



AIR PHOTO MAPPING,
INTERPRETATION AND
ANALYSIS FOR ALL
ARCHAEOLOGICAL APPLICATIONS
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**Yorkshire Henges and their Environs Air Photo Mapping Project
(3908 MAIN)**

funded by
Historic Environment Enablement Project
as a part of the
National Mapping Programme
English Heritage

Project Report

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SUMMARY

The Yorkshire Henges and their Environs Air Photo Mapping Project is part of English Heritage's National Mapping Programme. It was funded by Historic Environment Enablement Project and was undertaken by Alison Deegan.

The air photo mapping covers 586km² of land in the county of North Yorkshire. This area was surveyed to English Heritage's National Mapping Programme standards using existing air photographs and LiDAR-derived images. The main outputs of this project are digital maps, supporting records and this summary report.

New monument records were created for 1626 monuments or monument groups and a further 182 existing monument records were amended or enhanced.

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Report author	Alison Deegan

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1 INTRODUCTION

The Yorkshire Henges and its Environs Air Photo Mapping project is a part of English Heritage's National Mapping Programme (NMP). The NMP is generating a comprehensive record of the archaeology that is visible on air photographs for the whole of England. It is an ongoing programme and had covered approximately 45% of the country as of February 2013.

This project was carried out by Alison Deegan between June 2008 and February 2013. Dave MacLeod was Project Assurance Officer (PAO) for English Heritage (EH).

2 BACKGROUND TO THE SURVEY AREA

This project covered 586km² of North Yorkshire (see Figure 1). It focuses on the Southern Magnesian Limestone belt and takes in small areas of the Millstone Grit Series to the west, the Permian mudstones that overlie parts of the limestone ridge, and the Permian and Triassic sandstones that lie between the exposed limestone ridge and the River Swale. These bedrocks are partially covered with drift geology of a variable nature that was deposited by the last ice sheet and this has given rise to a range of pedological conditions.

The River Swale forms the approximate northern and eastern boundary of the project area as far south as Boroughbridge. The project also takes in stretches of the Rivers Ure and Nidd and their tributaries. The land is mostly gently undulating and falls gradually from around 150m in the west to below 30m on the Swale floodplain.

3 ARCHAEOLOGICAL SCOPE

The scope of this project broadly mirrors that of the 2004 National Mapping Programme Sphere of Interest document (Boutwood & Winton 2004). The main aspects that are pertinent to this particular project are summarised in Appendix 1.

4 SOURCES CONSULTED

4.1 Air Photographs

Three collections of air photographs were consulted for this project. Contact details for these collections are provided in Appendix 2.

English Heritage Archive (EHA) (formerly National Monuments Record).

The vertical, specialist oblique and military oblique air photographs held by the EHA were made available to this project in a series of loans. The prompt and efficient servicing of photo loans by the Archives team, and in particular Luke Griffin ensured that this project was able to progress smoothly. A small proportion of photographs could not be loaned and laser copies were supplied in lieu. Some recent born digital photographs were supplied as digital files because no physical prints have been produced. Unfortunately there is, as yet, no mechanism for the stereoscopic examination of digital photographs for the NMP. The EHA loan reference numbers are given in Appendix 2 these refer to the lists of the loaned photographs and as such are a record of the EHA images consulted for this project.

Cambridge University Committee for Aerial Photography (CUCAP) collection

This project was carried out in collaboration with CUCAP (briefly known as Cambridge University's Unit for Landscape Modelling): its contribution being the loan of air photographs to EH's Aerial Survey and Investigation (York). Loans were limited to 100 photographs at a time. The CUCAP library was temporarily closed on the 31st July 2010 and unable to lend photographs again until 26th September 2011. During this period of closure it was not known when or indeed if the library would re-open and so all mapping and recording had to be completed on the assumption that the CUCAP material would not be available for examination (other than a small number of copies held in the EHA or North Yorkshire County Council collections). As a consequence when the photographs did become available again large parts of the project had a backlog and this had to be dealt with rapidly and often without the benefit of having the other air photographs to hand. To expedite the clearance of the backlog the air photo interpreter visited the CUCAP collection to make a rapid assessment of several hundred images against the mapping from the other sources and so eliminate those that did not require any further examination. In this manner it was possible to reduce the number of loans that were required to complete the project.

A list of the photographs in this collection that were examined for this project is contained in the file CUCAP_YH_APLISTS.XLS.

North Yorkshire County Council (NYCC)

At the outset of this project a collection of archaeological air photographs (mainly obliques) was held in the office of NYCC’s Historic Environment Team. This collection was consulted as and when a number of quarter sheets had been completed from the EHA photographs. These photographs were checked against the project’s mapping and records: minor amendments were made as necessary and in the case of major adjustments or new information the relevant photographs were either scanned in situ or borrowed for processing at the EH York Office.

In September 2011 this collection was moved to the County Record Office and placed under archive conditions. This meant that material could no longer be borrowed although the original agreement to permit scanning was continued to the end of this project.

A list of the photographs in this collection that were examined for this project is contained in the file NYCC_YH_ APLIST.XLS

Table 1. Air photo collections and summary of material consulted (includes duplicates between collections)

Collection Name	Quantity consulted	
	<i>oblique air photos</i>	<i>vertical air photos</i>
EHA	3197 specialist 208 military obliques	9122
CUCAP	789	80
NYCC	1484	0
Total	5678	9202

4.2 Digital air photos supplied through the Pan Governmental Agreement

Geo-referenced 25cm resolution colour digital air photos produced by GeoPerspectives were made available to this project through the Pan Governmental Agreement (PGA). For Blocks 1 to 4 photographs taken in 2002 were supplied. For Blocks 5 to 8 photographs taken in 2002 and 2009 were supplied. This imagery is a digital only-product (no prints) so it was viewed on screen during the course of mapping from the other photographs and again towards the end of the mapping process for each quarter sheet to inform the monument condition assessment.

During the lifetime of the project the data shown in Google Earth was the same as the 2002 and 2009 GeoPerspectives imagery.

For features mapped directly from the geo-referenced image files supplied through the PGA the source is attributed to the individual image tile name. However for latest condition statements

arising from the 2002 or 2009 imagery the source is generally attributed to Google Earth, this being more widely accessible to the general user than the PGA-supplied data.

4.3 Light Detection and Ranging (LiDAR)

LiDAR-derived raster images were available for approximately 52% of the project area. These were supplied to EH projects by the Environment Agency in the form of low resolution, georeferenced, colour raster images (jpegs) with fixed parameters (eg lighting, azimuth and vertical exaggeration). Of the 308km² for which coverage was available 31 km² was derived from 1m resolution surveys, the rest and some overlaps were derived from 2m resolution surveys.

4.4 Existing records

The textual and spatial monument and event records in the National Record of the Historic Environment (NRHE) were routinely consulted during the course of this project. Existing NRHE monument records were updated with new information from the air photos and mapping. Where there was no existing monument record pertaining to archaeological features mapped from the air photos then a new record was created.

Data for the project area from North Yorkshire Historic Environment Record (NY HER) was made available to the air photo mapping project. This informed the mapping and recording and where possible the NHRE records that were created or enhanced by this project were concorded with the HER records.

4.5 Historic Maps

This historic Ordnance Survey maps delivered through EH's WEBGIS were consulted in tandem with the air photos. These informed interpretations and where appropriate were identified as a source in the monument record.

5 METHODOLOGY AND RECORDING

5.1 Mapping Methods

All of the available air photographs from the specified sources were examined under magnification and stereoscopically where possible. Photographs selected for transcription (rectification and mapping) were then scanned at a suitable resolution, this was usually 300 dpi, and output as uncompressed TIFF format images (.TIF).

Scanned images were rectified using the specialist software AERIAL5.29. 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. Accuracy for the Ordnance Survey raster 1:2500 maps is in the range of $\pm 2\text{m}$ and acceptable tolerance for rectification of photographs is generally $\pm 2.5\text{m}$. Rectified images were output from AERIAL in uncompressed TIFF format at a resolution of 300 dpi and a scale of 1:2500.

Individual digital maps for each OS quarter sheet wholly or partly covered by the project were created in MAPINFO Professional 7.5. The rectified images were placed into the relevant map drawing and the archaeological features were then digitised from the photograph observing the NMP standards and conventions (see Appendix 3). At the end of the project this data was exported into Autodesk Map®.

5.2 Recording Strategy

There are two strands to the NMP recording strategy and these were both employed for this project. The main strand is the creation of new or the enhancement of existing monument records in the NHRE. The NMP-generated entries or enhancements for each monument or monument group in this database record the location, 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 and any bibliographic or cartographic references) and administrative details such as concordance with SMR/HER records, record authorship, and links to NHRE event records and archives.

To assist in the management and querying of the map data in the GIS or Autodesk Map® environment select monument data is attached to each individual mapped feature. The content of this data table is listed Appendix 4.

5.3 Quality Assurance

During the lifetime of the project the air photos, mapping and recording for sample areas were examined and checked by individuals from EH's Aerial Investigation & Mapping Team to ensure the product met the desired standard for the NMP.

6 PROJECT REVIEW

This is a review of the aims defined in the original project design (Deegan 2008).

AIM: To contribute to EH SHAPE sub-programme 32111.110 National Mapping Programme: recording and mapping archaeological landscapes using aerial photographs.

This project has contributed 586km² of NMP mapping to the programme.

AIM: To generate baseline archaeological information to: inform county-level heritage management strategies (including the Local Development Framework); national heritage management strategies; add further later prehistoric and historic dimension to the work of the Swale-Ure Washlands Project; and to provide a wider context to ongoing research at Thornborough Henges. [English Heritage Research Agenda 2005-2010 A1]

This project has generated new NRHE entries for 1625 monuments or monument groups and a further 183 existing monument records were amended or enhanced. Of those 1625 records 316 were concorded with existing HER records. It should be noted that there were a substantial number of HER records that could not be verified by this project from the available air photos and so go unrecorded. A period summary of the projects results is provided in Section 7 and a list of all the period terms and monument types identified by the project is given in Appendices 5 and 6.

Aim: To provide a basic statement of monument condition [D1]

The condition of individual features, as deduced from the more recent sources including the LiDAR-derived images, is recorded explicitly in the GIS data (see Appendix 4) and is summarised in each NHRE monument record. In the GIS data where the EVIDENCE terms is CROPMARK then in general the feature may be considered to have been levelled and/or buried. Where the original EVIDENCE was EARTHWORK or STRUCTURE then a second field named LATEST CONDITION has been populated with information from the latest available source, this source being recorded in the PHOTO2 and/or LIDAR fields. If a cropmarked site has subsequently been destroyed then this will also be noted in the LATEST CONDITION field.

It should be noted however that the three fields: LATEST CONDITION, PHOTO2, LIDAR are not standard NMP data fields and it is not yet known if these will be retained in the archived version.

AIM: To assess alternative sources of remote sensing data that might be integrated within the NMP and other air photo mapping projects in the future [F2, G2]

Environment Agency LiDAR-derived raster images were available for approximately 52% of the project area and, of the 1808 monument or monument groups recorded by this project, 1019 lie partly or wholly in areas with LiDAR coverage. However only 313 monuments or monument groups were partly or wholly visible on the LiDAR data. No monuments were identified primarily from the LiDAR-derived images and rarely did this source significantly enhance the mapping or interpretation of the archaeological earthworks seen on the air photos. For some monuments these images demonstrated earthwork survival where the most recent photos were more ambiguous, which was useful, but limited to those features in the appropriate orientation with respect to the fixed virtual lighting conditions. For this reason the apparent absence of earthworks on the LiDAR-derived images was never construed as evidence that a monument had been levelled. Overall although the gain is low it is considered commensurate with the time input required to analyse these images. However it is highly desirable to negotiate with the EA for a better raster LiDAR product.

AIM: To heighten the awareness of the NMP, this form of remote sensing and this project amongst a broad audience [C2]

This project has had a dedicated page on the English Heritage website outlining its remit and scope throughout its lifetime. This information has now been updated to reflect its completion and information as to how the results may be accessed.

In 2010 Neil Redfern (EH) identified a need for illustrative and informative material suitable for a broad audience to demonstrate the nature and character of prehistoric assets on the A1 corridor in North Yorkshire. The result was two booklets, one for a general audience, the other for young archaeologists that are available in print and online via the CBA website. These booklets draw largely from the results of this and the earlier Thornborough Henges project and they promote the NMP.

In addition in 2012 a substantial block of data was made available to Northern Archaeological Associates for their use in the analysis of excavation results from an A1 widening scheme.

AIM: To disseminate digital data by the most efficient and fullest means [F2]

Although the original project design identified this aim, dissemination is now recognised as the responsibility of the EHA.

7 PROJECT RESULTS

This section provides a brief overview by period of the results of this project. References to NHRE records are provided in brackets eg (23599).

7.1 Prehistoric monuments

The Neolithic and Bronze Age monuments that were recorded by this project and are known from other investigations are not evenly distributed across the area. Instead there are three marked concentrations of monuments in the areas of Catterick, Hutton Conyers and North Deighton (see Figure 2). There is also a scattering of monuments along the western edge of the project, where the land rises towards the Yorkshire Dales.

The Catterick concentration is located on either side of the River Swale and contains a trio of major monuments, the earliest being the Scorton Cursus (23599) to the north of the river, followed probably by the Late Neolithic palisaded enclosure at Marne Barracks (1439729) and then by the Late Neolithic/Early Bronze Age henge at Catterick Racecourse (52343), both on the south side of the river. The henge was built upon a Late Neolithic cairn. At least 10 ring ditches or round barrows have been identified around the cursus, and a smaller number have been found south of the river.

The Hutton Conyers group is located on an island of slightly higher ground between the Rivers Ure and Swale and lies just 9km to the south-east of the Thornborough Henges. The Hutton Conyers group contains another three henges: Hutton Moor (53681), Cana Barn (53684) and the slightly more distant Nunwick (53761), and a possible short cursus or mortuary enclosure (1462122). Of these three henges Hutton Moor is the better preserved, Cana Barn has suffered considerable plough damage in the past but is now in a Stewardship Scheme. Evidence of ridge and furrow ploughing across the banks of Nunwick henge suggest its levelling may have been started in the medieval period, though the LiDAR-derived images do suggest that some bank material survives. Around the Hutton Moor and Cana Barn henges there are at least 19 cropmarked ring ditches or earthwork barrows.

The North Deighton group is spread across several parishes to the north and south of the River Nidd. It consists of up to 30 ring ditches or barrows but no larger monument was positively identified in this area by this project. It has been suggested that marks on Brame Hill that are visible on some air photos may indicate the site of a henge-like monument (Roberts et al 2010, 41). However a thorough examination of all the available air photos by this project concluded that these probably arise from natural features.

The discovery by archaeological excavation of an unusual palisaded enclosure at Marne Barracks, like the segmented Hengiform 162 at Ferrybridge and the double-pit alignment at Thornborough, has re-emphasised the diverse character of Neolithic and Early Bronze Age monument building (Platell et al, 2009, Roberts et al 2005 35, http://thornborough.ncl.ac.uk/double_pit_alignment.htm). This diversity makes it difficult to identify novel Neolithic and Bronze Age forms amongst all of the cropmarked features recorded by the project and it is possible that some features identified as being of later or uncertain date are instead the remains of monuments from this period.

More than half the survey area is on poorly drained soils that do not readily produce cropmarks, so it is likely that this has biased overall distribution of the known Neolithic and Bronze Age monuments. However, there are large areas of freer draining soils where ring ditches and barrows appear to be absent, for example between the River Swale and the A1 in the northern part of the survey area. With NMP data now available across large parts of Yorkshire, there is potential to conduct studies of Neolithic and Bronze Age monument distributions on a regional scale.

The Hutton Moor henges, a surviving section of Catterick henge and some of the better preserved barrows have Scheduled Monument protection. Unfortunately the Scorton Cursus ran across an area with mineral extraction rights and a significant portion has now been destroyed by that activity. The latest extractions were however preceded by open area excavations, something which had hitherto been lacking.

7.2 Iron Age and Roman landscapes.

Overall the picture of the Iron Age and Roman rural landscapes afforded by the air photos is rather fragmentary. It can be broadly characterised as a sparse distribution of single or small groups of enclosures associated with fragments of trackway and/or field system (see Figure 3). Occasionally the presence of a hut circle within or close to an enclosure indicates occupation but for most, settlement within or nearby can only be surmised.

Distinct from these rural landscapes are the Roman towns of *Cataractonium* (1021181) and at Aldborough (55220), elements of both are visible as cropmarks and earthworks on air photos. Whilst the hinterland of *Cataractonium* is well-studied it appears that less of the contemporary environs of the Roman town at Aldborough is known (Wilson 2002, & Wachter 1975). Aldborough is located near the Swale-Ure confluence in an area with some of the greatest density of medieval and post medieval ridge and furrow in the project. This, and the less permeable soils contrive to impede the visibility of buried archaeology, as demonstrated at nearby Roecliffe. Here a short-lived Roman fort (1075512) was discovered by geophysical survey

in the early 1990s, but no trace of this feature was visible on the air photographs examined. However, this project has identified at least 10 enclosures and/or settlements within 5km of the Roman town at Aldborough, some of which may have been in use during the town's lifetime. These fragments of pre-medieval landscape hint at what may lie beneath the ridge and furrow.

South of the River Nidd the limestone geology is free of the overburden of glacial tills and drift and the soils here are more conducive to the formation of cropmarks. As a consequence this small area at the southern end of the project area has the highest density of enclosures and the most extensive networks of trackways and field systems in the whole of the project area. The results here are much more akin to those produced for areas to the immediate south in West Yorkshire. In particular the agglomeration of enclosures on Gospel Hill (1568822), overlooking Crimple Beck is reminiscent of settlements at Wattle Syke (54896) and Dalton Parlours (1398980), which lie just 5km and 6km to the south respectively (see Figure 8). Both have undergone extensive archaeological excavation (Martin et al forthcoming, Wrathmell et al 1990). Trial excavations in a small area of the Gospel Hill complex failed to establish a date for the ring ditch investigated but if the comparisons with Dalton Parlours and Wattle Syke are valid then they suggest a high status settlement with occupation from the Iron Age through to the late Roman period. At Dalton Parlours the Roman settlement was expressed as a villa, and significantly one of only two villa sites identified by this project lies within 1km of Gospel Hill (1568799) at Kirk Deighton. At Wattle Syke the later Roman settlement took the form of sunken floored buildings; similar structures may be the cause of the rectilinear hollows recorded on Gospel Hill. Once the Wattle Syke excavations are published it may be appropriate to re-assess the morphological forms recorded on Gospel Hill and their wider significance to the Iron Age to Late Roman economy and whether some scheme of protection should be applied to any part of the complex.

Of potential significance and highlighted here because they are so unusual in this area, are the possible Iron Age square barrows recorded by the project. The first (1568506) is located near to Crimple Beck in the parish of Little Ribston. It lies amongst a cluster of probable Neolithic or Bronze Age barrows and close to a possible early medieval cemetery, which together suggest that this location long held some ritual significance. The other examples lie just over 2km to the north in a line of three (158137) near Scalibar Farm, on the banks of the River Nidd.

7.3 Early Medieval

The early medieval period is consistently difficult to identify from air photo evidence alone in many parts of England (see Foard et al 2007, 125). Identification of settlement from this period

has traditionally relied heavily on the association of sunken floored buildings to this period (note the accepted EH thesaurus term is Grubenhäuser). However the sunken floored buildings excavated at Wattle Syke were consistently of late Roman date and there was scant evidence for post-Roman occupation (Martin forthcoming 108-109).

The only possible early medieval site identified by this project is an inhumation cemetery (1568505) at Bottom Gate, close to the parish boundary between Little Ribston and Spofforth. As noted in Section 7.2 it is located in close proximity to an Iron Age square barrow (1568506) and several Neolithic or Bronze Age round barrows (1568500 & 1568501). At least 38 south-west to north-east aligned grave pits, arranged in neat rows are visible though others may be concealed by the patches of slower ripening crop that pattern this area.

7.4 Medieval

This project has produced evidence of an archaeological landscape rich in the remains of post-Roman settlement and cultivation remains. It has recorded earthwork, cropmark or soilmark evidence of at least 51 villages or hamlets and mapped ridge and furrow over approximately one eighth of the overall survey area (Figure 5).

The origin of the individual settlements is not always certain, some such as Aismunderby (153556) and Thornton (55427) are mentioned in the Domesday records but a medieval origin for other unnamed settlements such as those around Thornborough in the parish of Allerton Maulever (55101) and Lylands in Great Ouseburn (1480846) can only be surmised.

Some of these settlements, including Aismunderby (153556) and Humberton (55244) are described as abandoned or deserted, because the recent population is a fraction of the population suggested by the archaeological remains. Abrupt depopulation in the 14th century may be a factor but it does not preclude the possibility of continued or re-occupation of some such settlements into and through the post-medieval period. Indeed many of the remains recorded by this project are associated with living settlements such as Hunsingore (1570299), the Hopperton (1320302) and Minskip (53575). The latter, a small linear village lying close the A1, has so many of its original plots still in use that there are very few archaeological earthworks visible on the air photos, though the narrow strip fields to the rear of the plots indicate its medieval origins.

Other events and circumstances also contributed in the shrinkage or abandonment of some settlements. Emparkment appears to have been a factor in the abandonment of Hornby (52385) in the 16th century and perhaps also at Plompton (1568134) and Thornborough (55101). Intriguingly at Markenfield Hall (51868), it is suspected that a large artificial terrace on

the east side of the moated and fortified manor house may have covered over an area of settlement remains (51868). The terrace was probably built to accommodate a formal garden. Also at Markenfield Hall the abandonment of the medieval fields is signified by the presence of post medieval pillow mounds (artificial rabbit burrows) on top of the cultivation ridges.

As with the settlements it is not certain that all of the ridge and furrow recorded by this project was created and used exclusively in the medieval period. Certainly a particular form of narrow straight ridges is likely to have post medieval origins and this has been identified in the project's records as such. However other broader ridges may have continued in use beyond the medieval period and there is evidence that some were split to increase the cultivatable area. Figure 6 shows an example of this form in Hornby Park. Of all the ridge and furrow approximately one quarter appears to survive as earthworks, the remainder has been levelled, mostly by modern cultivation and a small percentage has been destroyed since 1945 by quarrying or development.

Other significant sites of this period include the abbeys of Fountains and Swainby and the mottes. The mottes are a variable group ranging from the striking Maiden Bower mound, its sub-circular bailey and substantial moated enclosure (55342) to the rather more diminutive Howe Hill (53388) at North Deighton. Interestingly the origins of the Castle Hill, a motte and bailey castle near Catterick have been questioned, particularly in light of the Neolithic palisaded enclosure discovery at Marne Barracks. It has been suggested that the mound, a modified natural feature, may have had an earlier use as a viewing platform overlooking activities at the enclosure (Platell et al 2009, 286). Similarly the prehistoric context of the Howe Hill motte (53388) in North Deighton might warrant re-consideration of this monument's origins. This small mound lies in close proximity to a number of Neolithic and/or Bronze Age barrows and ring ditches, including Green Howe (53400) and so the possibility that the motte was remodelled from an earlier monument might be entertained. Convenient re-use of an existing monument might explain why this motte does not reflect the overwhelming bias to river or beck-side location shown in the distribution of the other mottes in the project area (see Figure 5).

7.5 Post Medieval

Section 7.4 discussed the probability of continuity or re-use of medieval settlements and field systems. The other elements of post medieval landscapes that were recorded by this project fall into two broad themes: designed landscapes and industrial heritage.

Designed Landscapes

The project area is extraordinarily rich in parkland and designed landscapes. It covers eight Registered Parks and Gardens, including the World Heritage Site of Studley Royal Park. The North Yorkshire Historic Landscape Characterisation Project classified at least 40 other areas as “designed landscapes” ranging from ornamental gardens of just a few hectares to expansive parklands of over 350 hectares.

Designed landscapes present a particular challenge to the NMP process which is restricted to the relict elements of a landscape. Crucial components such as statuary, extant structures and soft landscaping (vegetation) are also excluded so NMP mapping for designed landscapes can lack cohesion. Furthermore tree cover, a significant element in most of these landscapes, is also an impediment to the visibility of earthworks, cropmarks and soilmarks on conventional air photos. However, recent parkland management plans in other parts of the country have used existing NMP data as a starting point to undertake more detailed analysis of such landscapes from conventional air photos and from the ASCII LiDAR data (Deegan 2011, Deegan 2012a & b).

This project has however made some contribution to the baseline data for some of the designed landscapes in the survey area. For example at Studley Royal the combination of recent aerial reconnaissance, historic air photos and the LiDAR-derived images has revealed terracing and a reservoir for a lost cascade (1096939). The mapping has extended southward the line of the main vista through the park to Low Lindrick.

At Hackforth examination of the historic vertical and recent specialist photography indicates that some of the earthworks originally thought to pertain to a medieval settlement (52380) may instead be the remains of a post medieval formal garden (1485566). The earthworks include a parterre, a possible ha ha and an embanked enclosure, which may be the remains of a terraced walk around a small lawn.

The project has revealed or enhanced knowledge of several intriguing “lost” post medieval features or landscapes.

At Studley Royal parchmarks visible on air photos indicate the location and plan form of some elements of the original hall and the surrounding formal gardens (52142 & 1517533). The hall, rebuilt by John Aislabe following a fire in 1716 was destroyed by another fire in 1945 and the residence was re-located to the nearby stable block. The features mapped from the air photos generally accord with the information depicted on the 1856 Ordnance Survey map.

Parchmarks at Plompton may also indicate the location and plan of parts of the unfinished country house built by John Carr for Daniel Lascelles in the mid-18th century (1565709). These

marks indicate at least three discrete rectilinear structures and other linear features (1568068). They lie to the south-west of Plompton Hall, which is thought to have been converted from the stable block of the original plan.

By virtue of their association with surviving parkland both the remains at Studley Royal and Plompton have the protection of Registered Parkland status, and of course WHS status in the case of the former. By contrast the remains associated with a former hall at Walkingham Hill have no protection. Walkingham Hill appears to have been a long-lived manor. It is recorded in Domesday but the hall is described as being in a ruinous state by in the early 19th century (Hargrove 1809, 159-160). Well-preserved earthworks of a moat, gardens, avenues and possibly the hall site itself survived in the 1940s and some up until the 1970s, but since then they have been greatly reduced by ploughing (53584). However the LiDAR derived images do indicate that some low earthworks may survive so analysis of the original LiDAR DSM or field survey may help establish if any remains warrant protection.

Industrial Heritage

In the post medieval period the survey area was predominantly rural in character, as it is now. Industrial activities were mostly localised and their archaeological footprint is relatively small scale. The industries whose remains were recorded by this project are mainly associated with extraction and some on-site processing. The principal resources exploited and the nature of their archaeological remains are outlined in the table below and on Figure 7.

Table 2. Examples of the post medieval extractive industries identified in the project area.

Resource	UID	Parish/Site name	Nature of archaeological evidence
Coal	1556637	Bilton, Harrogate	Small cluster of individual coalshafts ringed with spoil, Bell pit form. Appear to survive as earthworks
	1556519	Bilton, Harrogate	Individual coalshaft ringed with spoil, Bell pit form. Appears to survive as earthwork
	1569735	Spofforth Moor, Spofforth	Small dispersed scatter of coal pits visible as amorphous patches of darker toned soil.
	1569737	Spofforth	Large, dispersed scatter of coal pits visible as amorphous patches of darker toned soil.
Limestone	1508928	Watlass Lane, Snape with Thorp	Lime works, substantial quarry with lime kiln.
	1531185	Monkton Moor Quarry, Markington with Wallerthwaite	Lime works, substantial quarries with lime kilns, some cut into railway embankment.
	1547643	Mickle Hill, Burton Leonard	Limestone quarries with lime kilns.

Resource	UID	Parish/Site name	Nature of archaeological evidence
Clay	1519310	The Mires, Hutton Conyers	Small rectangular clay pits associated with a brick and tilemaking site.
	1537266	Myton Ings, Myton-on-Swale	Clay pits cut into medieval ridge and furrow and associated with a brick and tilemaking site
	1433015	Littlethorpe pottery, Littlethorpe	The clay pits and some of the structures associated with the pottery are visible on air photos.
Sand and Gravel	1486123	Scorton	The extents of a 19 th century gravel pit are visible on historic air photos and maps. These have now been subsumed by later and larger extractions.

of these resources only the extraction of sand and gravel has continued on a large scale into the 20th and 21st centuries. Several of the historic sand and gravel pits have now been subsumed by large and more recent workings.

7.6 First World War

Ripon was an important centre for the training, accommodation and movement of troops in the First World War. This project has revealed some of the physical remains of these activities over a wide area to the south-west of the city (see Figure 8). The Ripon Camp provided accommodation for over 5000 personnel at a time before their dispatch to the continent and for some, on their return. This facility was served by a branch line (1478569) off of the main Leeds to Northallerton railway line (both now disused) and a tramway (1531305). Almost all the structural remains appear to have been removed by the mid-1940s, but the earthwork remains of ranks of hut platforms, trackways and roads, parade grounds and other features are visible on photos taken in 1955 (including 1517597, 1519266 and 1519270). The LiDAR-derived images revealed several well-defined hut bases in Hospital Wood (1517503), which were probably part of the hospital that is reputed to have housed 670 beds for recuperating wounded soldiers (www.1914-1918.net/hospitals_uk.htm).

A little to the north of Hospital Wood this project has recorded remains of complex and multi-phase training areas along the banks of the River Laver, close to Claro and Deverell Barracks. Most elements probably relate to Second World War and later activity, however on photographs taken in October 1940 some structures had already been decommissioned and superimposed by other features.

A remarkable survival from this time is the 'mock-up' of front line trench defences constructed at Clotherholme Farm (1517581). These were probably built as a training facility for the outward-bound troops stationed at Ripon. The network of crenellated trenches and walkways and more hut platforms appear to survive as earthworks on recent air photos.

Overall most of the First World War military landscapes appear to have been levelled by ploughing or subsumed into a later military context but the air photo evidence suggests that some pockets survive as earthworks and detailed analysis of the ASCII LiDAR data and/or field investigations may help establish others. Where good survival is confirmed some features may warrant consideration for scheduling.

7.7 Second World War

The project area contains a number of large military installations that had an active role in the Second World War: RAF Scorton, RAF Catterick (now Marne Barracks), RAF Skipton-on-Swale, RAF Dalton, RAF Leeming and RAF Dishforth and the Claro and Deverell Barracks at Ripon. The Ripon barracks are in use, at the time of writing, but only RAF Leeming and Dishforth are still functioning airfields.

The air photographs taken during and immediately after the Second World War provide a record of the features that were present and in use during the war, some survive well but many have been destroyed. This project provides a record of the wartime layout of these installations and some of the subsequent modifications and developments.

A common suite of features has been recorded at each of the military airfields: one or more runways, a perimeter trackway, aircraft hangers and a technical site. During the war some of the airfields were protected by a ring of barbed wire defences and pillboxes and strategically placed anti-aircraft guns. At RAF Catterick the guns (1391415) were mounted on the bailey of the nearby medieval Castle Hill complex (52302), which stands at the eastern end of the runway. The table below highlights some of the significant features identified at each airfield and the current overall condition of the airfield.

Table 3 The WW2 Airfields

Name (UID)	Significant types present & other observations	Notes on current condition
RAF Scorton (1409216)	Three runways and perimeter track. Individual hardstandings within and without of perimeter, some with hangers and blast walls, others with blast pens.	Majority of airfield removed by sand and gravel extraction
Formerly RAF Catterick, now Marne Barracks (1391330)	Single runway with irregular perimeter track. 1940s air photos show this airfield painted up as fields for camouflage.	The airfield is now longer in use and has been redeveloped as Marne Barracks. Some of the WW2 fighter pens have Scheduled Monument protection (SM 1020990)
RAF Leeming (1521146)	Photos taken in 1940 show the site cleared of field boundaries and construction of the bomb stores and fusing buildings underway. By 1942 3 runways, a perimeter track and pan-handle dispersal pads had been constructed along	Some areas of this active airfield have been redeveloped.

Name (UID)	Significant types present & other observations	Notes on current condition
	with an extensive technical site. By 1946 one of the runways had been lengthened and a store has been built. The airfield continued to develop in the second half of the 20th century and in 1972 it was enhanced with Vulcan Quick Reaction Alert dispersals.	
RAF Skipton (1410440)	Three runways and perimeter track. Apron type dispersal pads along the perimeter. Associated with an armaments depot to the east. Cropmarked evidence of a former perimeter track on 1946 air photos hint at the initial layout of the runways.	By the early 1990s most the structural elements at this airfield has been removed. The runways, perimeter track and some of the hardstandings appeared to survive and were re-used as bases for turkey sheds.
RAF Dalton (1393319)	Three runways and perimeter track. Individual pan-handle dispersal pads along the perimeter track. Associated with an armaments depot a little to the west on the banks of Cod Beck.	The basic layout remains but the site is now used as storage area. The armaments depot appears to be relatively well preserved.
RAF Dishforth (1393750)	Early 1940s air photos show that it was originally a grass strip with a sub-circular perimeter track and that it was camouflaged to deceived overflying enemy aircraft (see 1521146). Also on 1939 air photos a "dummy whitley" was positioned close to one of the hangars. By 1946 the airfield comprise of three runways, perimeter, various dispersal pads, aircraft hangers and two bomb stores. This airfield was protected by a ring of pillboxes and other observation posts (see 1432122).	Many of the major elements of the airfield: the runways, taxiways and hangars survive but many of the buildings have been replaced.

Other significant military sites include a training ground near Ellington Banks (1517474). A wide range of features were identified on the site including anti-tank ditches, barbed wire obstructions and a minefield. These appear to have been created to provide training scenarios for tank operators. The area was relandscaped in 1954 and most elements appear to have been levelled at that time.

Ripon, as well as being an important centre for the training, mobilisation and rehabilitation of British troops, was the site of a Prisoner of War Camp. Urebank or Camp 178, was situated on the banks of the River Ure on the north side of the city and contained more than 100 huts (1474613). It was originally intended for British troops but eventually held German POWs and was renamed Camp 247. A contemporary plan of the camp, created by one of the German prisoners, identifies specific activities within some of the buildings and these can be correlated with buildings visible on the early post war air photos. The site was subsequently re-used as a caravan park.

8 DATA ARCHIVING AND DISSEMINATION

8.1 Copyright

The copyright of the air photo mapping and associated records produced by this project lies with English Heritage.

8.2 Project Archive

The results of this project's mapping and interpretation are contained within 36 Autodesk Map drawing files, one for each OS 1: 10 000 scale quarter sheet covered or partly covered by the project. These will be deposited with the English Heritage Archive. Aerial Survey and Investigation shall also retain digital copies.

The records resulting from this project are contained within and are integral to the NHRE. They may also be accessed online via Pastscape (www.pastscape.org.uk).

There are no formal arrangements for the archiving of other digital files created during the course of this project: scanned image files (.TIF), rectified image files (.TIF), World files (.TFW), AERIAL rectification files (.RDA) and lists of consulted material (.XLS). Copies of these will be deposited on the English Heritage file server under Aerial Survey. For this project decisions regarding the preservation of these files will be the responsibility of English Heritage but this is an area that needs consideration for future projects.

9 SUMMARY OF RECOMMENDATIONS

A number of recommendations have been suggested in the preceding sections, they are summarised here for easy reference:

- the specification of the LiDAR-derived images needs to be improved in order to optimise the potential of the resource without need for recourse to the original datasets.
- a method for stereoscopic viewing of the increasing number of images supplied by the EHA in digital only format, despite many being taken in stereo-lapping sequences
- formalisation of archiving procedures for non-core data eg photo lists
- provision should be made for the archiving and dissemination of a version of the project mapping that contains ALL the original object data (see Appendix 4)
- ground or detailed LiDAR analysis for surviving WW1 features in the Ripon area with a view to the protection of appropriate monuments.
- ground or detailed LiDAR analysis of the Walkingham Hill area to enhance understanding and to establish if the current condition of the site precludes protection
- re-assessment of the Gospel Hill settlement and fields to be informed by the results of the Wattle Syke excavations (Martin et al forthcoming) and to consider appropriate protection strategies for this predominantly levelled landscape.
- distribution analysis of Neolithic and Bronze Age monuments on a regional (Yorkshire) scale.
- analyse effectiveness of aerial photography/NMP as a form of remote sensing on a regional (Yorkshire) scale.

REFERENCES

- Boutwood, Y and Winton, H 2004 National Mapping Programme Sphere of Interest. Aerial Survey Report Series AER/4/2004
- Deegan, A 2008 'A project design for The Yorkshire Henges and their Environs Air Photo Mapping Project (3908PD)' v. 1.1 June 2008
- Deegan, A 2011 'Air photo and LiDAR mapping and interpretation for Belton Park, Grantham, Lincolnshire.' Unpublished report. Ref. 1011006
- Deegan, A 2012a 'Air photo mapping and interpretation for Calke Abbey and its environs, Derbyshire.' Unpublished report. Ref. 1213001 (August 2012)
- Foard, G and Deegan, A 2008 'The contribution of aerial photography to Anglo-Saxon studies' in Deegan & Foard (eds) *Mapping Ancient Landscapes in Northamptonshire*. Swindon. English Heritage 125-135
- Martin, L Richardson, J and Roberts, I forthcoming. Iron Age and Roman Settlements at Wattle Syke. Archaeological Investigations During the A1 Bramham to Wetherby Upgrading Scheme. Archaeological Services WYAS
- Platell, A. and Hale, D. and Millard, A. (2009) 'A late Neolithic palisaded enclosure at Marne Barracks, Catterick, North Yorkshire.', *Proceedings of the Prehistoric Society*, 75 . pp. 265-304.
- Roberts, I 2005. *Ferrybridge Henge: The Ritual Landscape*. Archaeological Services WYAS
- Roberts I with Deegan, A and Berg, D 2010. *Understanding the Cropmark Landscapes of the Magnesian Limestone*. Archaeological Services WYAS.
- Wacher, J S 1975 The towns of Roman Britain. 398-404
- Wilson, P 2002 *Cataractonium: Roman Catterick and Its Hinterland : Excavations and Research, 1958-1997* CBA
- Wrathmell, S. and Nicholson, A. (eds), 1990, *Dalton Parlours: Iron Age Settlement and Roman Villa*, Yorkshire Archaeol. 3

APPENDIX 1 SPHERE OF INTEREST

Based on Boutwood and Winton (2004)

Levelled Archaeology- All crop mark and soilmark features identified as archaeological in origin were plotted.

Earthwork Archaeology- All extant and vestigial archaeological features were plotted.

Ridge and furrow- All extant, vestigial, soilmark and crop mark evidence of ridge and furrow was recorded. The extent of ridge and furrow was outlined, with reference to the original furlongs, where these could be identified, or units of common ploughing trend. The direction of ploughing within each outlined unit was indicated by a single arrow.

Extraction sites – All evidence of extraction that was visible as earthworks or cropmarks was recorded. Large areas of extraction and associated activities were outlined either from appropriate vertical photographs or documentary and cartographic sources.

Industrial archaeology-Few features within this category were observed by this survey. Where such features were observed they were recorded.

Modern military archaeology- Former military sites and installations were mapped.

Buildings – All building or structural remains foundations that were observed as crop marks, soilmarks, parchmarks, earthworks or ruins were mapped and recorded.

Post-medieval and modern field boundaries and dew ponds – In general such features were not mapped. However for the sake of clarity post-medieval and later field boundaries were mapped where they coincided with earlier cropmarked or earthwork features.

Geological features -In general, geological features were not recorded except for the sake of clarity where they coincided with cropmarked archaeological features or could be mistaken for archaeological features.

APPENDIX 2 AIR PHOTO COLLECTION DETAILS

English Heritage Archive (formally the National Monuments Record): English Heritage, National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon SN2 2GZ

Table 4. Summary of EHA loans.

Project blocks	EHA loan ref.	Loaned verticals	Loaned obliques	Loaned military obliques
Priority Groups 1 & 2	27751	1096	103	53
Priority Group 3	30074	886	257	11
1	33286	835	205	12
2	34919	501	139	0
3	34921	932	113	27
4	34922	1547	516	66
5	34956	763	511	36
6	34957	730	216	0
7	34958	1070	287	3
8	34959	762	850	0
Total		9122	3197	208

North Yorkshire County Council: Historic Environment Team, North Yorkshire County Council until September 2011 and thereon County Record Office, Malpas Road, Northallerton, North North Yorkshire DL7 8TB.

CUCAP: University of Cambridge, Air Photograph Library, Sir William Hardy Building, Tennis Court Road, Cambridge CB2 1QB

APPENDIX 3 AUTODESK MAP® LAYER CONTENT AND DRAWING CONVENTIONSP

Layer Name	Layer content	Colour and linetype
BANK	closed polygons for supra-surface earthen features such as banks, platforms, mounds and spoil heaps	1 (red) continuous
DITCH	closed polygons for cut or wear features such as ditches, pits and hollows	3 (green) continuous
EXTENT OF AREA	closed polygons outlining complex or extensive remains such as mining or army camps	8 (grey) continuous
MONUMENT POLYGON	closed polygons encircling all the features comprised within a single NMR record.	7 (white) continuous
RIGARREWK	polyline showing the plough direction of earthwork ridge and furrow	4 (cyan) continuous
RIGARRLEVEL	polyline showing the plough direction of levelled or crop mark ridge and furrow	6(magenta) continuous
RIGDOTSEWK	closed polygon defining the furlongs or extent of extant ridge and furrow	4 (cyan) continuous
RIGDOTSLEVEL	closed polygon defining the furlongs or extent of levelled or crop mark ridge and furrow	6 (magenta) continuous
STRUCTURE	for all stone, concrete, metal and timber features, structures and erections	52 (white)
T HACHURE	convention to schematise the top & direction of slope	5 (blue)

APPENDIX 4 MONUMENT DATA (GIS)

MONUMENT DATA TABLE

The Monument Data table consists of ten data fields. These are associated with and specific to each graphical element in a monument depiction.

Field name	Field content	Sample data
EHLAYER*	Name of layer on which the mapping sits in the Autodesk environment (for GIS datasets)	DITCH etc (see Appendix 3)
MONARCH	NMR Unique Identifier (UID)	1460426
NHER*	Corresponding monument record in NYCC HER (where appropriate)	MNY123456
PERIOD	date of features (EH Thesaurus)	LATER PREHISTORIC
TYPE	monument type (EH Thesaurus)	RING DITCH/ROUND HOUSE (DOMESTIC)
EVIDENCE	Form of remains as recorded on the source photograph (EH Thesaurus)	CROPMARK
PHOTO1	NMR or other reference for the photograph from which the feature was plotted and its date of photography	HCC HAP 91/13/7 16-JUL-1991
LATEST CONDITION*	Condition of the monument as suggested by the latest available photos or LiDAR-derived images (this field may be blank if EVIDENCE was CROPMARK)	LEVELLED EARTHWORK
PHOTO2*	NMR or other reference for the most recent photograph from which LATEST CONDITION was deduced (this field may be blank if the EVIDENCE was cropmark or latest condition relied on the evidence of the LiDAR-derived images.	EARTH.GOOGLE.COM 01-OCT-2009 ACCESSED 01-JUNE-2010
LiDAR*	If the monument could be detected on the LiDAR-derived images the relevant tile reference was recorded here.	LIDAR SE2896 ENVIRONMENT AGENCY D0057155 20TH-JUL-2006

* these are not core NMP-standard data fields and they may not be retained in the files that are formally archived by the EHA and/or uploaded to the EH GIS. However it is highly desirable that arrangements are made for the archive and dissemination of the full data versions as this information cannot easily be recovered from the NHRE records alone.

APPENDIX 5 EH PERIOD TERMS INDEXED BY THE PROJECT

PREHISTORIC OR ROMAN	EARLY 20TH CENTURY
LATER PREHISTORIC	FIRST WORLD WAR
NEOLITHIC	SECOND WORLD WAR
LATE NEOLITHIC	SECOND WORLD WAR (1940)
EARLY BRONZE AGE	SECOND WORLD WAR (1942)
BRONZE AGE	SECOND WORLD WAR (1946)
IRON AGE	MID 20TH CENTURY
ROMAN	LATE 20TH CENTURY
EARLY MEDIEVAL	21ST CENTURY
MEDIEVAL	EARLY 21ST CENTURY
POST MEDIEVAL	UNCERTAIN
20TH CENTURY	

APPENDIX 6 EH THESAURUS TERMS INDEXED BY THE PROJECT

ABBEY	BLAST SHELTER	CIRCULAR ENCLOSURE
ABLUTIONS BLOCK	BLAST WALL	CLAY PIT
AIR RAID SHELTER	BOMB CRATER	COAL DEPOT
AIRCRAFT HANGAR	BOMB STORE	COAL WORKINGS
AIRCRAFT OBSTRUCTION	BOUNDARY	COMMON LAND
AIRFIELD DEFENCE SITE	BOUNDARY BANK	CONTROL BUILDING
AMMUNITION DUMP	BOUNDARY DITCH	CONTROL TOWER
ANNEXE ENCLOSURE	BOUNDARY WALL	COURTYARD
ANTENNA ARRAY	BOWL BARROW	COURTYARD HOUSE
ANTI AIRCRAFT BATTERY	BRICK AND TILE WORKS	CROFT
ANTI TANK DITCH	BRICK AND TILEMAKING SITE	CROSS
ARMAMENT DEPOT	BRICEARTH PIT	CURSUS
AVENUE (LANDSCAPE FEATURE)	BRICKFIELD	CURTAIN WALL
BAILEY	BRIDGE	CURVILINEAR ENCLOSURE
BAKEHOUSE	BRIDLEWAY	DAM
BANK (EARTHWORK)	BUILDING	DECOY POND
BAR (LICENCED)	BUILDING PLATFORM	DECOY SITE SHELTER
BARBED WIRE OBSTRUCTION	CASCADE	DEW POND
BARN	CASTLE	DISPERSAL
BARRACKS	CAUSEWAY	DITCH
BASEBALL COURT	CAUSEWAYED RING DITCH	DITCHED ENCLOSURE
BASTION	CEMETERY	DOMESTIC SITE
BATTERY	CHAPEL	DOUBLE DITCHED ENCLOSURE
BELL PIT	CHARCOAL BURNING PLATFORM	DRAIN
BLAST PEN	CHURCH	DRAINAGE DITCH
	CINEMA	DROVE ROAD

Yorkshire Henges and their Environs: Air Photo Mapping Project (3908MAIN)

DUCK POND	ISLAND	PARADE GROUND
EMBANKMENT CROSS	KEEP	PARK PALE
EMERGENCY WATER SUPPLY	KITCHEN	PARK WALL
ENCLOSURE	KNOT GARDEN	PARTERRE
EXERCISE YARD	LIME KILN	PATH
EXPLOSIVES STORE	LIME WORKS	PEN
EXTRACTIVE PIT	LIMESTONE QUARRY	PERIMETER TRACK
FARM	LOCK	PILLBOX
FARMSTEAD	LONG MOUND	PILLOW MOUND
FENCE	LYNCHET	PIT
FIELD BOUNDARY	MAGAZINE	PIT ALIGNMENT
FIRING RANGE	MANOR HOUSE	PIT CIRCLE
FISHPOND	MARL PIT	PIT CLUSTER
FLOOD DEFENCES	MARRIED QUARTERS	PLATFORM
FOOTPATH	MAZE	PLAYING FIELD
FORMAL GARDEN	MEDICAL CENTRE	PLOUGH HEADLAND
FORT	MILITARY AIRFIELD	POLYGONAL ENCLOSURE
FORTIFIED MANOR HOUSE	MILITARY AIRFIELD SITE	POND
FUEL STORE	MILITARY BUILDING	PRACTICE TRENCH
GARDEN FEATURE	MILITARY CAMP	PRINT SHOP
GARDEN TEMPLE	MILITARY HOSPITAL	PRISONER OF WAR CAMP
GARDEN TERRACE	MILITARY TRAINING SITE	PROMONTORY FORT
GARDEN WALL	MILL	PROSPECT MOUND
GATEHOUSE	MILL MOUND	QUARRY
GRAVE	MILL POND	QUARRY PIT
GRAVEL PIT	MILL RACE	RADAR BEACON
GRUBENHAUS	MINEFIELD	RADAR STATION
GULLY	MINERAL RAILWAY	RAILINGS
GUN EMPLACEMENT	MOAT	RAILWAY
HA HA	MORTUARY ENCLOSURE	RAILWAY EMBANKMENT
HALL	MOTTE	RAILWAY SIDING
HARD STANDING	MOTTE AND BAILEY	RAILWAY STATION
HEARTH	MOUND	RECTANGULAR ENCLOSURE
HEAVY ANTI AIRCRAFT BATTERY	MULTI DITCH ENCLOSURE	RECTILINEAR ENCLOSURE
HENGE	NARROW RIDGE AND FURROW	RESERVOIR
HOLLOW	NATURAL FEATURE	RESERVOIR INSPECTION CHAMBER
HOLLOW WAY	NISSEN HUT	RETAINING WALL
HOUSE	OFFICERS QUARTERS	RETTING PIT
HUT	ORDNANCE FACTORY	RETTING POND
HUT CIRCLE	ORDNANCE STORE	REVETMENT
HUT PLATFORM	OVAL ENCLOSURE	RIDGE AND FURROW
ICE HOUSE	PADDOCK	RING DITCH
INFECTIOUS DISEASES HOSPITAL	PALAEOCHANNEL	ROAD
INHUMATION CEMETERY	PALISADED ENCLOSURE	ROBBER TRENCH
	PAPER INDUSTRY SITE	ROUND BARROW

Yorkshire Henges and their Environs: Air Photo Mapping Project (3908MAIN)

ROUND CAIRN	STOCK ENCLOSURE	TRENCH
ROUND HOUSE (DOMESTIC)	STOREHOUSE	UNCERTAIN
RUNWAY	STRIP LYNCHET	UNDERGROUND
SAND AND GRAVEL EXTRACTION SITE	STRUCTURE	MONITORING POST
SAND PIT	SUB CIRCULAR ENCLOSURE	VILLA
SANDSTONE QUARRY	SUNKEN GARDEN	VILLAGE GREEN
SCARP	TAXIWAY	WALL
SEARCHLIGHT BATTERY	TEMPLE	WASTE DISPOSAL SITE
SEARCHLIGHT EMPLACEMENT	TEMPORARY CAMP	WATER CHANNEL
SETTLEMENT	TERRACE	WATER TANK
SEWAGE WORKS	TERRACED GROUND	WATER TOWER
SLIT TRENCH	TERRACED WALK	WATERCOURSE
SLOPE	TEXTILE MILL	WEAPONS PIT
SMALL ARMS AMMUNITION FACTORY	TOFT	WEIR
SPOIL HEAP	TOWN WALL	WELL
SQUARE BARROW	TRACKWAY	WHEEL HOUSE
SQUARE ENCLOSURE	TRAMWAY	WINDMILL MOUND
STACK STAND	TRANSMITTER SITE	WOOD
STANDING STONE	TREE ENCLOSURE RING	WOOD BANK
	TREE MOUND	WORKSHOP
	TREE THROW	

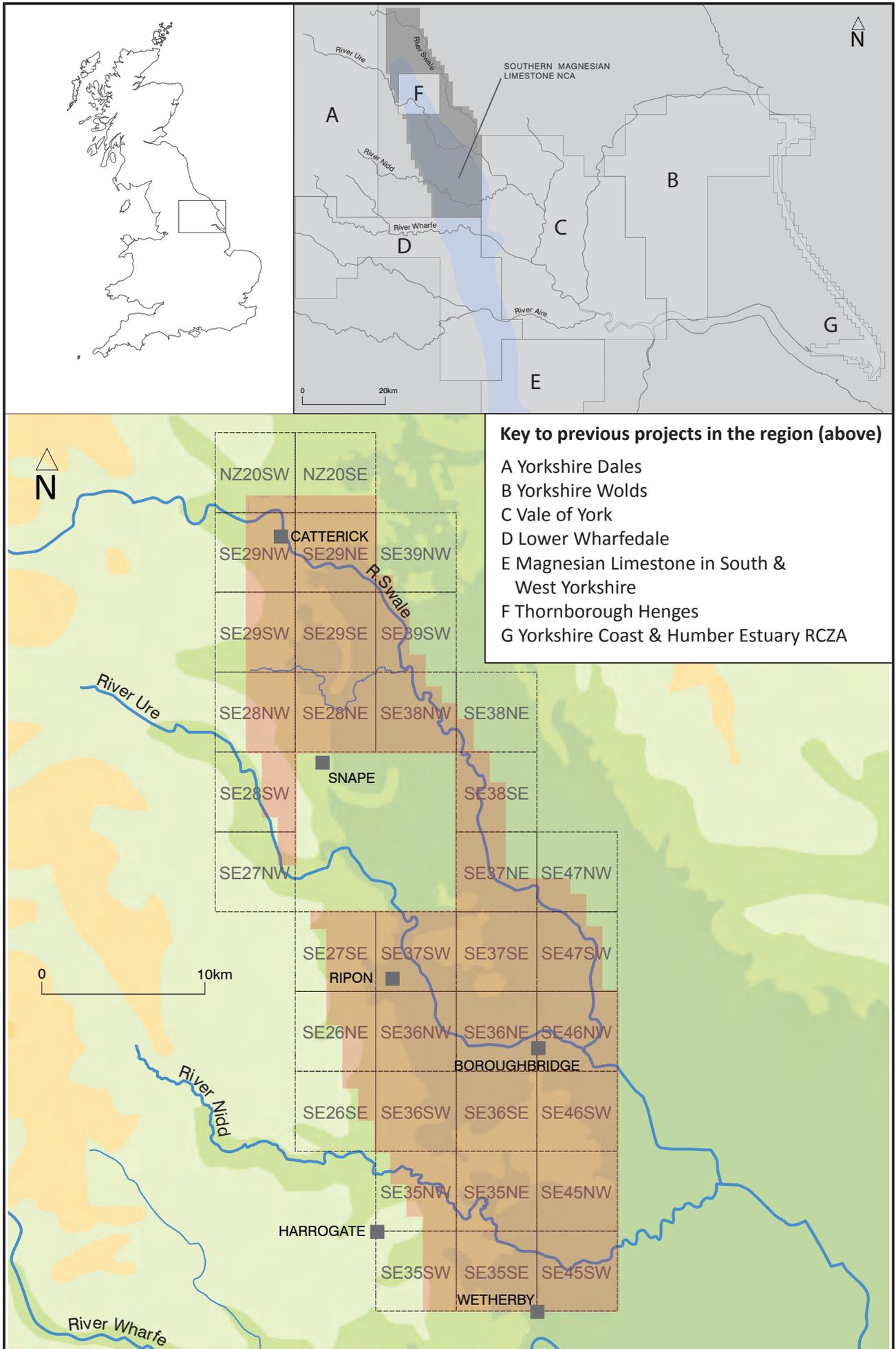


Figure 1. Location plan of the Yorkshire Henges and their Environs Air Photo Mapping Project

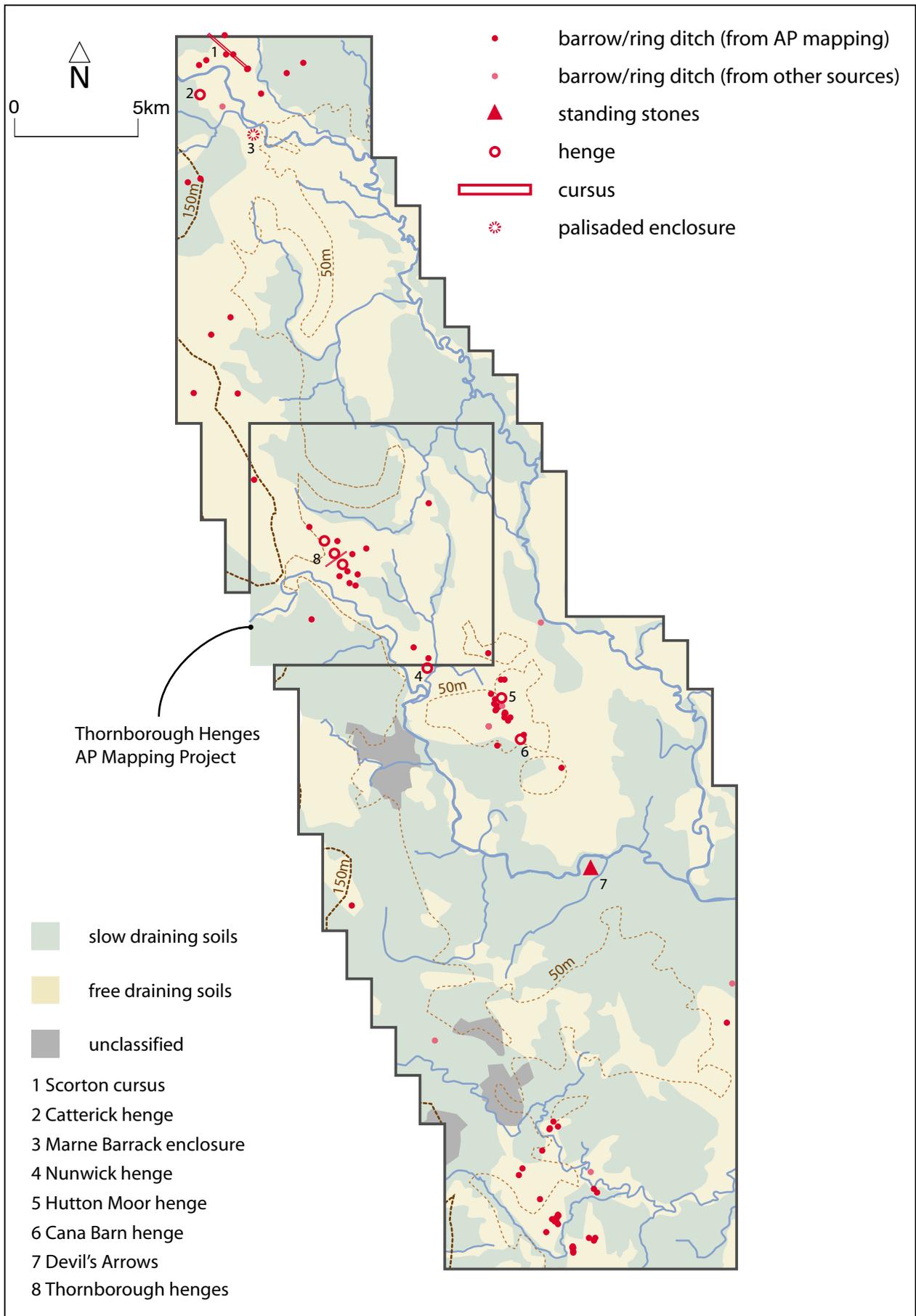


Figure 2. Distribution of Neolithic and Bronze Age monuments and key sites from this and the Thornborough Henges AP Project.

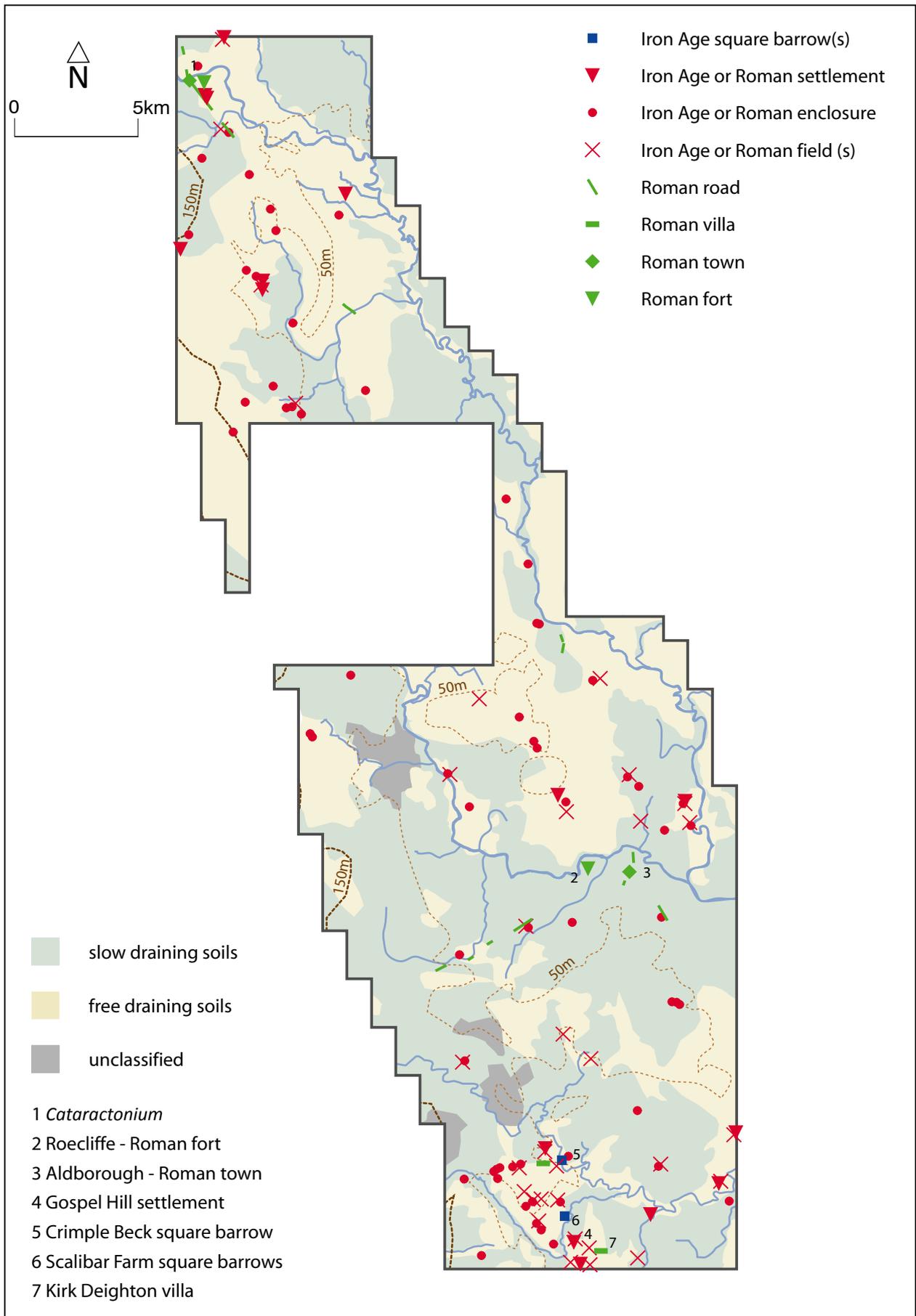


Figure 3. Distribution of Iron Age and Roman sites.

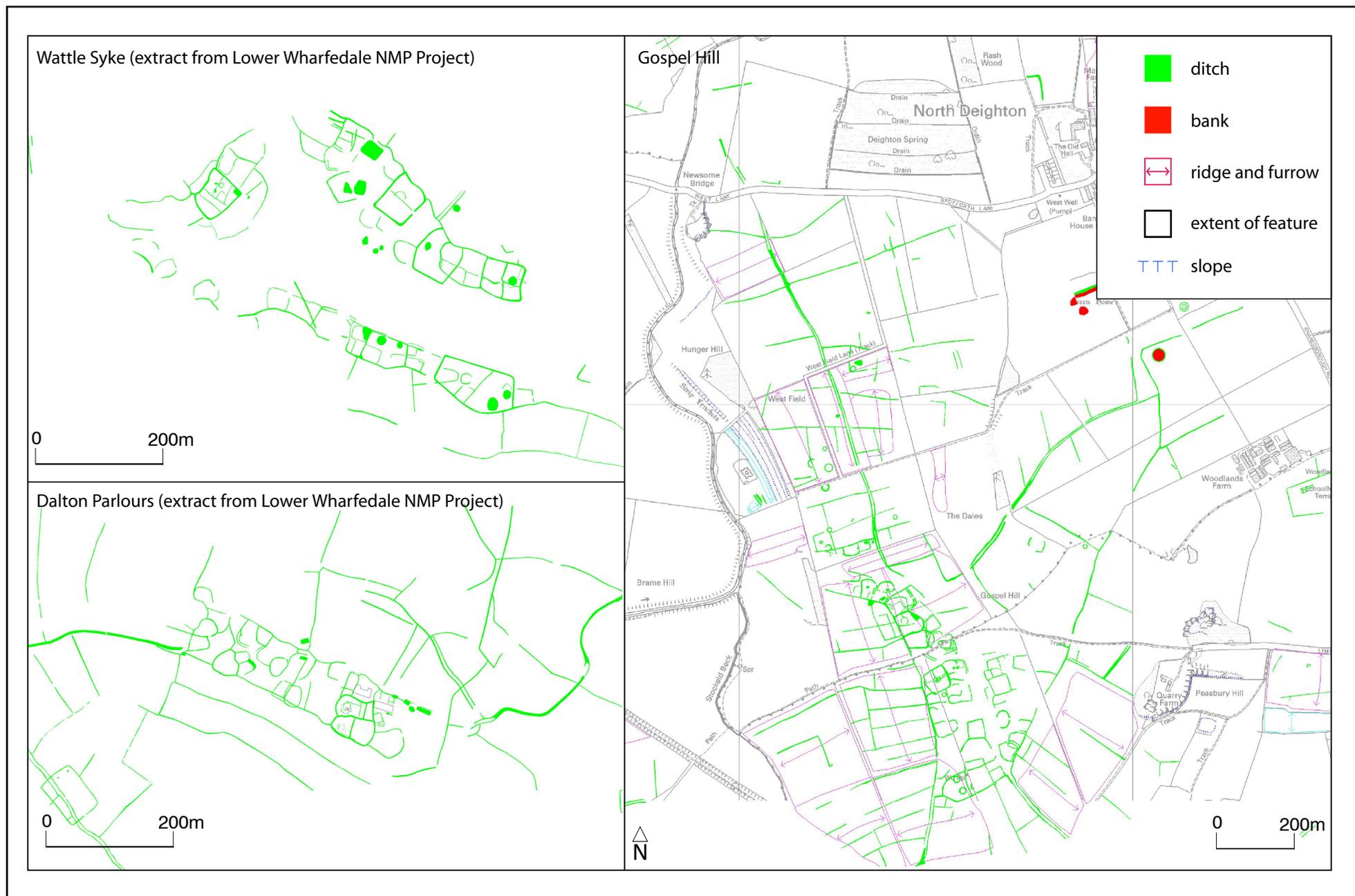


Figure 4. Comparison of the Iron Age and Roman settlements at Wattle Syke and Dalton Parlours with the enclosure complex on Gospel Hill.

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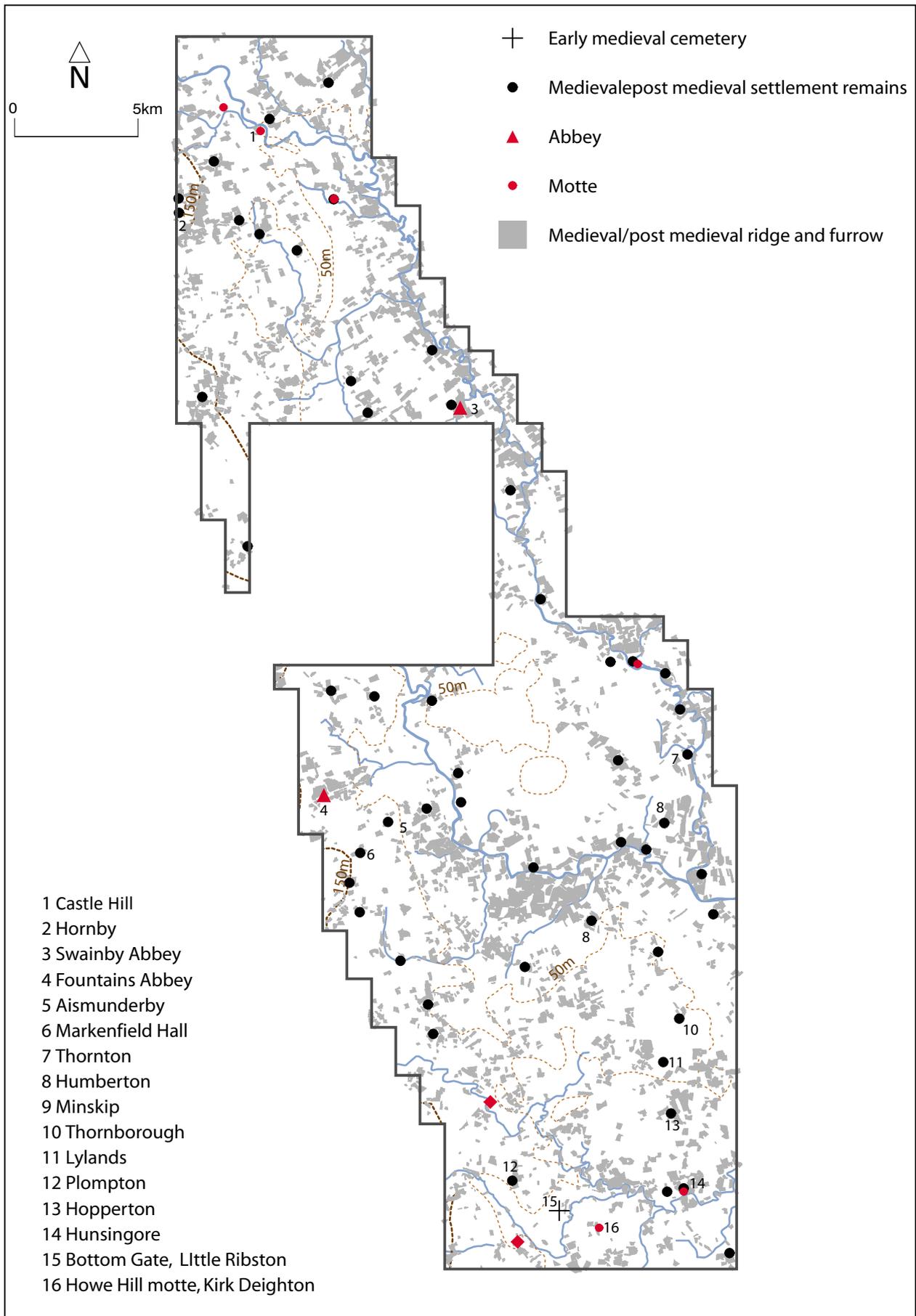


Figure 5. Distribution of medieval and post medieval sites.

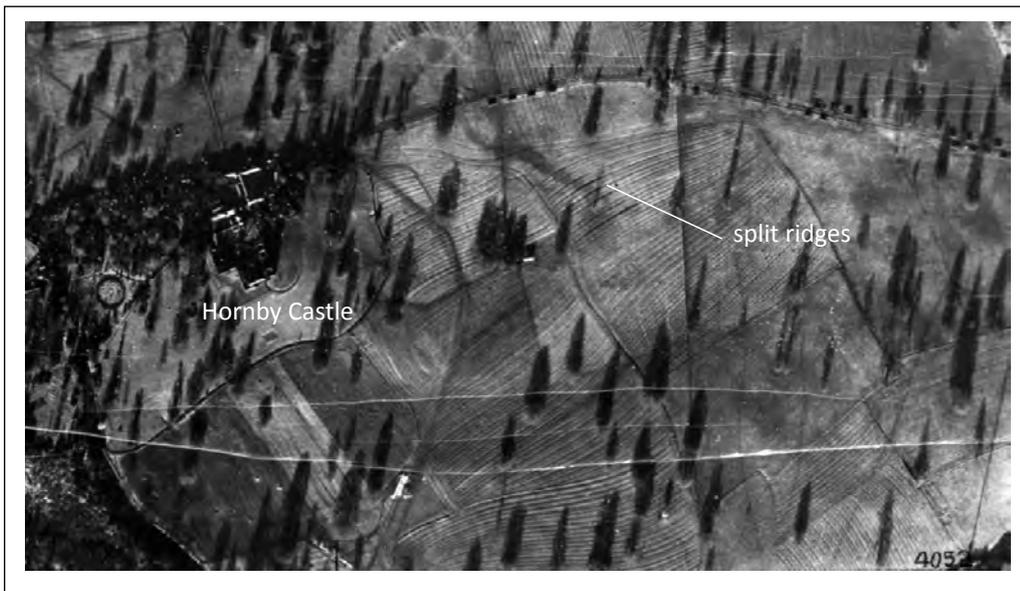


Figure 6. Medieval ridge and furrow, some with split ridges, Hornby Park (RAF/CPE/UK1884 4033 06-DEC-1946)

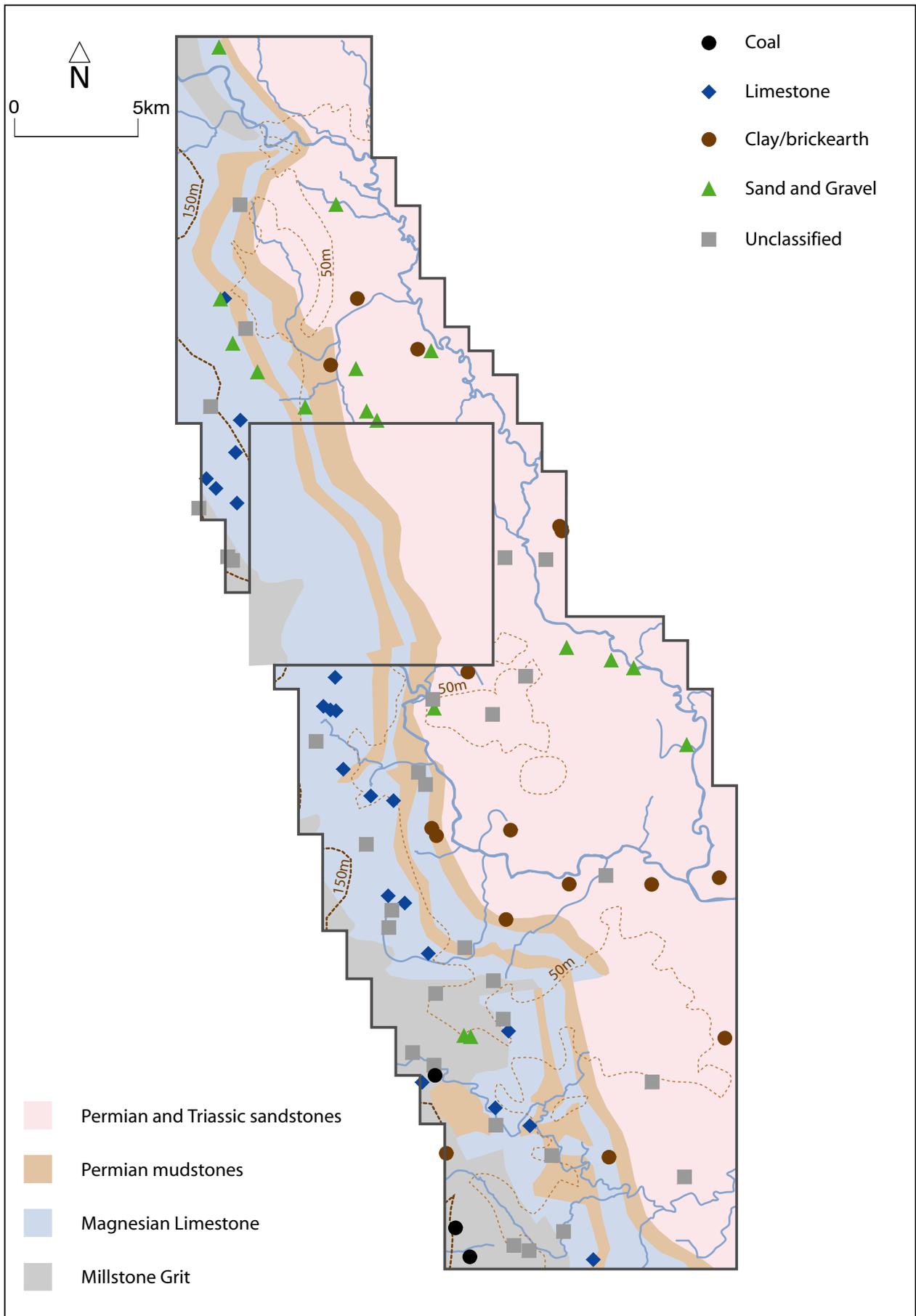


Figure 7. Distribution of post medieval extraction industries.

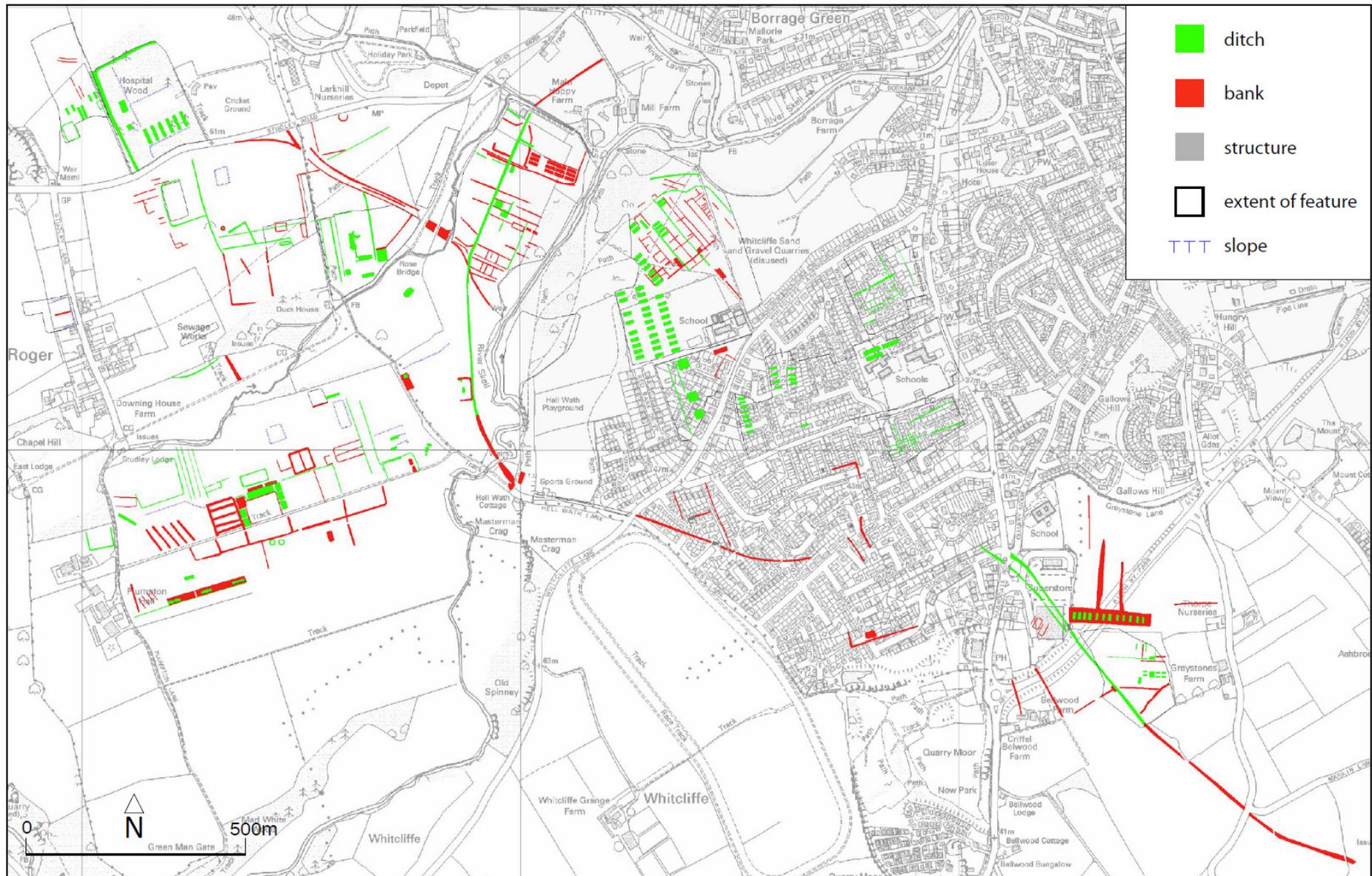


Figure 8. Extract of air photo mapping of First World War features on the south-west side of Ripon. © Crown Copyright and database right 2013. All rights reserved. Ordnance Survey Licence number 100019088.

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