MONARCH	AMIE Unique Identifier (UID)	1,043,117
PERIOD	date of features (EH Thesaurus)	NEOLITHIC
TYPE	monument type (EH Thesaurus)	HENGE
EVIDENCE	Form of remains (EH Thesaurus)	CROPMARK
PHOTO	NMR or other reference for the photograph from which the feature was plotted and its date of photography	ULM BTY/043 05-Jul-1975

MONARCH DATA TABLE

The Monarch Data Table comprises just one field which records the AMIE Monument UID.

Field name	**Field content**	**Sample data for the Northern Henge**
MONARCH	AMIE Unique Identifier (UID)	1,043,117

APPENDIX 3

EH Thesaurus terms indexed by the Thornborough AP Mapping Project.

A ANGLE TOWER
AVENUE
B BANK (EARTHWORK)
BARROW
BOMBING RANGE
BOMBING RANGE MARKER
BUILDING PLATFORM
C CAUSEWAY
CHAPEL
CIRCULAR ENCLOSURE
CURSUS
CURVILINEAR ENCLOSURE
D D SHAPED ENCLOSURE
DESERTED SETTLEMENT
DIPPING WELL
DITCH
DOUBLE DITCHED ENCLOSURE
E ENCLOSURE
EXTRACTIVE PIT
F FIELD BOUNDARY
FORT
G GARDEN FEATURE
GRAVEL PIT
GRUBENHAUS
H HENGE
HILLFORT
HOLLOW
HOLLOW WAY
HOUSE PLATFORM
I INHUMATION
K KILN
L LIMESTONE QUARRY
LYNCHET
M MACULA
MARL PIT
MILL
MOAT
MORTUARY ENCLOSURE
M MOTTE
MOUND
N NARROW RIDGE AND FURROW
O ORDNANCE FACTORY
ORDNANCE STORE
OVAL ENCLOSURE
P PARK PALE
PIT
PIT ALIGNMENT
POND
POND BARROW
Q QUARRY
R RAILWAY
RAILWAY CUTTING
RAILWAY EMBANKMENT
RECTANGULAR ENCLOSURE
RECTILINEAR ENCLOSURE
RIDGE AND FURROW
RING BANK
RING DITCH
ROUND BARROW
ROUND HOUSE (DOMESTIC)
S SAND AND GRAVEL EXTRACTION SITE
STACK STAND
STRUCTURE
SUB CIRCULAR ENCLOSURE
T TEMPORARY CAMP
TERRACED GROUND
TOFT
TRACKWAY
TRENCH
V VILLA

APPENDIX 4

Map quarter sheet information

Map	Author	No. of records		End date	NMR loan ref.
		New	Amended		
SE27NE	MO	52	16	7/01/05	69905
SE28SE	DVDT	34	10	13/01/05	69905
SE37NW	DVDT	37	7	3/02/05	69905
SE38SW	MO	30	8	3/02/05	69905

APPENDIX 5

The air photo collections consulted for this project:

National Monument Record
English Heritage
National Monuments Record Centre
Great Western Village
Kemble Drive
Swindon
SN2 2GZ

Heritage Unit
North Yorkshire County Council
County Hall
Northallerton
North Yorkshire
DL7 8AH

Unit for Landscape Modelling
University of Cambridge
Air Photograph Library
Sir William Hardy Building
Tennis Court Road,
Cambridge
CB2 1QB
http://www.uflm.cam.ac.uk