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"**Interpreting the changing Prehistoric landscape of the Western Yorkshire Wolds**"

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Note: As a Student of the University of Hull, I declare that I have closely examined the ethical research guidelines produced by the University Ethics Committee and have adhered to all rules, guidelines and regulations surrounding ethical considerations in academia.

Communication has been maintained with my appointed supervisor at all necessary times, whom has been updated on the thesis progress when appropriate.

This thesis is dedicated to my father, Alan Gledhill, who has shown unwavering faith in me.
Thank You

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UNIVERSITY OF HULL

Interpreting the changing Prehistoric landscape of the Western Yorkshire Wolds

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Supervised by Dr. P Halkon

Hull University: Department of History

Abstract:

In 2015, a BA Dissertation in Archaeology demonstrated that by combining the data provided by remote sensing, with the results of excavations, it was possible to unravel data sets of original aerial photographic and geophysical plots to construct a chronology of landscape development at Nunburnholme Wold.

The core purpose of this thesis is to place Nunburnholme Wold into a wider geographical context; hence a larger area on the Western escarpment of the central Yorkshire Wolds has been examined in order to reconstruct the agricultural, societal and economic development, through analysis of the data provided by the cropmark coverage and other forms of remote sensing following the example provided by Halkon (2008).

In order to chronologically construct landscape development through later prehistory, combined data sets were key. These included the plotting of features from the Stoertz (1997) mapping programme "Ancient Landscapes of the Yorkshire Wolds" (RCHM (E) 1997), and the use of satellite imagery from the computer software programme, Google Earth (© 2014 Google © 2014 Infoterra Ltd & Bluesky). Raster data was inputted into ArcGIS 10.3 and identified against geographical constraints such as geology, soils and watercourses in order to assess the influence on settlement patterns.

The results have demonstrated a landscape which is rich in archaeological sites and was active during the Neolithic, Bronze and Iron Age. Settlement activity is noted to be concentrated across the drier and better drained soils of the uplands as opposed to the wetter, poor draining, and less workable alluvial valley floor soils. These results have proved consistent with Halkon's (2008) thesis of the Foulness Valley c. 800 BC to c. AD 400. This study proposes that human activity in the study area had its origins in a focus as a ceremonial landscape, subsequently developing into an agricultural environment which permitted the fluid movement of people and stock across the area.

Key Words:

Archaeology, Bronze Age, Neolithic, Iron Age, Geophysics, Distribution

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Finally, but most importantly thanks to my children, Edward, William and Henry who have supported me and shown so much patience. I hope that they will have observed my determination and perseverance and will apply this to achieve their own goals in life.

How to navigate this thesis

Below, you will find the contents page which will guide you through the structure of the thesis. Chapter 1 introduces the key themes of the research, which is followed by Chapters 2-5, which study the environmental background, the Neolithic period, the Bronze Age period and Iron Age period. Discussion can be found in Chapter 6, followed by references and appendices. A list of figures and tables is complimented to the thesis from page 8.

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Chapter 1: Introduction

1.1 Aims

The aim and objectives of this study are as follows:

To provide an understanding of landscape development through prehistory into the Late Iron Age period on the western escarpment of the central Yorkshire Wolds in an area bounded by the following NGRs:

SE 484000 454000	SE 491000 454000
SE 484000 446000	SE 491000 446000

- To assess the extent to which topography, soils and watercourses influence settlement patterns
- To assess the reliability of the mapping for Stoertz (1997)
- To reconstruct the agricultural, societal and economic development of the study area through analysis of the data provided by the cropmark coverage and other forms of remote sensing following the example provided by Halkon (2008)

The National Mapping Programme for English Heritage (now Historic England) aimed to plot the crop marks of features appearing in aerial photography across areas of England. One of the most comprehensive of these was that carried out by Cathy Stoertz and published as "Ancient Landscapes of the Yorkshire Wolds" (RCHM (E) 1997). Within this survey, the area around Londesborough and Nunburnholme can be highlighted as being of particular archaeological significance.

To accompany the HLF funded Community Heritage Project at Nunburnholme, a detailed examination of Nunburnholme Wold for a BA Dissertation in Archaeology was undertaken which demonstrated that it was possible to unravel data sets of original aerial photographic and geophysical plots. By combining the data provided by remote sensing with the results of excavations undertaken in 2014, it was possible to construct a chronology of landscape development (Whiteley, 2015).

The main purpose of the research proposed here is to place the Nunburnholme Wold research into a wider geographical context, providing a platform for testing the hypotheses generated by earlier work (Whiteley 2015).

1.2 The study area

Fig 1 The location of the study area shown over World Topographic Map (Esri, mapped in ArcGIS 10.3)

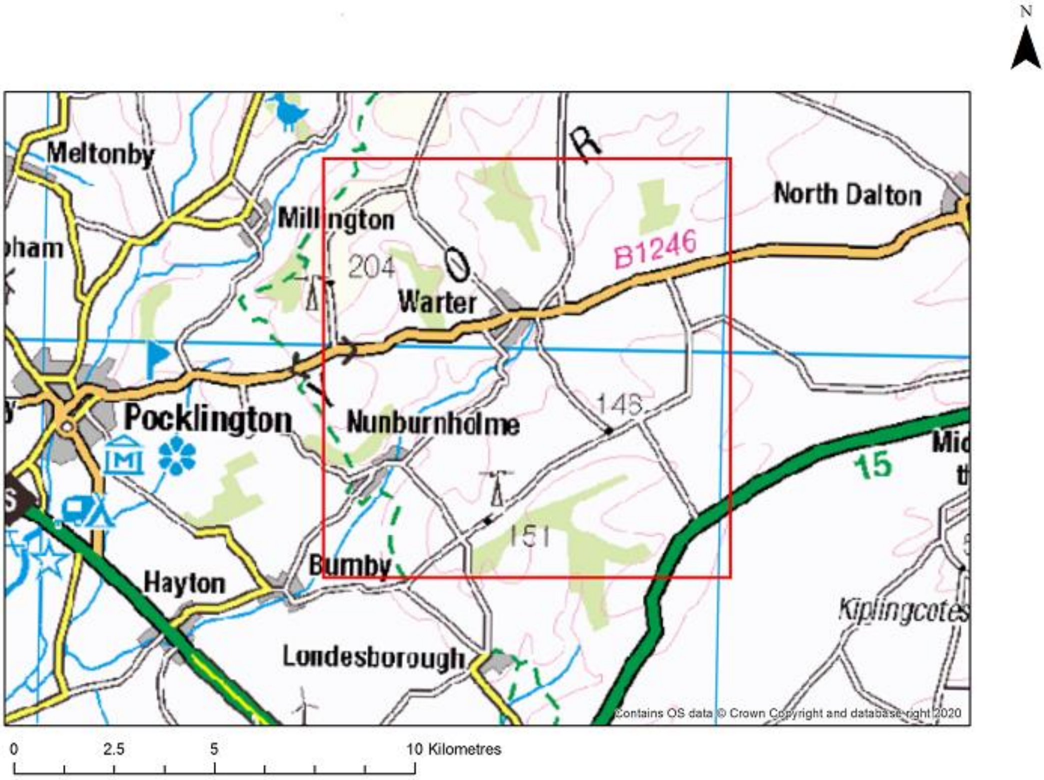


Fig 2 The location of the study area shown over OS open raster tile layer (ArcGIS map service mapped in ArcGIS 10.3)

The study area is situated in a landscape block of 8 x 8 kilometres as shown in figures 1 and 2, an area on the western escarpment of the central Yorkshire Wolds. Geographically the Yorkshire Wolds are the northernmost span of a chalk band, which stretch from Wessex through the Lincolnshire Wolds and terminate at the North Sea (Stoertz, 1997, 2). The Wolds are characteristically defined by primary Cretaceous chalk, which beginning on the north bank of the River Humber rises into an extending arc terminating at Flamborough Head on the eastern coast (Lewin, 1969).

The topography and character of the research area is typical of the Yorkshire Wolds, demonstrated by dissecting valleys and elevated plateaus which have wide ranging views across the landscape. The valleys in this area have been by created by glacial melt waters (fluvial erosion) with some tectonic activity, which presents as depressions within the landscape (Myerscough, 2017). The main valley system within the area is Nunburnholme Valley which extends northwards into Golden Valley. There are numerous dry valleys known as 'dales' or 'slacks' in the area which are characteristic of the Wolds (Stoertz, 1997, 3).

The principle drainage system for the area are the becks at Nunburnholme and Millington which run along the valley bottoms. The becks run into the River Derwent, a tributary of the River Ouse and they appear to be fed from the many springs which are situated where the permeable Cretaceous chalk meets the clay layers of the Lias Bench (Lewin, 1969, 3).

The study area has well-draining soils which overlaying the chalk and are, as described by Stoertz (1997, 3), to be well draining calcareous, lithomorphic and brown soils. These groups include rendzinas, brown calcareous earths, brown earths and argillic brown earths (Ellis and Newsome, 1991, 59). The soils have provided favourable conditions for cropmark development, ideal for aerial reconnaissance, and as such the entire landscape has been recorded (Wilson, 2000, 12).

The main villages in the study area are Nunburnholme and Warter which are situated in the lower lying areas. The area is mainly farmland, with an agricultural industry which uses the land for arable cultivation, although there is some livestock rearing which includes cattle, sheep and pigs (Natural England, 2020).

1.3 Present and previous archaeological research in the Wolds

The key sources which have related to the main arguments within this study are discussed below. They are organised in a chronological format comparable to the study itself.

This review aims to:

- Provide a background to this study by summarising pervious work
- Classify the research into different categories and demonstrate what research has developed over time, and highlight and explain new theories
- Evaluate previous key research, identify limitations and acknowledge any gaps

The Yorkshire Wolds are of great significance and importance to archaeologists from earlier times through to present day. Gibson and Bayliss (2009, 39) identify the research significance of the Neolithic and Bronze Age within the area to be second only to Wessex. This awareness, first documented by the antiquarians of the 19th century, originated through an interest in distinctive, visual and well-preserved landscape linear features and round barrows. In the study area Mortimer (1905) and Canon Greenwell (1877) were leading investigators, and JAS Silburn was an excavator and collector of artefacts from the barrows. The recovery of artefacts during this period was the overriding aim to excavations, as opposed to documentation of the features within the landscape setting (Manby, King and Vyner, 2003).

The antiquarian years of research, energetic and often aggressive agrarian routines resulted in mass scale turning over of the land with many artefacts sold off by labourers employed at the digs (Giles, 2012,5). Hence, the Wolds became well known for their archaeology; Mortimer (1905) and Greenwell (1877) published major works which have informed the research of this study area.

The most overriding and significant study contributing to this thesis is Cathy Stoertz's (1997) excellent Royal Commission on the Historical Monuments of England publication, '*Ancient Landscapes of the Yorkshire Wold*s' which has provided the basis for the interpretation of the study. Stoertz (1997) plotted maps from aerial photographs, reconstructing the prehistoric landscapes of the Wolds, offering a basis for further research. Notwithstanding its ground-breaking significance, there are limitations to the maps, as modern technology has advanced, the reliability of the study can be called into question (Whiteley, 2015). The distortions caused in scanning, transcriptions by hand, mismatches between images and the scaled grid, suggest the margin of significance to be ±5-10m (Cousins *et al,* 2017). In addition, previous work by Whiteley (2015) highlighted a feature which was mapped as a ploughed-out linear earthwork to be a geological anomaly (Myerscough, 2015).

To compliment the work by Stoertz (1997), the geolocation software computer programme, Google Earth (2016 Infoterra), which uses satellites to captures images of earth, was utilised. This software has enabled this study to identify and plot additional features which had not been picked up through the aerial survey and question the validity of others. In addition, it captures historical data which provides several opportunities to view crop marks at various times of the agricultural year. It does, however, have some limitations, notably requiring a high bandwidth connection for the best performance.

Of equal importance to this study is the doctoral thesis by Dr Halkon from the University of Hull (2008). The thesis 'Archaeology and environment in a changing East Yorkshire landscape; The Foulness valley c.800BC to c. AD400, examined a 30 x 20 km landscape block exploring the development of settlement and economy in a changing landscape. Halkon (2008, 42) divided his study area into three zones on the basis of soils, topography and drainage and the focus for this thesis was placed within Zone 1. Halkon's (2008) thesis applied a landscape perspective which demonstrated how environmental influences had impacted on past human activity. This laid the foundations for this study, enabling a more detailed analysis of a smaller portion of the landscape block.

The survey and excavation programmes at Nunburnholme Wold and Kipling House Farm which the writer has been involved in, have enabled a more enlightening, comprehensive and chronological approach towards the interpretation of the landscape and phasing. At Nunburnholme Wold a geophysical survey of around 50ha was undertaken by James Lyall of Geophiz.biz (2014). The result of the geophysical survey was outstanding, revealing archaeological features not evident on the Stoertz (1997) aerial transcriptions (Whiteley, 2015). In April 2017, a geophysical survey by James Lyall accompanied by Peter Halkon and the writer revealed an unexpected and incredible outcome at Kipling House farm; a 22m in diameter roundhouse inside the concentric enclosure. Subsequent excavations took place in 2018, 2019 and 2020 which have revealed various phases of construction and a site of national significance, helping formulate ideas concerning the landscape control of territories within this study. The chronology and understanding of these archaeological sites, have been significantly enhanced from geophysical survey results.

A programme of excavations at Nunburnholme Wold over 2014, 2015 and 2016 and Kipling House Farm 2017-2020 have revealed a landscape which has developed and changed throughout the periods. They have provided significant dating evidence, material culture, occupation and burial practices which have assisted the writer with the interpretation and chronology of the study area (Halkon and Lyall, 2015-2020). Interim reports 'The Archaeology of Nunburnholme Wold' 2014, 1015, 2016 provide details of the excavation and include the results of fieldwork and offer preliminary interpretations.

In addition to the above key sources, additional important texts and research which have aided a chronological perspective to be applied to this study are noted under the headings of Neolithic, Bronze and Iron Age.

1.3.1 Neolithic

In the pursuit of identifying any Neolithic activity within the study area, publications from T.G. Manby were key to this study. Manby has published extensively on the prehistoric activities across the Wolds and 'The Neolithic in Eastern Yorkshire' (1998) and 'Archaeology of Yorkshire; an assessment at the beginning of the 21st century' (Manby *et al*, 2003), in conjunction with his work on Thwing (Manby, 1982, 1983, 1984, 1990), Kilham Long Barrow (Manby 1970), and the Neolithic Occupation sites of the Yorkshire Wolds (Manby 1975), have assisted in the research of this thesis. In search of any evidence of Neolithic activity within the study area alongside the publications aforementioned, Manby's (1998) analysis of flint was used in conjunction with field trips with Geologist Richard Myerscough. Desk based research supplemented the search using Historic England's data base site Pastscapes, the Humber Historic Environment record and excavation data (Halkon and Lyall, 2014, 2015, 2016, 2018, 2019, 2020).

Manby's study on Neolithic Occupation on the Yorkshire Wolds (1975) was identified as an original resource, as the significance of pit assemblages is of great importance to the archaeological record in demonstrating pottery and flint industries and Neolithic activity. The research paper has its limitations due to its age and it does not provide any comment as to how the pottery and flint assemblages can be secured to their contexts and so therefore reliability and validity of the paper may be disputed. Other features which demonstrate evidence of Neolithic activity across the Wolds are Mortimer's (1905) detailed excavation accounts which record barrow 230 as a Neolithic round barrow within the study area.

Ashbee (1984) is a key figure in the analysis of distribution patterns of long barrows across Britain by producing maps, graphs and tables to support his study. Plans and drawings are set to various scales and photographs are used to support the text. There are limitations to the study defined by the period in which original work was done, however, Ashbee's methodical approach is a valuable primary source to compliment newer and more up to date research. Ashbee (1984) identified key earthen long barrow sites across the Wolds and Kinnes (1992) identified an eastern Yorkshire group. More recent aerial survey (Stoertz, 1997) of the Yorkshire Wolds has now added to this initial list.

Contemporary research such as aerial imagery is vital to aid archaeological research. This is demonstrated by Gibson's (2011) work, 'Some Recent Research at Two Yorkshire Long Barrows: Denby House, Rudston & Esh's Barrow, Helperthorpe' a topographic and geophysical survey to re-examine antiquarian investigation as part of an English Heritage funded survey. This paper was key source for this study, due to the similarity in morphology of the ditches plotted at Thirty Acres, which are comparative to the two positive features at Esh barrow at Helperthorpe.

Both antiquarian and modern research and investigations have shown that East Yorkshire and the Wolds have a wealth of evidence of Neolithic activity and have provided a platform to investigate, analyse and develop the understanding of the Neolithic within the study area.

1.3.2 Bronze Age

As discussed earlier the antiquarian research remains an important resource for this study. Mortimer's (1905) recording of the inhumations, cremations and associated grave goods of the Bronze Age round barrows at Blanch Farm, Cobdale Farm and Dugdale Fields in the study area have shed light on burials and material culture from this period which are consistent with Beaker burials across the Wolds (Jones 2008, 186). Canon Greenwell also investigated and excavated three round barrows in the research area which are documented in 'British barrows, a record of the examination of sepulchral mounds in various parts of England' (1877).

Greenwell and Mortimer's weighty volumes of results and drawings were a key primary source when investigating Bronze Age activity in the study area. Limitations to both these studies are obviously the periods in which they were written and secondly the heavy emphasis on artefacts as opposed to the landscape influences.

Societal changes during the late Bronze Age are evident in the research area through defensive structures, settlement patterns and linear ditches (Mortimer, 1905, Fenton Thomas, 2003, Halkon, 2008, Ferraby *et al*, 2017, Giles 2007, 2012, Stoertz, 1997, Manby, 2003). Fenton- Thomas 's (2003) BAR thesis explores the origins of linear ditches and outlines the roles the earthworks played within the landscape. Giles (2012) applies an alternative and post-processual viewpoint, proposing that the linears are to facilitate a still highly mobile population to areas of communal significance.

A key source to aid the understanding of the function and phasing of these features was provided by the 2017 Yorkshire Archaeological Report edited by Rose Ferraby (2017) 'Thwing, Rudston and the Roman-period exploitation of the Yorkshire Wolds'. Key chapters were from contributors; Millett (2017) 'The Background'; 'Characterising the Thwing Ladder Settlement', Millett and Wallace (2017) 'The setting' and Evans, Johnson, Millett, Mills, J, Mills, P and Popescu (2017) 'Excavating the Thwing Settlement'. The study examined a 10 km by 10 km landscape block using results from different strands of research methods to examine human exploitation of the landscape from the Neolithic through to the early medieval period. A chronological perspective was used to understand the development of the ladder settlement, which was valuable for the purpose of this study, in that it drew similarities with Warter Wold Ladder settlement and thus helped formulate discussion of chronology and the physical relationship between the ladder settlement and earlier features.

In addition to linears, defensive structures are evident in the study area. The approach of assessing hillforts within the geological setting and their relationship with other surrounding features was supported by the Wessex Hillforts Project, Payne *et al* (2006). The project report argued that geophysical survey is a powerful tool alongside earthwork surveys in hillfort archaeology. The survey was across a wide region and examined the interrelationship of hillfort form and function. The data revealed not only the complexity of the archaeological record preserved inside hillforts, but also great variation in complexity among sites. Survey of the surrounding countryside also revealed hillforts to be part of their contemporary landscape rather than isolated features. This research enabled comparisons to be drawn from the study area with examples within Wessex and morphological examples were comparable to features within the study area itself.

1.3.3 Iron Age

There has been much theoretical debate from academics surrounding the transition from the Bronze Age to the Iron Age. Furthermore, there is a tendency towards accepting this period as one of continuity as opposed to large scale change in material and social cultures (Needham, 2007, 39). A key resource for this thesis has been the publication by editors Haselgrove and Pope (2007) '*The Earlier Iron Age in Britain and the near Continent*' which determined, using 26 individual contributing papers, from a seminar reviewing the earlier Iron Age in Britain, that there was indeed a fundamental transformation in Britain around the period 800 BC which spanned over five centuries. The contributors provide various current research themes which relate to the Early Iron Age include migration, transition and landscape and geographically encompasses Britain and France.

Early key resources regarding the emergence of the Arras culture which have been utilised for laying the foundations of the Iron Age chapter are by Ian Stead; ‘La Tène cultures of Eastern Yorkshire’ (1965), ‘The Arras culture (1979’), and ‘Iron Age cemeteries in East Yorkshire’ (1991) which have provided a key text for this study. In addition, works by John Dent, ‘Cemeteries and settlement patterns of the Iron Age on the Yorkshire Wolds ‘(1982), ‘A summary of excavations carried out in Garton Slack and Wetwang Slack’ (1983) and ‘The Iron Age in East Yorkshire’ (2010).

More recent texts and resources include, ‘The Parisi Britons and Romans in Eastern Yorkshire’ (Halkon, 2013) and ‘The Arras Culture of Eastern Yorkshire Celebrating the Iron Age’ (Halkon, 2020). The Arras publication brings together papers from the bicentenary anniversary of the Arras conference in 2017. Key themes are on settlement, landscape and burials, and migration.

Melanie Giles (2012) book ‘A Forged Glamour’ also focuses on the Arras culture, particularly burials, and is based on earlier works by Tony Brewster, Ian Stead and John Dent. The book is based on a post-processual framework and at times although it is evidence based, does require a creative reconstruction. Ferraby *et al* (2017) has also been useful concerning the Iron Age landscape of the Wolds.

As with the previous chapters geophysical surveys have proved informative; the Nunburnholme Wold survey by James Lyall, Finn Pope-Carter and Tom Sparrow (2012-2014), revealed a concentration of square barrows. Aerial reconnaissance by the writer failed to see any clear smaller square barrows but the large square feature present in the Stoertz (1997) plots was clearly visible. Excavation of two square barrows within the study area in 2014 and 2015 by the Nunburnholme Community Heritage Project under the supervision of Malcolm Lille, then Reader in Archaeology and Geography at Hull University, has played an important role in this thesis complimenting the geophysical and aerial survey results.

1.4 Archaeological Methods

1.4.1 Desk-based methods- Hull Historic Environmental Records

Desk top research was conducted through visits to the Humber Historic Environmental Records, to examine the Sites and Monuments record of the known archaeological sites within the landscape block. Each Neolithic, Bronze and Iron Age entry across the study area was noted from Records Sheets which are cross referenced to Ordnance Survey Maps at 1:10,000 and 1;2500 for areas which have a greater number of archaeological features. This method produced mixed results due to an incomparability between sources; some sites had full excavation reports whilst others had little documented information. In addition, the method was time consuming due each entry being stored in box files as paper documents, with a record number and brief details, as opposed to digital GIS interactive entries.

Overall, this proved a beneficial methodology as a supplementary source to the antiquarian and aerial survey, specifically in relation to the analysis of Bronze Age round barrows and historic aerial photographs.

1.4.2 Field Trips

As Neale (2006, 1) notes, "to use a geological approach to understanding landscape evolution and its direct link to past human activity, prohibits any pre-defined chronological obstructions".

Numerous field trips were taken with the guidance of Geologist, Richard Myerscough, from the University of Hull around the study area. The experience of being immersed in the landscape allowed a greater engagement with the context and positioning of certain archaeological features, and in addition the landscape context of a feature tells much more than considering the site in isolation.

The field trip assessed areas where known cropmarks were and explored the relationship of these features with the geology, soils, topography and hydrology of the study area. Field notes and photography taken at the site were later analysed and used to support the archaeological analysis of this research.

Limitations to this method included the restriction and denial of access to the Warter estate despite several requests.

1.4.3 Geophysical Survey

The value of geophysical survey is evident from two main sites in this study; Nunburnholme Wold and Kipling House Farm at Middleton-on-the-Wolds. This survey method plays an important part in the chronological interpretation of the site and is a standard technique in landscape archaeology (Halkon, 2008). The Nunburnholme site was surveyed using a combination of a cart -mounted 4 probe Forester instrument, a dual array handheld Bartington gradiometer and a cart-mounted Bartington Grad601 gradiometer array by James Lyall of *Geophiz.biz* and Tom Sparrow and Finn Pope-Carter of Bradford University Archaeology Department (2012-2014). Remarkable results revealed archaeological features which were not evident on the Stoertz (1997) aerial transcriptions. The main features comprise of an ovoid negative space surrounded by enclosure systems and approached by several trackways.

A further geophysical survey was undertaken at Kipling House Farm using a dual sensor Bartington gradiometer in April 2017 by James Lyall with the assistance of Peter Halkon and the writer. Once more, the results were unexpected and spectacular. Within the concentric ditches, visible from Stoertz (1997) aerial transcriptions and on Google Earth (© 2014 Google © 2014 Infoterra Ltd and Bluesky), was a central circular feature which had an inner ring of posts around 5m in diameter. To the outer aspect of the circular feature was a 20m diameter outer ring. An entranceway was visible flanked by post settings, which aligned with the outer entrances. The large magnetic anomaly on the western side of the outer enclosure is a filled in pit, visible on old Ordnance Survey maps and on Google Earth imagery, filled in between 2007 and 2012. (Halkon and Lyall, 2018). As the closest feature in morphological terms to this is the Bronze Age ringfort at Paddock Hill, Octon Grange at Thwing (Manby, 2007) it is argued that the site is of national importance.

Both surveys have added impressive and detailed results to the existing aerial survey results. The data has provided a level of detail which has been instrumental in understanding the landscape usage and enabled theories to be proposed regarding landscape division which simply would not have been possible without.

1.4.4 Digitising and mapping existing raster data

Digitising and mapping existing raster data of the Stoertz (1997) aerial transcriptions was supplied by geophysicist James Lyall (2014). This data was used in the software programme Google Earth (© 2014 Google © 2014 Infoterra Ltd and Bluesky). Each feature was then assigned an attribute and description following the Historic England Archive; Monument Recording Guidelines (Horne, 2009), (see example table 1). This analysis of data was a lengthy and considerable amount of work, as features were required to be re-transcribed in order to separate the vector polygons from other polygon features. Each polygon was required to be an individual entity; this enables the writer to demonstrate the chronological development, central to this thesis.

The data was then exported into ArcGIS 10.3 mapping software where polygons were identified against geographical constraints such as geology, soils and watercourses. In addition, geophysical surveys were mapped in the ArcGIS 10.3 software.

Table 1: ArcGIS and Google Earth data table showing example data

ATTRIBUTE	DESCRIPTION	SAMPLE DATA
Period	Date of the feature	Bronze Age
Narrow-type	Monument type	Round Barrow
Broad Type	Broader to permit groupings of features	Barrow cemetery
Evidence 1	Source feature was mapped from	Yorkshire Wolds mapping project (Stoertz, 1997)
Evidence 2	Source feature was mapped from	Google Earth 2005 and 2007 Earth (© 2014 Google © 2014 Infoterra Ltd and Bluesky).
Location	Area of feature	Kipling House Farm SE898481
Number	Number of feature	C101

1.4.5 Aerial reconnaissance

Aerial photography has long been recognised as a powerful technique for the investigation of landscape archaeological features. Wilson (2000) states “the value of air photographs for archaeological research has long been recognised.” Halkon’s (2008) study of the Foulness Valley took an alternative and ground-breaking approach by viewing the relationship between cropmarks and environmental influences such as soils, watercourses and topography. This approach laid the foundations for this study to use a similar methods.

The writer was extremely fortunate in the summer of 2018 to be able to undertake some aerial reconnaissance over the study area. The last time exceptional cropmark conditions were seen was in

2011, so it was an exciting summer for aerial photography, revealing ancient landscapes not visible from ground level.

"This spell of very hot weather has provided the perfect conditions for our aerial archaeologists to 'see beneath the soil' as cropmarks are much better defined when the soil has less moisture"**.**

Duncan Wilson, Chief Executive of Historic England

Barrows which were newly identified from Google Earth by the writer were highly visible as soil marks cementing the idea that there are new features to be found using the software programme **(**© 2014 Google © 2014 Infoterra Ltd and Bluesky). In addition, features which were questionable were not viewed in these ideal conditions, therefore raising questions regarding the reliability of Stoertz (1997) mapping.

Other sources of aerial images by D. Riley were analysed at the Hull Historic Environmental Records, however, there was not a large sample to view. It was the intention of the writer to obtain original Stoertz (1997) aerial images where the data was not convincing, however, this proved difficult and not possible mainly due to the Global Pandemic in 2020 which meant the archive collections department in Swindon was not open or staffed. The study areas photographs are not yet digitised and available online through the Historic England aerial imagery archive department.

1.4.6 Excavation evidence

The final section of the applied methodology to this thesis is the excavation programme which the writer has been involved in. Various excavations between the years of 2014-2016 at Nunburnholme Wold and Kipling House Farm 2018-2020 are central to this study. Excavations allow a comprehensive database of spatial data, photographs, material culture and help to inform the interpretation of archaeology and the environment (Historic England, 2020).

It is not the intention in this chapter to provide a detailed account of the results from the excavations as they are incorporated within the forthcoming chapters. However, to briefly surmise; the excavations at Nunburnholme Wold in 2014 by members of the local community, University of Hull archaeology students and members of the East Riding Archaeological Society focused on a square barrow and the enclosure complex, where pottery was dated to the early to late Iron Age (Halkon and Lyall, 2014). In 2015, the focus was the Iron Age cemetery, investigating the parallel ditches from a possible Neolithic mortuary enclosure, a ring ditched feature and an additional square barrow (Halkon and Lyall, 2015). In 2016, focus was on a ring ditch of a Middle Bronze Age barrow and the enclosure and droveway complex leading into the ovoid area (Halkon and Lyall, 2016).

At Kipling House Farm, excavations of the inner and outer enclosure ditches were undertaken in 2018, as part of an ongoing project to investigate cropmark sites on the western Yorkshire Wolds. Due to the remarkable geophysical survey results and the site's potential to be of national significance, an exploratory excavation was conducted. The intensions of the excavations were to address the date and function of the site and understand the relationship between features shown by the geophysical survey (Halkon and Lyall, 2018). Results from the pottery indicated a Late Bronze Age date, and it is of note that the site was probably contemporary with the Nunburnholme Wold site (Halkon and Lyall 2014; Halkon, Lyall and Lillie 2015; Halkon and Lyall 2016).

Excavations in 2019 at Kipling House Farm centred around the large central roundhouse, which revealed a later roundhouse, invisible in aerial photography or geophysics, (Halkon and Lyall, 2019). The latest excavations in 2020 focussed on the eastern main entrance to the outer enclosure ditch and further investigation of the square enclosure. The inner narrow slot contained the skulls of ten cows and red deer jawbones and antler, highly suggestive of an act of structured deposition (Halkon and Lyall, 2020).

1.5 Structure of the thesis

This chapter has outlined the aims of this research and the methodology required to achieve these objectives. Chapter two identifies the geological and environmental perspectives of the Wolds, with greater detail of the study area itself. It examines the environmental evidence of the area to explore any factors that have impacted or influenced landscape usage. The geology, soils and watercourses provide the backdrop for the archaeological features to be examined against.

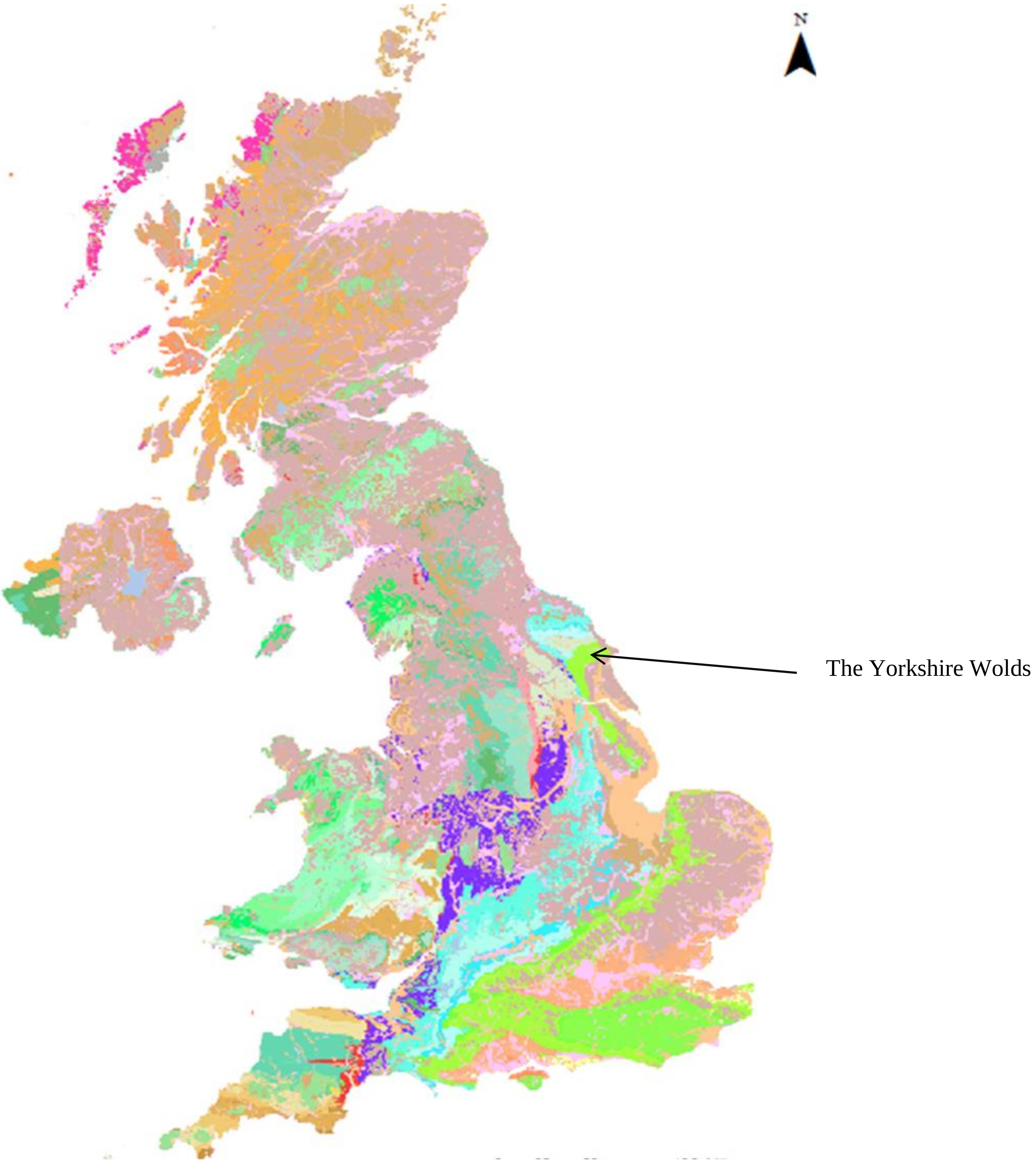
The study then analyses the archaeological features against the environment from a chronological perspective beginning with the Neolithic Period, the Bronze Age, and the Iron Age. Chapter 5 discusses how the evidence obtained from the preceding chapters is used to provide an interpretation of the chronology of the area.

Finally, chapter six provides a conclusion and recommendations for future research.

1.6 Summary of archaeological methods

After setting out the aims of the study, this chapter has provided an overview of the study area, briefly noting key geological and environmental features. Past and present archaeological work and investigations have been discussed, with key sources acknowledged. Finally, the combination of archaeological methods applied to this study have been identified.

Chapter 2- The Environmental Background



The outcrop of Chalk shown on a Geology map of Britain

Figure 3: Chalk bands of England. BGS Bedrock and Superficial Geology. (An Ordnance Survey/Edina supplied service. Mapped in ArcMap 10.2 software).

2.1 Introduction

The first section of this chapter aims to provide a background of the Wolds in relation to its character, geology, soils and hydrology. It will then examine in greater detail, the geological features of the study area to provide an in-depth knowledge of the landscape. Each subsequent chronological chapter will apply this information to the prehistoric period of discussion to assess the extent that the topography, soils and watercourses may have affected any ceremonial and settlement patterns from each epoch.

2.1.1 The characteristics of Yorkshire Wolds

The Yorkshire Wolds are characterised by 300 square miles of Cretaceous chalk, (fig 3) formed approximately 95-75millon years ago, which extend from the lands of Holderness at the Humber to create an arc shaped feature round to Flamborough Head (fig 5), where they stand at a height of 135m OD (ordnance datum) (Fenton-Thomas, 2003, 21) (fig 4).

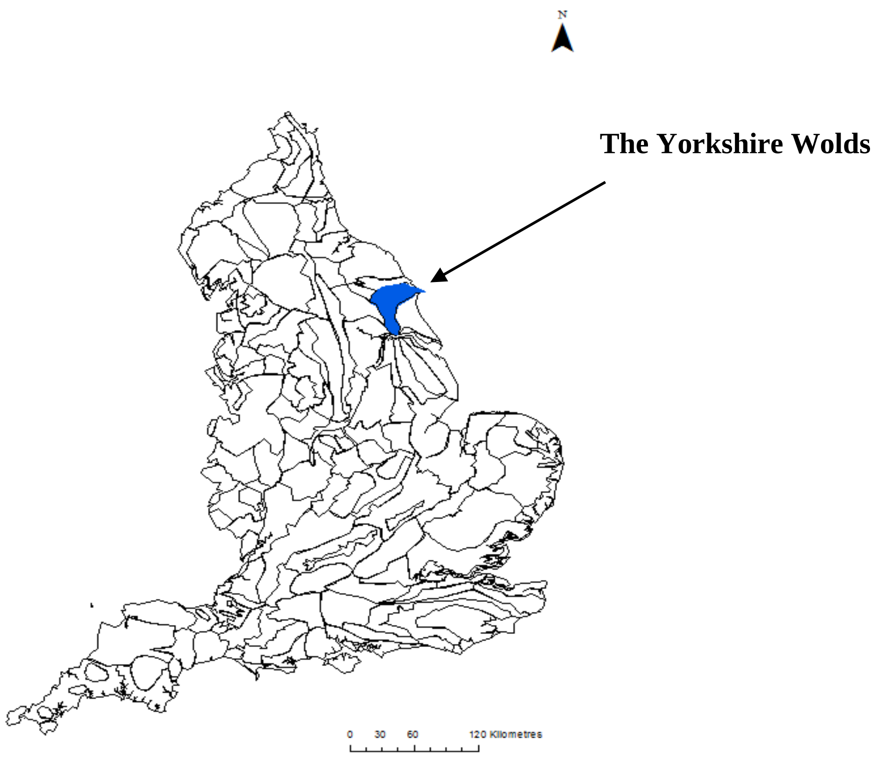


Figure 4: The Yorkshire Wolds. National character areas @ natural England. An ordnance survey/Edina supplied service. Mapped in ArcMap 10.2 software

Figure 5; The chalk cliffs at Flamborough Head (Whiteley, C. 2015)

The Vales of York and Pickering to the north and west of the Wolds, juxtapose with the elevated topography of the Wolds Chalk, presenting as lower lying and wetter areas (fig 6), (Fenton-Thomas, 2003, 21). The Vale of York has little evidence remaining of the Anglian glaciation, although evidence does survive from the later Devensian epoch at Church Hill, Holme on Spading Moor (Gaunt 2009, 3).

The extent of land covered by the Vale of York encompasses 700 square miles, and archaeological investigations indicate a settlement history extending over at least c.11,000 years. Halkon (1987) identified, through environmental research on soils, the evidence for a tidal inlet that led to the archaeological discovery of a 12-metre long (40-feet) 100 feetIron Age boat at Hasholme. This has led to further environmental research, and demonstrated that within the area there would have been a series of tidal inlets in the first millennium BC, providing past societies with opportunities of social contact and trade opportunities (Halkon and Millett, 1999). Today the Vale provides a contrasting landscape, with a modern farming industry working with some of the most fertile soils in the region. There are still indications of an earlier landscape with small hedged fields, commons, carrlands and ings (Whyman and Howard, 2005, 2).

Further north between the Wolds and the hills of North Yorkshire lays the Vale of Pickering. It is a flat area with gentle undulations, rising no more than 15m OD above sea level. The underlying geology is of Jurassic rocks which are overlain by Kimmeridge Clays and alluvial deposits including glacial peats (Gaunt and Buckland, 2003, 17). Like the Vale of York, it would have had a higher water table, and as such a series of glacial lakes, which in present day are filled with peat and clay. Fossil studies of remains, within the lake mud or peat bogs, have provided evidence of a wetland landscape which has provided abundant environmental evidence taken from plant and animal remains (Menuge, 2001, 3). The Vale of Pickering has some of the best-conserved evidence of Mesolithic activity (Halkon, 2009, Manby, 2003, 33), with notably exceptional preservation of artefacts at Star Carr, a designated Scheduled Monument in the Vale of Pickering (Clarke, 1954).

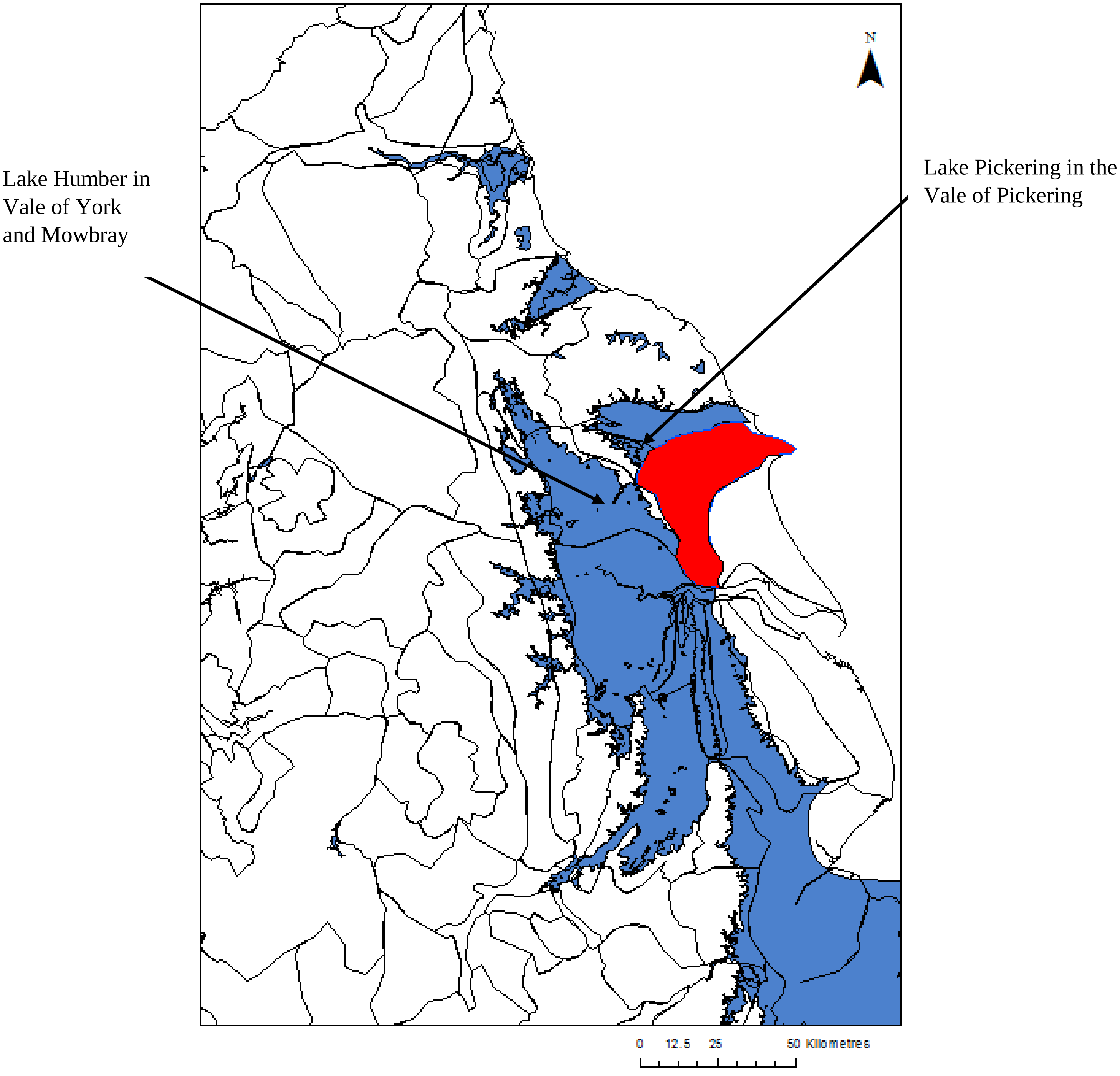


Figure 6; The Yorkshire Wolds in red with the glacial lake of the Vale of Pickering to the north and the glacial lake of the Vale to York to the east formed during the last Ice Age in Britain. (An Ordnance Survey/Edina supplied service mapped in ArcMap 10.2)

The western and northern escarpment of the Wolds contrasts greatly with the plain of Holderness, and Vales of York and Pickering which surround it. The escarpment rises 140m OD above sea level, after which it progressively slopes down towards Holderness, where it loses its incline and becomes less apparent (Fenton-Thomas, 2003 14). The base of the escarpment can be distinguished as a separate identity from the crest. It rises gradually from North Ferriby to approximately 91m OD near North Grimston and then declines once more laterally along the northern ridge. The crest is more diverse in its form, and ranges in height from 91m OD in the south, to a maximum of 244m OD at South Wold, this variation is believed to be the resultant of a glacial erosion processes which has removed around 300m of the upper chalk (Lewin 1969, 7).

The Quaternary period is synonymous with the 'Ice Age' in which distinct glacial activity resulting from glacial stages, interspersed with interglacials, created dramatic climate changes. These climatic changes in which material has moved across the landscape has resulted in complex landforms, notably the valleys, sediments and biological remains as seen across the Wolds (Lowe and Walker, 1984, 3). Lewin (1969, 1) notes the Wolds to be moderately waving, criss-crossed with dissecting valleys and suggests this is not an exceptional feature of topographical landscapes within England, as there is similar topography across large parts of the southern and eastern chalk formations. Topographically the gradient of the Chalk block meant drainage inclined towards the southeast, however, some of the valley systems created are in a westwards direction, resulting in a dry valleys system in the high western Wolds (Fenton–Thomas, 2003, 22). These steep-sided valleys generally run from an east to west direction and define the western escarpment and have been the subject of many hypotheses, with the consensus that they are paleoclimatic and a result of periglacial activity and glacial erosion (Neale, 2009, 11).

The underlying geology of the Yorkshire Wolds is that of Flamborough, Burnham, Welton and Ferriby Chalk Formations. The Wolds chalk are identified as (three bands); grey to red marly Ferriby Chalk, which Lewin (1969, 4) notes is generally less than 30-meters (100 feet) thick; the white flinty Welton Chalk; and the uppermost band of the white flintless chalk of the Flamborough formation (British Geological Survey 1995). The soils of the Wolds overlaying the chalk are as described by Stoertz (1997, 3) as well drained calcareous soils, with the principle soils identified by Ellis and Newsome (1989, 59) as lithomorphic and brown soils. These groups include rendzinas, brown calcareous earths, brown earths and argillic brown earths. The nature of these fertile soils and the paucity of standing water has been at the centre of a discourse and subject to much work by Hayfield and Wagner (1995a and 1995b).

One of the current and permanent hydrology sources are the springs that erupt on the spring line; where the base of the permeable Cretaceous chalk rests upon the Jurassic clay layers where the water table meets the Devensian deposits of Holderness, and northern edges of the Wolds (Fenton-Thomas, 2005, 18, Myerscough, 2017). These springs form streams and small rivers which drain into the River Derwent in the Vale of York and Holderness. It is plausible that these springs may have appeared on the Wolds surface in the past, but this is dependent on how much the water table has fallen. It is during a higher water table that these intermittent springs produce large volumes of water; this seasonal activity is evident at the only remaining permanent watercourse, the Gyspey Race which runs from Duggleby Howe eventually terminating at Bridlington where it runs into the North Sea (Fenton-Thomas 2005, 16).

Neale (2009, 52) notes the Gyspey Race has had great significance on settlement patterns across the Wolds. She also suggests that the idea of springs are only to be found on the spring line is incorrect and highlights areas where there are active spring-fed ponds such as Thixendale and Wharram le Street. Hayfield *et al* (1993, 394) agree noting other Wold top villages have located away from streams for example Fimber and Warter which must have historically sourced water from meres. These springs remain active even though the modern-day water table is considerably lower than past periods due to the agricultural industry pumping water from the chalk aquifer (Neale 2009, 69).

These topographical characteristics have provided a landscape which would have been attractive, however, there are also landscape elements such as the lack of understanding of the high Wolds hydrology and lower lying wet boggy areas, which would potentially have proved problematic in terms of settlement and agriculture.

2.2 The research area environment

2.2.1 Topography.

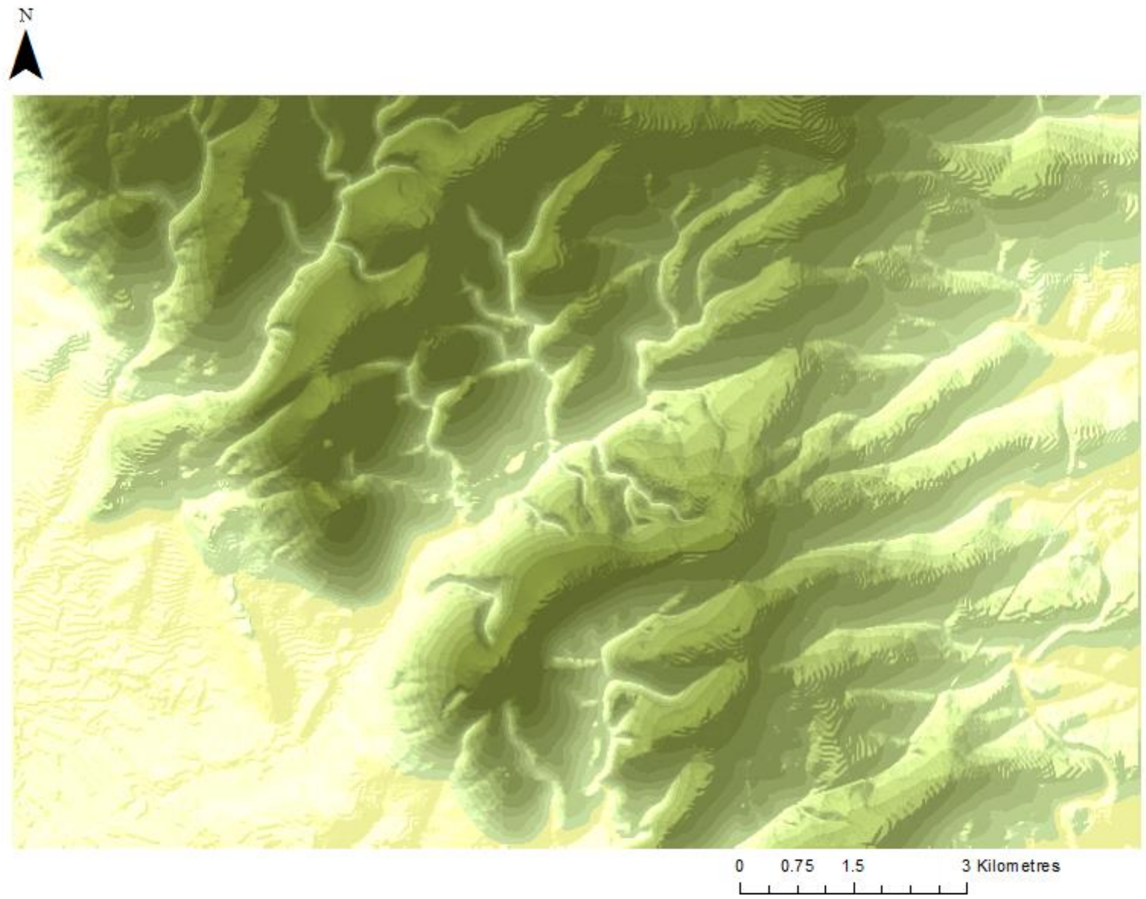


Figure 7: A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap)10.3 software).

The topography and character of the research area is typical of the Yorkshire Wolds, demonstrated by dissecting valleys and elevated plateaus which have wide ranging views across the landscape (Lewin, 1969) (fig 7). Hugget (2017, 244) suggests valleys can regularly be overlooked as they are common features in landscapes, however, as Evans and O'Connor (1999, 193) note they hold a wealth of environmental information which is central not only to understanding their creation but also in the relationship between settlement in valley systems.

The valleys in this area have been by created by glacial melt waters (fluvial erosion) with some tectonic activity which presents as depressions within the landscape (Myerscough, 2017). The valleys are notably longer than they are wide, a feature that has been caused by the past action of running water. The hydraulic action also causes the depth of each valley, and the valleys width is a result of erosion and mass movement created by the fluvial process (Hugget, 2017, 244). This process is evident in the research area where the largest valley system runs from Warter to Nunburnholme (see red arrow). The range of this valley is extensive and would have been lengthened by headward erosion, spreading over newly visible land. Halkon (2008, 12) notes valleys on the chalk block have a steep gradient which subsequently means the valleys tends to track east to westwards through the Wolds. This landscape feature is illustrated in figure 8 below where the narrower tributaries and dendritic parts of the valley widen and becoming much less distinct as they travel westwards.

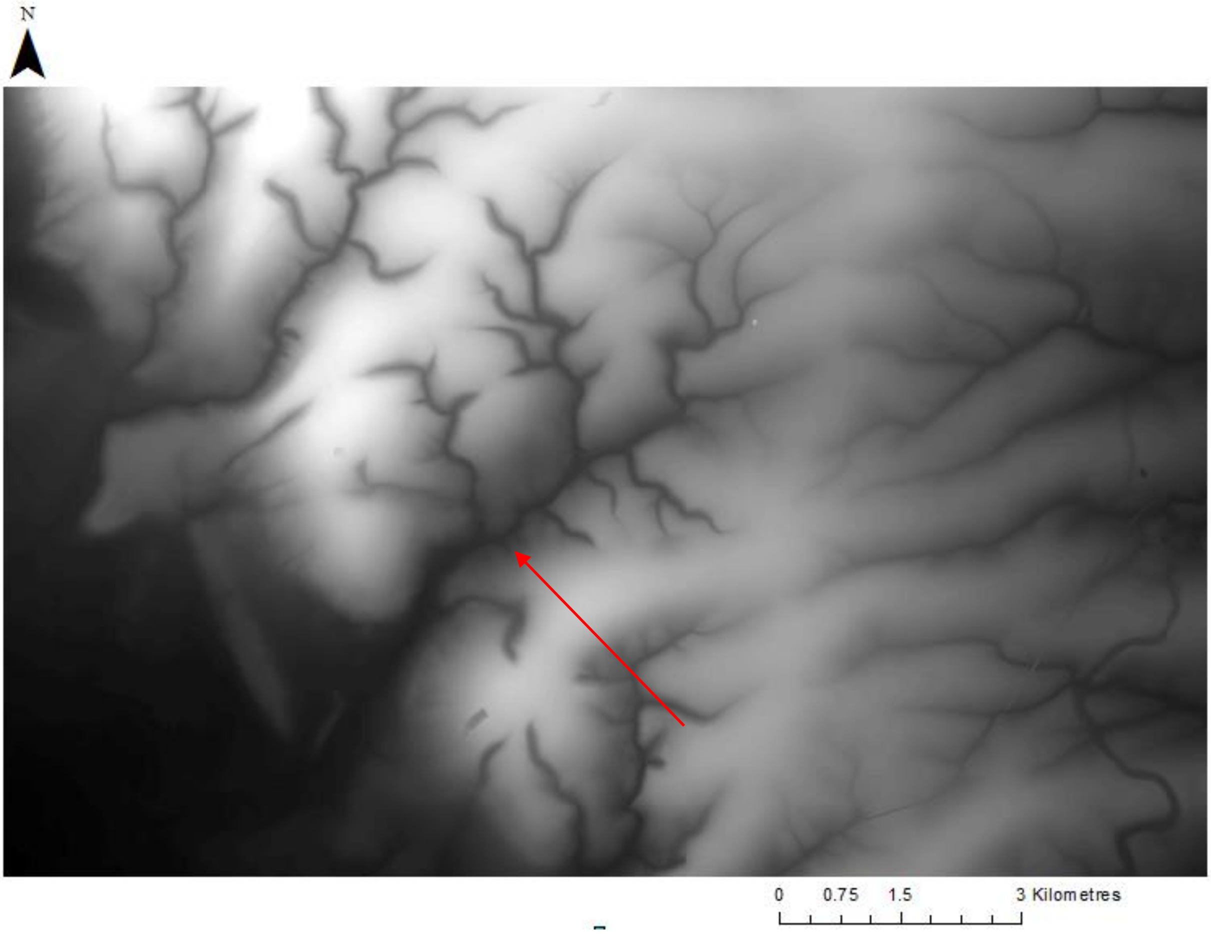


Figure 8: A merged raster set of the research are illustrating dendritic drainage with the red arrow showing Nunburnholme Valley ((Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcGIS 10.3)

Figure 9 left: Satellite imagery of the area showing relict watercourse channels. Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

Further examples of fluvial periglacial landscapes within the research area which produce distinctive landforms, are the relict of water course channels which appear on satellite imagery as darker dendritic like features patterning the landscape as seen in fig 9 above at Loaningdale SE 8909948501.

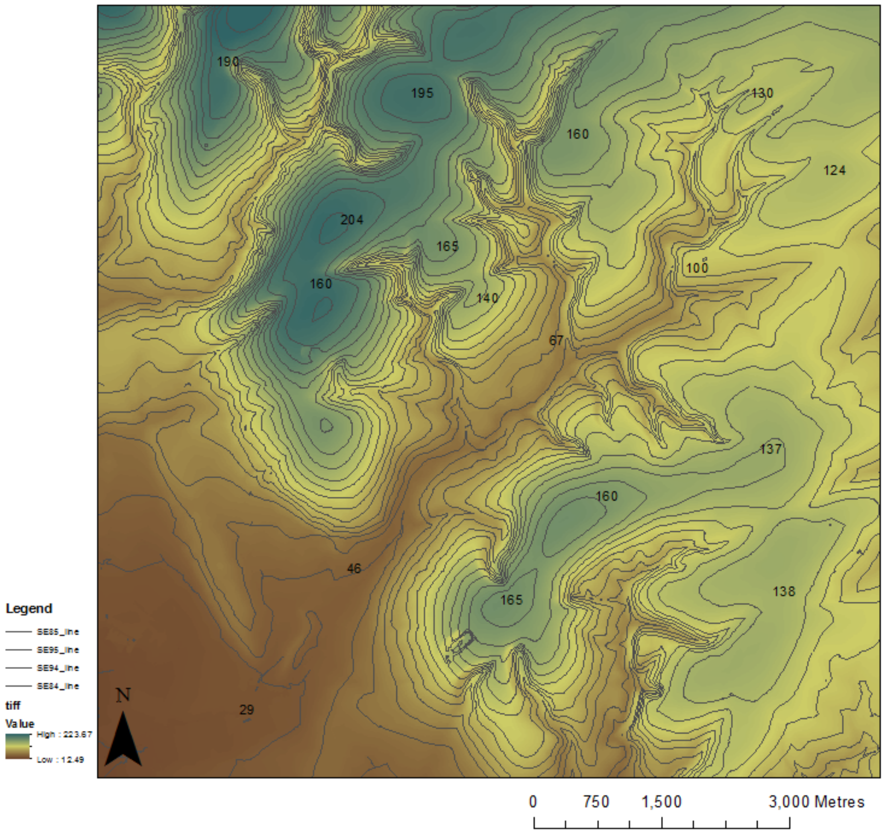


Figure 10: Topographic elevations of the research area (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3software).

The research area has a wide range in elevations with the lowest lying area at 29m OD towards the Vale of York and the highest at 195m OD on the Wolds plateau at Cobdale. The elevated plateaus provide far reaching views across the landscape (fig 10). The relationship between archaeological features, aerial photography and satellite imagery will be discussed in detail in later chapters.

2.2.2 The geology of the research area

The underlying geology of this landscape is that of the Triassic Period, a geological epoch which spans 50.9 million years ago from the end of the Permian period to the beginning of the Jurassic Period (Gaunt and Buckland, 2003, 21). In ascending order, the geology of the area comprises of the Triassic Mercia Mudstone group, and the thin mudstone/limestone sequence of the Penarth and the Jurassic Redcar Mudstone Formation. The subsequent Jurassic Period is represented by the earliest Lias group in the area; the Lower Jurassic Redcar Mudstone Formation sequence which overlies the Penarth group. This formation features heavily over Nunburnholme Valley. There is no evidence of the Middle Jurassic Marlstone Middle Lias rock documented in the area, however, geologist Richard Myerscough has identified some possible Marlstone and Cleveland Ironstone near Millington in the research area SE8350. Lying above these deposits is a Mid Jurassic limestone known as the Whitwell Oolite from the Inferior Oolite series (Kent, 1955, 208). This rock is filled with fossils and is quarried for building stone anywhere it outcrops. There is no documented evidence for limestone in the research area, but it is known to feature south of Market Weighton near Newbald, Hotham and to the north of Pocklington (Myerscough, 2017).

The oldest clays from the Lower Cretaceous Period in the research area is the Carstone; an iron rich sandstone, and the red chalk identified as Hunstanton Chalk Formation (Myerscough 2017). Kent (1955, 202) describes how historically these Jurassic Lias groups could be seen in well exposed large marl pits and in railways cuttings. In the research area they are usually below the spring line, however, can sporadically be seen at the surface.

The Cretaceous Chalk is the final sequence of the vertical strata and rests, and at times oversteps the Jurassic rocks. The proportions of Chalk and Jurassic rocks vary greatly between the base and the escarpment across the scarp. To the southern aspect there is a greater depth of chalk underlain by Upper Jurassic clays, whilst further north in the research area at the Market Weighton uplift an increasing proportion of the escarpment is occupied by the earlier Lower and Middle Jurassic rocks, resting on the chalk, even though the upper Jurassic has decreased (Lewin 1969). Figure 11 illustrates the varying lithology of the scarp profile with the arrow illustrating the proportions of chalk in the research area (N.B Lewin uses older nomenclature for rocks).

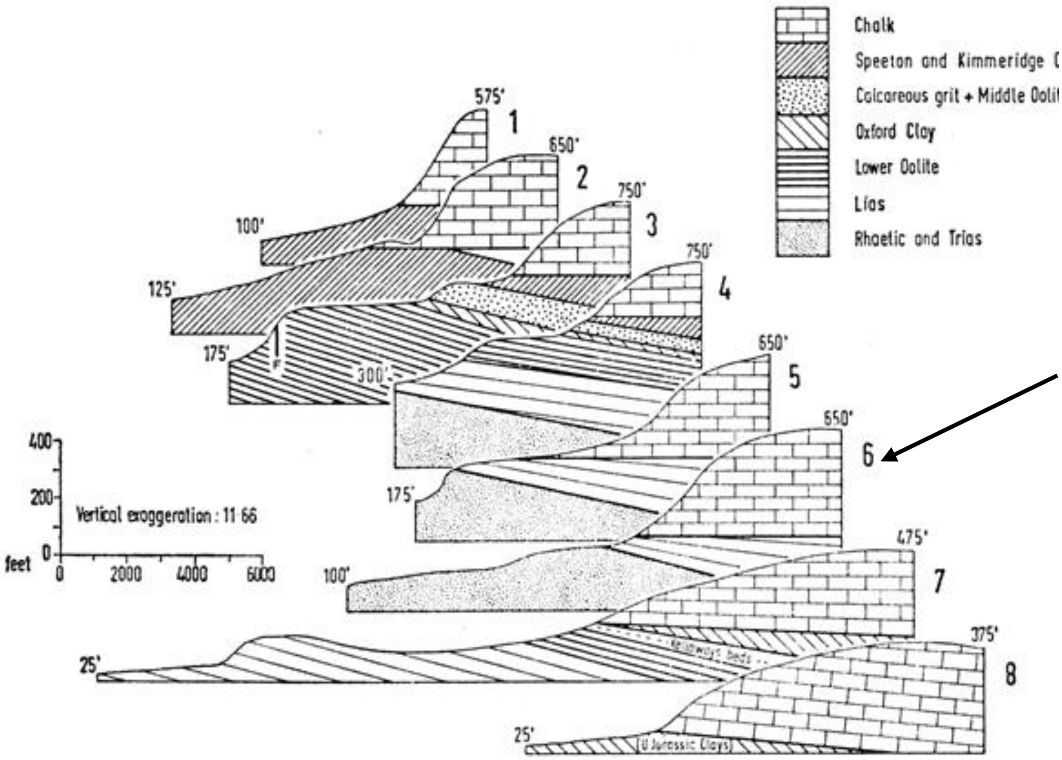


Figure 11: Scarp profile of the Wolds. The arrow marks the geology of the research area (Lewin, 1969, 8)

The principle Cretaceous Chalk of the area is that of Welton Chalk which overlies the grey to red marly Chalk from the Ferriby Chalk group. Welton Chalk is white flinty Chalk with thin marly beds (British Geological Survey 1995). Although unsuitable for building use it is easily worked, and archaeological evidence has demonstrated its use for the manufacture of tools. There is no evidence of the Flamborough formation white flintless Chalk within the research area.

Table 2: Lithostratigraphy of the Northern Province (English) Chalk (from Mortimore *et al*, 2001)

Old units	Formations	Thickness	Local formal names	Local Informal names
Upper chalk	Flamborough Chalk Fm Burnham Chalk Fm	260-280m (topmost) 120m basal 130-150m		Flamborough Sponge bed
Middle chalk	Welton Chalk Fm *Principle chalk of research area*	44-53m	Plenus Marls Member	Black Band
Lower chalk	Ferriby Chalk Fm Red Chalk Fm	20-30m 12.8m		Nettleton Stone Totternhoe Stone

Figure 12; Exposed Ferriby Chalk at Warter (Whiteley, 2015)

Figure 12 above illustrates the principle chalk of the research area, Ferriby Chalk, see table 2, which comprises of massive white chalk with distinct marl bands particularly the Black Band at its base (Smedley, *et al*, 2004, 7). Maintenance works at Warter Village green exposed chalk of around 1 metre depth.

2.2.3 Study area sediments and soils

Innes and Blackford (2003, 25) suggest there are very few palaeoecologically useful sediments surviving from the Early Devensian period, and where they do exist, sedimentation tends to be limited to caves. Stoertz (1997, 3) notes there is no drift geology across the Wolds. However, Catt *et al* (1973, 24) note a thin silty drift covers the chalk of Eastern England with the largest silty drift covering the Yorkshire Wolds. It is 0.3 to 1.5 metres thick on the flat and slopes, is brown-or yellowish brown and is generally richer in clay directly above the chalk. Archaeological evaluation and monitoring of topsoil at Great Givendale SE 8136 5287, 119m OD demonstrated this sequence (Humber Field Archaeology, 2010).

On the gentle slopes and on the valley floors the silty material is less stony and is generally 1.5 metres thick. Catt *et al* (1973, 24) suggest the silty drift on the Wolds are deposited by the wind as this is the most credible explanation for the thin deposit spreading over such a large area. The thickest of these deposits, known as brickearths are thought to have a glacial origin. Located at Huggate SE 955 353 they are rich and fertile soils, which when saturated with water, are prone to 'collapse' and are therefore unsuitable for building on, however, have been extracted for use for brick making at Huggate (Myerscough, 2017). Further unrecorded examples of these deposits were found in the research area whilst field walking with geologist Richard Myerscough near Blanch Farm SE 9054 and it is proposed that these deposits would have provided a source of water and attracted settlement. (figure 13).

Figure 13 Unrecorded brickearths discovered at SE 9054 whilst field walking with Geologist R Myerscough (Whiteley, 2018)

Overlying these early deposits are an assortment of soils including patches of soils which have escaped the erosion process, and others that were deposited onto bare chalk and exposed to frost shattering, resulting in flinty drifts. For past cultures these soils would have offered various prospects for settlement and land usage, however, their activities such as cultivation and woodland clearance would have created a change to the soil composition, and over time a poorer quality, this is a key factor when recreating and understanding past environments (Fullen and Catt, 2004). Underlying deposits reflect their geological background which contributed to the composition of the residual modern-day soils (Gobbett, 2012).

Archaeological evidence illustrating soil composition change is shown when prehistoric soils are buried beneath prehistoric monuments. For example, soil samples from beneath Kilham Long Barrow show a Wolds landscape which would have been forested in the early Neolithic period before clearance began , not long afterwards (Manby 1980). Wolds soils generally comprise of shallow well drained calcareous silty soils and calcareous fine loamy soils (Stoertz, 1997, 5).

Halkon (2008, 14) identifies the characteristics of the soils of the area north of Market Weighton to be of rendzinas of a similar character to those of brown earths but are thinner over the chalk. The research area provides evidence of a range of different soil types, (fig 14) some of which have escaped the erosion process (Catt *et al*, 1973, 32). Other absent soils would have been removed by the processes of gelifluction, mudflows and surface streams during the Late Devensian (Gobbett 2012). Halkon (2008) digitised the Market Weighton Soil survey map with permission of Cranfield University, as part of a PhD study. This shapefile was used with kind permission and manipulated in ArcGIS 10.3 to create a map of the research area. It clearly illustrates how the soils are not uniform and change across the area and are defined by the topography

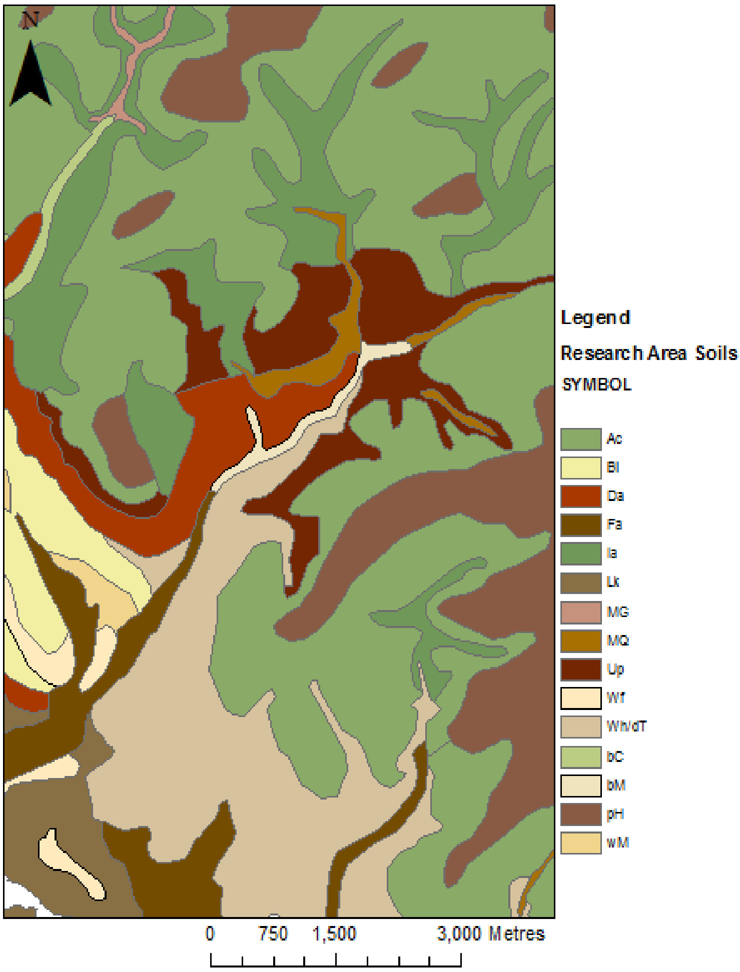


Figure 14; The soils of the research area (after King and Bradley 1987). The letters against the bocks are abbreviated soils types and area and explained in Table 3 (Shapefiles manipulated in ArcGIS 1032 software with permission of Peter Halkon).

Table 3: Market Weighton Soil Survey Map showing the soils within the research area

Map symbol	Soil Series	Drainage	Work-ability	Group	Sub-group	Definition
Ac	Andover	4	1	Rendzinas	Brown rendzinas	Silty lithoskeletal chalk
Bi	Brockhurst	2	2	Stagnogley soils	Typical stagnogley soils	Medium loamy or silty drift over reddish clay to mudstone
Da	Denchworth	3	3	Stagnogley soils	Pelo-stagnogley soils	Swelling clayey material passing to loam or sandstone
Fa	Fladbury	3	3	Alluvial gley soils	Pelo-alluvial gley soils	Clayey river alluvium
la	Icknield	1	3	Rendzinas	Humic rendzinas	Loamy lithoskeletal chalk
LK	Landbeach	1	1	Gleyic brown calcareous earths	Gleyic brown calcareous earths	Light loamy material over calcareous gravels
MQ	Millington	1	2	Brown calcareous earths	Colluvial brown calcareous earths	Medium silty calcareous colluvium
Up	Upton	1	2	Rendzinas	Grey rendzinas	Loamy lithoskeletal chalk
Wh/dT	Wickham/Drayton	3	3	Loam		Slightly stony clay loam
bc	Block	2	2	Brown calcareous earths	Gleyic brown calcareous earths	Medium loamy chalk drift
bM	Broadmoor	4	3	Humic-alluvial gley soils	Typical Humic-alluvial gley soils	Clayey river alluvium
pH	Panholes	1	1	Brown calcareous earths	Typical brown calcareous earths	Medium silty material over lithoskeletal chalk
wM	Whimple	4	2	Argillic brown earths	Typical argillic brown	Medium loamy or medium silty

					earths	drift over reddish clayey material passing to the clay or soft mudstone

KEY

DRAINAGE		WORKABILITY	
1	Good	**1**	Good
2	Average	**2**	Average
3	Poor	**3**	Poor
4	Artificial		

The soils covering the upper plateaux areas of the study area, to a maximum elevation of 204m O.D, are brown calcareous earths which comprise of medium silty material and lie directly over lithoskeletal chalk (pH). The drainage and workability of these soils is good, and they are fertile enough to be suitable for all crops. On the slopes, laying over the underlying Lias are Block soils (bc); brown calcareous earths which are defined as medium loamy chalk drifts, which have average drainage and workability and were best used for cereal roots cropping, however, can be wet underfoot due to the underlying Lias which is non-permeable.

This sequence is noted following an archaeological brief by Northern Archaeological Associates (2015) to evaluate for a water main renewal at three locations around Cobdale SE 85569 53002. They observed shallow calcareous silts of the Panholes associations with Humic soils of the Icknield association on the steeper slopes. These tended to be deep on the valley sides but remarkably shallow on the peaks, resulting in the erosion of the underlying chalk from ploughing.

At Nunburnholme Wold the spring line is on average at 180 metres O.D and is situated where the chalk meets the Lias clays (fig 15). As the terrain drops and the elevation lowers towards the valley floor, the soils, from the Denchworth series pass from clay soils to soft mudstones and brown earths, which have poor drainage and workability.

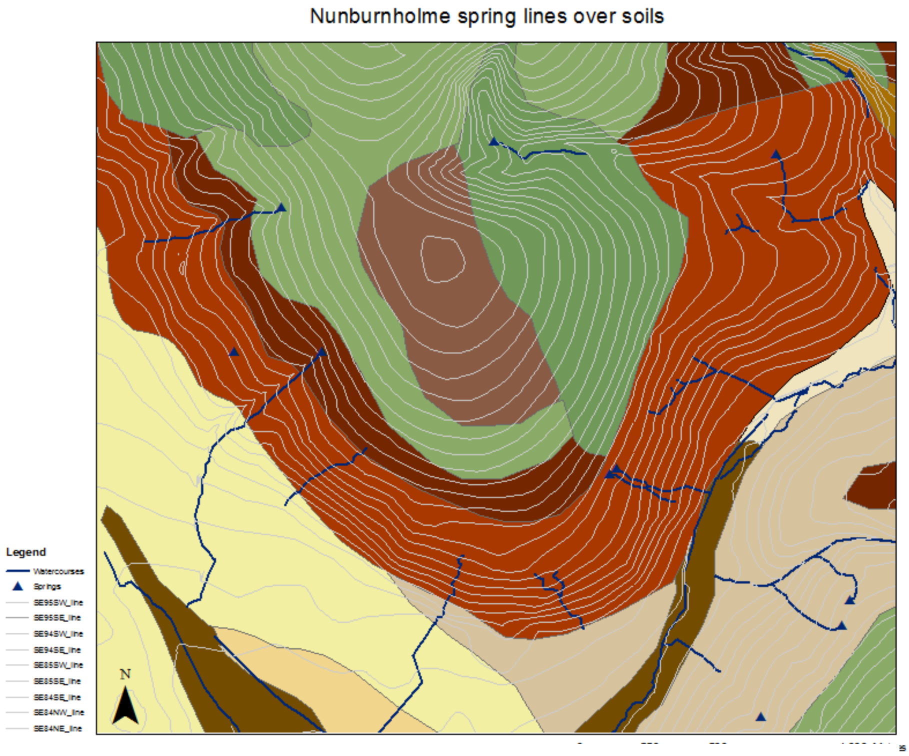


Figure 15: Spring lines at Nunburnholme Wold (Shapefiles manipulated in ArcGIS 10.2 software with permission of Peter Halkon).

The valley floor soils in the study area are of Wickham/Drayton (Wh/dT) soil series, formed in fluvial and marine sediments, which have poor drainage and workability due to the underlying Lias which, again proves difficult to work. The Nunburnholme valley is lined with clayey river alluvial gley soils from the Broadmoor series (bM) formed from the Redcar Mudstone formation which have poor drainage and workability, and therefore may have been too wet for winter agriculture and would have been suitable for summer grazing. Halkon (2008, 22) suggests that although ancient farmers could have worked these heavier Wickham/Drayton soils, they would have preferred the well-drained calcareous soils of the plateaus.

At the base of the slopes of Golden Valley, Loaningdale Bottom and Millingdale Pasture are Brown soil rendzinas of a silty loam. The drainage and workability of these soils is variable, with some areas having artificial drainage but good workability, and other areas with good drainage yet poor workability (Halkon 2008).

The valley bottoms in the study area are situated within the low-lying topography, and it seems would be better suited to summer usage as the winter months would have experienced wet and boggy unworkable conditions. To put this information into context the alluvial soils of the bottom valley floors during the winter seasons would have provided boggy conditions, therefore ancient civilisations may have relied on the well-drained calcareous soils of the plateaus during these periods. Drainage is pivotal in the quality and workability of the soils, however, there is a tension between the need for workable fertile soils on the plateaus and peaks and for a regular water supply.

2.2.4 Hydrology

Although the water supply of the Wolds in antiquity has been studied by Hayfield *et el* (1995b), it remains poorly understood. Fenton-Thomas (2003, 22) notes the free draining calcareous soils and consequent lack of surface water is one which may have been of great significance to human settlement.

The main water sources within the research area are Nunburnholme Beck and Millington Beck which run along the valley bottoms (fig 16). In addition, Nunburnholme, Millington and Warter are plentiful in springs.

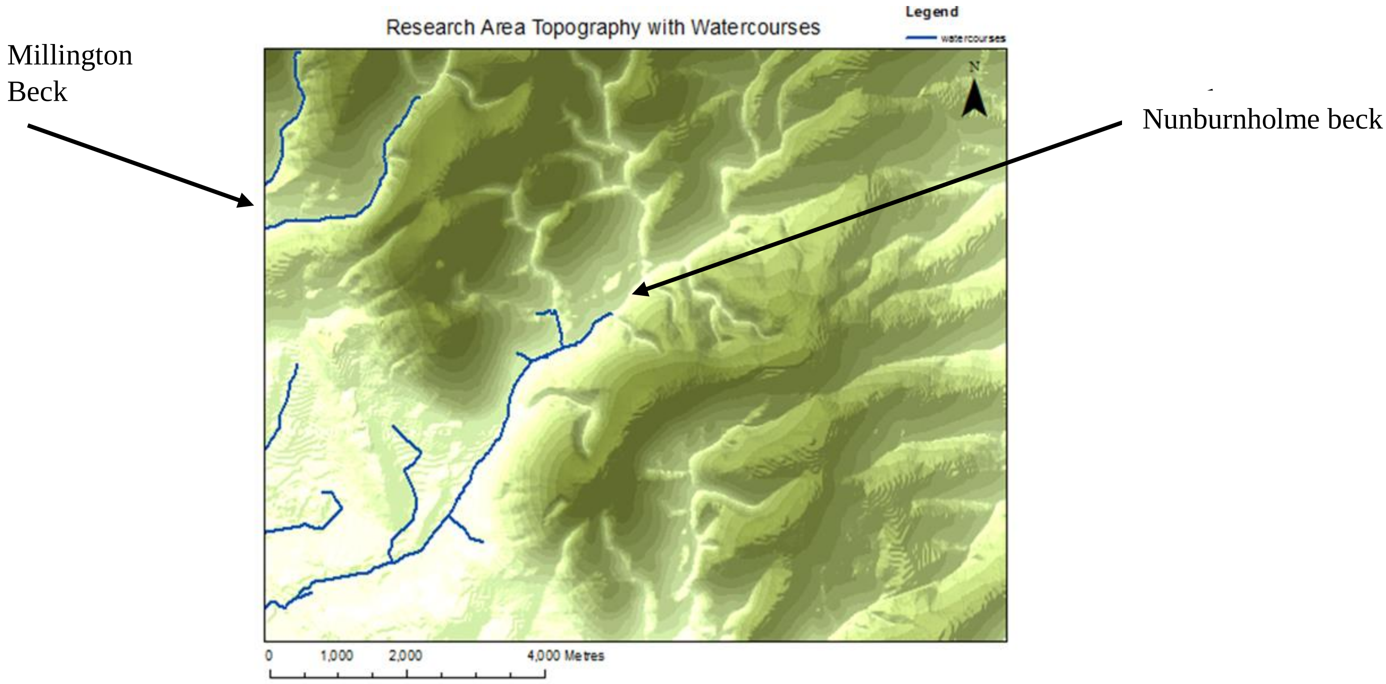


Figure 16: The main watercourses within the research area: A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).*

The names, themselves of Warter and Nunburnholme are significant, with the word '*burn*' recorded in The Domesday Book as *'Brunha'* means 'at the streams or springs' (Domesday 1086-7, Williams and Martin, 788). The becks run into the River Derwent, a tributary of the River Ouse and they appear to be fed from the many springs which are situated where the permeable Cretaceous chalk meets the clay layers of the Lias Bench (Lewin, 1969, 3) (fig 17). Away from this geological stratum to the east of the area there are less springs and the water supply would have been from a series of meres and ponds. Within the research area there is only one pond mapped (see figure 18) It is important, however, to remember that over the last century the water table has dropped significantly as it has been extracted from the Rivers Derwent and Ouse (Hayfield and Wagner, 1995, 63).

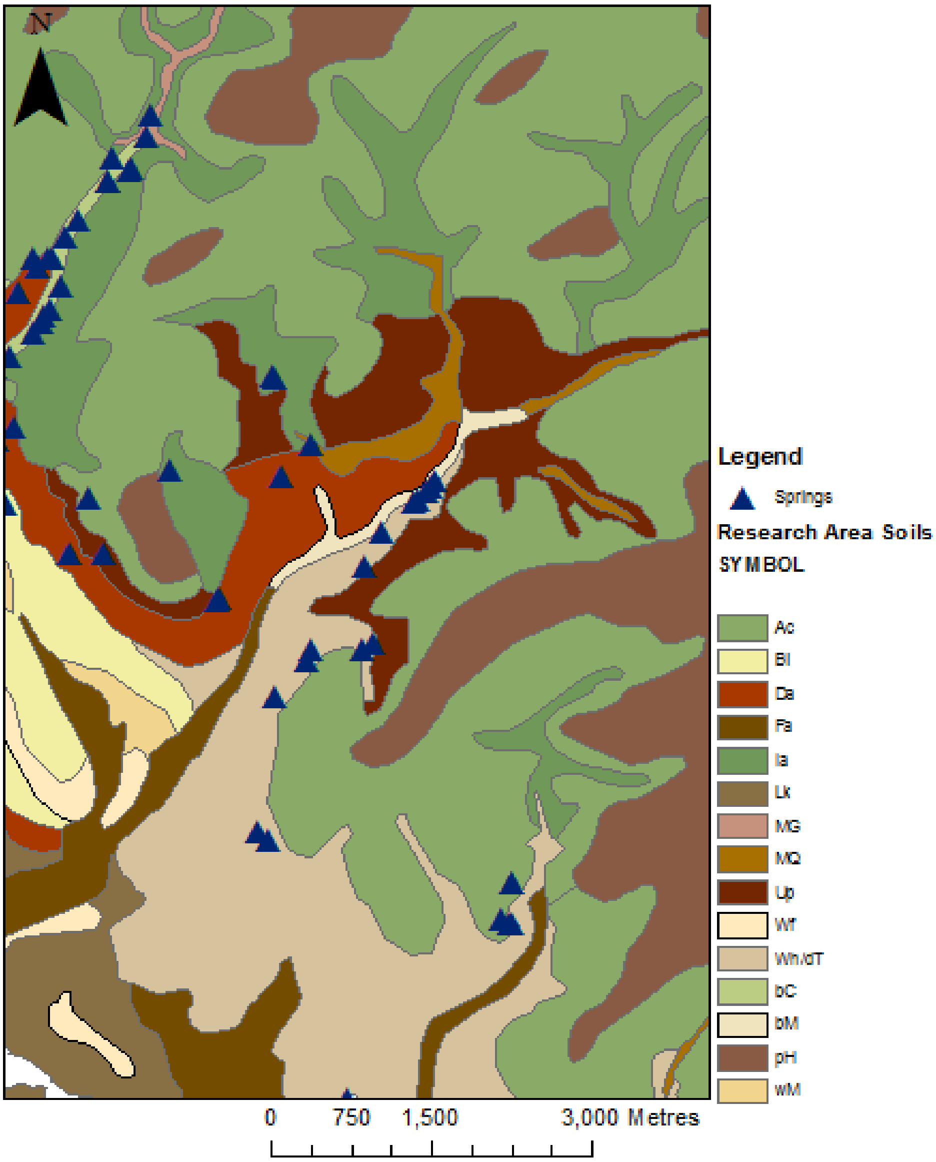


Figure 17; Springs of the research area were ploted in ArcGis 10.3 from the 1:25,000 OS Pathfinder series (Shapefiles manipulated in ArcGIS 10.2 software with permission of Peter Halkon).

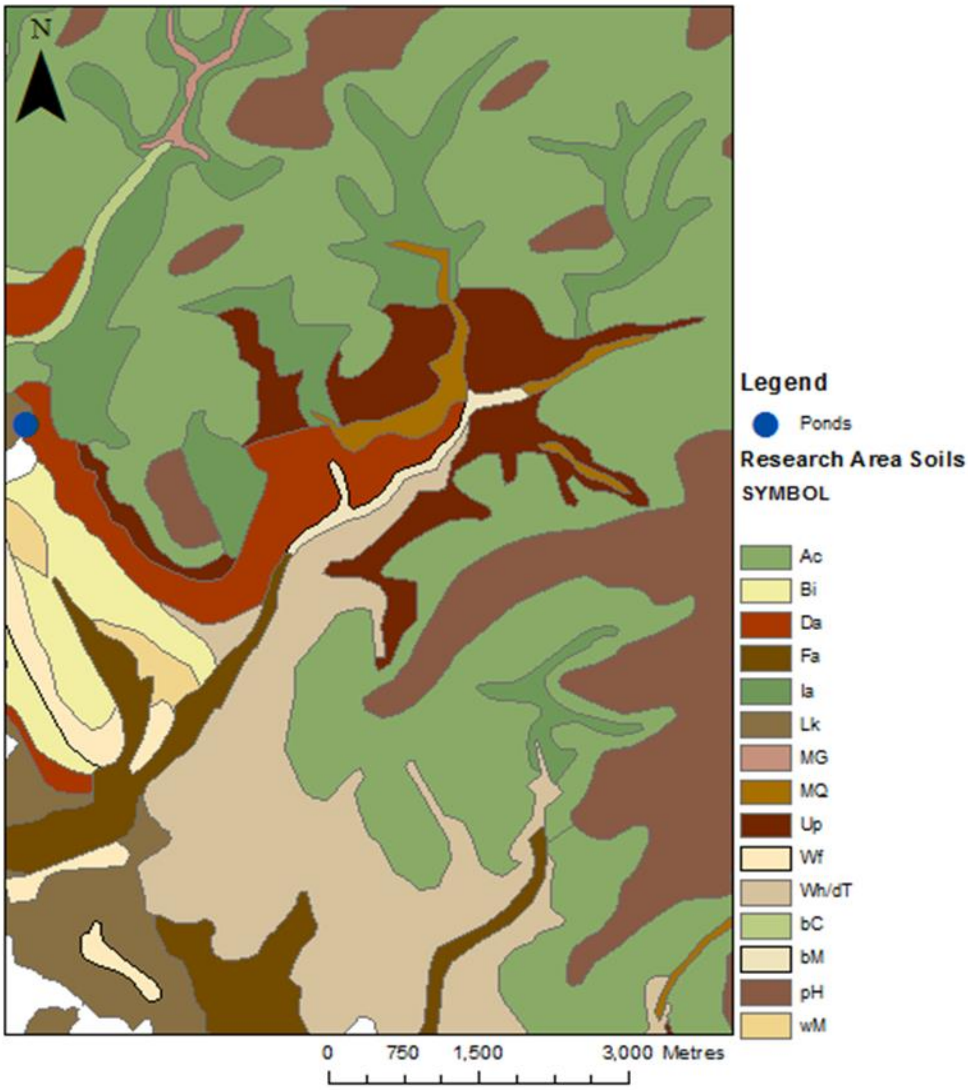


Figure 18: Ponds within the of the research area were ploted in ArcGis 10.3 from the 1:25,000 OS Pathfinder series (Shapefiles manipulated in ArcGIS 10.3 software with permission of Peter Halkon).

Hayfield *et al* (1995a) recognise the paucity of water on the Wolds tops and have researched prehistoric activity around hollows at Vessey Pasture. The hollows, probably formed under glacial conditions, were filled with purple clay with sand lenses, with silty deposits at the base, suggesting the hollows had held water in the past. Several hollows across the Wolds may have been excavated to assist with the construction of barrows as recorded by Mortimer (1905) and have revealed substantial clay and flint layers incorporated into their structure. An interesting proposition put forward by Hayfield *et al* (1995a, 401) is that chalk pits across Wolds tops may have originated as dolines, formed through the solution of the deep chalk, resulting in the collapse of the overlying chalk and subsequently creating a hollow in the landscape. Loose glacial clay deposits of infill may have trapped surface water and subsequently permitted the chalk to be more accessible and quarried. The research area has many chalk pits across the Wolds plateaus and appear randomly in the centres of modern enclosure fields, if as Hayfield *et al* (1995a) suggest they may have held water it would be plausible that water was trapped and contained, hence providing a water source. Previous work by Whiteley (2015) argued a disused chalk pit central to a cluster of enclosures at Nunburnholme Wold may have originated as a doline and then held water.

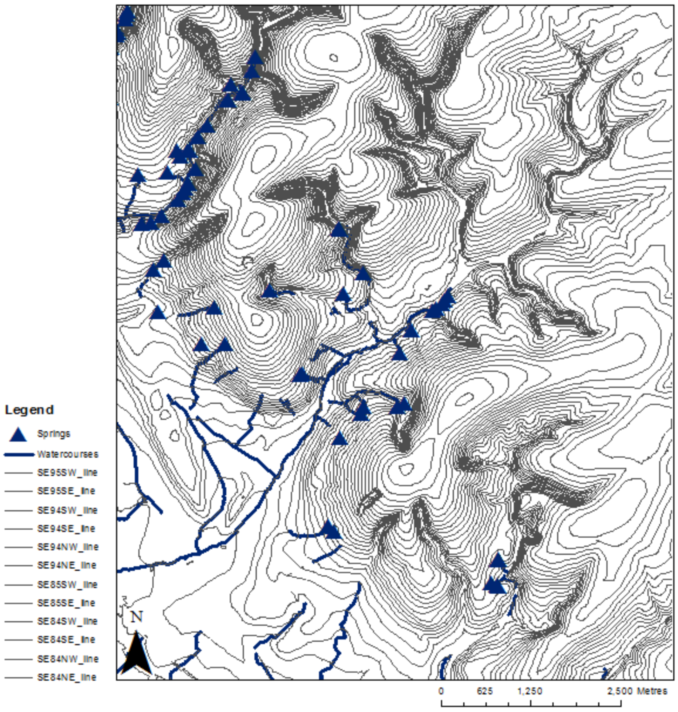


Figure 19: Watercourse and springs of the research area against the topography (1:25,000 OS Pathfinder series) (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.2 software).

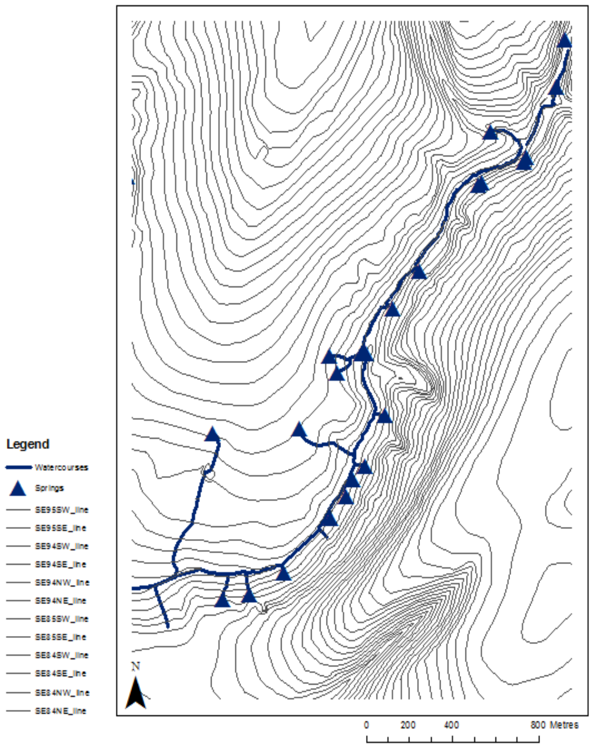


Figure 20; Millington Bottom watercourse and associated springs The springs range between elevations of 80 and 100m O.D. (1:25,000 OS Pathfinder series) (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.2 software).

In summary the most accessible water source within this area are the becks in the valleys bottoms at Nunburnholme and Millington (figures 19 and 20). There are many springs within the research area where the chalk meets the Lias clays, however they are situated well below the workable soils of plateaus. It would have been possible to transport water; however, to date there has been no evidence of any archaeological material which could be attributed to such function, probably due to the organic nature of the materials such as wood or leather. There is a lack of evidence for water on the research plateaus. Field walking near Huggate revealed unmapped brickearths which would have trapped and held water; however, this is only evident in a limited area and cannot be attributed to other parts of the research area. In addition, with a drop in the water table it is difficult to say whether any Wolds top surface streams were present.

2.3 Chapter 2 Conclusion

This chapter has considered the topography, soils and watercourses of the study area. The following chapters will assess how these factors have influenced human activity, settlement patterns and the reconstruction of agricultural, societal and economic development. The impact of a changing climate on the landscape for each period will be discussed within the relevant chapters.

Chapter 3: The Neolithic Period

3.1 Introduction

This chapter investigates the Neolithic period activity within the study area. A brief overview of the Neolithic period across the Wolds is explained, and theories of sedentism or mobility related to this period, which may have impacted on lifestyle and landscape developments, are discussed.

The study area is analysed using the methodologies explained in chapter one, in order to assess the extent that the topography, soils and water courses may have impacted or indeed influenced any Neolithic activity. This chapter then briefly examines new data available from the Neolithic mound, Duggleby Howe, the closest barrow to the study area, to provide some insight to the area's inhabitants and demonstrate the importance of re-assessment of antiquarian research.

3.1.1 The Wolds Neolithic

East Yorkshire is renowned for its Neolithic archaeology and the evidence available is extensive. Halkon *et al* (2009, 13**)** suggests the agricultural activities and land improvements instigated by the Sykes family, who bought and enclosed large areas of land for cultivation, are significant factors in the evidence available. Manby *et al* (1988, 35) also note how agriculture has enabled evidence to be obtained stating that:

> *'the expansion of arable farming that has destroyed barrows and other monuments yielded a vast harvest of flint and stone artefacts '*

Therefore, the archives of East Yorkshire are rich in artefacts, records and drawings, which can be traced back to the eighteenth-century antiquarian's, Mortimer and Greenwell. Mortimer recorded that twenty-five percent of the original barrows had been removed by landowners when excavations began in 1860 and that the rate of destruction was increasing due to agricultural practices (Mortimer 1905, ix). Regrettably this development removed many barrows and monuments across the landscape, however, it revealed material culture of flints and stones artefacts. More recently, Terry Manby has been a significant figure (Gibson and Bayliss, 2009, 39), in the study of the Neolithic and Bronze Age in Eastern Yorkshire (Manby, King and Vyner, 2003).

Other favourable factors in the accumulation of evidence of the Neolithic past, are the chalky soils and related gravels of the Wolds which have been invaluable to archaeologists in the search of quality crop and soil marks. The aerial survey by Stoertz (1997) plotted and presented aerial images which revealed many Neolithic features. Gibson and Bayliss (2009, 39) identify the research significance of the Neolithic and Bronze Age within the area to be second only to Wessex, observing that the land of both areas provides excellent visibility of monuments and features.

The climate during this period is unstable, shifting from warmer and drier conditions to cooler and wetter conditions (Roberts, 1998. 162). Present day sea level was reached between c 7000 and c 3000 BP, interspersed by a series of marine transgression and regression, and by 6000, BP Britain had become an island (Van de Noort and Davies, 1993, 17, Whyman and Howard, 2005, 14).

The Early Neolithic period in Britain has extensively been dated to c.5000 BP, when the landscape across Britain changes, principally in that woodland was cleared exposing areas of land, consequently aiding the development of agricultural practices (Manby *et al*, 2003, 42). Even though hunting remained a practice during this period, there is evidence of a deliberate transition towards the planting and growing of crops (Whyman and Howard, 2005, 17). Introduction of agricultural practices beginning on the Wolds, coincides with a decreasing elm species and other changes to the forest types. Although there is an initial impact to the landscape, evidence has shown this impact decreases over time; despite more intensive woodland clearance occurring in the later Neolithic (Whyman and Howard, 2005, 40).

During this process of land development, Sheridan (2013, 290) has highlighted a lack of 'sub- prime' farming land in Northern France due to a millennium of farming and suggests the land of Britain and Ireland would have hence been attractive to immigrants.
There has been much discourse surrounding the degree of sedentism or mobility related to this period, which encompasses lifestyle and landscape developments associated with these theories. Sheridan (2013, 284) identifies and summarises four key challenging theories of the Neolithisation development which include:

- Indigenous hunter gatherers who change their lifestyles adapted from the continent around 4000BC (Thomas, 2008)
- Colonisation from France, in two separate episodes around Wessex (Collard *et al,* 2010)
- Colonisation from France into Kent resulting in a spread to the north and west and an amalgamation of cultures (Bayliss *et al,* 2011)
- Four episodes of immigration from the northern France to Britain and Ireland (Sheridan, 2013).

As noted in the environment chapter of this thesis, the chalky well-draining soils of the Wolds would have been an attractive destination to Neolithic farmers as would have been the available natural resources. These include flint, which occurs as a solid layer in the lower chalk beds and is valuable commodity in the early Neolithic; there are two types of flint of which were utilised, bedded flint and nodular flint (Manby, 1998, 42). An example of a Neolithic white flint knapped lithic found in the Millington parish is shown in figure 21 (Portable Antiquities Society, YORYM-88C853).

Fig 21; An example of a white flint tool from Millington Parish

The value and availability of natural resources of native regional flint and hard stone erratics, is evident through the production of material culture and the availability would have ensured a continuing and sustainable exchange of trade in the area (Manby *et al*, 2003, 49). Axes provide greater detail of agricultural areas from the Early Neolithic with distribution patterns favouring brown earths, but rarely above the 300m contour. Over 2700 axes have been recorded across the Yorkshire Wolds but a notable decrease in distribution is observed by Manby *et al* (2003, 47) towards the central Pennines. Within the study area there is documented evidence of flint tools indicating land clearance and woodland management (Halkon, 2009, 14), and can be seen in the form of stone and flint tools as shown below in figure 22.

A flint adze from Londesborough Wold is suggested by Whyman and Howard (2005, 17) to have enabled a greater force to be applied and would have cleared land with greater speed and efficiency and enabled timber product exploitation. It seems unlikely such a precious commodity would have been discarded and Manby *et al* (2003, 49) suggests some axes were votive offerings.

Fig 22; Left, A flint adze from Londesborough Wold

The evidence indicates that the Early Neolithic period can be associated with the emergence of a structured community, whether that be indigenous hunter-gatherers or immigrants from the continent, remains a challenging theme, however, a sustained and cohesive effort would have been required from the whole community. To clear a landscape dominated by mature and natural alder oak forests would have required knowledge of natural resources to enable the manufacture of required tools and a provision for trade.

The Early Neolithic is noted by the emergence of a ritual landscape. Gibson (2011, 5) suggests long barrow monuments are the earliest features to Britain where 500 long barrows have been identified (Darvill, 2004, 71). Manby (1970) in his survey and excavation of the long barrows suggest they were constructed during the 3rd millennium BC and identifies these monuments to be the earliest structures across the Yorkshire Wolds landscape (Manby *et al*, 2003, 42). A typical barrow would have been constructed of chalk and rubble to make an unchambered mound, around which would have been two short parallel ditches.

Barrows generally tend to lie on ridges and escarpments between 200-400ft. Halkon (2013, 269) records how excavated long barrows across the Wolds tops are close to natural crossing points where valley heads infiltrate the chalk escarpment. Darvill (2004, 85) observed in the Cotswold-Severn region 100 barrows were situated along the escarpment, however, Ashbee (1984, 8) noted the environment can be varied. The positioning of barrows appears to play an important role; escarpment edges would have provided excellent backdrop views; however, this would not be a common factor when examining valley floor locations as plotted by Halkon *et al* (2009,20), who identified two possible long barrow features on lowland sand areas in the Foulness Valley. Precisely why these communities chose the location for the long barrows remains unclear.

3.2 The study area

The research area itself has one documented Neolithic feature at Nunburnholme Wold (Halkon and Lyall, 2015), SE 84 NE 55, and this thesis has identified a possible further feature through satellite imagery which has morphological features associated with long barrows at Thirty Acres, SE 489880 452160.

As there are no obvious noticeable mounds from this period, other methods of survey are imperative to reveal parallel ditches in a flattened landscape. Stoertz's (1997, 21) survey of aerial cropmarks across the Wolds increased the evidence of long barrows and provided further evidence of mortuary enclosures (fig 23) and round barrows. However, Manby *et al* (2003, 46) advices caution in relying only on aerial or satellite imagery to observe long barrows, as features constructed of surface materials such as grasses and stone, which did not require any digging of flanking ditches, are difficult to detect, and therefore there may be more than have been recorded so far. This is a pertinent theory which applies to the Neolithic feature at Nunburnholme Wold which was only identified by Halkon and Lyall (2014) from a geophysical survey.

Fig 23; Map of the Yorkshire Wolds illustrating known long barrows and potential new Neolithic sites (Mapped in ArcMap 10.3 software.)

The parallel ditches noted at Thirty Acres SE 489880 452160, (fig 24) are only visible from Google earth, and are in an area which has known to have other documented and researched archaeological features. It is a complex area (fig 25) and would benefit from a geophysical survey. Stoertz (1997, 25) notes that careful consideration should be paid to features which are within the proximity of ring ditches, as shown at the sites of Kilham and Willerby Wold long barrows.

Fig 24: The red arrow indicates the double ditched parallel feature as seen from Google Earth (Google Earth, Infoterra, 2016)

Other known mapped and unmapped archaeological features close to the ditches include; two round barrows (Barrow A and Barrow B, OS 6" 1911) surveyed and investigated, but not excavated by Mortimer, two ring ditch/pit like features not noted on any maps but visible on Google Earth; a chalk pit noted on the OS maps (OS 25" 1892-1914) and a barrow situated around a chalk pit (OS 25" 1892-1914). (fig 25 overleaf).

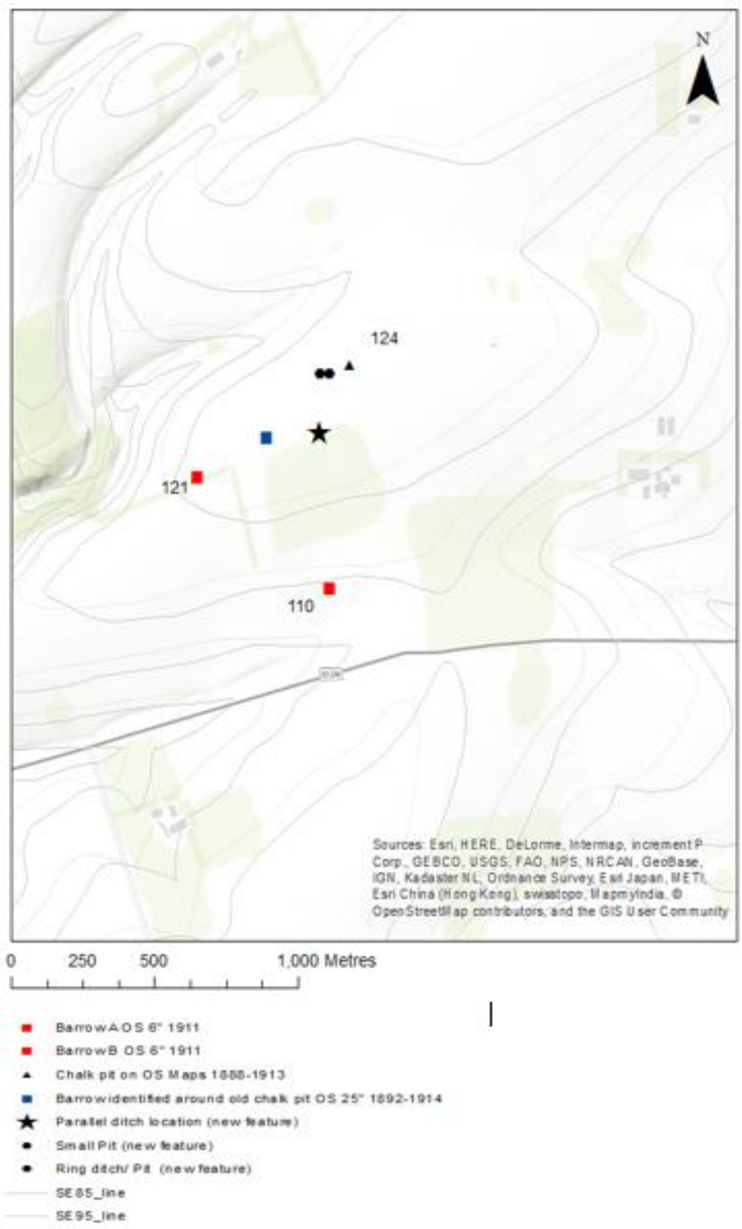


Figure 25: The parallel ditches site at Thirty Acres, SE489880 452160 shown within proximity to other archaeological features (mapped in ARGIS 10.3)

The ditches are suggested to represent a short, long barrow feature from the mature period of the Early Neolithic when a ritual landscape emerges. The flanking ditches are 64m-69m in length and are spaced 30m apart. This provides favourable evidence of them being long barrow ditches, as the most common variety have ditches which are generally 30m to 73m in length and 18m to 35m apart (Stoertz, 1997, 23).

The site is 124m OD and has far reaching views across the landscape towards Warter Wold and Nunburnholme Wold (fig 26).

Figure 26; The site of the parallel ditches at Thirty Acres SE 489880 452160 (Whiteley, 2017)

The ditches (fig 27) have a similar morphology to two positive features from a geophysical survey from Esh barrow at Helperthorpe (fig 28). A topographic and geophysical survey to re-examine antiquarian investigation as part of an English Heritage funded survey of two long barrows, was part of an enquiry of Neolithic barrows of the upper Gypsy Race (Great Wold) Valley. The barrows, Denby House at Rudston and Esh barrow at Helperthorpe had previously had antiquarian research investigations and were chosen for modern surveys (Gibson, 2011).

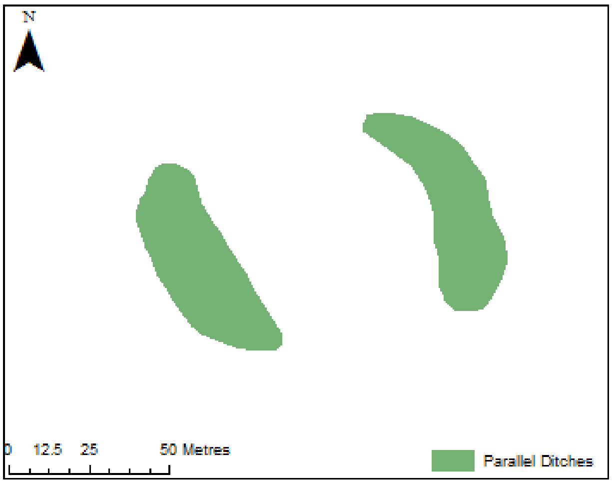


Figure 27 The parallel ditches at Thirty Acres as plotted in Google Earth and mapped in ArcGIS 10.3

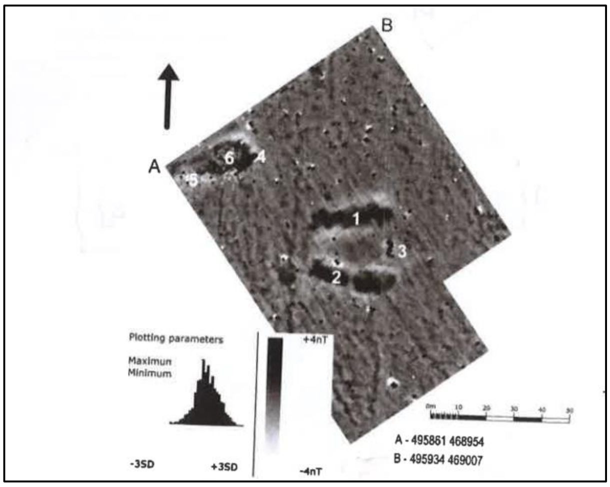


Figure 28: The geophysical survey results of Esh Barrow (Gibson, 2011).

A geophysical survey of Esh barrow indicated that there were two positive features in the area, however, these findings questioned Mortimer and Greenwell's original notes. The antiquarians documented a round barrow overlying a long barrow, which is now thought to be another separate positive feature seen in fig 28 to the west of the ditches, the short long barrow is thought to be in the centre of the survey area (Gibson, 2011).

The orientation of the ditches at Thirty Acres are on a north-west to south-east orientation, whilst the comparable morphological features at Esh barrow are aligned on an east-west axis. Orientation of long barrows is unclear as there does not appear to be a uniform alignment. Many of the long barrow ditches of the Yorkshire Wolds are situated on a north-east to south west axes, examples at; Kilham, Willerby Wold, Burton Agnes and Heslerton (Stoertz 1997, 25). Manby, (1998, 45) identifies exceptions at Rudston and Ling-Howe which are roughly south east to north west. Therefore, it can be argued there is not a clear and defined prescribed orientation for long barrows across the Wolds, and therefore orientation cannot be an effective argument for dismissing the ditches at thirty acres as not been a viable Neolithic feature.

Other features within the area which may be Neolithic features are noted at Nunburnholme Wold. A geophysical survey was undertaken by James Lyall of Geophiz.biz in 2014 as part of the Nunburnholme Community Heritage project and revealed a landscape of ritual features. Two linear ditches on a northwest to southeast axis lie within proximity to a large round barrow and a square barrow cemetery. The ditches are 47m long and 18m apart and appear to widen towards the eastern end. As noted with the other potential long barrow ditches within the research area they are on an elevated topography of 160m OD (see fig 29).

A trench was positioned over these ditches and two pits as part of the 2015 excavation at Nunburnholme Wold. A small piece of Neolithic flint and a copper alloy ring, possibly Roman, were discovered in the ditches; however, the pits in-between the ditches were empty.

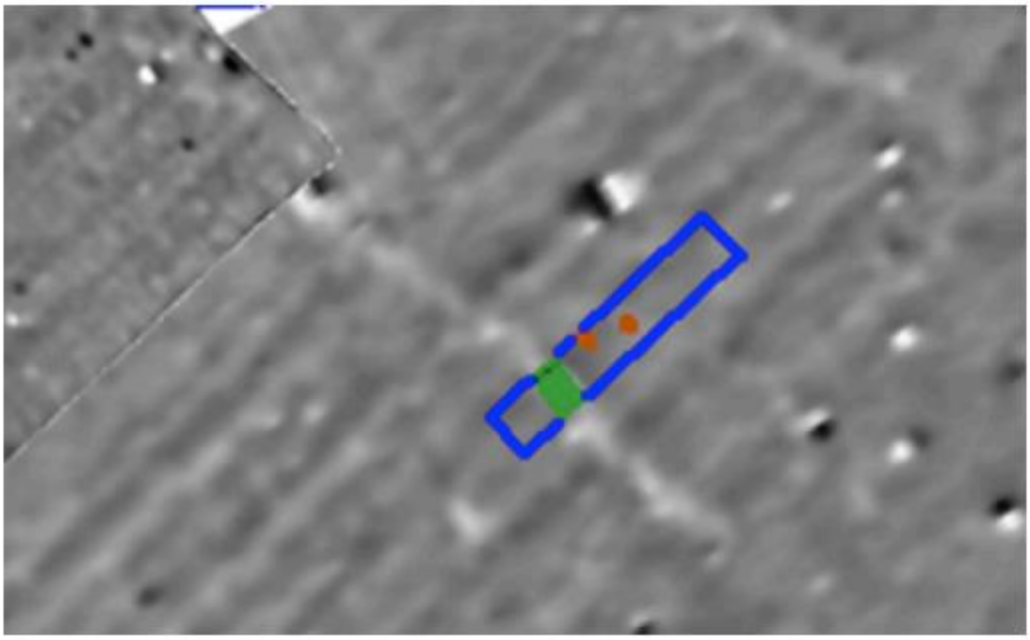


Figure 29; The ditches at Nunburnholme Wold as seen on the geophysical survey (Halkon and Lyall, 2014)

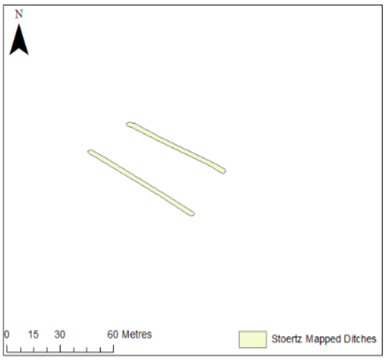


Figure 30 (left) The ditches as mapped in ArcGIS 10.3

Figure 31 (right) excavational trenches over the ditches in 2015)

To understand to what extent the topography, soils and watercourses influenced the settlement patterns, the features were plotted over topography, soils and watercourse maps (fig 32 and fig 33).

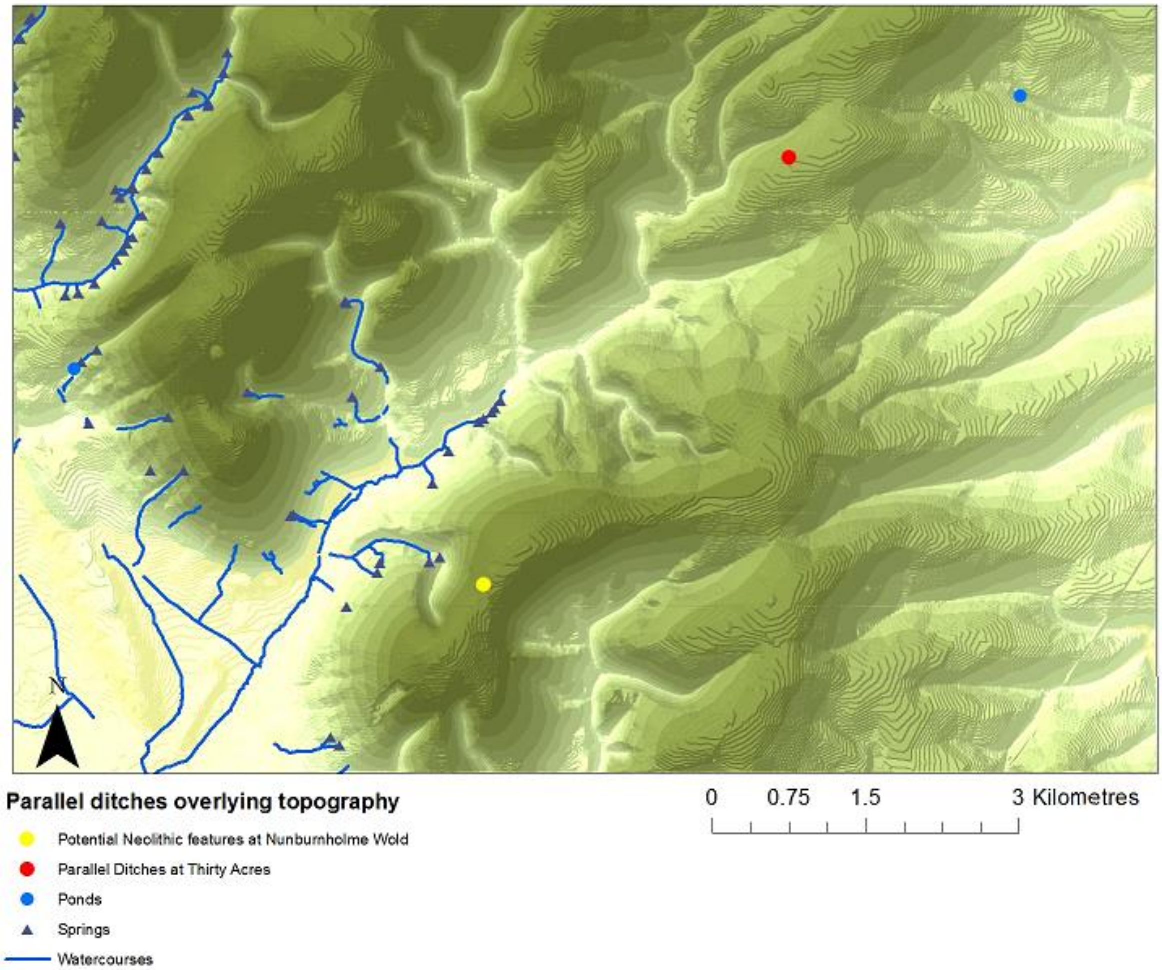


Fig 32; A merged raster data set of the research area illustrating the morphological features and the proximity of watercourses, springs and ponds. (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

Lewin (1969) notes the distribution and position of Yorkshire Wolds barrows appears to have been influenced by streams, springs and other water sources; Nunburnholme Wold is located near to the spring line however, the site at Thirty Acres is not located within proximity of known water sources (figure 32).

Darvill (2004, 72) notes other influencing factors to distribution are topography and coasts. It is proposed the topography of both sites has dictated the feature's location and offers important visibility of the monuments from lower lying areas and the sites themselves offers far reaching views (fig 33). Halkon *et al* (2009, 13) note as the Mesolithic period progresses the vegetation moves from mere and fen towards a boggier carr environment. The Mesolithic/Neolithic marine transgression would have made valleys inhospitable places and may explain a movement towards higher ground. The plotted barrows are singular, Darvill (2004, 67) notes, generally barrows occur singularly in isolation, although infrequently pairs are noted.

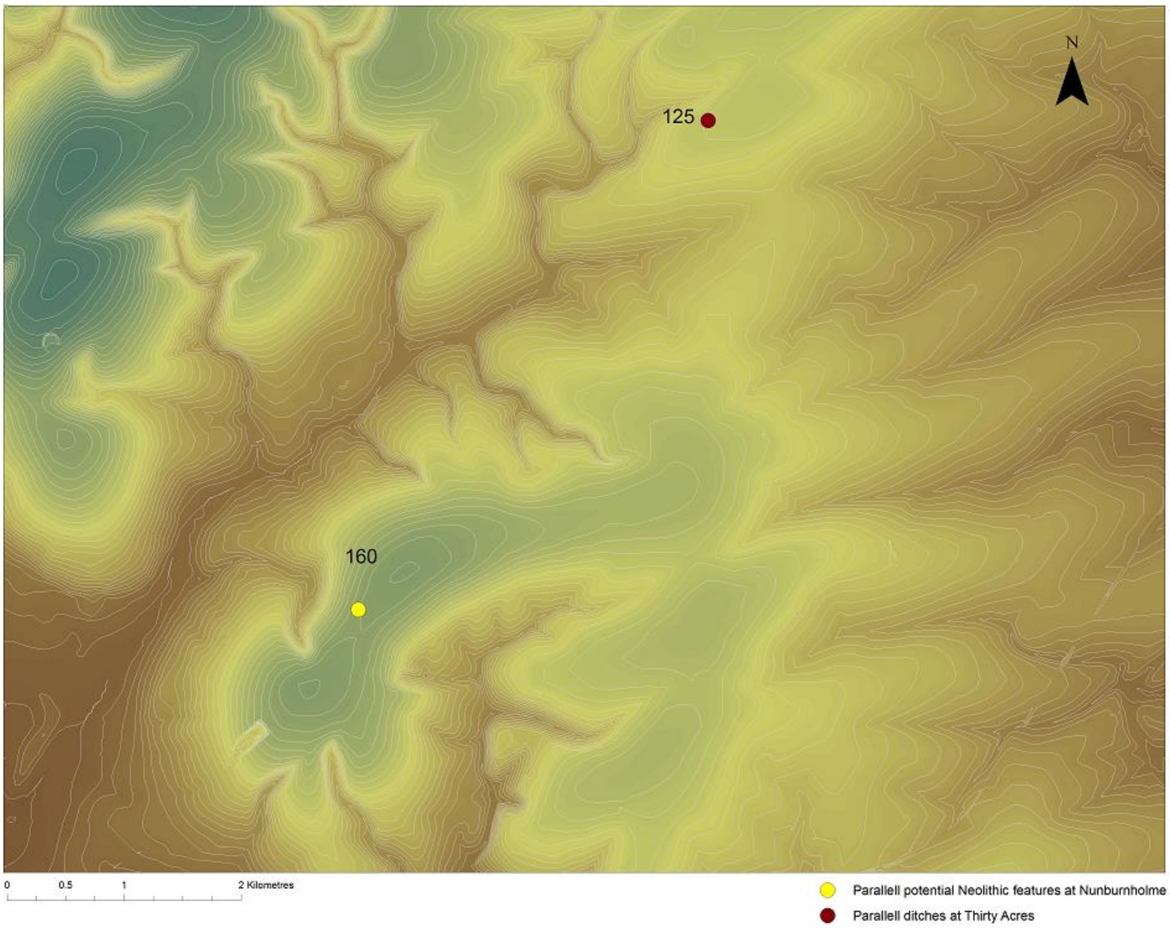


Fig 33: A merged raster data set of the research area illustrating the elevations of the morphological features (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in (ArcMap 10.3 software).

The soils in the Neolithic period would have been thick brown forest soils not representative of modern-day thin plough soils which directly overlay the chalk with only small patches of clay subsoils found in depressions and hollows (Manby *et al*, 47). The soils underlying the various features are from the Upton and Andover soil series; Rendzinas group and are well drained soils with good workability (figures 34 and 35). Obviously this group of soils are easier for digging features, however, in this instance it is proposed the site topography takes preference in terms of location significance, as opposed to the soil profile, which tend to be widespread across the study area plateaus.

Evidence of Neolithic settlement in the form of pits/ flints as seen at Nunburnholme Wold suggests the structure would have been central and symbolic within the wider community. Thomas (2012) suggests pit deposition may have involved a connection between a community and a location and enabled no trace of occupation to be left on the landscape. To construct these monuments would have required a communal effort and large workforce who had an association with place, and it is feasible that although still a mobile population, the monuments provided a place of sense, ancestry and community.

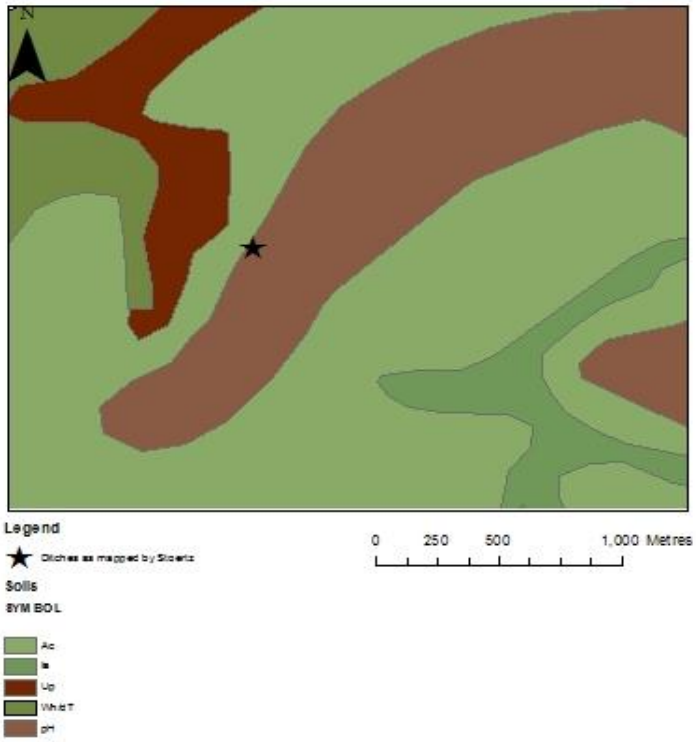
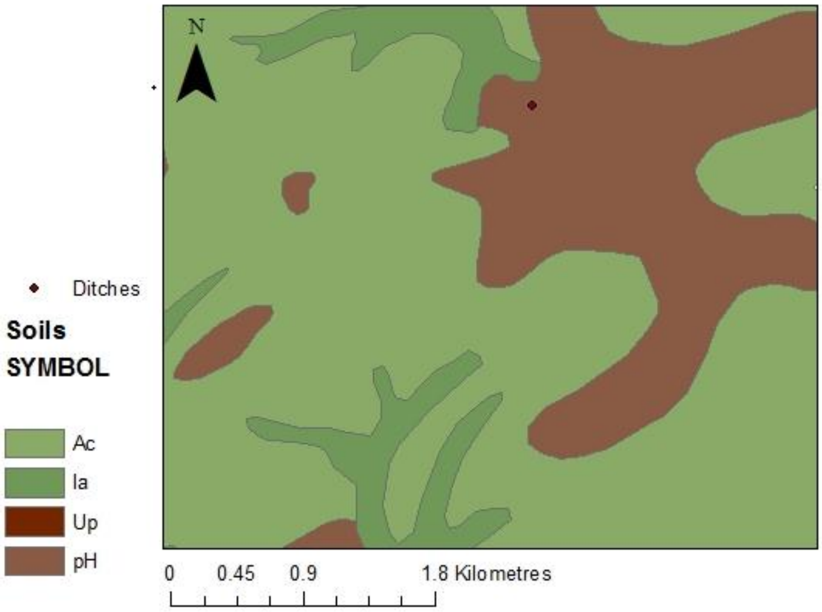


Figure 34: Nunburnholme ditches overlying soils of the research area (after King and Bradley 1987). The letters against the blocks are abbreviated soils types and area and explained in Table 3 (Shapefiles manipulated in ArcGIS 10.3 software with permission of Peter Halkon).

Figure 35: Thirty Acres ditches overlying soils of the research area (after King and Bradley 1987). The letters against the blocks are abbreviated soils types and area and explained in Table 3 (Shapefiles manipulated in ArcGIS 10.3 software with permission of Peter Halkon).



Locating further evidence of occupation is challenging as Neolithic house structures are problematic to source, academic thinking has changed to support the theory that Neolithic pits, one of the most common features of the Neolithic period, are now widely thought to represent past occupation

(Manby, 1975, Rigby, 2004). There are pits noted within the research area, more identifiable from geophysical survey as seen at Nunburnholme Wold, however, pits noted from satellite imagery tend to be large and are difficult to attribute a function to a period and it is unlikely they are from the Neolithic period as Thomas (2012, 1), notes that Neolithic pits to be generally small and shallow.

Fenton- Thomas (2003, 46) argues that such a lack of evidence of settlement, in conjunction with ceremonial monuments, suggests the landscape was not one of occupation, rather a landscape of burial monument. However, Manby (1980) advises that traces of occupation generally occur as debris scatters of flint work and animal bone and this evidence is not conducive to the methodology applied in this thesis to plot settlement features.

There is evidence of various house like structures within Britain and Ireland from the Neolithic period although Whyman and Howard (2005, 17) note there are no known Neolithic houses within the Vale of York and suggest this may be due to the area having been too wet for any settlement. The only current evidence for house like structures on the Yorkshire Wolds have been identified in Driffield where a rectilinear house with a rectilinear floor plan, post holes and charcoal/ artefacts were excavated to the Middle Neolithic date and a similar structure was identified at Sewerby Cottage Farm, Bridlington (Manby *et al*, 2003, 53).

3.3 Later Neolithic activity across the Wolds

Funerary developments occur during the latter part of the Middle Neolithic period and into the Late Neolithic. Manby (1998, 64) notes there are four large barrows, 100ft in diameter along the southern aspect of the Great Wold Valley. These barrows are Willy Howe, Wold Newton Barrow 284, Greenwell's barrow 77 and Duggleby Howe, a barrow excavated by Mortimer 1905 where a sequence of burials and cremations was represented. Duggleby Howe (fig 36) is the closest late Neolithic feature to the study area, and is important in respect of recent investigations which has enabled osteological techniques, an insight to the variety of fauna and dating evidence to compliment other Neolithic data and to further understand the Neolithic environment.

Remote surveys were carried out in 2009, with the topographic survey revealing a shallow but broad earthwork of a depth of 200mm around the causewayed enclosed ditch of which was originally thought to be only visible as a cropmark. The geophysical survey confirmed data from aerial photography of a penannular and interrupted nature of the encompassing ditch but with no association of a bank.

Figure 36; Duggleby Howe, a significant landscape feature from the later Neolithic (Whiteley, 2018).

Ogden (2009, 50) used standard osteological techniques to analyse human bone remains. Bones from children were assessed for age by studying, dentition development, long bone shaft length and fusion of the epiphyses, adult age was estimated through the assessment of the pelvis and cranium. Analysis was described as ‘challenging’ as much of the surviving assemblage has been restored using plaster, wire and fireclay which cannot be removed. However, interesting data was accomplished; one skull demonstrated injuries associated with two peri-mortem blunt forces. In addition, a broken nose which had healed for a substantial period prior to death, a dubious vertical tilt to the frontal bone and new bone formation over the glabellae (Ogden, 2009, 57).

This new bone was identified on several other skulls which suggests it may have been an essential part of the evidence of large frontal sinuses. The sinuses could possibly have been under stress due to the environment, smoky and enclosed in winter. Other factors may be related to tattooing, ritualistic practices or the application of ointments or pigments which produced a distinguishing feature around the eyebrows, enlarging them and making them more visible which Ogden (2009, 57) tentatively suggests may be in relation to a form of signalling between humans.

Bayliss (2009, 61) was able to radiocarbon date eleven inhumations and an antler macehead through seventeen radiocarbon measurements. The objective was to acquire chronology of the Neolithic period with existing artefacts/ remains because there is an absence of radiocarbon dates with the area. In addition, Duggleby Howe has great significance in both local and national importance.

The summary of results indicates that the first burial (K) dates to the 35th century cal. BC. The bones were weathered which Bayliss (2009, 71) suggest may indicate they had been left to the elements for a period before burial or alternatively the burial environment has caused them to be worn. Burial I buried with the skull (J) are thought to be slightly later than Burial K 3400 cal. BC. Both shows signs of a trauma indicated by blunt force fractures to the skull. Burial H, a four-year-old child is above in the sequence, with Burial G, in the uppermost part of the grave, is a male dating to around 3300 cal. B. Artefacts with this burial include a lozenge arrowhead, antler mace head and flint adze.

There is a gap in burials of several centuries before Burial C, a mature male accompanied with boar's tusks and a broken arrowhead and is dated to around 3000 cal. BP. Burial D, a mature male is buried with a polished flint knife in around 2900 cal. BC. This burial offers a date for the mound's terminus post quem whilst the Burial F and E provide a terminus ante quem. Bayliss (2009, 71) suggests from this data that mound construction would have been around 2900 ca. BP. Burials F and E are child inhumations, and are significant as they are from the Middle Neolithic and the Beaker period which is connected to the Grooved Ware and there are few known burials from this date in the north and west of the country

The dates of the Middle Neolithic have been related to Duggleby Howe; however, the time span the mound was in use was not anticipated; Burial M interred almost a millennium after Burial K which dates to the 35th century cal. BC.

Mortimer, despite his schematic section drawings, admitted that conservation of bone was not of great importance and hence the collection is depleted. The data from the strontium and oxygen isotopes has revealed that the skeletons were not from the local area, with the possibility that burial K was from as far as Paris or Denmark. This opens lots of questions- why were they traveling so far and was this to bury the dead? It is a consensus amongst theorists that the period of the Neolithic and Bronze Age are not associated with the requirement of every individual to be buried. Burials with associated grave goods are presumed to be an elite social ritual, however, Bayliss' (2009, 73) discussion has raised the possibility that as these burials seem to be associated with trauma that subterranean burials were in fact for slaves or enemies.

3.4 Conclusion

Thanks to antiquarian and present day investigations and research, East Yorkshire and the Wolds have provided a wealth of evidence of Neolithic activity. Theorists have identified several models in pursuit of the origins of the Neolithic population with both indigenous and immigrant groups favoured. Not in question is how attractive the Wolds would have been offering a favourable agricultural landscape, with workable and well-draining soils and an abundance of natural resources.

The emergence of a structured community is evident in the study area seen through the process of large-scale land clearance and the required organisation, essential to build large scale structures. Short long barrow type monuments have been noted across the study area at Thirty Acres and Esh Barrow, exposed through satellite imagery and geophysical survey. The most significant landscape influences evident at both sites is argued to be the topography as both features are situated on high ground with far reaching views.

Chapter 4: The Bronze Age Period

4.1. Introduction

This chapter aims to explore how the landscape development of the research area reveals the economic and social structure of the Bronze Age period. The study area is analysed using the methodologies explained in chapter one, in order to assess the extent that the topography, soils and water courses may have impacted, or indeed influenced, any Bronze Age activity.

To address these aims, immigration patterns, trading and warfare, are explored in conjunction with landscape changes to understand the complex chronology of the area; from that of a primarily funereal one, to a more divided and occupied place. This approach is in line with Barber (2003, 9) who suggests that, in the past, Bronze Age theorists have primarily focused on artefact typologies. However, academics in recent years have focused their attention towards the transformation of the landscape and occupation patterns, which resulted in social and economic changes.

The chapter will begin by providing a general contextual overview of the Bronze Age. This existing knowledge will then be applied to build a chronological approach to the research area through the analysis of settlement and funerary practices. An analysis of the research area in the Early Bronze Age period, with supporting evidence from national sites will be conducted by investigating monument buildings and settlement patterns into the ensuing Middle and Later Bronze Age. Land division, settlement and defence requirements within the research area are explored during the later period.

4.2 The Bronze Age

Parker-Pearson (1993, 96) defines the Bronze Age as having changeable periods in which the earlier landscape of the dead, is substituted by one for the living, evident through landscape changes towards settlements, enclosures and domestication. Barber (2003, 12) also identifies distinct stages to the Bronze Age as ceremonial, with fluid mobility of its population, towards a shift where land division and settlement are more dominant.

Manby *et al* (2003, 58) identify the transitioning period from the Neolithic period into the Bronze Age to be *c*.2500-2300 cal BC. Historically, this period has been characterised by the introduction of metal into the British Isles, however, there has been difficulty in assigning precise dates. Barber (2003, 14) suggests that, in Britain, metalworking evidence correlates to *c*.2700-2000 BC, later than in the Near East and the Balkans, where copper axes and tools were manufactured from *c*.4600 BC.

Likewise, Parker Pearson (1993, 73) identifies metal as evidence of a new era and argues that the early circulation of copper daggers and axes provide indication of European networks, noting exchange systems that would have offered a sense of endeavour and experience, giving acclamation to leaders who were willing to undertake the journey. Needham (2009, 13) equally highlights the inter-regional connections of the Early Bronze Age which include Continental Europe. In addition, there is archaeological evidence of metal trade as noted at shipwreck sites at Dover and Salcombe, in which scrap bronze was being transported across the Channel (Cunliffe, 2009, 80), and closer to the research area, Van de Noort (2009, 164) identifies North Ferriby as a Bronze Age boat yard site which may have been intrinsic in mobility to and from Continental Europe and the trans-shipments of bronze.

In addition to the introduction of metal, a new style of pottery emerged; delicate and elaborately decorated beakers and new mortuary practises which were attributed to the 'Beaker' people. These burials are usually associated with the deposit of a beaker, thought to represent the identity of the individual and provides connotations for eating, drinking and communality (Jones 2008, 186). The aspects of new material culture in conjunction with new burial practises, led 19th century archaeologists and antiquarians to debate the arrival of continental migrants around *c*.2400-2200BC and has continued to generate considerable discussion amongst academics regarding the Bell Beaker culture, its associated new practices and migration.

In the past, discourse has considered two contrasting options: migration or conversely a new emerging British culture. Recent ground-breaking research from 170 genomes of ancient Europeans, suggests both theories are true and supports a model which proposes that *c*.2450 BC there is a cultural-transmission process, and human migration which resulted in genomic transformation of the population. Olalde *et al* (2017) argue both are of equal importance.

Previous research in Whittaker (2011, 53) has indicated mobile, non-local groups came into contact and assimilated with local inhabitants from which a process of cultural adoption and adaptation of continental rites occurred. Evidence is derived from the analysis of oxygen and strontium isotope values from burial contexts of Neolithic and Bronze Age civilisations by several researchers; Evans *et al*. (2010), Montgomery *et al.* (2000) and Grupe *et al* (1997).

The Olalde *et al* (2017) model confirms and cements previous research but as Callaway (2017) notes, academics argue that it does not verify the scale of migration. However, funerary sampling exposed a Beaker-steppe related ancestry, which replaced 90% of Britain's gene pool within a few hundred years and remains dominant in this present day (Olalde *et al*, 2017). This evidence, therefore, counteracts previous thinking as evident in Heath (2009, 65) where immigration patterns from Europe are recognised, yet thought to be on a smaller scale than more recent research, which has established the scale of migration into Britain as more of an invasion (Olalde *et al*, 2017).

The Beaker People Project (Parker Pearson *et al*, 2016) analysed 264 skeletal remains of individuals from the Early Bronze Age, and likewise acknowledges there is evidence of migration, however, the project also proposes cultural transmission is of equal importance. The project demonstrates that a third of the sampled population was buried in a different region to where they grew up and is therefore indicative of considerable mobility between childhood and death, as either small groups or individuals (Parker Pearson *et al*, 2016). This is reflected in regional variations of burial practice and artefact modifications associated with the Beaker style, as noted within Olalde *et al*'s (2017) model.

Parker Pearson (2005, 75) identified that Beaker individuals were of a different racial stock to the indigenous British Neolithic, drawing upon evidence taken from Beaker people's skulls, which were brachycephalic in comparison to the Neolithic dolichocephalic. More recent statistical analyses of the Peak District samples revealed significant differences in cranial length between Early Neolithic (c. 3800–3400 cal BC) and Beaker/Bronze Age (c. 2500– 1500 cal BC) individuals, confirming the transition from dolichocephalic (long-headed) to brachycephalic cranial forms (Pearson *et al,* 2016).

Olalde *et al* (2017) shows that research from 170 genomes of ancient Europeans further substantiates this theory; 90% of the British individual's analysed, showed little relationship with Neolithic farmers and demonstrated more of a correlation with people from the Netherlands. By 2000 BC the Beaker folk have replaced the early Neolithic farmers, as evidence points to their lineage disappearing.

4.3 Beaker culture burials

The Beaker cultural-transmission process and human migration resulted in a distinct burial practice which first began *c.*2475-2360 cal BC (Parker-Pearson *et al* 2016). The commencement of this style of burial within a round barrow, generally comprising of a mound and a simple ditch and not as elaborate in design as the earlier Neolithic large barrows, was initially practiced in Wessex (84% probability) moving across the country, with Yorkshire, noted by Parker Pearson's *et al* research (2016) as being the final area for the new inhumation rites (36% probability). Callaway (2017) suggests there is a regional diversity within these burial practices.

The Beaker burial practice included a single inhumation with a pottery beaker and other beaker associated artefacts. The ceramic pottery beaker was therefore associated with grave goods for between 480-640 years (Parker-Pearson *et al*, 2016).

The landscape of the Wolds in the Early Bronze Age is marked by the construction of numerous round barrows. Nineteenth century antiquarian barrow diggers, notably Mortimer, who over his archaeological career excavated over 300 such mounds, with much of it recorded in his magnum opus "*Forty Years' Researches in British and Saxon Burial Mounds of East Yorkshire*" (1905), was a key figure in this early research. Another key figure, Cannon Greenwell, investigated, excavated and illustrated many East Yorkshire barrows, in his work '*British barrows, a record of the examination of sepulchral mounds in various parts of England' (1877).* General Pitt Rivers influenced antiquarian barrow investigations by producing a more schematic and detailed approach to barrow excavation, using measurements, plots and scale illustrations (Woodward, 2000, 12).

Research continued into the twentieth century and was heavily influenced by the archaeologist Leslie Grinsell, who examined and catalogued around 10,000 of the southern barrows of England. In addition, field investigators commissioned by the Royal Commission of Historic Monuments, analysed and recorded barrows, with systematic intricacy enabling a greater understanding of construction sequence. Parallel to this research, modern barrow excavations were undertaken during the 1950s through into the 1970s and a central figure was Paul Ashbee, who sought planned research programmes, the raising of standards, and to move away from inexperienced and untrained excavators. Present day investigations and recordings of the Yorkshire Wolds barrows is led by the prolific Terry Manby *et al* (2003) who has produced an in-depth account of the Yorkshire barrows. The aerial survey by Stoertz (1997) plotted and presented aerial images which revealed many Bronze Age barrow features (fig 37).

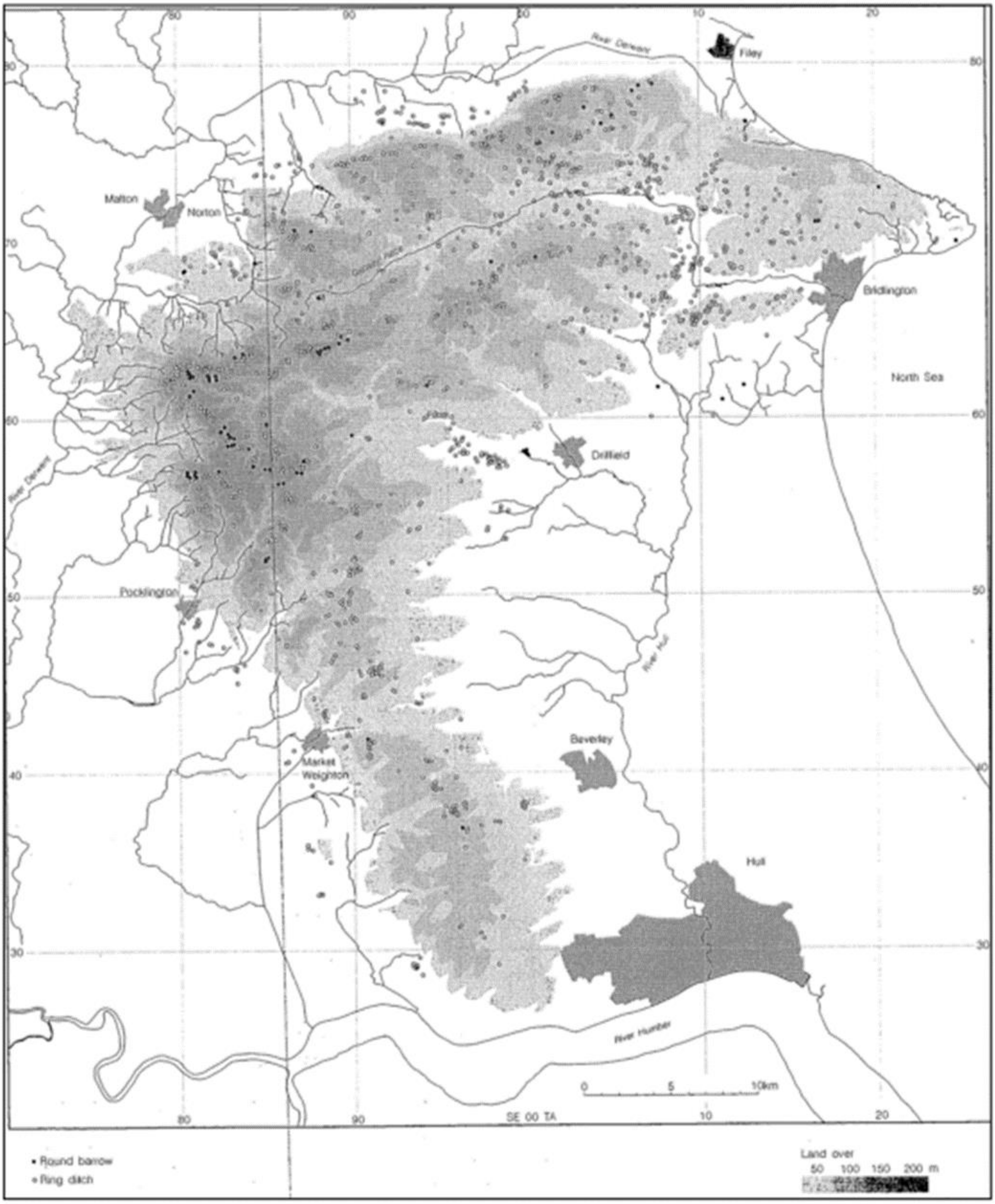


Fig 37; Bronze Age funerary monuments mapped across the Yorkshire Wolds (Stoertz, 1997, 32)

The barrows plotted by Stoertz (1997), were analysed alongside newly identified round features in the study area evident from the Google Earth satellite imagery (Infoterra, 2016). The features were analysed against the topography, watercourses and soils, to assess what extent the geological features may have had on the distribution patterns.

There is not an archetypal construction of barrows but a range of distinguishing morphological features which include single or double ditches, including annular, penannular and segmented varieties. Woodward (2000, 16) reclassifies barrows according to length, width, shape, height and composition and identifies five types of barrow: bowl, bell, disc, saucer and pond.

The identified features are representative of the Beaker period and would have presented as small, simple and round, with a surrounding uninterrupted ditch, from which the mound was constructed, and would have generally contained a single inhumation. Historic England (2020) classifies these mounds as Bowl Barrows.

'*inverted bowl-shaped mounds with slopes of varying profile of which have a surrounding ditch and occasionally an outer bank. They might reach over 40m in diameter and as much as 4m in height, although very smaller versions can occur that measure just 5 or 6m across'*

Woodward (2000, 16) advises that the primary purpose of a round barrow is for use as a grave, in which a mound is constructed over an individual or group. Past research (Jones, 2008) has suggested a rise in single inhumation burials represents a regionally constructed individual, arguing that there is a shift from direct ancestry, to a regional common ancestry. Recent research has supported this theory and this is reflected in the change of practise of multiple burials from the Neolithic barrows to the Bronze Age single inhumations (Parker Pearson *et al* 2016, Olalde and Reich, 2017). It is difficult to be able to be demonstrate real ancestor and genealogical relationships within this period but Jones (2008, 194) argues that, as opposed to a linear descent, ancestry can be created, both through relationships and the landscape.

Across the Wolds there is a high proportion of primary crouched inhumation burials, and evidence of multi-phased cemetery usage, in which secondary burial or cremation deposits are interred, but are ultimately the same structure which has taken a new character from its original form (Manby *et al*, 2003, 74). Bradley (1998, 133) argues that, in addition to a burial space, the area within a monument enclosure or surrounding space would have also enabled communities to come together, providing both a ritual and social community space

Within the research area there are an existing 106 round barrow features as identified by Stoertz (1997). In addition, a further 27 morphological features were identified from Google Earth satellite imagery. Each feature, including the Stoertz (1997) features was analysed and categorised as either a ring ditch or maculae, depending on how the features morphology presented. Caution was applied when interpreting features from aerial imagery and satellite technology as some of these features could be ponds, quarries or pits. This caution is supported by Stoertz (1997, 33) who advises some features can be attributed to other structures, noting:

'circular ditches can also represent the remains of other structures, such as hut-circles, post-mills, dewponds and search-lights emplacement'

Halkon (2008, 85) also highlights 'fairy rings' to be potentially mistaken for manmade ring ditches.

Ring ditches made up 64.09% of the identified round features. Maculae represented 17% of the features and were categorised separately in order to view soil types and establish if the presentation was due to underlying soils (fig 38).

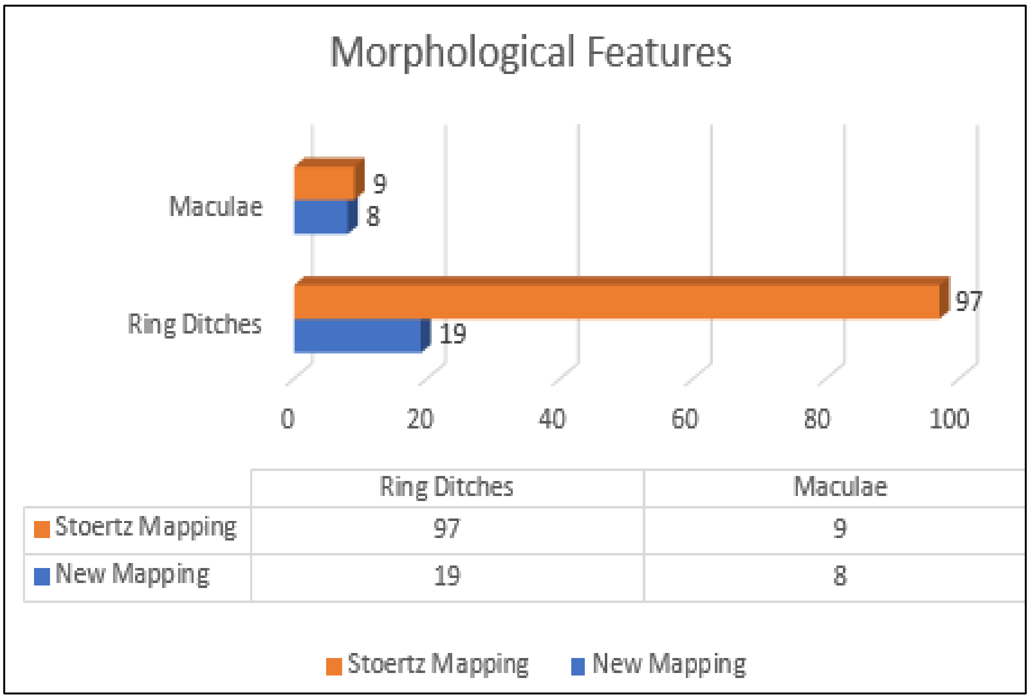


Fig 38; Bar chart classifying new features and existing Stoertz (1997) identified features

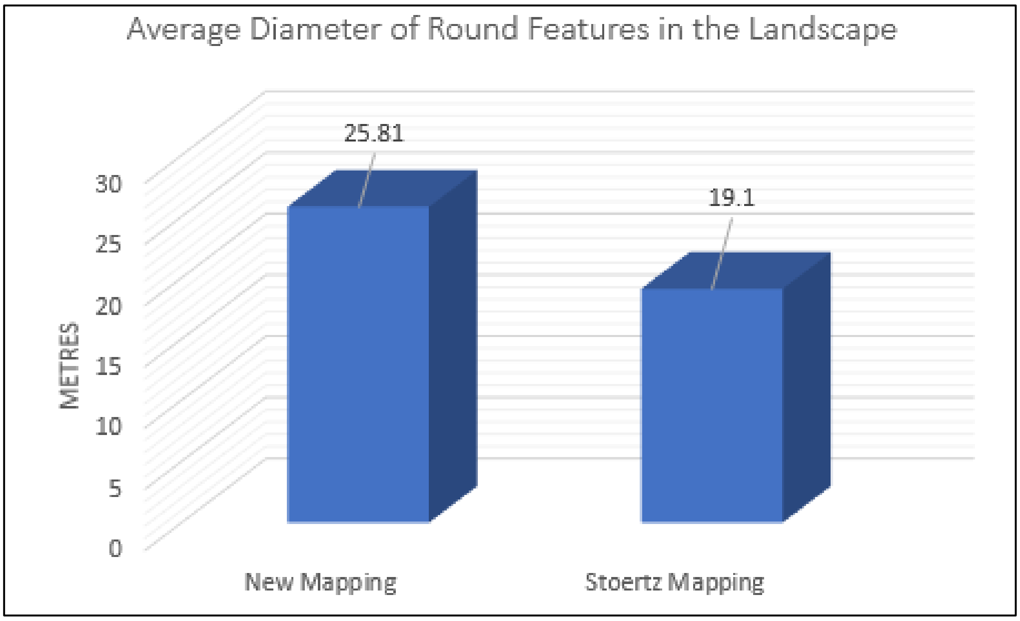


Fig 39; Bar chart illustrating average diameters of new features and existing Stoertz (1997) identified features.

The average diameter of a round barrow as classified by Stoertz (1997, 33) is 30m, although ring ditches of a smaller diameter can be also classified as round barrows (fig 39). However, Stead (1991, 17) excavated four round barrows within a square barrow site at Garton Station, of diameters between 6.2m and 4.8m, which proved to be of Iron Age date.

Halkon (2008, 86), advises caution in assigning an Iron Age date to smaller ring ditches and provides examples of small ring ditches at Warter (SE 490224 451557) which were related to the larger barrow cemeteries and of possible Bronze Age date. Further examples in the study area of small barrows in which the diameters of the ditches are recorded 9.98m and 10.9m, are noted North West of Wold House Farm (SE 490039 48686). Other barrows with a diameter of less than 10m may be considered as residential dwellings or storage facilities and should be considered in relation to other associated features.

The average diameter within the research area of newly identified curvilinear features is 25.81m, however, round features, as mapped by the Stoertz (1997) aerial survey imagery, show that round features were smaller at 19.1m (fig 39). This is a 6.71m difference which may be due to the alignment of images. Satellite imagery uses multi-layers (Bands) with different spatial resolutions, whilst aerial photographs come in a single layer. Image matching and rectification is required to select precise corresponding control points, without accuracy there can be doubt within the research (Chen, Chen and Tseng, 2016). Newly mapped diameters are measured from the outer ditch, the diameter calculation is not specified in Stoertz's survey (1997) and measurements may have been taken from the inner ditch.

4.4 Distribution patterns

As in the Neolithic period, the Bronze Age demonstrates the emergence of a social process as the clearance of land continues, which is principally believed to be for the management of woodland and for the construction of monuments. The monuments tend to be on higher ground with positioning evidently of great importance and as Lewin (1969) notes, the proximity to springs and steams may also have been a deciding positioning factor.

Jones (2008, 187) proposes Beaker burials tend to be concentrated in areas, where Neolithic round barrows are situated, demonstrating a continuity in practice. This is supported by Cooper (2016) who notes a close relationship between the Neolithic features and Bronze Age round barrows, and suggests some barrows were created to replicate historical trajectories, as opposed to the internment of individuals. There are multiple examples of barrows situated near to long barrows across the Wolds, with two examples evident at Kilham TA 056673, Willerby Wold TA 029761 (Stoertz, 1997, 23). The study area also has examples, as discussed in chapter 2, where the proposed Neolithic short parallel ditches at Thirty Acres SE 489880 452160 have later Bronze Age features within close proximity and this is also seen at Nunburnholme Wold (SE 84 NE 55)

It is argued by Field (2001, 58) that large Neolithic monuments would have provided an indication of human presence within the landscape and may have been used as land and territorial markers by Neolithic farmers. This is consistent with Woodward's theory (2000, 51) in that the positioning of Neolithic barrows are within discrete territory blocks of land belonging to farmers. Although early settlement evidence is rare and is suggested from lithic scatters favouring boulder clay areas, there is the concept that good and bad land experiences were communicated down the groups, leading to use or reuse of an area (Clay, 2001). Hence offering plausible explanations for certain distribution patterns

The positioning of barrows explains the pattern of Bronze Age domestic practice. Past discourse has produced various explanations on Early Bronze Age settlement invisibility, which have included erosion, colluvial and alluvial processes (Manby *et al*, 2003), or building techniques which have left little trace on the landscape (Bradley, 2007, 195). Brück (2012, 53) convincingly argues that early Bronze Age sites are actually non-existent, asserting the notion that the concept of 'domestic' in the western world is synonymous with structures, or alternatively a spatial and functional type of site. Therein lies the difficulty as the focus in locating settlements in the past has fixated on a pre-fixed notion of a settlement with western connotations.

Brück (2012, 60) suggests settlement is related to domestic practice, which in a westernised sphere, is defined by constructions and subsequent compartmentalisation for domestic chores, which tend to be assigned to a gender or race. However, this concept may not be common in other societies, including the Early Bronze Age. The lack of substantial evidence suggests that there was not as great a focus in this early period on material investments, as seen within the modern western world.
Therefore, the notion of occupation in the early Bronze Age may have been a fluid and mobile one, which moves across the landscape. Parker Pearson *et al* (2016) in an analysis of 264 individuals from the British Chalcolithic indicated there was a significant degree of mobility from birth until death. The archaeological record as noted by Johnston (2008, 47) notes monuments tend to be situated in areas which have provided a focus for domestic activities, common archaeological finds include burnt flint, flint knives and cooking vessels within their vicinity.

It is therefore argued that despite a lack of settlement evidence from the study area, Beaker barrows were continuing to use some of the existing Neolithic territorial boundaries and, in conjunction with the acquisition of landscape knowledge, demonstrates a continued use of preferred locations. A significant point is that Bronze Age barrows continue to have a place in an intense relationship with the landscape and the activities which took place, were so intrinsic to the culture, that the same sites are evidently reused.

Bronze Age artefacts synonymous with these events from the region, include bronze axe hoards and individual axe losses, appropriate agents for woodland management and landscape change (Gaunt, 2009, 29). Manby *et al*, (2003,60-61) notes middle and later Bronze Age metal finds have been located on sandy ridges and demonstrate the potential for metalworking being carried out along the Western aspect of the Southern Wolds. Radley (2009,23) notes a similar distribution pattern on sandy ridges in the Vale of York with possible associations of managing woodland alongside the edges of wetlands. The most remarkable artefact found is the halberd, found at Sancton, which demonstrates the skills of this civilisation in early metalworking (Gaunt, 2009, 23).

Around c.2880-2667 cal BC changes occurred in sea levels and the region experienced periods of climatic instability (Heath and Wagner, 2009, 36). The formation of peats has provided a wealth of pollen data; analysis of Coleopteran evidence from the Hasholme log boat, the Ferraby boat, Melton and Skelfrey Beck near Market Weighton were analysed by Heath and Wagner (2009, 36) to provide a paleoenvironment assessment of the Foulness Valley. The data demonstrated that the Foulness valley landscape was not uniform, rather an assortment of wetland habitats and dense vegetation cover, which is suggestive of a wetland landscape. Therefore, any settlement at this time may have been located on higher drier ground, away from the wet valleys (Innes *et al,* 2009, 35). Van De Noort (1993, 17) proposes a similar environment in the Hull Valley c.2800 BP, describing the valley bottoms as inhospitable to human settlement.

Hence the climatic instability may also be a significant factor in the influencing of the distribution pattern, which is seen across the study area. The research area barrows are situated on an elevated topography, with the average elevations of Stoertz's round features at 123.06m OD (1997) and newly identified features at 122.7m OD (see fig 40, 42 & 43). If there was any potential for further barrows to be situated on lower terrain of the valleys within the study area, colluvium on the valley floors has eluded any signs of settlements or associated features (Neale, 2009).

The choice of elevated site positions on tops of hills and ridges suggests the barrows would have commanded the landscape and could be viewed from distance (fig 40 and 41). However as noted, this is not a general pattern across the Wold, with some barrows situated along valley floors, notable examples being set within the Great Wold Valley (Stoertz, 1997, 33). An additional theory is described by Cummings (2008, 151) who, suggesting some of the Neolithic monuments with wide ranging views, are encircled by the landscape, which ensures the monument is at the centre point. Bradley (1998,) suggest the monuments circular space is representative of the wider circular landscape being a *microcosm* of the wider world (Bradley, 1998).

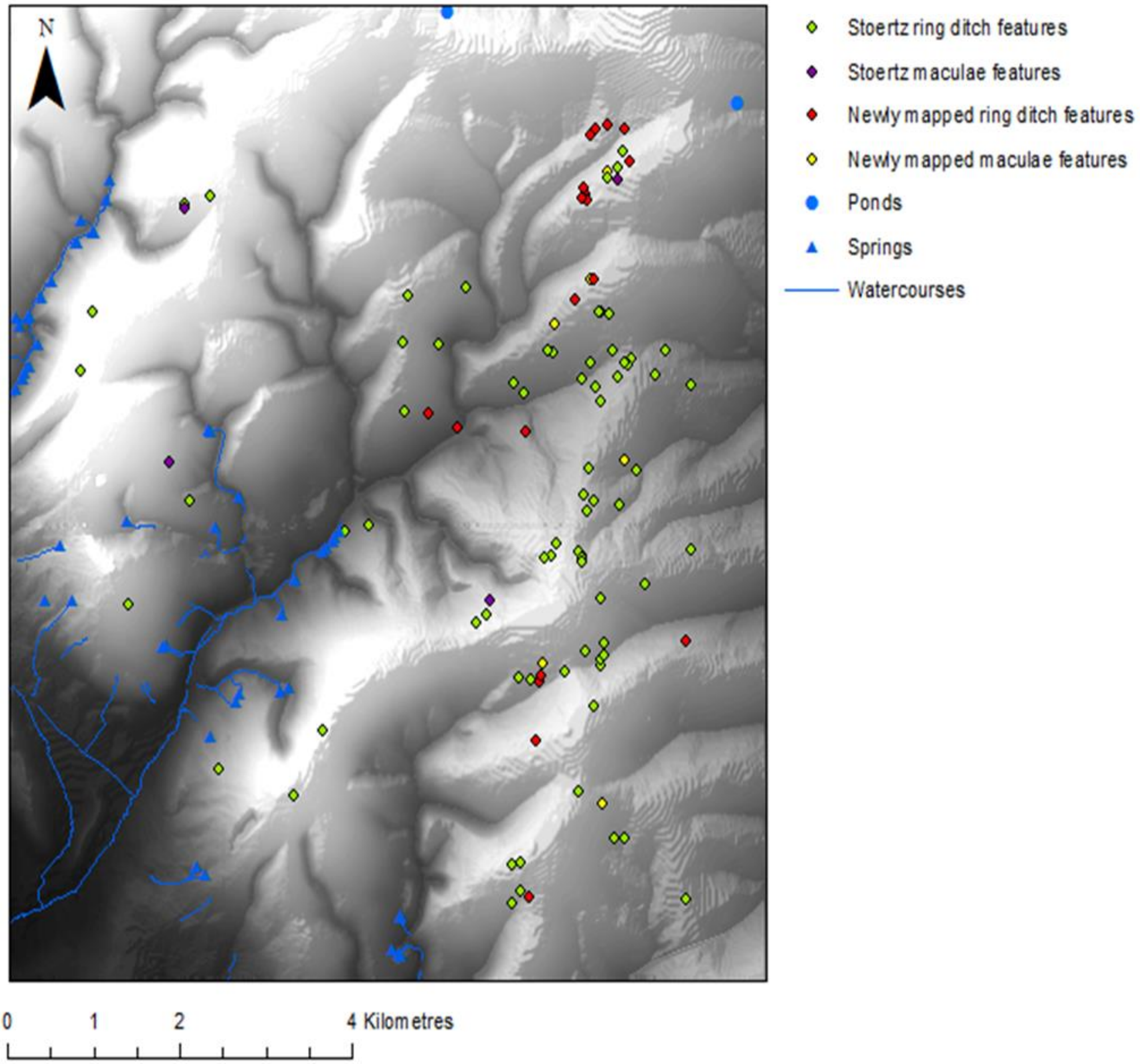


Fig 40; The distribution pattern of Stoertz and newly identified ring ditches and maculae across the research area. (A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap)10.3 software).

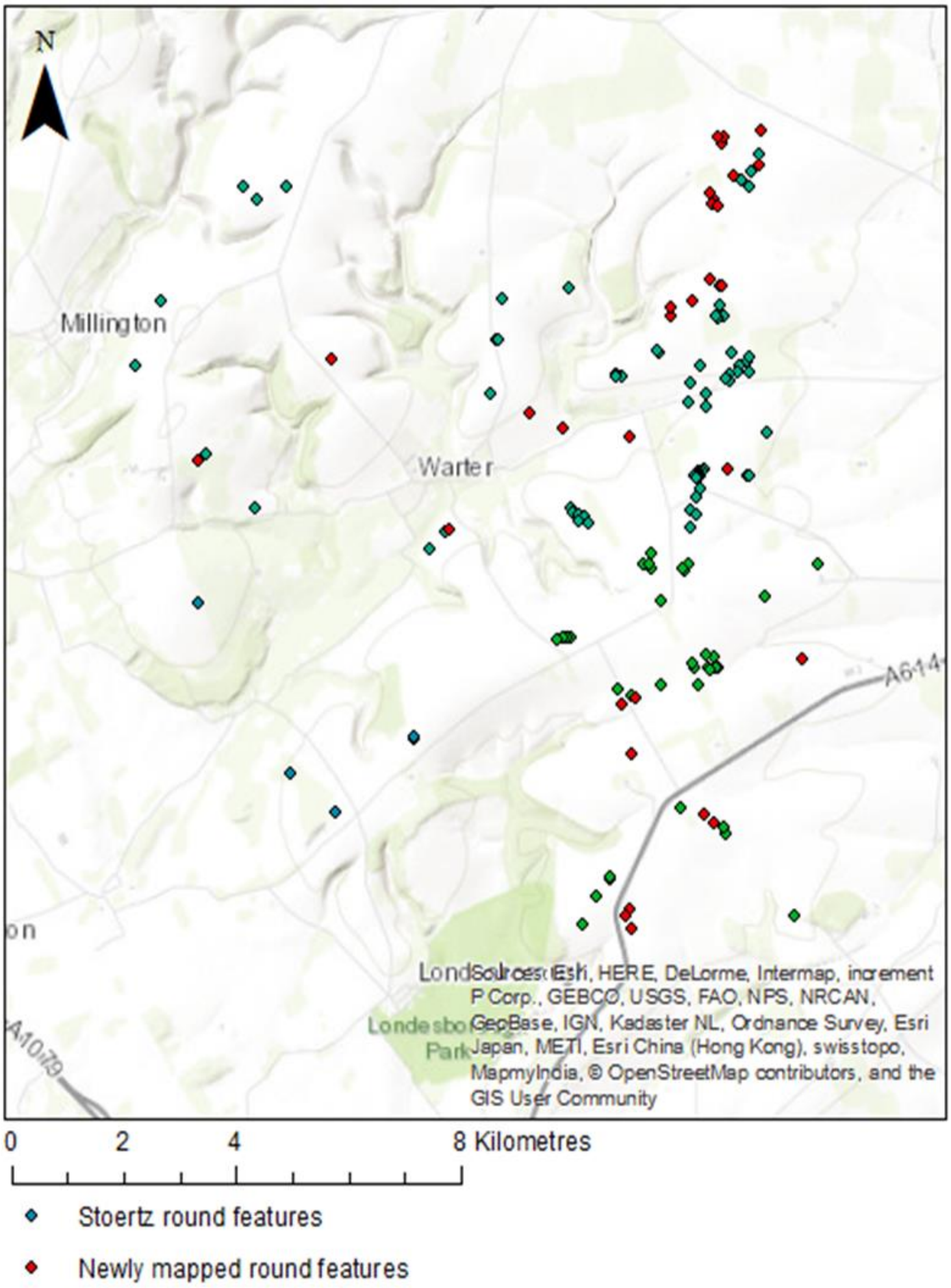


Fig 41; The distribution pattern of Stoertz and newly identified ring ditches and maculae across the research area. Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.

The barrow distribution across the research area is varied, with both single and cluster group representation, which is consistent with the Wolds general distribution patterns (fig 42 and 43). Manby *et al* (2003, 74) notes Wolds barrow distribution to be across the whole chalkland, including the slopes and valley floors, however, identifies a significant distinction between the main Wolds mass and the southern Wolds. To the South of Nunburnholme the chalk outcrop is a narrow ridge in which barrows are grouped in clusters.

The round features in the study appear as two groups; singular or in groups of two, situated near to watercourses/spring lines or as groups forming barrow cemeteries, which Historic England (2018) note would have taken place over several generations. Some barrows are clustered in small numbers within a marginal area (fig 42), whilst others are noted to be in smaller groups but with a connection to other barrows delivering a linear arrangement (fig 43).

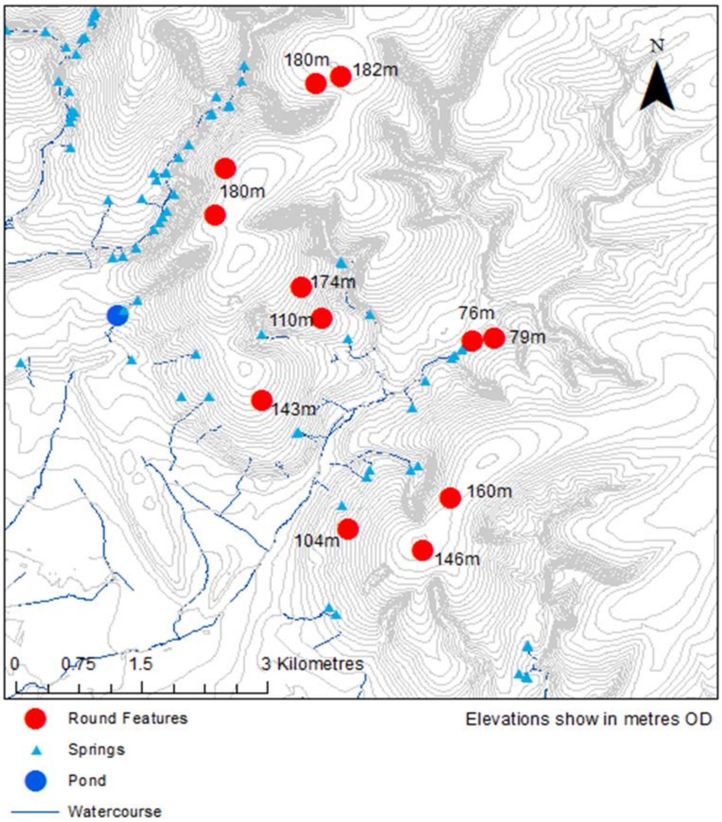


Fig 42; Round features in association with valley systems and hydrological sources (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.

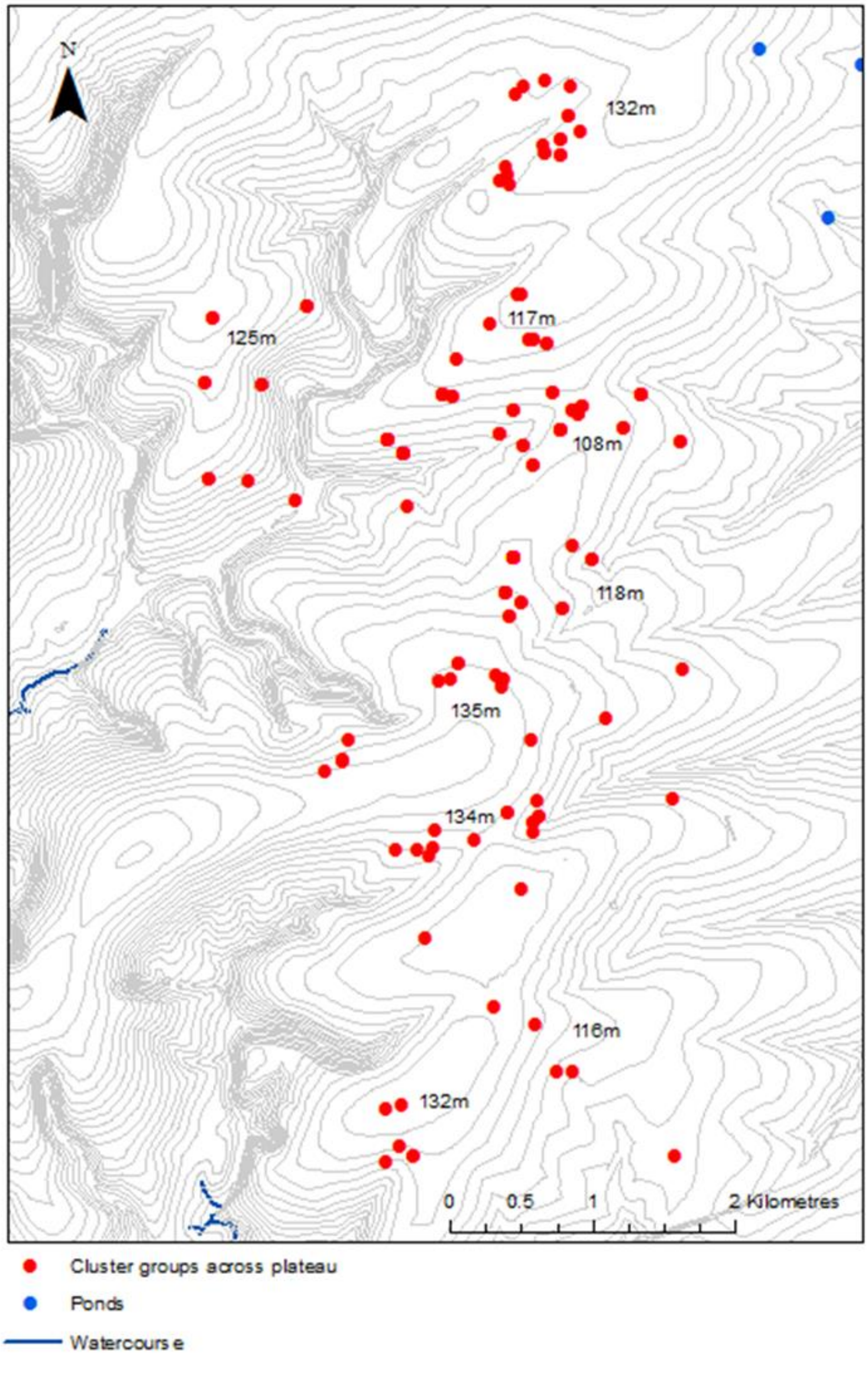


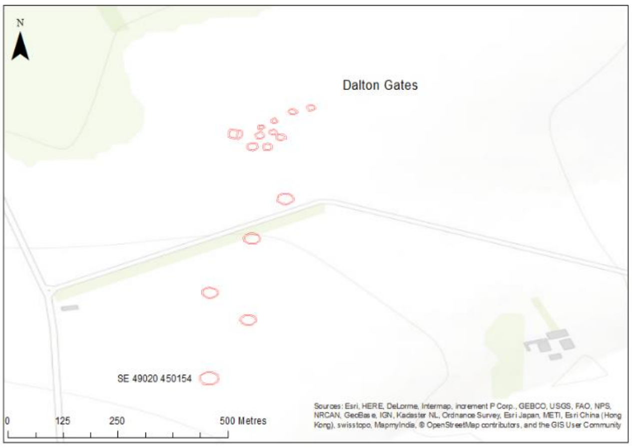
Fig 43, The linear arrangement of barrow clusters over the topography (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.

Fig 42 illustrates the barrows which are not within a cluster in the research area. They are positioned either individually or within groups of two. The barrows are situated on elevated grounds overlooking watercourses and may, in the past, have acted as territorial boundaries controlling access to the water. There is no documented excavation evidence of these barrows from Mortimer (1905) or Greenwell (1877).

Manby *et al* (2003, 60) describes how barrows were also isolated across the North Yorkshire Moors but identifies Wolds barrows to be generally distributed into groups. This theory is substantiated in the research area where barrows are in clusters across a linear arrangement, travelling along the length of the plateau, creating a barrow cemetery type arrangement. The elevations of this arrangement is shown in fig 43 and ranges from 108m OD to 132m OD providing wide reaching views across the landscape and would have been visible from the valley floors below. A common factor between both the individual barrows and the cluster groups, are that they are situated on elevated topography and have wide reaching views, however, the plateau barrow cemeteries are not located within vicinity of the watercourses or spring line.

The cluster groups forming barrow cemeteries invariably converge around the larger barrows indicative of generational landscape change (Historic England, 2018) and this is evident at Dalton Gates (fig 44).

Within the distribution across the plateau there are notable cluster concentrations at Blanch Dale Farm SE 892553, Dalton Gates SE 9075351649 and the Brambles SE 9003948686 (figs 44, 45 & 46).



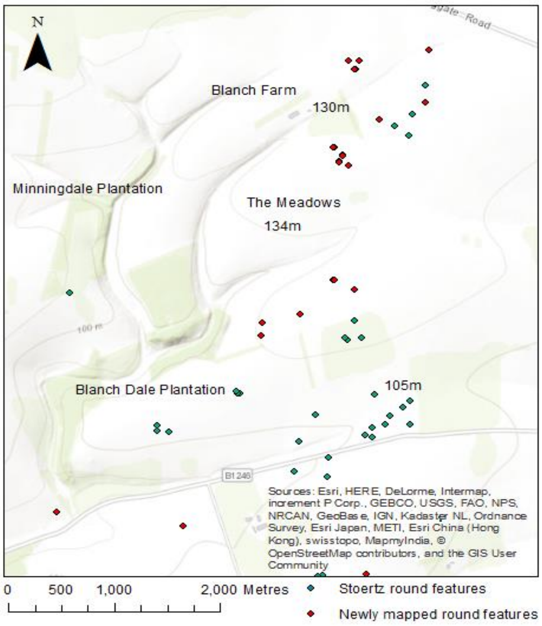


Fig 44; above; Barrow distribution at Dalton Gates (World topographic map. An EDINA supplied service mapped in ArcGIS 10.3 software). Fig 45; right, Barrow distribution at Blanch Farm (World topographic map. An EDINA supplied service mapped in ArcGIS 10.3 software).

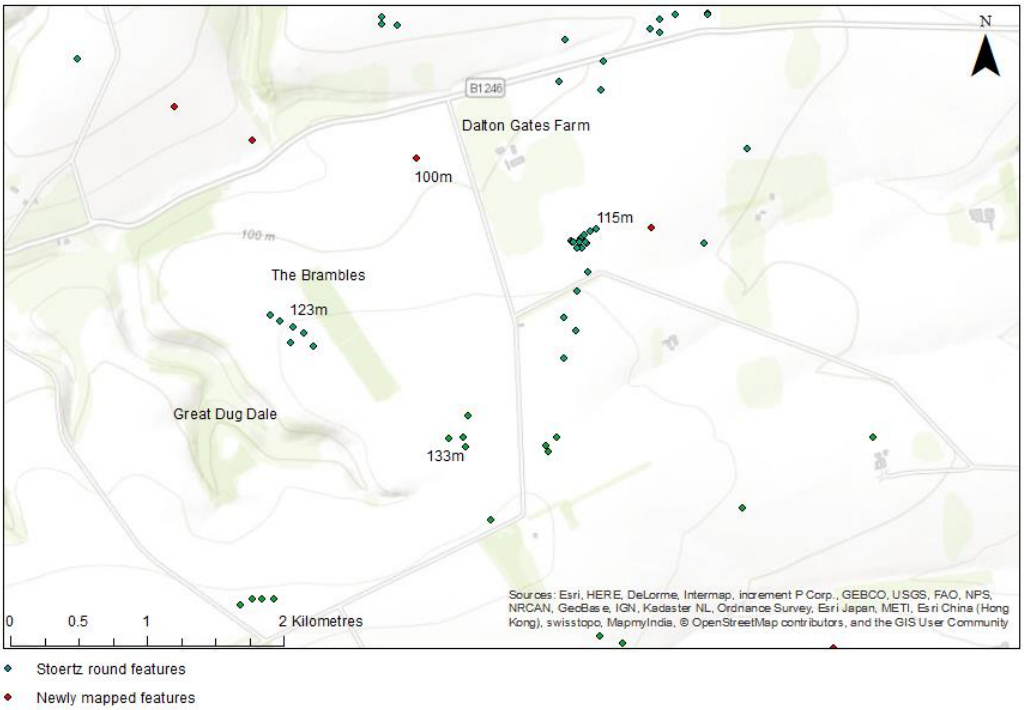


Fig 46: Barrow distribution patterns at Dalton Gates Farm (World topographic map. An EDINA supplied service mapped in ArcGIS 10.23software).

4.5 Soils

Most of the Wolds are covered with calcareous brown earths, however, this study wanted to investigate if there was a particular specific soil type used for barrow construction, and in addition, if a different soil type resulted in some barrows presenting on satellite imagery as a ring ditch or maculae that had not been seen by Stoertz (1997) aerial images.

Due to calcareous brown earths covering most of the Wolds and the free draining underlying chalk, the visibility of crop marks are good. From the soil map (fig 47) it is evident that the newly identified features are plotted over a soil type which is consistent with existing features; the main profiles being calcareous (Ac) or brown soils (pH). It is suggested that the reason they were not picked out on the original Stoertz (1997) mapping is due to the fields crop at that time. Features which present with a maculae pit type appearance, as opposed to a clear ring ditch, were also analysed for the soils type in which they are situated (fig 48). The data demonstrated that they both overlay the same soil type; therefore the underlying soils have not affected the presentation of these features to satellite and aerial imagery analysis.

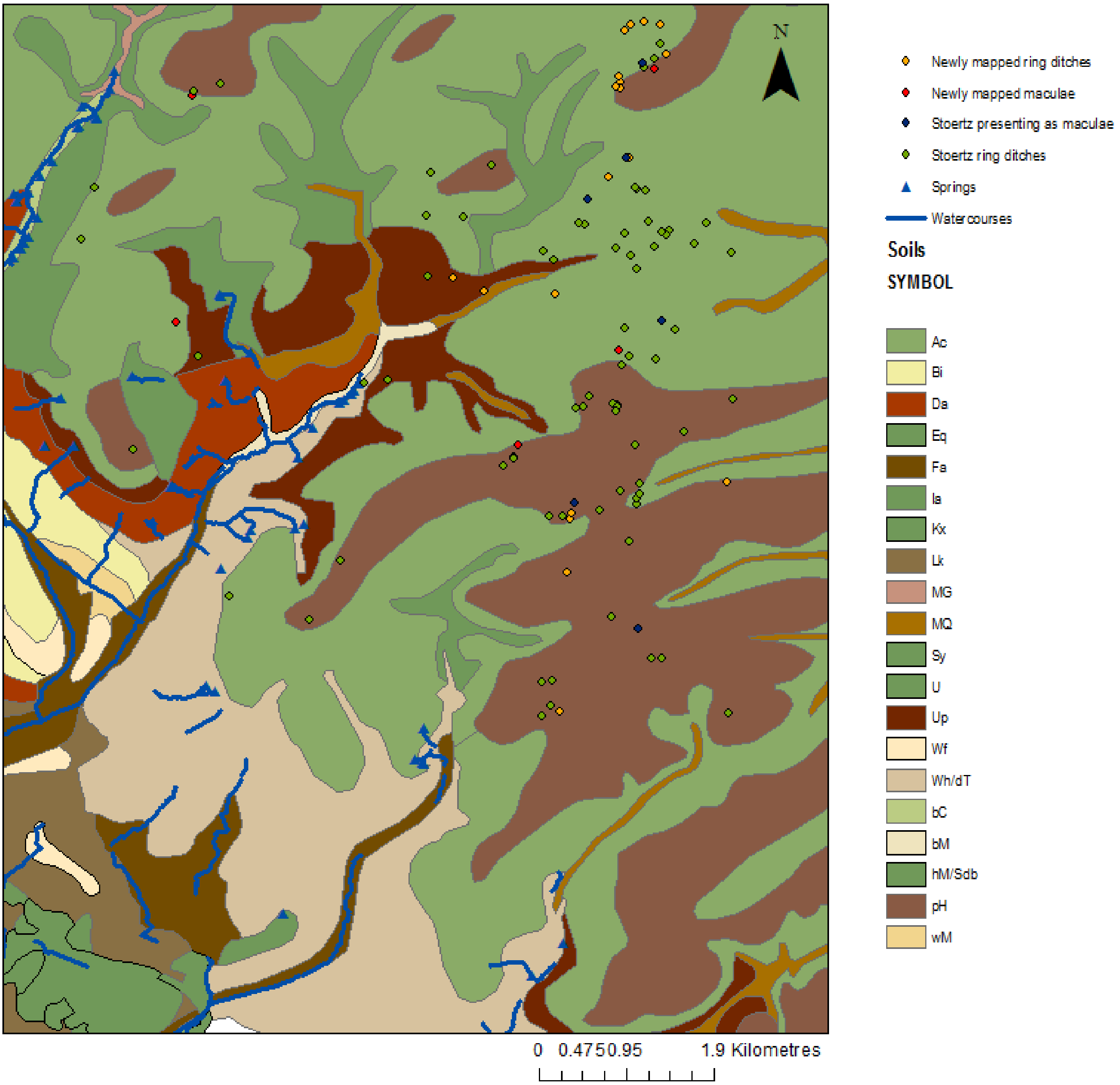


Fig 47; All curvilinear features overlying soils (after King and Bradley 1987). The letters against the blocks are abbreviated soils types and area and explained in Table 3 Chapter 2. (Shapefiles manipulated in ArcGIS 10.3 software with permission of Peter Halkon).

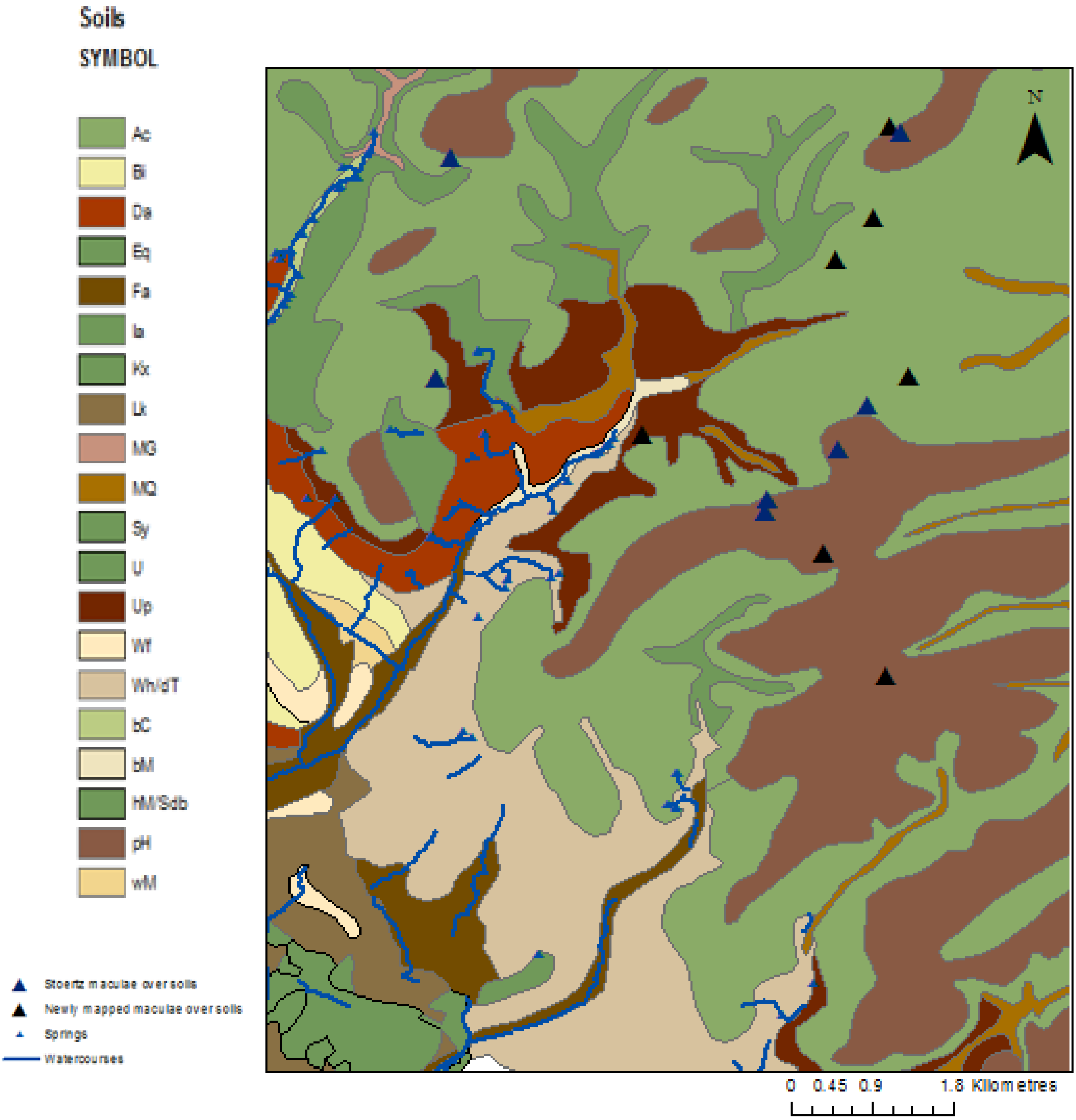


Fig 48; Maculae overlying the soil profile. (after King and Bradley 1987). The letters against the blocks are abbreviated soils types and area and explained in Table 3 (Shapefiles manipulated in ArcGIS 10.3 software with permission of Peter Halkon).

Maculae type features which include pits (Halkon, 2008, 48) are not always surrounded with a clear ring ditch on satellite imagery; however, historical documentation or aerial imagery has identified them as round barrows. Therefore, supplementary evidence is required to determine the primary purpose of a feature which present as maculae. An example is noted by Pastscapes, where two barrows near to Blanch Farm, were investigated by Mortimer but not excavated. Barrow A, as seen in fig 49, appears as a large macula but was historically documented as an upstanding and visible barrow in the landscape SE8945 55201

Fig 49; Aerial imagery of a maculae type feature visible through Google Earth and identified as a ring ditch by aerial imagery by Stoertz (1997). (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

4.6 Antiquarian Barrow excavations

The area attracted antiquarian attention; hence 19th century excavations dominate the Early Bronze Age records. Manby *et al* (2003, 75) lists excavations undertaken across the Wolds as: Boarding Dale, Burton Agnes, Cot Nab, Cowlam, Etton, Garton slack, The Hollies, Kilham, Octon Wold, Poundsworth, Rudston, Sharp Howes, Staxton, Wallington, Willbery and Wille Howe.

Mortimer's (1905) excavations include several barrows located within the study area and he refers to them in his volume *'Forty Years' Researches'* as The Huggate and Warter Wold group and the Blanch Group (see figs 50 and 53). The Mortimer Collection is now housed at The Hull and East Riding Museum, in the Bronze Age gallery (photographic images of some of the excavated artefacts are seen in fig 51/52/56/57/60/61).

The barrow excavations provided examples of barrow inhumations, in which skeletons were typically in a crouched position, laid on an east-west axis and in some instances, cremations were also interred. This is consistent with the 66 of 70 Wolds excavated barrows in which secondary burials are recorded (Woodward, 2000,23).

This section of the thesis will highlight Mortimer's (1905) excavations from the study area and key information is provided in tables 4, 5, 6 and 7.

4.6.1 The Huggate and Water Wold group

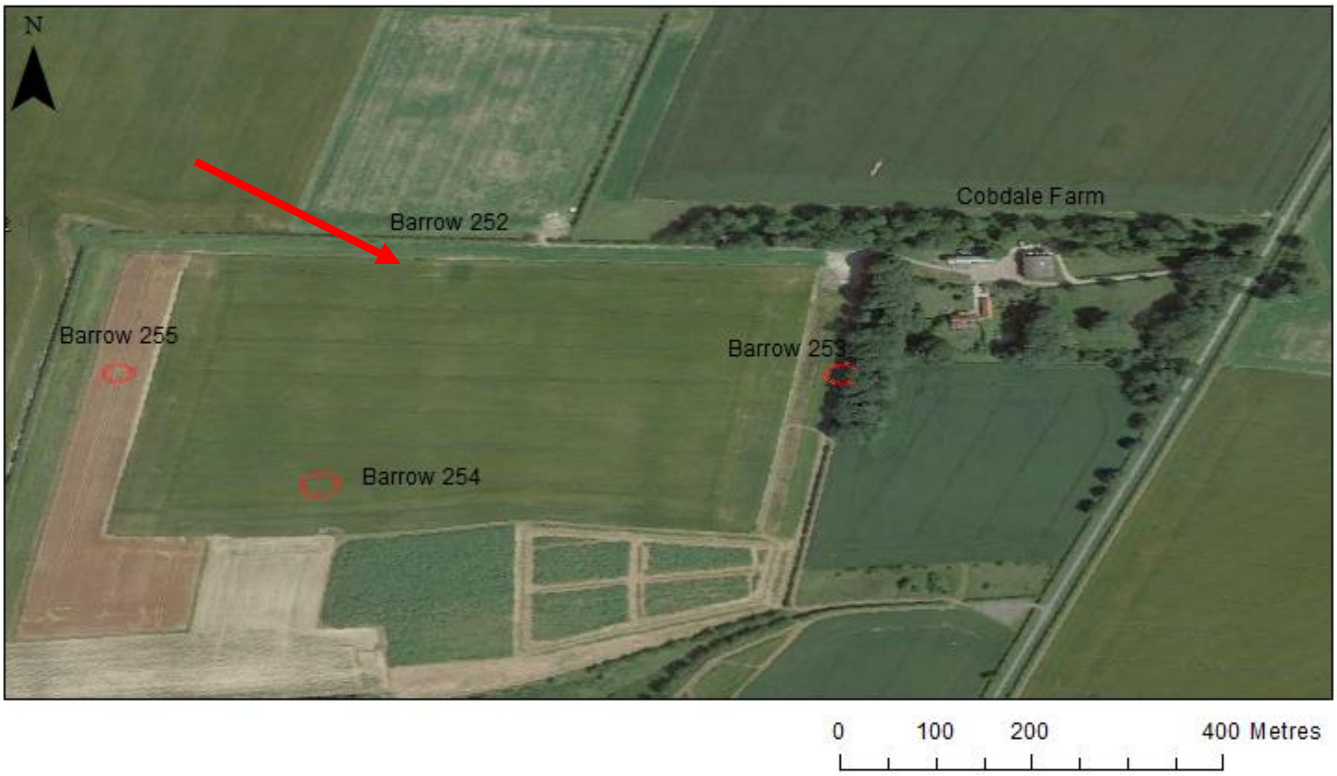


Fig 50; satellite imagery of the Cobdale Farm barrows from the Huggate and Warter Wold group (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

Mortimer, (1905, 311) documented and investigated four barrows within the research area at Cobdale Farm, barrow numbers: 252, 255, 254 and 253. Three barrows from this group were also identified by Stoertz's aerial survey (1997), however, barrow 252 was not seen on aerial imagery and therefore not mapped. It is now visible on Google Earth and presents as a maculae (see red arrow on fig 50).

Table 4: Mortimer's (1905) barrow findings at Cobdale Farm

MORTIMER BARROW NUMBER	COORDINATES	EVIDENCE	COMMENT (PLUS MHU NUMBER)
252	485460 453159	Google Earth Mortimer's (1905) accounts	Barrow no. 252 measured 13 diameters and 0.76 metres in height. The barrow had been opened by a JAS Silburn, who had excavated many of the barrows and left lead plaques bearing his name Mortimer, (1905, 31) deduced that the central grave had been lined with wood and the remains were described as: '*many broken bones of a disturbed nature'*. Remaining artefacts included flint flakes from different origins, scrapers, and five sherds from a food-vase. A more unusual find were two chalk discs, of which both had a perforation to the centre
254	485159 453034	Google earth, aerial imagery and Stoertz aerial survey (1997) Mortimer's (1905) accounts	Two crouched adult inhumations accompanied by two drinking vessels (fig 52) A further third inhumation missing the complete right arm Three inhumations visible, Mortimer concluded they had been buried together before any mound was created. Burnt soils of ashes and woods and calcined bone, plus a human foot, were also evident within the grave.
253	485460 453159	Google earth, aerial imagery and Stoertz (1997) aerial survey	Opened initially by JAS Silburn; 17 metres in diameter and 0.76 metres in height and had contained two graves, which at the time of Mortimer's excavations, contained disturbed skeletal remains. Artefacts included shards of pottery and black flint sling stones and splinters. MHU 4604 Scheduled Monument no: 2118
255	485164 453085	Google Earth Mortimer's (1905) accounts Stoertz (1997) aerial survey	Smaller than 253 and as previously, had been opened by JAS Silburn (fig 51). Mortimer (1905) notes an adult inhumation and a large flint knife Adult skeleton, flint flakes and flint knife (Hull museum) MHU 4624 Scheduled Monument no: 2118

Fig 51; A plaque left by JAS Silburn (Hull museum Accession NO: 2011.195.2

Fig 52; Barrow 254 beaker, decorated with three raised lines at lip and decorative comb lines (Hull museum Accession NO: 2011.195.2)

4.6.2 The Blanch Group

The Blanch group contained 28 barrows lying parallel within the Huggate Wold group at a two-mile distance (fig 53). As with the previous group, many had been opened by JAS Silburn before Mortimer (1905) began his investigations. Mortimer (1905) identifies two different and distinct types of internments within the group, inhumations and cremations and documented entries of his investigations at the Blanch Farm group. Those containing any skeletal remains and flint are noted overleaf in Table 6 and 7.

The study has identified three main groups; A B and C to provide a cohesive explanation of the excavation information (fig 53).

Fig 53; satellite imagery of the Blanch group barrows. (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

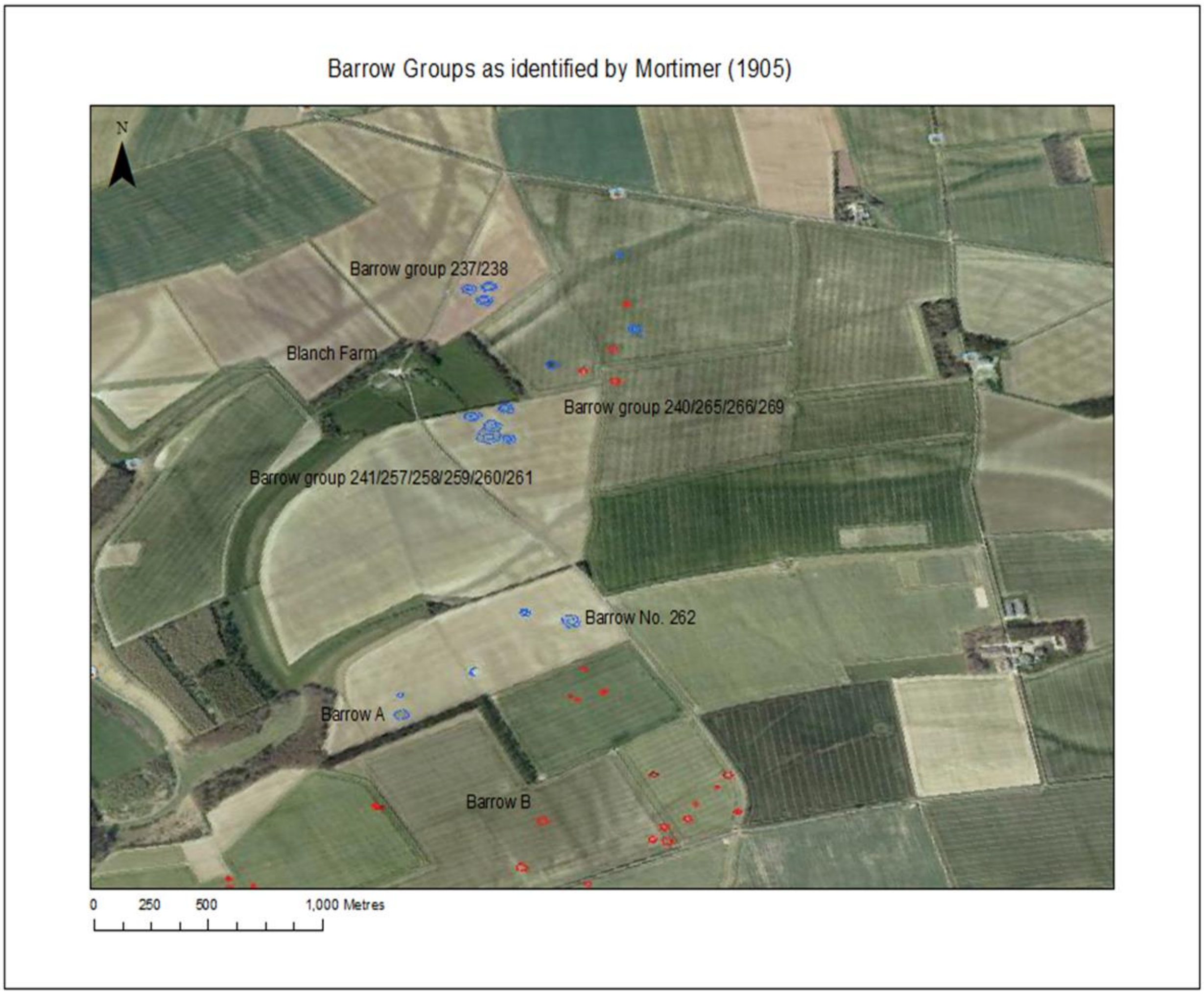


Fig 54; illustrates the barrow excavated by Mortimer (1905). The red barrows are mapped by Stoertz (1997) and the blue are newly identified features from satellite imagery of which many have been investigated by Mortimer (1905). (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

Fig 54 illustrates how several archaeological methods are required to present a full landscape picture. Barrows in blue have been plotted through the aid of Satellite imagery, some of which were also identified by Mortimer. The red barrows were documented in the aerial survey by Stoertz (1997).

Table 5: Barrow group A at Blanch Farm

MORTIMER BARROW NUMBER	COORDINATES	EVIDENCE	COMMENT (PLUS MHU NUMBER)
241	489829 453117	Google Earth 6” OS 1885-1900 Mortimer (1905)	Used for habitation prior to its use as a grave, in which a collared cinerary urn with round shoulder, concave neck, everted collar and simple rim was placed containing a cylindrical mass of black matter and burnt wood
257	489773 453138	Google Earth 6” OS 1885-1900	Two disturbed graves, calcined bone. Two hand struck flint chips. MHU 14565Scheduled Monument no:21100
258	489807 453244	Google Earth	Opened by JA Silburn Shallow grave with urn Disarticulated bone MHU 14564 Scheduled Monument no: 21101
259	489807 453244	Google Earth 6” OS 1885-1900	One adult inhumation, four flint chips and two scrapers MHU 14566 Scheduled Monument no: 21102
260	489825 453183	Google Earth 6” OS 1885-1900	Disturbed internment, flint knife, two flint scrapers MHU 14567Scheduled Monument no: 21102
261	489829 453117	Google Earth 6” OS 1885-1900	Fragmentary adult bones, oval knife, two flake scrapers and three flakes. MHU 14568

Barrow group B

To the north of the group Mortimer (1905, 326) notes barrows 237 and 238. On the OS map 1888-1913, both tumuli are identified. On Google Earth and Bing maps, there are three round barrows visible, of which none have been shown on the Stoertz (1997) aerial mapping programme. These may have been upstanding at the time of the survey. Recent aerial reconnaissance clearly shows the outline of barrows 237/238 and the third barrow (fig 55)

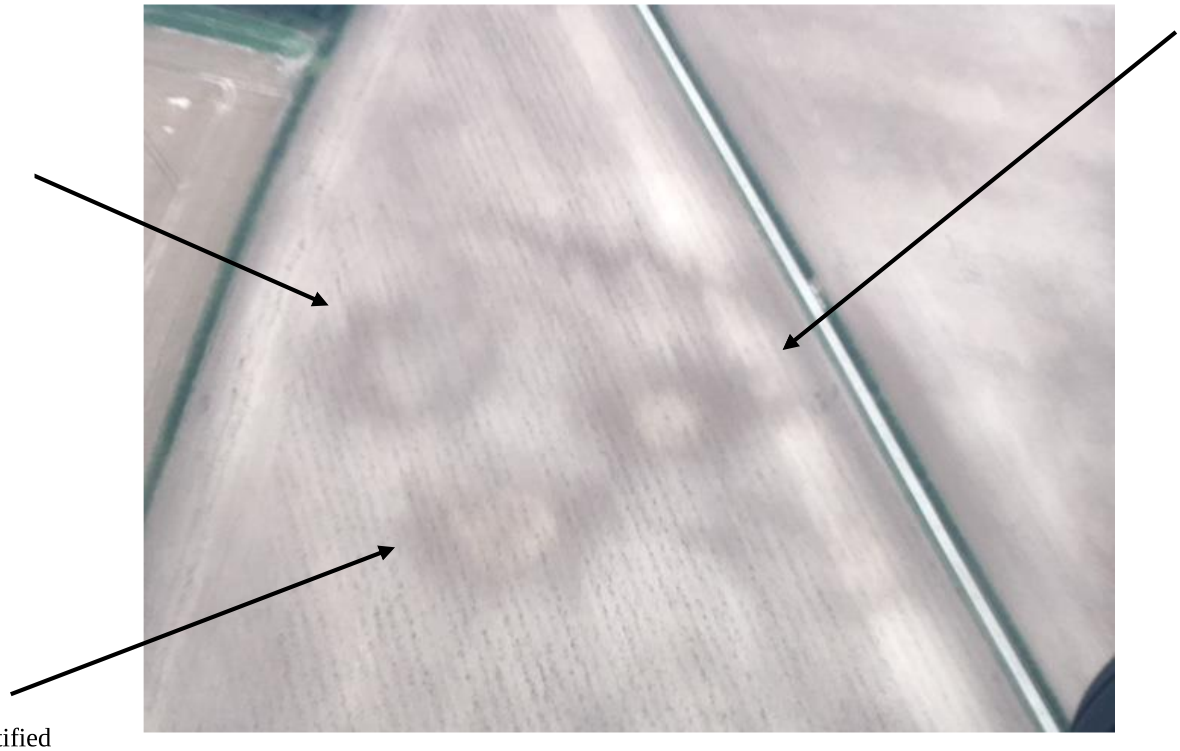


Fig 55; Aerial survey over barrows 237 and 238. Whiteley (2018)

Fig 56; Food Vessel from barrow 238 with groove decoration and a conical oval jet button (Hull museum) KINCM:1942.504

Table 6: Barrow group B at Blanch Farm

MORTIMER BARROW NUMBER	COORDINATES	EVIDENCE	COMMENT (PLUS MHU NUMBER)
237	489930 453806	Google earth, and aerial reconnaissance 6" OS 1885-1900	4 inhumations, of which one was a teenager, one adult and two children; in addition, there were food vessels with cord-like impressions, bones of a pig and another smaller animal.
238	489875 453743	Google earth, and aerial	2 couched adult burials, animal bone, dismembered human bones, jet button,

		reconnaissance	triangular flint knife Possible underground habitation similar to barrow 241 Diameter 60ft MHU 7631Scheduled Monument no: 21125
3rd barrow	490078 453846	Google Earth and aerial reconnaissance	Third barrow as seen on fig 55

Fig 57; and 58; A Flint scraper and a sandstone boulder with evidence of use as a hammerstone for polishing, excavated from barrow 237 (Hull museum, KINCM 1942: 503a, KINCM 1942:341.7)

Barrow group C at Blanch Farm

The final group at Blanch Farm are the barrows; 240/ 265/266/269 (fig 59)

Fig 59; Barrow group C as seen from aerial reconnaissance (Whiteley, 2018)

Table 7: Barrow group C at Blanch Farm

MORTIMER BARROW NUMBER	COORDINATES	EVIDENCE	COMMENT (PLUS MHU NUMBER)
240	490253 453602	Mortimer(1905) Stoertz (1997) aerial survey	Large adult male. Barrow 60ft in diameter Flint knife (fig 61) and flint flakes Brown soils with stone scatter remains MHU 4611SMR 21104
265	490198 453438	Mortimer (1905) Stoertz (1997) aerial survey	15 diameters and contains the bones of an adult skeleton. Dark matter beneath the skeleton, presumably the remnants of decayed wood. Food vessel with handle in cross form (fig 60)
266	490187 453324	Mortimer (1905) Stoertz (1997) aerial survey	Cremated bones Food-vase of cinerary urn type Collared vessel, food vessel and handled food vessel Flint scraper Initially opened by JA Silburn in February 1852 MHU 4611SMR 21107
269	490083 453337	Mortimer (1905) Stoertz (1997) aerial survey	No internment Was 120ft in diameter reduced to 80ft had originally encircling ditch MHU 14569SMR 21105

Fig 60; Right, a Food vessel with handle (Hull museum KINCM: 1942. 506)

Fig 61; Left, A Plano-Conex flint knife found close to the right shoulder of a human burial (Barrow 240. Hull Museum KINCM: 1942.378)

Barrow 262 is of interest, lying south of the other groups and according to Mortimer (1905), smaller in circumference than the other barrows within the group. The mound contained an urn and the cremated bones of a young adult. Associated goods included a large flint scraper. Barrow 262 is situated near Barrows A and B, which are evident on OS 6” 1911 maps but not excavated. In addition, there is a chalk pit noted on the OS maps (OS 25” 1892-1914) and a barrow situated around a chalk pit (OS 25" 1892-1914). As noted in the Neolithic chapter, there are also a pair of parallel ditches, which this paper suggests may be a previous long barrow site. This field, in its complexity, would benefit from further research but is a possible example of continued use of a sacred site.

In addition to Mortimers (1905) investigations, a further three barrows were identified by Greenwell (1887) in his works 'British Barrows', documenting the research area, one and a half miles to the north of a cluster barrow group on Goodmanham Wold. He notes two have been opened but a third remained untouched by the plough. He excavated the barrows and found the disturbed bones of a young adult, six feet from the centre and at the central point a grave containing the bones of a child, noted to be around 12-14 years of age, lying on its side, the head on a south east axis, with a food vessel decorated with cord impressions. In addition, he found another grave within one of the removed barrows containing the body of a male in his twenties, with remains of wood beneath the skeletal remains. These barrows are not mapped by Stoertz (1997), however, the writer has identifed barrows (C149 and C148 in appendicies) which are quite possibly the barrows Greenwell alludes to. The barrow C 149 diameter is consistent to the first barrow Greenwell notes. Barrow C148 is within close distance, although smaller. Greenwell makes no mention to its size. These barrows lie near the defensive feature at Kipling House Farm.

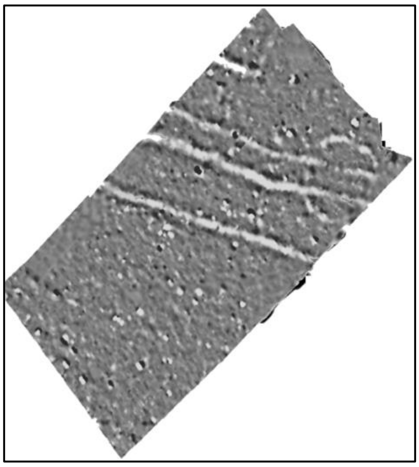
Material culture, in association with a strong inhumation tradition, identified from barrows, indicate the Beaker tradition. Manby *et al* (2003, 61) advises ceramic beaker pottery to be the only pot associated with burials and notes 25-30% of Wolds barrow excavations have some ceramic association. This applies to the research area barrows where the barrow excavation has produced pottery. Manby *et al* (2003, 61) identifies associated pottery with 'rich' graves.

In addition to the ceramic pottery the barrows have revealed other artefacts including flint, jet and bone. In addition to finds from barrows, evidence of early Bronze Age human activity is noted from the parish of Warter; a white patinated flint, a possible knife at Thirty Acres (SE 9051) and a pale cloudy grey flint fabricator, near to Blanch Farm (SE 8953). These have been dated to the early part of the Bronze Age (NLM-6208F3 and NLM-61E705, Portable antiquities).

4.7 Present Day Barrow Research

Modern day research has excavated two further barrows in the research area at Nunburnholme Wold. The first large barrow, noted on the first Edition Ordnance Survey map, was also identified through aerial photography (Stoertz, 1997) and more recent aerial reconnaissance in July 2018 (fig 62) (Whiteley, 2018). However Halkon (2017) notes the feature is potentially a hengiform (fig 62 and 63).

Fig 62; Aerial photograph outlining faint circular barrow – red arrow (Whiteley, 2015)



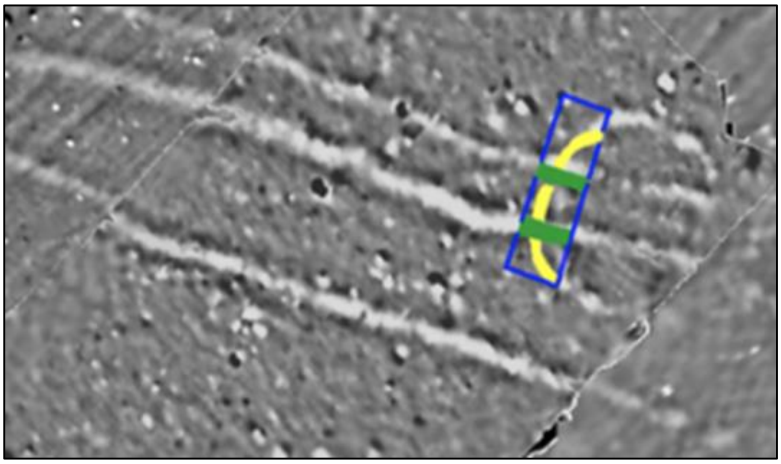


Fig 63; Geophysical survey of the large Bronze Age Barrow at Nunburnholme Wold and Fig 64; the 2015 excavation trenches (unpublished geophysical survey, Lyall, 2014.

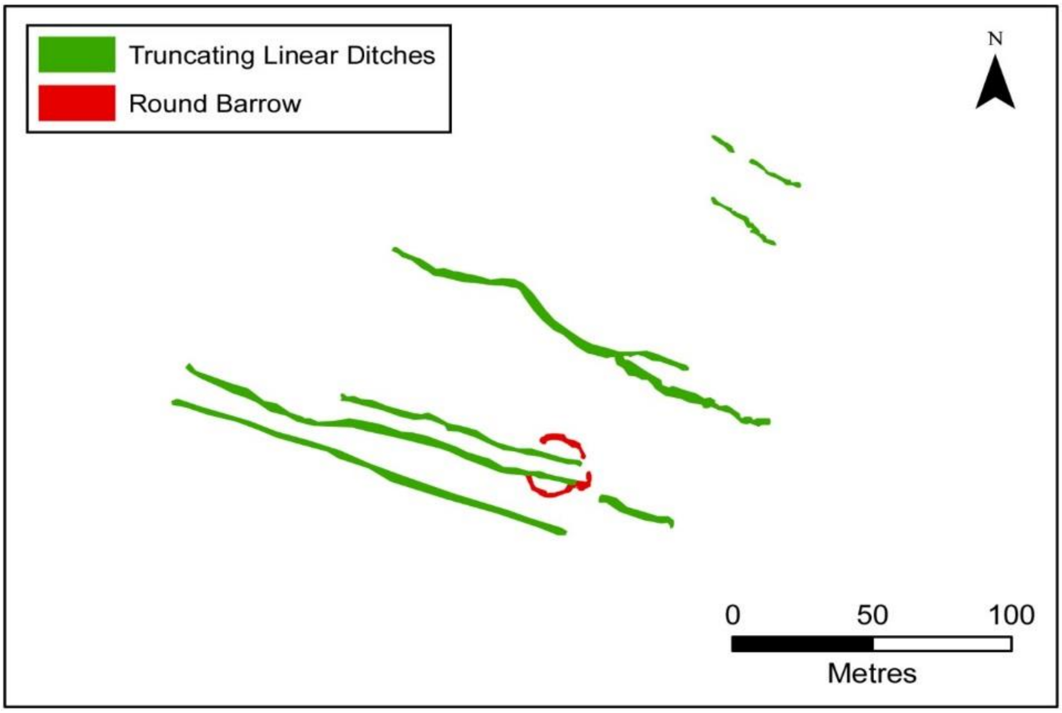


Fig 65; Mapping of the large Bronze Age Barrow at Nunburnholme Wold and the 2015 excavation trenches (unpublished geophysical survey, Lyall, 2014, mapped in Auto CAD map 2008 software (Whiteley, 2015)

A geophysical survey carried out by James Lyall of *Geophys.biz* in 2014, illustrates the large circular ring ditch feature, which is truncated by two linear features. The ring ditch measures 20.18m in diameter and is situated at an elevation of 165m OD. Excavations in 2015 opened a trench as seen in fig; 64.

The trench exposed the arc of the ring ditch with the two linear features. Halkon and Lyall (2017) suggest this feature may be a round barrow or, a hengiform feature from the later Neolithic. The ring ditch is the earliest feature which appears to have been truncated later by parallel ditches, this is argued to be a sign of land and territorial division and will be discussed in further detail later in this chapter. There is a small pit below the right-hand ditch, of which its purpose is unknown.

Half of a perforated stone axe was discovered on the edge of the western linear feature which Halkon and Lyall (2017) suggest may have been disturbed from the ring ditch (see fig 66).

Fig 66; Excavated stone axe (Halkon and Lyall, 2017)

Later excavations in 2016 focused on the penannular feature as seen in figure 67. A trench (CC) was opened over a penannular feature, which was 10m in diameter (fig 69). In previous work, Whiteley (2015) argued the potential for this feature to be a roundhouse and indicated settlement at Nunburnholme Wold, due to its smaller diameter, which measures less than 10m in diameter. Evidence was drawn from Stoertz (1997, 33) who noted barrow diameters across the Wolds average at around 30m. However, excavations in 2016 provided evidence that the brown soil, which was a few centimetres under the modern soils, indicated the remains of a round barrow mound (Halkon and Lyall, 2017). This is consistent to the 1500 ring ditches recorded across the Wolds, which includes a proportion of the smaller ring ditches representing round barrows (Stoertz, 1997, 33).

The feature demonstrated several stages of activity which includes the insertion of a fence or palisade, evident from a slot like feature, which had been cut through the primary ditch. Halkon and Lyall (2017) argue that the lack of a burial does not deter from the feature being a round barrow and suggests the internment would have been a cremation within a pot. There was a rim sherd of a collared urn at the site, of the decorated type, which T Manby identified to be of Middle Bronze Age (fig 68).

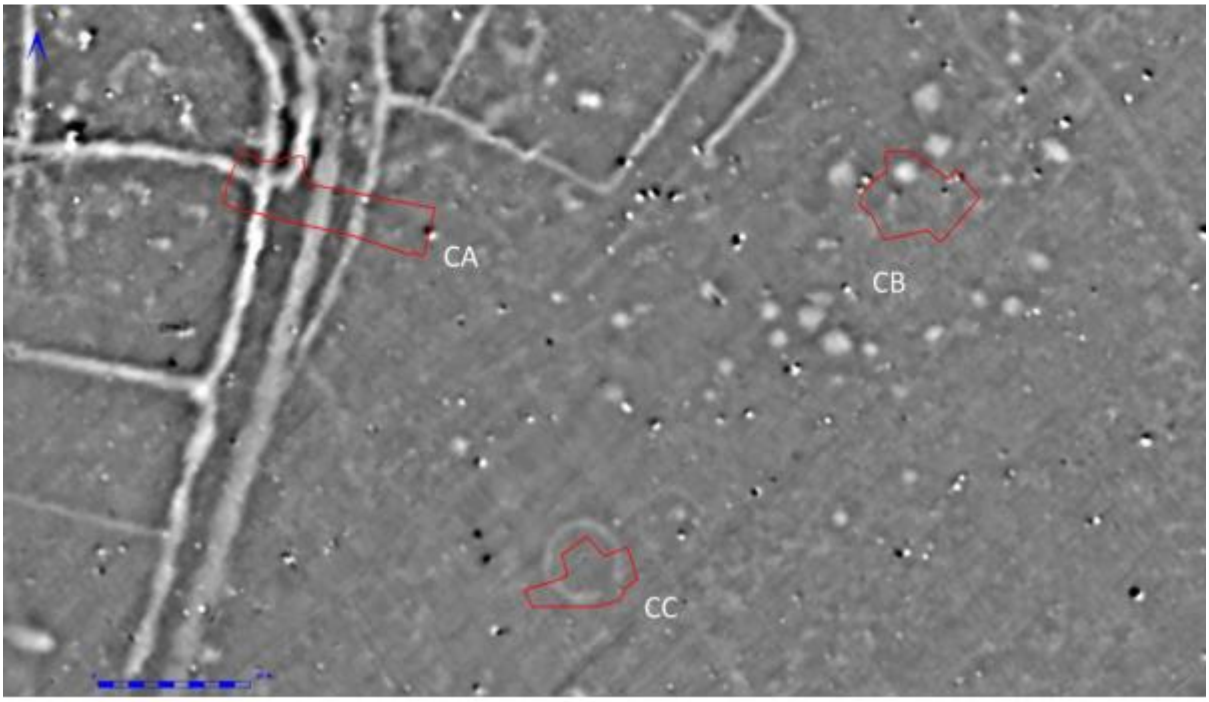


Fig 67; Unpublished Geophysical survey (Lyall, 2014) identifying trench CC

Fig 68; (top left) A sherd from the rim of a Bronze Age collared urn from the ring gully in Trench CC (Halkon and Lyall, 2017) Fig 69; (top right) Aerial photography of the ring gully in Trench CC (Drone photo; Steve Barker in Halkon and Lyall, 2017)

To conclude, the evidence of the barrow distribution, ceramic pottery and the barrow concentration favouring brown earths, are consistent with the general patterns across the Wolds (Manby *et al*, 2003, 61). Evidence has demonstrated the importance of earlier Neoltihic sites, in the positioning of later Bronze Age barrows and continuation of an area. In addition topography is a key factor in the distribution patterns. The plotting of these features requires a multi-method approach in order to fully understand the complexities of the distribution patten. The excavations from antiquarian and modern day research provides data which enables a bigger picture of the Bronze Age community to be built.

4.8 Bronze Age Landscape and Societal Changes

The Later Bronze Age landscape undergoes significant changes, demonstrated through the emergence of a social process, which involved the continued clearance of land, which was principally believed to be for the management of woodland and for the construction of monuments (Manby *et al,* 2003, 60-61).

The emerging landscape picture suggests much of the woodland that had existed in the Neolithic period had been cleared by the end of the Bronze Age. Gaunt, (2009, 25) notes that during this period much of the Wolds would have been deforested and wood would have been sourced from the lowland areas.

The linear earthwork system which was created during this time also advocates a more open landscape. A report commissioned by Mr. Soanes (2014), prior to an extension to a potato grading agricultural storage business, was carried out by East Riding Archaeology on land within the study area, to the west of Wold Dyke Farm, Market Weighton Road, Middleton on the Wolds. An evaluation trench 30m by 2m wide was opened over one of the ditches of the Great Wold Dyke and is considered to be Bronze Age in date. Bulk sediment samples were obtained and exhibited a restricted suite of taxa. Each sample was dominated by taxa that prefer dry, open ground such as short tufted calcareous grassland, which included *Vallomia, Vertigo pygmaea, Cochlicopa and Pupilla muscorum.* Foster and Carrott (2014) notes the assemblage is suggestive that the landscape during this period on the higher Wolds appears to be short grassland with areas of bare ground and no substantial vegetation in the immediate vicinity.

A similar vegetation history is evident at Nunburnholme Wold, Site Code NUN 14, also within the study area, where five Sediment samples from a ditch and a pit fill were obtained and analysed. These deposits included charred plant remains of indeterminate charcoal, seeds and grains grass, as opposed to cereals and molluscs. The sediments inferred a vegetation history of a dry environment short-turfed, calcareous grassland. One of the contexts reflected a damper, shaded environment indicative of a greater vegetative cover e.g. woodland/scrub or hedgerow environment. Mollusc assemblages also indicate dry conditions with no standing water (Carrott *et al*, 2015).

The most significant changes to the landscape during the later part of the Bronze Age period are reflected by the construction of defensive structures, linear ditches and settlement patterns. The linears, known locally as dykes, were substantial structures which appear to slice the land into blocks across the Wolds and as Ferraby *et al* (2017, 11) note, they represent land division on a major and visible scale. It is difficult to ascertain what function these linears have served over history and their usage may have altered over time. Ferraby *et al* (2017, 15) notes there is a difficulty in distinguishing the morphology of dykes from trackways and suggests their histories have been interwoven.

The English Monuments Class description defines linear boundaries as

"man-made features, comprising single or multiple ditches and banks, which continue for distances varying less than 1km and over 10km. In profile the ditches are either V shaped or U shaped, whilst their dimensions range between 1.5km to 6m wide and between 0.4 and2.0m deep. The banks are simple dump construction and where they survive rarely exceed 0.5m in height or a width of 3.0m. Prehistoric linear boundaries may be identified in the field as low earthworks, though in many cases have been ploughed out…. they may be visible as crop or soil marks on aerial photographs" (English Heritage 2018).

Fenton-Thomas (2003, 36) notes the dating of linear features is problematic, advising any long-distance boundary would have undergone many phases of reuse and adaption, and hence re-cutting the ditches would have removed any potential datable materials. However, as more dating evidence has become available, the Late Bronze Age appears to have been the defining period of a substantial increase in land division, through the construction of ditches (Fenton-Thomas, 2003, 37). The construction appears to continue through into the Iron Age as noted by Dent (1983) in his excavations at Wetwang and Garton Slack, where evidence of linear feature construction is apparent. Stead's (1968) excavations at Cowlam also provided evidence of Iron Age linears, noting a double linear ditch truncated the ditches of a square barrow.

The arrangement of the linear ditches across the Yorkshire Wolds are complex and varied. The densest concentration as noted by Fenton-Thomas (2003, 37) are situated in the central Wolds between Driffield and Millington. The dykes respect the contours of the land, whilst others lead from the elevated topography, down steep valley sides, into the valleys. On higher ground they appear to radiate from Hillforts, this is evident at the defensive site at Paddock Hill, Thwing, where three major dykes converge on the area (Ferraby *et al*, 2017, 15). The study area linears appear to be consistent in their appearance and function as elsewhere across the Wolds (fig 70). Each plateau overlooking the valley has either a double or triple linear running along the valley systems, giving the impression of a sectioning-off of large areas and access to water. Linears do not tend to run along the valley floors and this is a generally recognised feature of all linears across the country (Johnston, 2008, 104).

For the purpose of this research the linear features have been sectioned into several categories which include triple, double and single linears as in line with Stoertz (1997). In addition, the double linears are further sub divided into two classifications for this study; land boundaries, and secondly, linears associated with enclosures, which have subsequently developed into ladder settlements. This is often seen across the Wolds, for example the Thwing ladder settlement was dated to a later date and therefore, it is argued, the major Maidens Grave-Thwing dyke was initially land division and a possible trackway (Millett, 2003, p227).

The aim of this section is to understand to what extent the topography, soils and watercourses have influenced the features and why some linear features run across swathes of land and why others subsequently develop a string of rectilinear enclosures. It is not the intention to discuss at this point the chronology and division of the landscape, this will be addressed in the discussion chapter of this study.

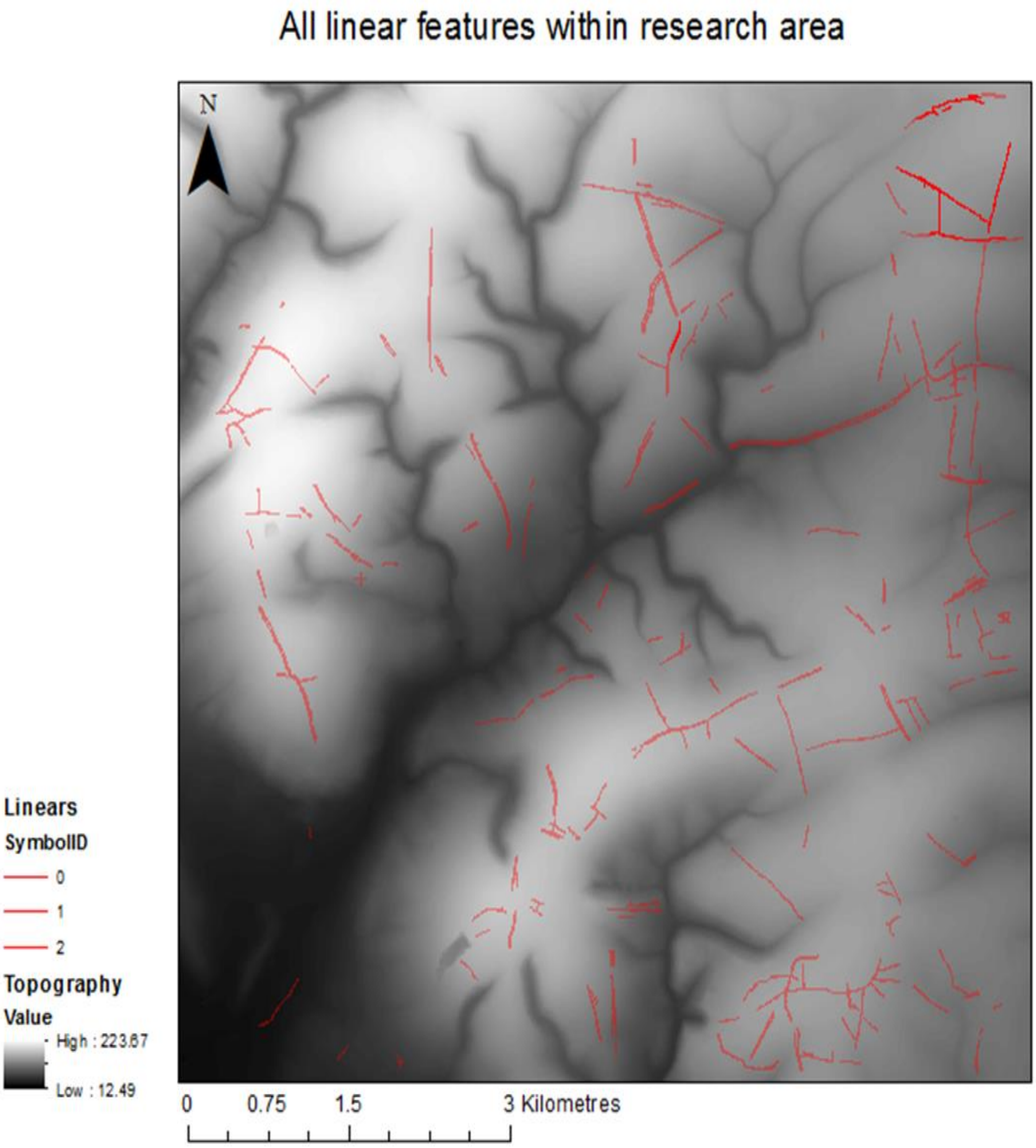


Fig 70; illustrates triple and double linears over the topography (A merged raster data set of the research area illustrating the valley systems Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

4.8.1 Multiple Linear Features

Perhaps the most impressive linear features on the Wolds are those at Huggate Dykes (SE857558 to SE865561). This large and impressive linear consisted of 6 ditches and 5 banks, some of which stand at a height of 2m. Halkon (2008, 56) notes such earthworks are rare. Figure 71 illustrates the linears in the study area which appear at points to be triple, plotted at Northdale plantation SE 8420251550, a section at Loaningdale SE 8800348751, Londesborough Fields SE 8744346534 and Sky Gates SE 8676150795. However, apart from Northdale Plantation, it is proposed the others are a resultant features from the recutting of the ditches due to heavy usage.

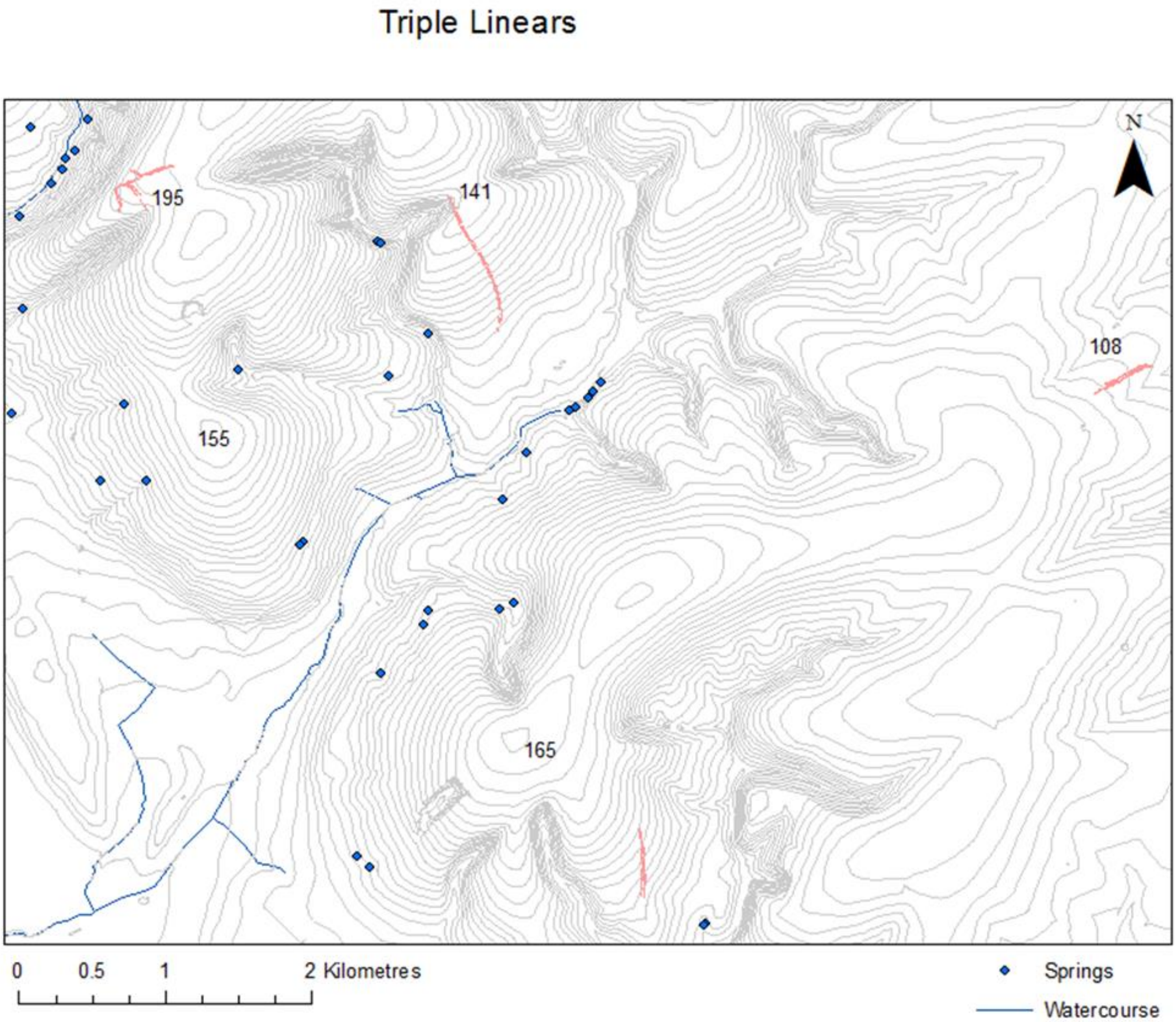


Fig 71; illustrates the triple linear features overlying the topography and in relationship to the springs and watercourse (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016. Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

The multiple banks and earthworks at Northdale plantation SE 484067 451262, are mapped by Stoertz (1997) and are also visible on Google Earth. Fenton-Thomas (2003, 39) notes elaborate and multiple arrangement of ditches and banks are usually associated with areas of topographic significance, either at the heads of dry valleys, or where valleys converge. This theory applies to the Northdale plantation linear systems, scheduled monuments (SMR 21135) which link Warrendale to Deepdale dry valley and is noted to be Bronze Age and improved by Iron Age tribes (MHU 6743)

Stoertz (1997) map has identified the linears but does not show them as earthworks leading into Deepdale. Field walking of the site notes extant bank and ditches going down the valley towards Deepdale (see fig 72 and 73)

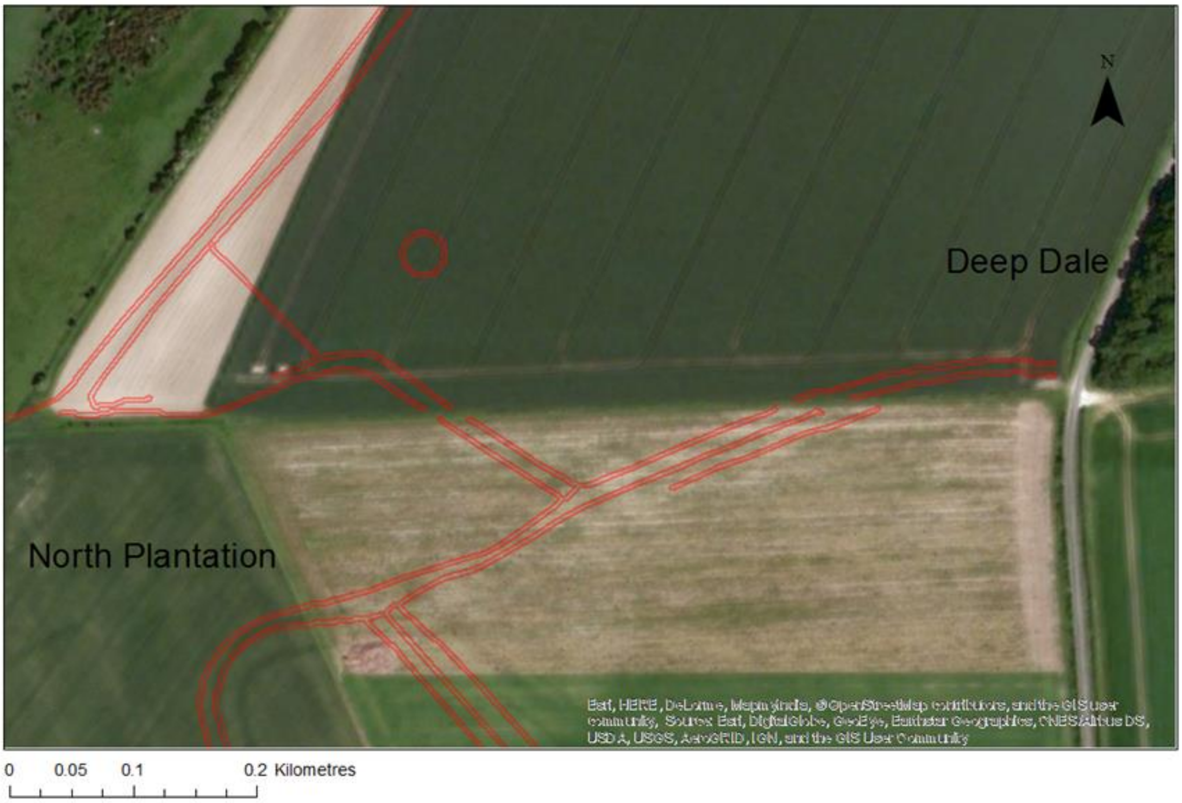


Fig 72 Satellite imagery of North Plantation SE 8420251550, with Stoertz (1997) mapping in red (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

Fig 73; The banks and ditches of the linear earthworks leading down into Deepdale Valley (Whiteley, 2017)

The ditches are of considerable size and have obviously silted up over the period. Fenton-Thomas (2003, 32) suggests their construction would have taken a considerable amount of time and evolved over the periods. Further examples of a triple linear feature is at Sky Gates, this linear runs a distance of 1030m, from a topography of 141m OD towards Warter 88m OD. The linear has potential to have been part of the double feature noted over Cold Wold and may have joined the complex system at North Plantation and in doing so enveloped the land into chunks. It is proposed this feature was a major routeway to the valley floor at Warter.

A clearer picture of land division is when the triple and double linear ditches are analysed in combination.

4.8.2 Double Linears

For the analysis of this study, the double linears of the area have been placed into two broad categories; those which are potential boundaries and appear to divide the landscape and those which have subsequently developed into ladder settlements.

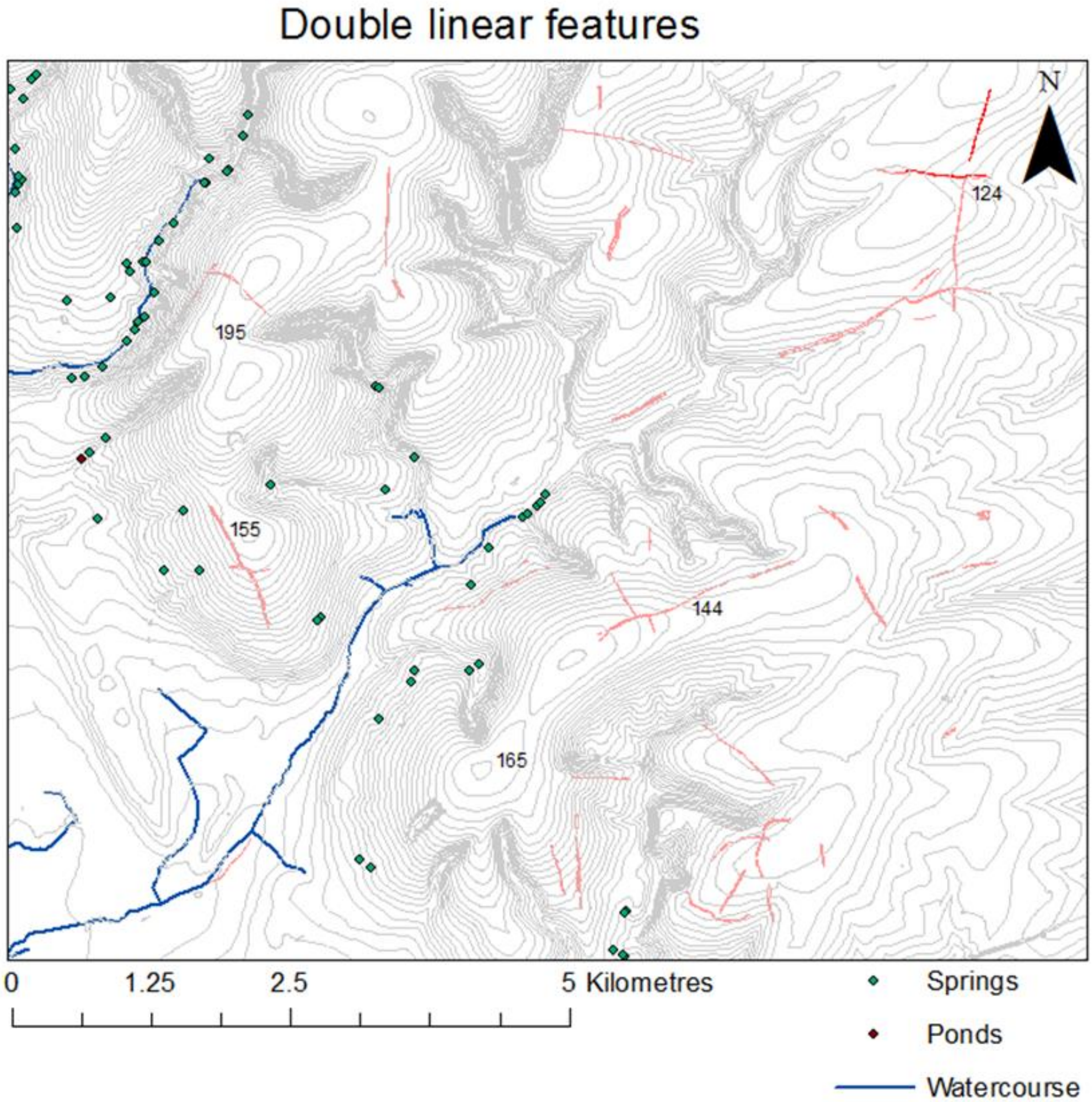


Fig 74; Linear features dividing the landscape (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016. Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

The double linears consist of pairs of ditches and banks and are potential boundary markers or droveways. It is evident that the features which range in length from 82.67 m to 2,785 m are enabling division and movement across the landscape (fig 74). They vary in their topographical positioning, with many following contours whilst others run up and down valley sides. Fenton Thomas (2003, 38) notes linears across the Wolds were designed to follow the lines of topography and the way the linears respond to valleys and slopes, is indicative of the importance of the natural environment to the Bronze Age populations.

Although aerial photography presents many features as un-continuous, there are many which are clearly aligned and orientated in such a way that they can be undoubtably associated with other corresponding linears in and beyond the study area. It is evident no height or terrain has hindered their construction which Fenton-Thomas (2003, 38) notes would have required immense human effort required to construct, with simple bone, stone or wooden tools and baskets to remove the spoil. The linears which are running over the plateau areas, at a high elevation, may have used the natural features of valleys to provide territorial division. Each feature would also have had the far-reaching views required for defensive purposes.

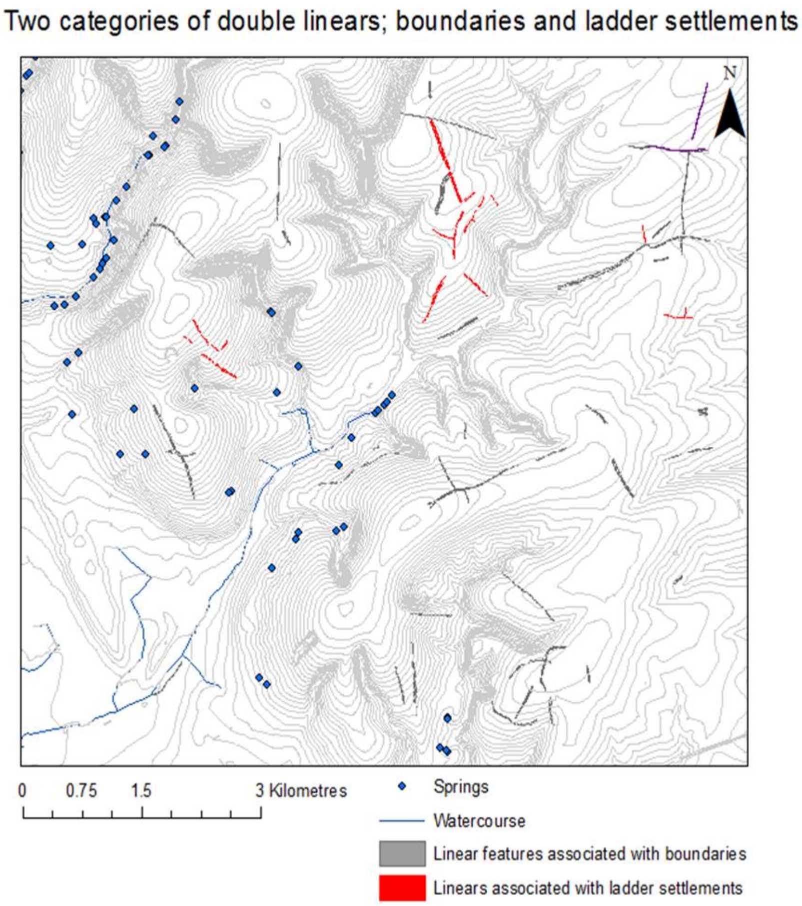


Fig 75: Left, Linears associated with boundaries and/ or ladder settlements (Ordnance Survey Map 2013). DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version:December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016. Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

The linears in the research area would have served many purposes, either simultaneously or successively. Stoertz (1997, 41) suggests the purpose of linears is to act as land divisions, and also as trackways and droveways and this theory is consistent with the linear purposes within the study area. It is argued that the study area linears do exactly that; divide, yet allow, fluidity of movement across the Wolds (Johnston, 2008, 104). Figure 75 shows the linears which have potentially evolved later into ladder settlements and those which have remained as boundaries/ trackways.

There is not a clear indication why some have become ladder settlements at this point, however it is proposed the largest ladder settlement at Warter Wold which leads to accessible water sources, began as a major route way due its association with other key routes traversing the Wolds and later developed into a ladder settlement and will be discussed in chapter 5.

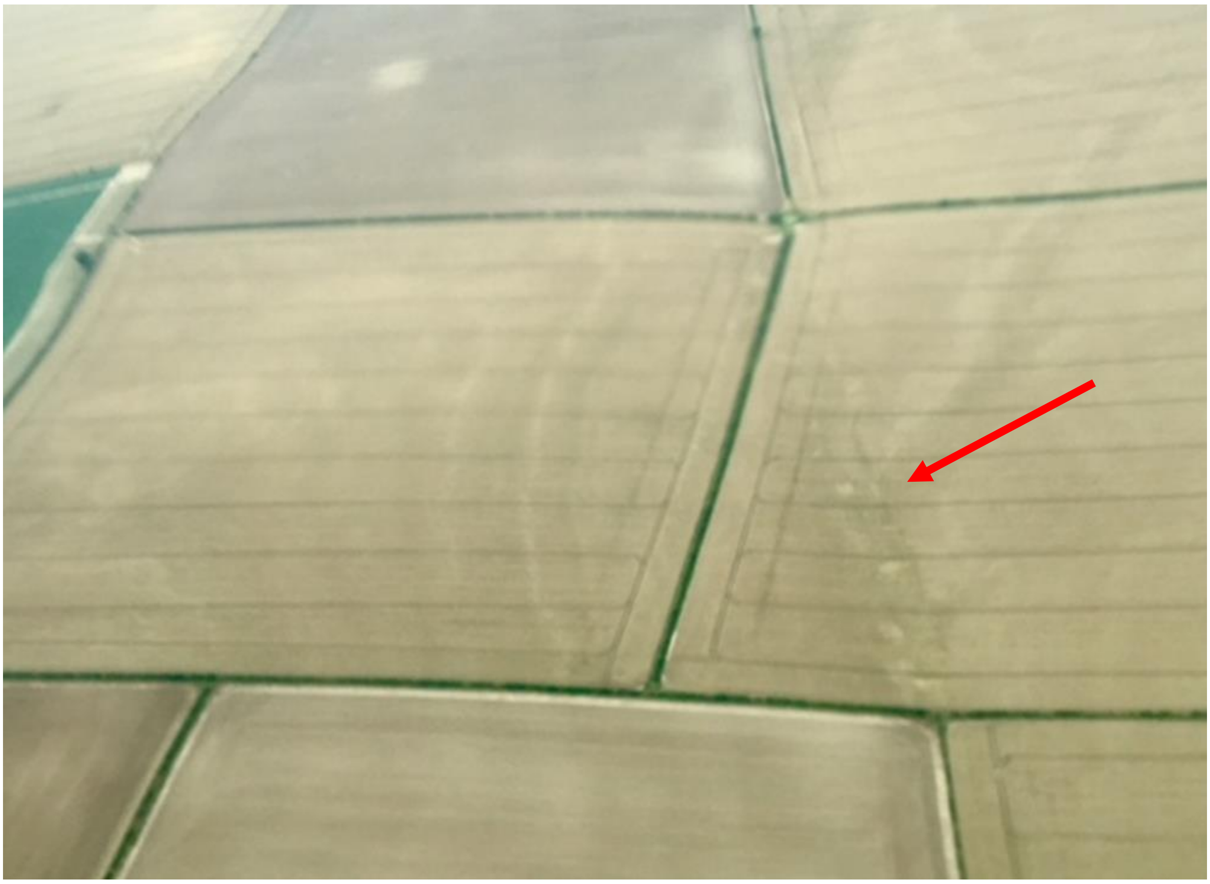


Fig 76; Aerial photograph showing double linear feature SE9047 (Whiteley, 2018)

4.8.3 Barrows and Linear relationships

Fig 77; Aerial photograph illustrating the linear's respectful awareness of the existing barrows (Whiteley, 2018).

Ferraby *et al* (2017, 24) argues linears have relationships to other monuments and this is a viewpoint similarly observed by Fenton Thomas (2003, 40) who identifies numerous examples of close relationships between round barrows and linear features.

This theory is seen in the study area where barrows appear to have an association with linear features, which present in two ways; those which appear to pre-date the linear features (fig 77), and those whose relationship could be viewed as aggressive, evident through the linears truncation through the barrow. Mortimer's (1905) barrow 127 is significant as an example how linear/ barrow relationship can be viewed as aggressive. The linear truncates the round barrow and thus incorporates it within its arrangement.

A further example is noted from a geophysical survey at Nunburnholme Wold (fig 78), where two of the linear features clearly truncate the barrow/hengiform feature. The way the linear cuts across the barrow may be viewed as a forceful territory marker, perhaps reaffirming landscape divisions (Whiteley, 2015).

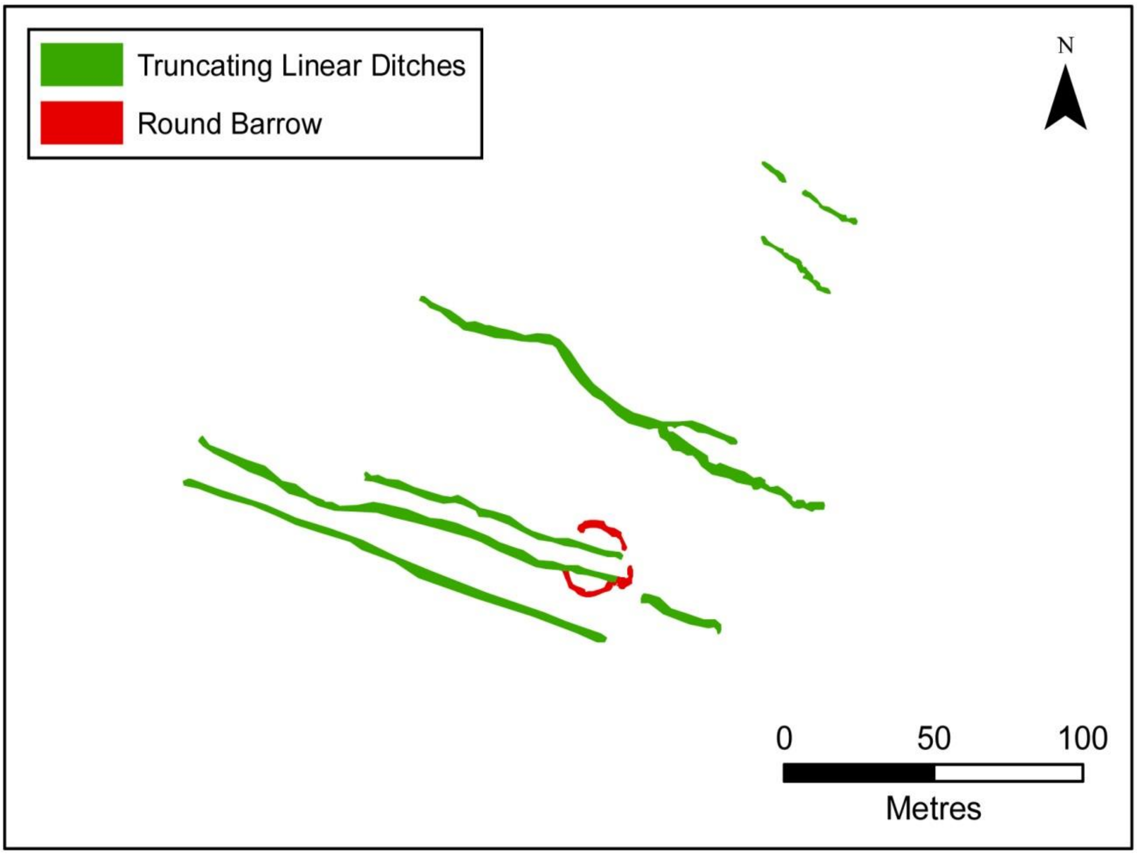


Fig 78; The Bronze Age Barrow is truncated by ditches at Nunburnholme Wold (mapped in Auto CAD map 2008 software, Whiteley, 2015)

As society and population developed, land division occurred and it appears some barrows were used as boundary markers. The most common example was noted by Mortimer (1905, 61) at Aldro (Barrow 256) where he describes the parallel double ditched linear to 'skirt the margins' of the barrow and consume it within a boundary.

4.9 The Development of the Bronze Age

Late Bronze Age landscape changes continued at a swift pace, as noted by Mulville (2008, 225) which included how the dead were handled, the metalwork, unenclosed and enclosed settlements, and defensive hill forts. Bradley (2007, 222) adds further evidence noting settlements were increasingly dispersing onto marginal lands during this period, Spratt (1993, 116) agrees and notes a rise in population may have contributed to the expansion of activity on the hills of North East Yorkshire.

Burial rite changes comprise of large barrows re-usage, ceasing to be constructed, or replacement by smaller mounds. Bradley (2007, 186) notes rich graves disappear, reflecting a change in wealth and status and suggest this is in response to the diminishing power of the traditional elite. Cremation cemeteries supplemented barrows and may have been initially located in small groups close to settlement sites before ceasing to be built (Bradley, 2007, 185).

This is supported by Manby *et al* (2003, 76) who notes across the Wolds, in contrast to the quantity of Early Bronze Age barrows, the Middle and Later Bronze Age, is represented by a small number of bucket urn burials, hoards and bronze artefacts.

Bradley's (2007) theory of barrow distribution is evident in the research area with cluster groups of smaller barrows emerging and it is argued that they are of a later date, in conjunction with societal and landscape changes as seen at Thirty Acres SE 9075351649.

It would be rather easy to be persuaded into thinking the reduction in barrow size is suggestive of a smaller population, in that civilisations were unable to offer the labour required to construct massive monuments, as seen in the earlier part of this period. It is apparent, however, to organise the landscape through the creation of monumental land boundaries and fields systems, which would have required the labour equivalent to that provided for earlier monuments.

4.9.1 Settlement sites

It is claimed the change from open to large scale land enclosures may have been a response to an increasing population, which required land management to maximise arable and pastoral productivity (Johnston, 2008, 277). A continuity to established practice remains, as boundaries run to existing burial mounds, which offered landmarks for alignment and visibility, and ensured continuity of rights over pasture and arable plots, as noted in Spratt's research on the North Yorkshire Moors, where round barrow distribution represents the defined large territories, based on valley systems (Spratt, 1993, 120).

Other theorists (Bradley 2007, Amesbury *et al*, 2008, Heath and Wagner, 2009,) report an increase in settlement sites is in response to climatic deterioration, where upland soils were becoming more acidic with poor drainage, whilst lowland grounds were wetter with poor workability due to the soils erosion from the valleys. As in present times, civilisations would have been vulnerable without satisfactory food storage and unfavourable conditions for planting new crops. Reference has been made earlier in the environmental chapter of this study, indicating the eras of climate instability which would have had a profound impact on the landscape.

Once formal boundaries were introduced, the movement of people would have been, to some degree, restricted as never witnessed before, and division would have been a necessity to enable stock management, maintenance and safekeeping of crops and animals. Hence from the second half of the 2nd millennium BC there becomes a new prevalence of domestic settlement sites across the country (Mulville, 2008, 238).

Parker Pearson (1993, 25) proposes the most striking landscape change of the Later Bronze Age is the occurrence of extensively dispersed cluster group settlement sites, which included building structures of a more permanent nature and a frequency of enclosed ditches, opposed to the more ephemeral structures of the Early Bronze Age, although Bradley (2007, 195) notes the rates and nature of settlement vary across the regions. From c. 1800 BC houses were represented by solid circular structures where the floor space was 100 square metres. Past thinking has thought of these dwellings to be small hut like structures; however, measurements show they were substantial features. Roundhouses are known to be in clusters of between two and ten, with some enclosed by ditches and banks whilst others may even have had a palisade. Usually, domestic houses were in pairs and served a variety of roles, such as storage of grain (Bradley, 2007, 188).

Clearly there would have been a greater emphasis on soils which retained productivity, for example the study area soils; Upton, Icknield, Landbeach and Millington soils. These loams have good drainage and would undoubtedly have been more workable than the valley floor clays. Knowledge of the land acquired from past generations would have played an important part of the settlement process and the subsequent choice of cultivational plants and agricultural cycle, which would have then defined that community. Mulville (2008, 228) notes that the early prehistoric cattle herd were of social and economic significance to a community but in the later part of the Bronze Age, sheep became an important commodity for their wool and milk. Archaeological material culture associated with these houses included loom weights, spinning whorls and combs, all connected with textile production. Parker Pearson (1993, 97) notes textile production was a feature of the Bronze Age from at least 2500 BC.

Johnston (2008, 101) records the concept of tenure within land division, suggesting it would have played an important role in material expression but equally in working practices within the community. This concept emphasises how essential a functioning economic and tightly defined community would have been. Within land division there would have been various forms of tenure associated with the availability of resources and the means required to access these resources. Tenure of land is also time dependant and would be affected and influenced by the seasons and the growth of crops. Johnston (2008, 101) suggests that within land enclosures, tenure would play an important part in social relationships of a community, and as permanent boundaries are put in place, there is an increased emphasis on the control or tenure of land.

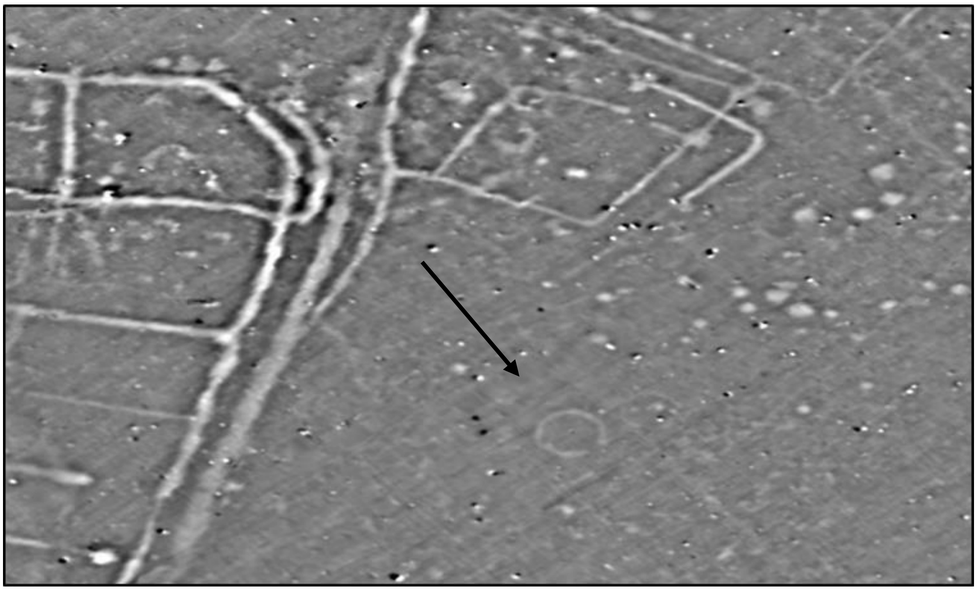


Fig:79; Geophysical survey illustrating with an arrow indicating two of the penannular features (Unpublished geophysical survey, Lyall, 2014)

Across the Wolds the average barrow diameter is, according to Stoertz (1997, 33) usually around 30m; however, these penannular shaped ditches at Nunburnholme Wold have smaller diameters (fig 79), measure 5.87m and 7.04m and therefore alternative explanations were sought. Excavations demonstrated that the two penannular features close to the enclosure system were not domestic structures but were actually round barrows (Halkon and Lyall, 2016). One feature of settlement from this period at Kipling House Farm is discussed in the next part of this chapter, Hillforts, due to its defensive type features.

An additional source of settlement evidence are casual finds which may indicate previous settlement areas, as noted in Spratt's (1993) analysis of North East Yorkshire. Bruck (2012, 53) argues settlements were located in parts of the landscape which suffered from erosion by colluvial/alluvial sediments and hence their invisibility remains a feature within the record. It is, however, noteworthy that Mortimer's (1905) barrow 241, appeared to have been used for habitation prior to its use as a burial barrow. It is suggested that some barrows may have been used previously as domestic dwellings. Later Bronze Age recorded casual finds within the parish include scraper tools and debitage of grey and white patinated flint from Thirty Acres, Minningdale and Warter Wold (SE 9052, SE8852, SE 8751 Portable antiquities).

A further major factor noted by Mulville, (2008, 238) which would affect and define a community, would be crop choice, impacting factors such as harvesting, tenure and timings. Agricultural cycles and production ultimately affect the populations availability to deal with other activities, such as construction or combat. Bradley (2007, 192) agrees and advises some settlements would have had a more specialised economy than others, although barley is thought to be the main crop of choice with sheep livestock on chalkland. Evidence of paired ditches or droveways indicates movement of livestock between pasture and waterholes, as seen in fig 80 of the research area. Note how the red linear features lead towards water sources.

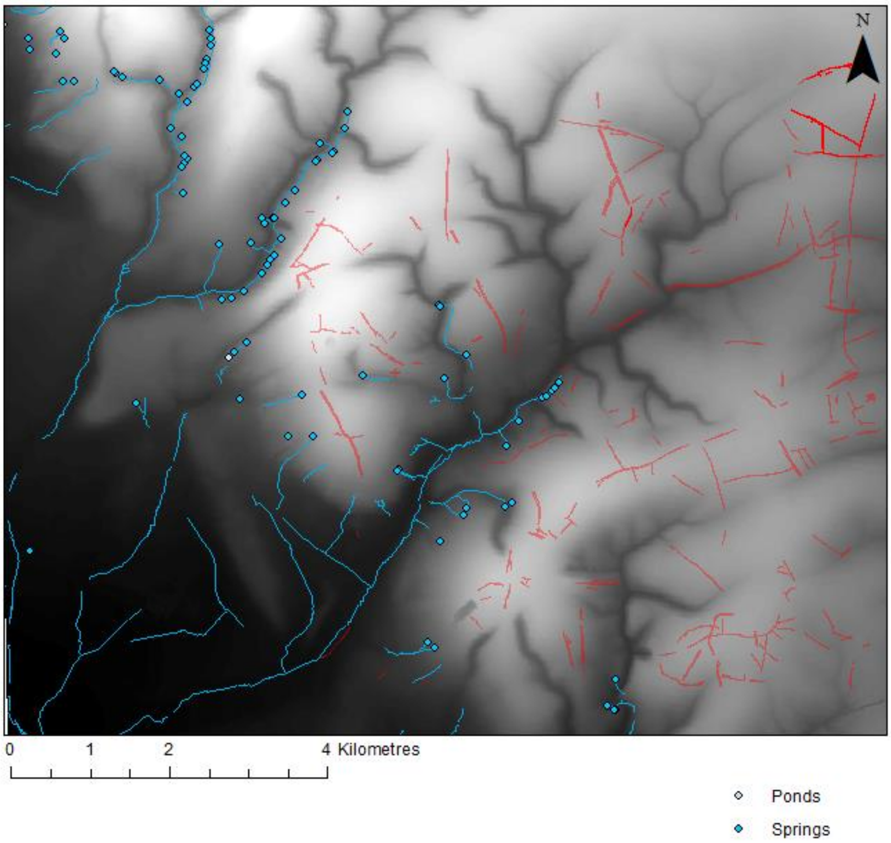


Fig 80; The linear systems and water sources. (A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

Bradley (2007, 222) proposes a tension in the Later Bronze Age, arguing a fluctuating metalwork supply and the disappearance of mortuary rights and monuments as factors indicating a less stable society. In addition, the emergence of hillforts indicates some degree of protection was required. Johnston (2008, 277) suggests the large-scale division of land is a direct response to population increase, which required land management to meet demand, whilst Mulville (2008, 238) proposes new settlement patterns would require interactions within community groups and external groups. Both factors could be argued to facilitate a defensive culture as noted by Mercer (1999, 143) who suggests typical warfare causative factors, including trade and its ambition as a means of progression, and the acquisition of land to enhance and grow the economics of a community.

Fenton-Thomas (2003, 32) notes large scale linears are indicators of a sense of territorial organisation in a physical form, emphasising social and cultural change. Heath (2009, 91) also identifies the association of linear features with defence and notes territorial warfare from osteo-archaeological evidence from the site of Tormarton in the south west Cotswolds. Three young males suffered extreme violence prior to their deaths due to weapon injuries. Spears had been thrust with such force that the spearheads had broken off and remained embedded within their skeletal frames. Later investigations revealed two further male skeletons had also died because of extreme violence (Osgood, 2005). Evidence of a linear delineating ditch at Tormarton is suggested by Heath (2009, 94) to be highly significant and central to these events. The tension caused amongst discrete tribal groups from progressive division of agricultural land and resources, is thought to have been a triggering factor to tribal warfare. Although there is no skeletal evidence of trauma available from the barrows within the study area, it is noteworthy that some of the excavated barrows did contain the remains of youths and further research would be required to provide evidence for tribal warfare.

4.9.2 Hill Forts

A further and significant landscape development in conjunction with land division is the introduction of hillforts. This section of the study analyses four sites which have the potential to be of a defensive nature/morphology; Kipling House Farm SE 898481, Blanch Farm SE 892553, Grimthorpe SE 816535 and Warter Wold SE 870175. Payne *et al* (2006, 155) identifies two type of hillforts, those for defence and those that may have been to hold livestock and used for ceremonies and feastings. Heath (2009, 103) notes that Hillforts are significant and known characteristic features of the Iron Age, nevertheless, there are British examples from the Late Bronze Age, with known sites at Rams Hill in Berkshire, Mam Tor in Derbyshire and Norton Fitzwarren in Somerset.

Payne *et al* (2006, 17) advise that a hillfort is just one feature in a complex landscape and to understand their function requires assessment of how they relate and interact to the surrounding settlements, field systems, boundaries and trackways. The tension between the amount of available land and a growing population to feed, would have required the construction of defensive structures. Heath (2009, 107) suggests other influences include a surplus of wealth in the form of agricultural excess, and a deteriorating climate as pre-requisites to defence and suggesting raids were carried out on foot, boats and horses.

Stoertz (1997, 46) notes the earliest settlements on the Wolds, which are clearly identifiable on aerial photographs, are defended sites, and has identified eleven locations with regular pattern of spacing across the Yorkshire Wolds. The four sites which been excavated are Grimthorpe (Stead, 1968), Paddock Hill (Manby, 1982; 1983; 1984), Staple Howe (Brewster, 1963) and Devil's Hill (Stephens, 1986).

The Wolds defended sites occupy elevated positions and as Heath (2009, 106) notes in this period, fortified sites were positioned at this elevation to provide a natural defence against raids. Payne *et al* (2006, 22) agree and note the positioning on ridge ends or escarpments, in association with enclosure type features, plus a communal function provide the common denominators of hillforts.

Grimthorpe SE 816535, in the parish of Millington, is one out of the four defended sites, not in the study area, however, is proposed to have some relationship to other features. Stoertz (1997, 46) suggests that this site may be one of the earliest defended sites across the Wolds, with radiocarbon dating evidence from a timber- built box rampart, placing the site to the late 2nd millennium BC. It has a relatively simple regular curvilinear morphology with a 220m diameter rampart. The site is positioned on a ridge end and its defences follow the 158 meters (520ft) contour. The site was excavated by Mortimer in 1871 who made note of the 'filled up inner ditch of a supposed camp', but his main focus at the time was of a male burial in the south-west sector of the hillfort, who was interred with a shield and a sword, associated with elite individuals (Mortimer, 1905, 150). Later excavated by Stead in 1961/1962, the site's defences were reported to consist of a single ditch 6-7 feet deep and 10-15 feet wide with a SE facing entrance.

Within the enclosure were eight, four-posted structures which were identified as granaries. Pottery and bones were excavated from the ditches and an unaccompanied crouched burial was found in the filling of the ditch. Stead (1968) proposes the date of the 1st century BC for the warrior but advises that the burial, granaries and hill fort are not necessarily contemporary. Halkon (2013, 67) notes the burial is much later than when the hillfort was abandoned, and suggest the internment venerates the significance of the site.

The morphology of Grimthorpe is comparative in plan to the curvilinear enclosures and hill forts at Thwing, Staple Howe, Londesborough Moor, Warter, Greenland's and Devil's Hill (based on Stoertz 1997).

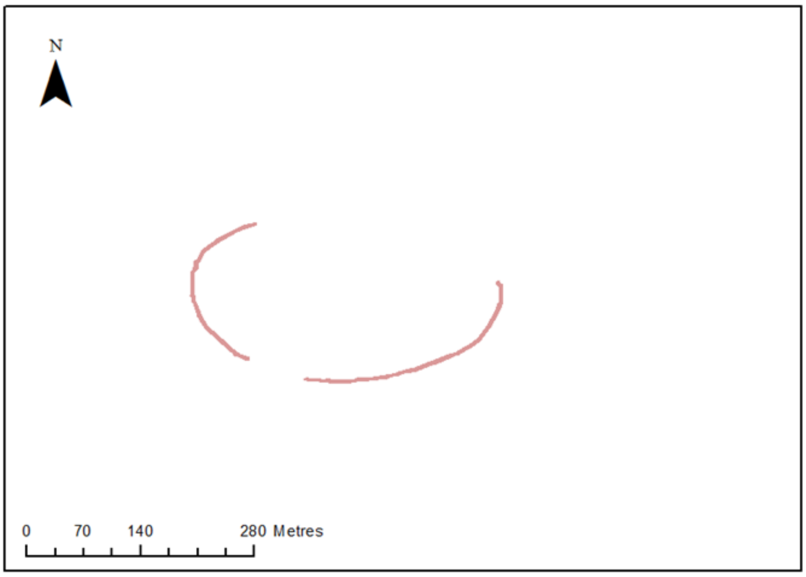


Fig 81; Grimthorpe Curvilinear (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

Fig 82; Aerial image of Grimthorpe taken in July 2018 (C Whiteley)

A further site mapped by Stoertz (1997) with a possible defensive morphological appearance, is within the research area at Blanch Farm in the Warter parish SE 892533, which, illustrated on aerial photographs, traces a chalk bank between two ditches (fig 83). The ditch running south east to north west is newly identified from satellite imagery. Its morphology is very similar to Hod Hill in Dorset and Walbury camp in Berkshire in that it has multivallate ditches.

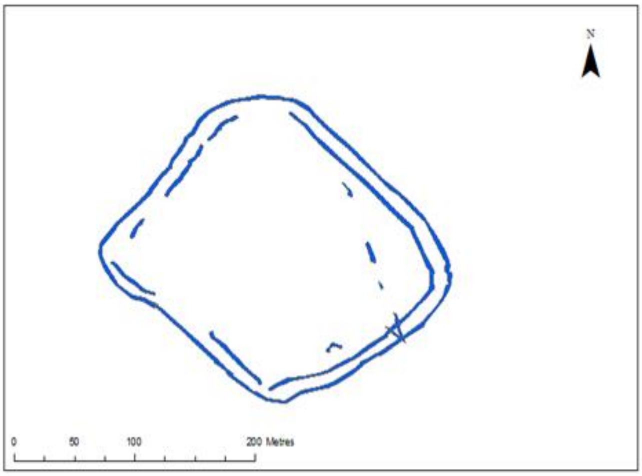


Fig 83 Blanch Farm (stoertz, 1997 yorkshire Wolds mapping project. Shapefiles mainuplated in Arc GIS 10.3 software)

Fig 84; Aerial reconnaissance of Blanch Farm. The red arrow marks the site of the double ditched defensive enclosure. Not visible (Whiteley 2018)

Disappointingly aerial reconnaissance showed no clear evidence of any feature due to the crop, although there are some faint traces within the field, these could be natural underlying geology.

Geophysical survey would be required to greater understand the site, although this was unfortunately denied by the Warter estate upon asking during this study (fig 84).

However, Google Earth Imagery has highlighted some features which may be what the Stoertz (1997) survey noted (fig 85).

Fig 85; Google image of the site at Blanch Farm

Aerial photographs taken by the RAF noted a large circular ditched enclosure at Warter Wold, a potential hillfort with an in-turned entrance at the eastern side, situated on a chalk spur 152 meters(500ft) north west of Minningdale farm SE 8701752387. The site was not visible in aerial photographs taken by D Riley, held at Humber Sites and Monuments records (MHU 6725). See figure 86 overleaf.

Fig 86 is taken from Google Earth and suggests a hint of a circular feature 152m (500 ft) to the west of Minningdale farm as noted from aerial reconnaissance. This could be a geological anomaly or a potential defensive or settlement site, as its diameter is 210m similar in size and morphology to Grimthorpe and topographic elevations 160m OD, consistent with other defensive features. It is important to mention, however, it has not been seen on any other surveys or aerial reconnaissance in 2018. Like Blanch Farm further surveys would be of benefit to the landscape development study.

Fig 86; Warter Wold curvilinear feature SE 8701752387. (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky). The red arrow points into the direction of where the feature had been identified by RAF reconnaissance, however there are not clear crop marks visible of the feature.

.Fig 87; Top The ditches as plotted by Stoertz, (1997) overlying Google Earth (Google Earth Imagery ©2014 Google ©2014 Infoterra Ltd & Bluesky)

As part of this research, a site at SE 898481 Kipling House Farm was identified from the Stoertz (1997) mapping project as of significant interest. On aerial and satellite imagery it presents as concentric D shaped features, with the outer enclosure diameter of 150m and the inner 65m. Within the wood there are possible traces of surviving earthworks visible (figs 87 and 88).

Fig 88; The ditches a seen from Google Earth (Google Earth Imagery ©2014 © Infoterra Ltd & Bluesky)

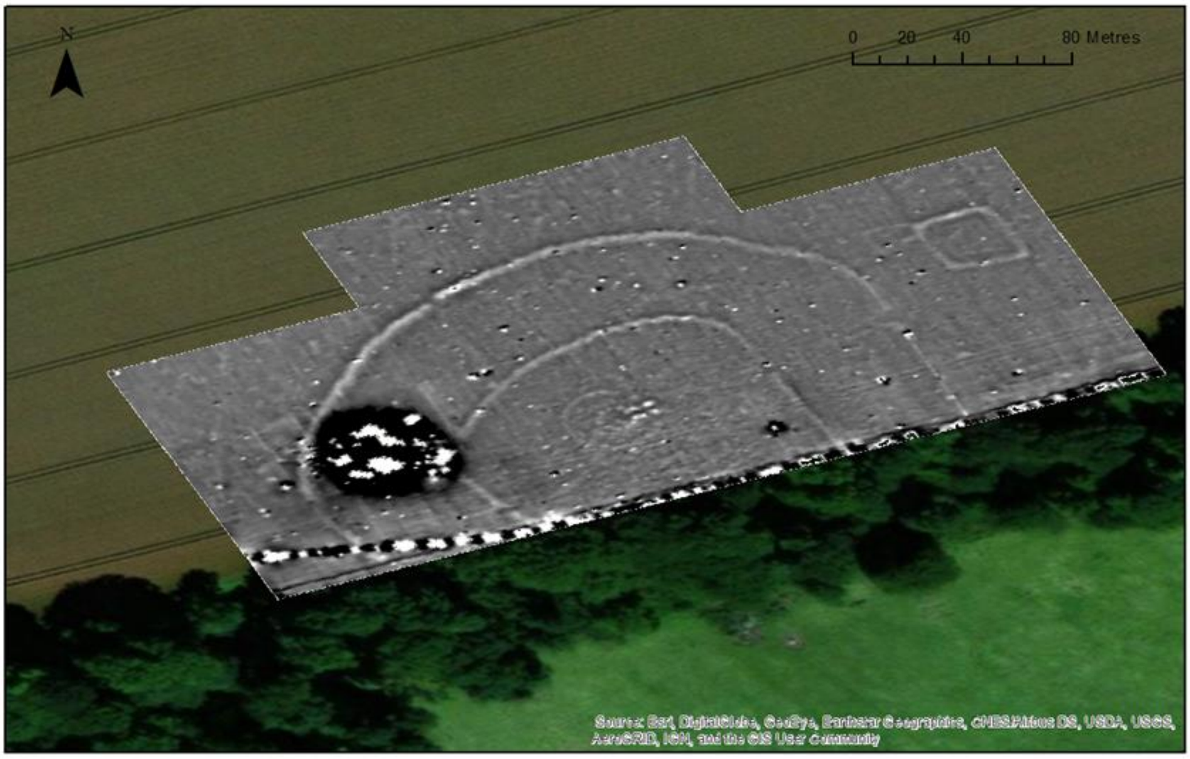


Fig 89; The ditches at Kipling House Farm House Farm (unpublished geophysical survey, Lyall. Overlaid on Google Earth Imagery (Google Earth Imagery ©2014 © Infoterra Ltd & Bluesky)

In April 2017 a geophysical survey was undertaken of the site by James Lyall of Geophiz.biz, at the request of the writer. Geophysical survey is necessary to enhance and extend the access of information and notes any traces of structures against the underlying natural geology (Payne *et al* (2006, 21).

James Lyall was assisted by Dr Peter Halkon and the writer who surveyed the site over a two-day period. A dual sensor Bartington gradiometer was used to survey 10m squares. The results were astounding for the result they revealed, sufficient to demonstrate the existence of a structure, by the arrangement of evident post pits. This evidence has demonstrated that the site was highly significant within the landscape and of national importance (fig 89).

Fig 90; Left, Kipling House Farm site (Whiteley, 2019).

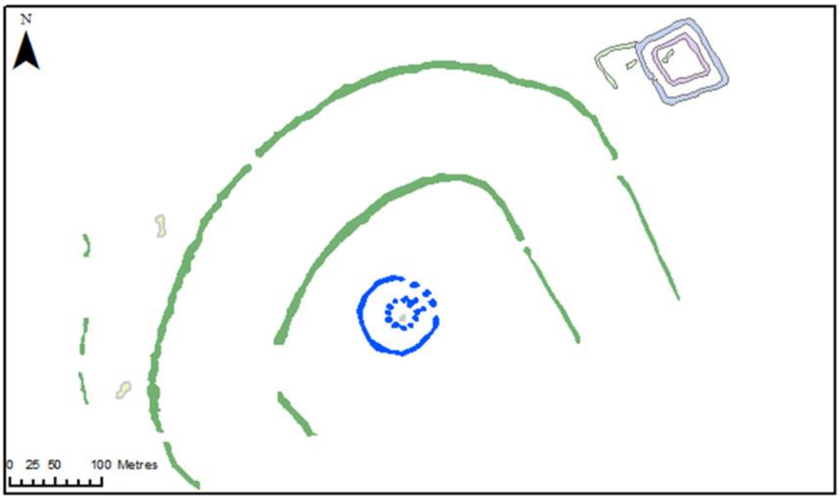


Fig 91; Left, Geophysical survey data of Kiplingcotes (unpublished geophysical survey, Lyall, 2017) mapped in ArcGIS 10.3 software.

Features revealed at the centre of the concentric outer ditches, was a large circular central structure, 20m in diameter with an inner ring of posts 5m in diameter, probably a roundhouse. The entrances to the roundhouse and enclosures were flanked by post settings leading from an inner circle to the outer ring creating an entranceway. The large magnetic anomaly on the western side (fig 89) was a filled in pit. A square feature with a double ditch to the NNE was revealed which following 2020 excavations in which trenches were opened, revealed deposits of deer in one and cattle skulls in the other, in an arranged manner, suggestive of ritualistic deposits as identified by Claire Rainsford, an independent bone specialist. The closest example to this feature are the later Bronze Age ringforts at Paddock Hill, Thwing, East Yorkshire, and Springfield Lyons (fig 92) and Mucking in Essex (Manby 2007). Pottery from the excavations at Kiplingcotes site, were examined by Dr T.G. Manby and placed the site to the later Bronze Age, similar to pottery from Paddock Hill, Thwing.

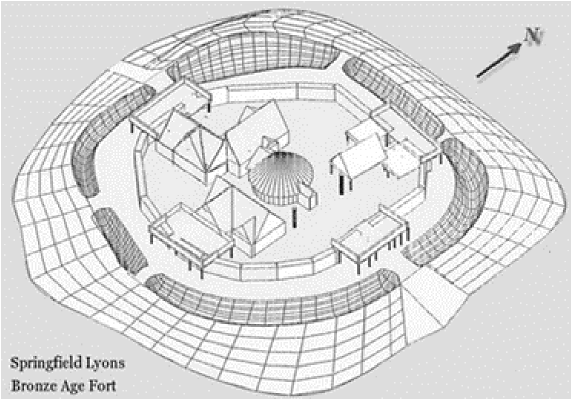


Fig 92; Springfield Lyons, interpretation of how Kiplingcotes may have looked.

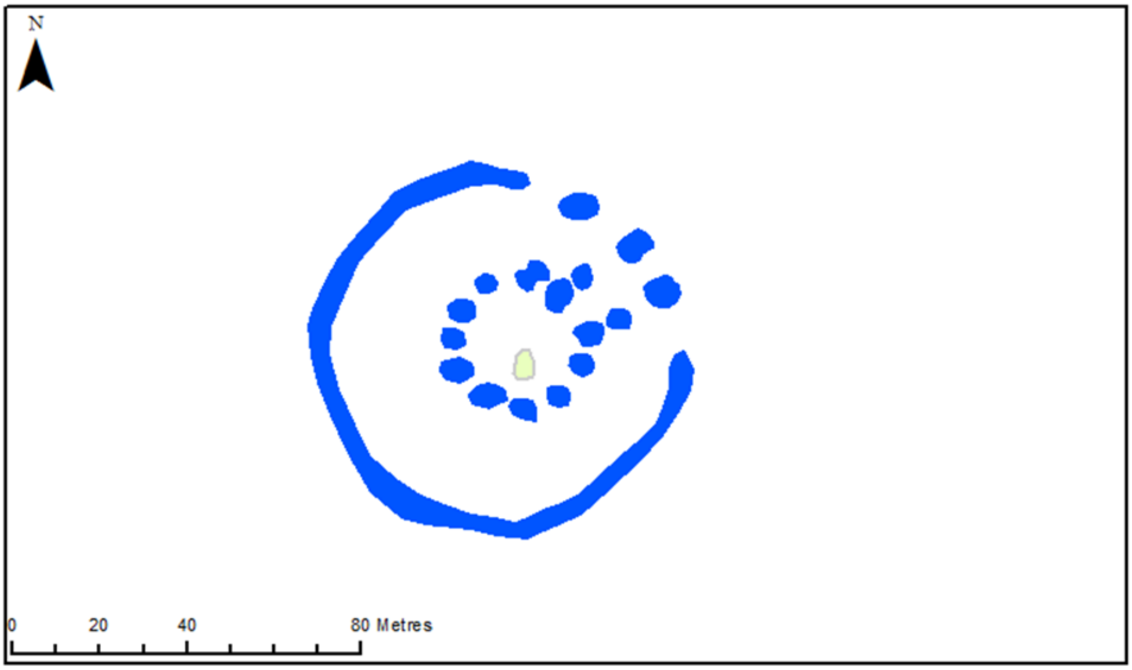


Fig 93; The inner circle of Kipling House Farm (unpublished geophysical survey, Lyall, 2014) mapped in ArcGIS 10.3 software

Within the inner post holes, an anomaly is shown as pale green and may have been a pit or hearth (fig 93).

Later excavations show how the site developed with a later Iron Age roundhouse (shown in green below) which supersedes the earlier Bronze Age structure (shown in red and blue) (fig 94).

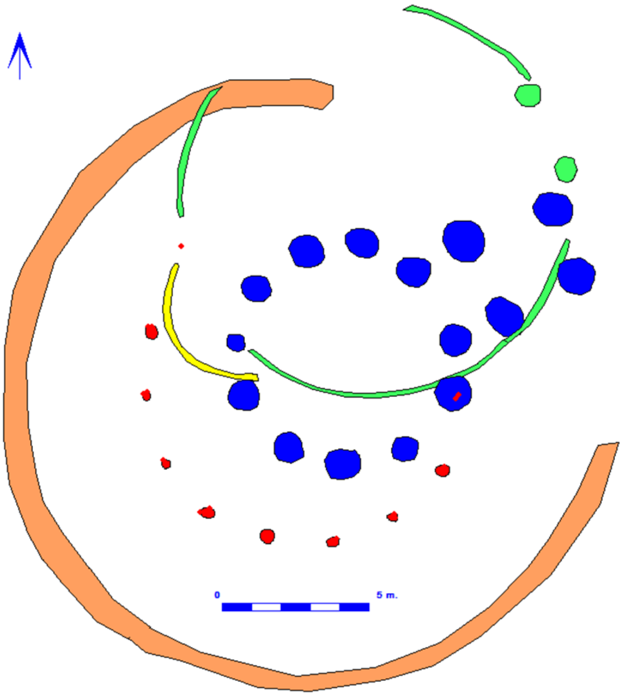


Fig 94; Later survey work of Kipling House Farm further surveys and excavations were completed after the first geophysical survey of 2017 in 2019 and 2020.

Situated on an elevated topography at 137m OD and comprising two substantial ditches about 30 metres apart, it could be argued that this site is defensive, and equally feasible that its purpose was as a focus for ceremonial and feasting, reflecting a level of social political organisation. There are no known springs or watercourses near to the site, unlike Grimthorpe which is located near to several springs and watercourses, however, a pond situated near to the farm may potentially be a spring.

A comparable site is at Paddock Hill at Thwing Manby (1973-87), 10km west of Bridlington, situated on a chalk ridge overlooking the Gyspey Race valley. Situated at 100m OD and close to a pond, it comprises a substantial circular Class II Henge monument and has major regional significance alongside Staple Howe, Devils Hill, Greenland's, Reighton and Swaythorpe. The enclosure of the main phase is dated to the Later Bronze Age; its purpose is debated, with a gathering place or settlement as the main theories. Manby *et al* (2003, 68) notes the ring fort constructed around the inner monument is associated with PDR plain ware which includes cups, pyramid loom weights, worked chalk and bone assemblages.

It has three major dykes which converge on the area and may have been constructed on a long-standing boundary. A ladder settlement of a later date also accentuates the importance of the central point of Paddock Hill defensive site (Ferraby *et al*, 2017 9). Bradley (2007, 212) suggests Thwing may have been a defended site, occupying a prominent position, in order to define a succession of territories based on the valleys and/or in association with the linear features control access to water sources.

The two potential defended sites within the research area, Kipling House Farm and Blanch Farm, do not appear to have any clear relationship to water, unlike Grimthorpe which is situated close to springs and water courses (fig 95).

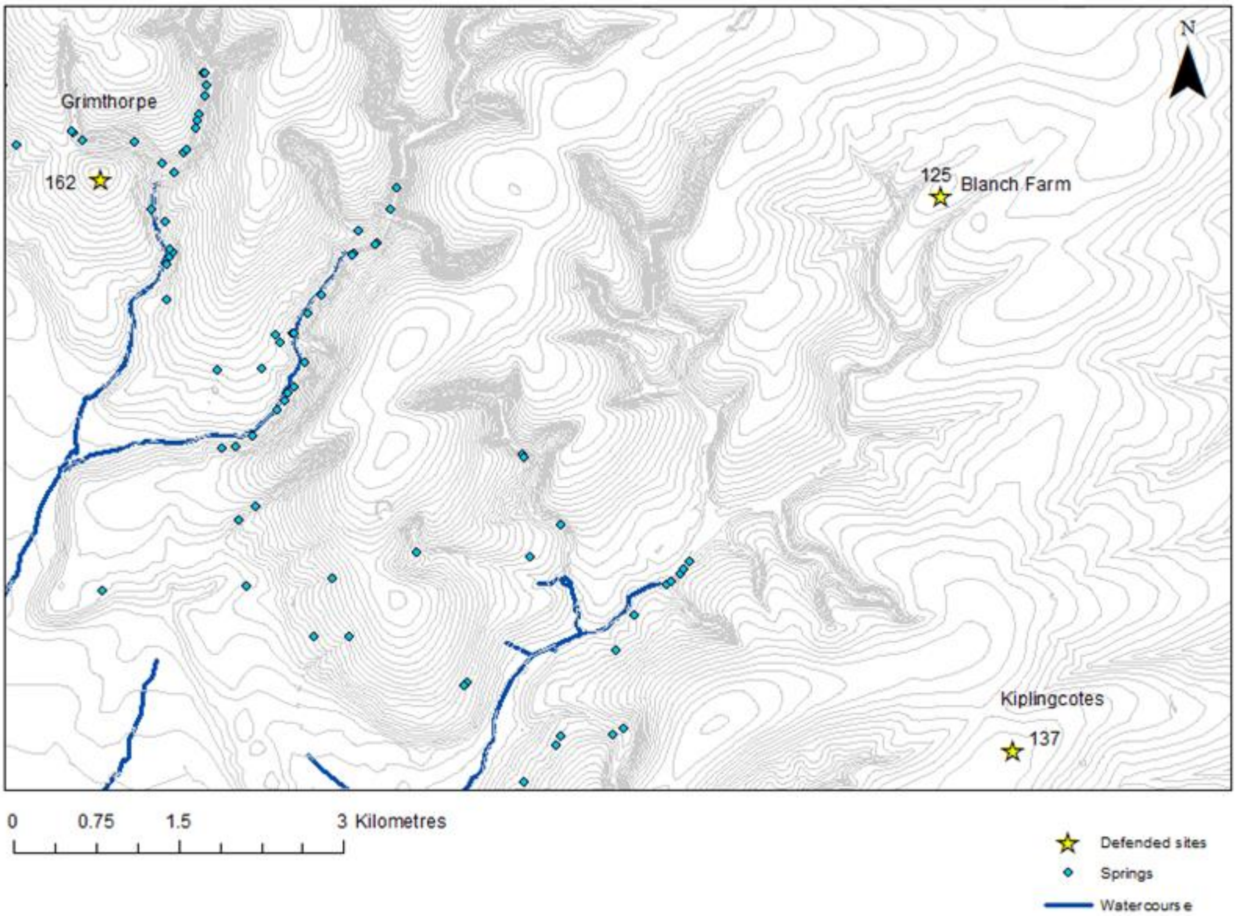


Fig 95: The sites with potential defensive features and their relationship to water and topography (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version:December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

Figs 95 and 96 illustrate how a long linear continues after the Nunburnholme watercourse terminates, towards Thirty Acres and effectively maintains a boundary. Past work at Nunburnholme Wold has demonstrated a site used for stock exchange and feasting, although a key difference is the lack of defensive structures at Nunburnholme Wold (Whiteley, 2015). The phasing and function of these sites are discussed in greater detail in chapter six.

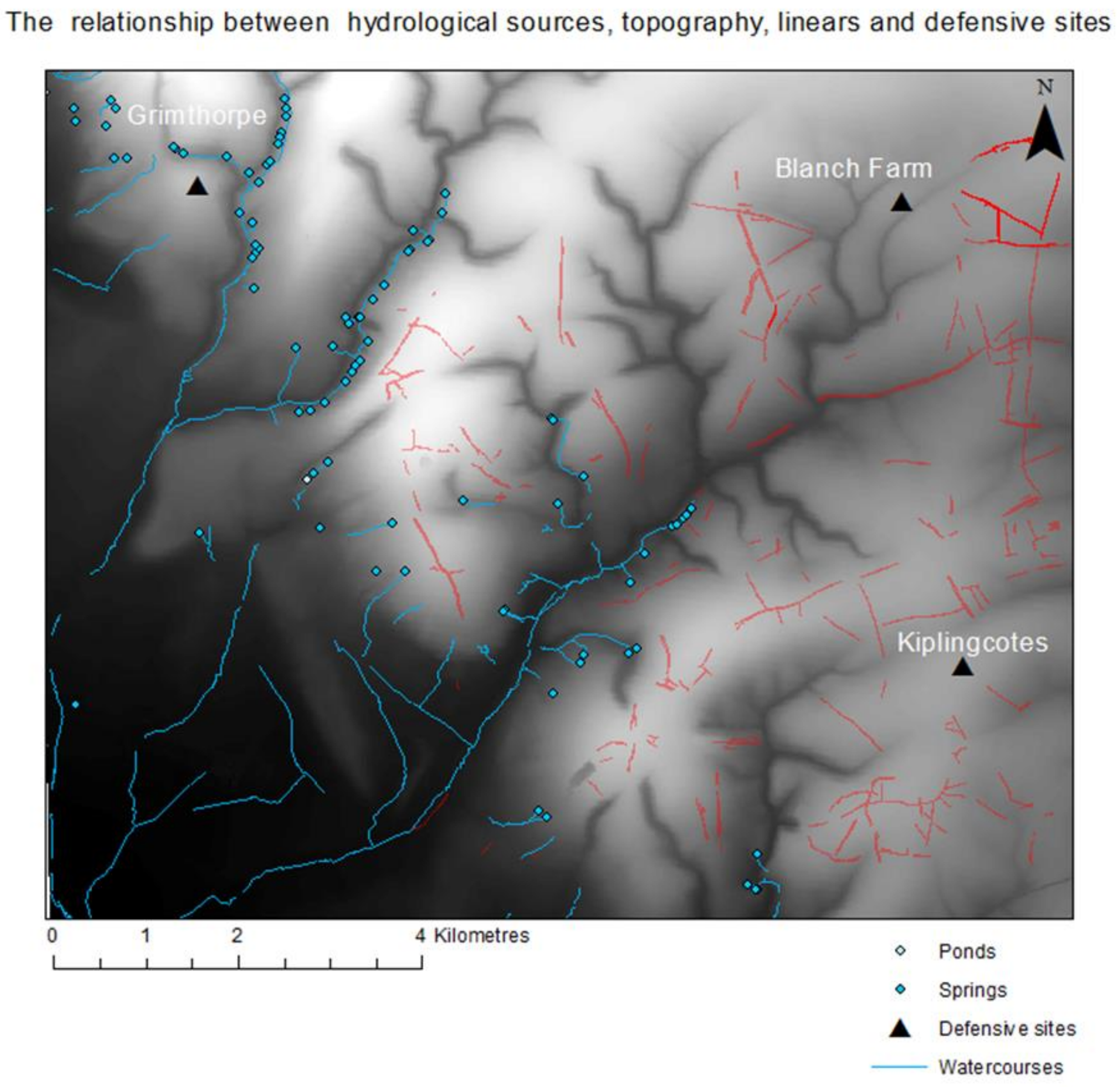


Fig 96; The relationship between proposed defensive sites, water sources and linears (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

4.10 Conclusion to Bronze Age

The research area has demonstrated development throughout the Bronze Age, which is consistent with the Wolds in general. A chronological approach has demonstrated how the landscape, initially characterised by large scale monuments commemorating the dead, was transformed into a more fluid and settled area, which was exposed to some degree of tension in the later part of this period.

The introduction of small-scale immigration resulted in the assimilation with local inhabitants, towards a cultural adoption and adaptation of continental rites. This is evident in the smaller bowl barrows which took the place of the larger and Earlier Bronze Age barrows. Associated grave goods provide an insight into the assimilation of material culture, presenting in graves as flint objects, beaker pottery cups and food vases.

It is argued the barrows at Nunburnholme Wold and The Belt, which stand in isolation or groups of two, are from the earlier part of the Bronze Age and act as territorial markers to the valley below containing a major water source. Other barrows appear not to be influenced by hydrological sources and the topography suggests visibility to be a highly significant factor.

As settlement developed, small barrows cluster around larger barrows, to form small cemeteries, mainly across the plateaus and may indicate where potential early settlement was established. The soils of the previously identified barrows and newly mapped features, are consistent with each other. The common factor with all barrows is the soils they overlie (calcareous (Ac) or brown soils (pH)) and the elevated topography.

It is argued that settlement patterns are more elusive than the funerary monuments due to a degree of residential mobility in the early part of the Bronze Age. Enclosure systems within the research area would need to be subjected to geophysical surveys and excavation in order to identify any early enclosure systems.

Subsequent Bronze Age changes witness the division of land into a complex and varied pattern of linear features. The area has illustrated triple, double and single systems, with purposes varying from boundary markers to trackways, although there is difficulty in distinguishing the morphology of dykes from trackways and it is probable their usage has been adapted and changed over time. Each plateau within the area overlooking the valley has either a double or triple linear feature, focusing on the valley systems, giving the impression of sectioning off large areas and access to water. The purpose appears to divide yet allow some fluidity across the Wolds.

Later Bronze Age landscape changes continue, which involved the treatment of the dead, metalwork, unenclosed and enclosed settlements and defensive hill forts. A tension is proposed within society with theories noting a climatic deterioration, a variation in bronze supply and the demands of an increasing population as causative factors. There is no doubt that the Later Bronze Age demonstrated economic growth regardless of aspects of tension, rivalry and conflict (Bradley, 2007, 225).

The research area has provided evidence of Bronze Age landscape changes consistent across the Wolds, and although some regional variations exist, there is general consistency at a national level. Further investigative work would be required to provide secure dating; however, there is a clear sequence of events obtained from the morphological features. The chronology of the Bronze Age landscape, function and purpose of sites will be discussed in further detail within chapter six of this thesis.

Chapter 5- The Iron Age Period

5.1 Introduction

This chapter aims to explore how the landscape developed across the Wolds from the Late Bronze Age, into and during, the Iron Age. The research continues to investigate how the land was utilised, through the analysis of crop marks and excavation data, to understand how the economic and social structure of the Iron Age period was constructed. In addition, the topography, soils and watercourses are assessed to understand what extent they have influenced Iron Age settlement patterns.

A general and brief overview of the Iron Age in its European and British context will be discussed, this information will then enable a chronological approach to be applied to further understand the landscape development within the research area. To address these aims, Iron Age burial practice and settlement patterns will be examined in greater detail.

5.2 The Transition to Iron Age

Much theoretical debate has surrounded the transition from Bronze Age to Iron Age, with academics debating two key problems towards fully understanding this period. These are based around a lack of common ground in the application of frameworks for developing landscape evidence and material culture, hence making interpretation difficult. Furthermore, there is a tendency towards accepting this period as one of continuity as opposed to large scale change in material and social cultures (Needham, 2007, 39).

It could be argued that raw materials requiring new manufacturing processes means some change is inevitable, however, this process alone does not necessarily indicate major changes within other aspects of society. However, Needham (2007, 39), argues major change did occur during this period, as bronze was viewed as a material which was pivotal to the way in which society on a practical, structural, religious and political level functioned. Therefore, it could be argued that with its collapse there was a requirement for a whole new political and social arrangement. If iron was a substitute material to maintain society both politically and economically, it would facilitate any transition, however, this is complicated, as chronological frameworks differ in their interpretation of the introduction of iron.

A key feature for this period is the inequality of metals before and after. There are three main models of change for the demise of bronze towards iron becoming the primary metal; firstly, a steady transition, secondly, iron becoming the favored metal eclipsing bronze and finally a severe reduction in the amount of surplus stock available in bronze (Cunliffe 1992, Burgess, 1979 and Bradley, 1988).

Haselgrove and Pope (2007, 6) suggest the models of iron underpinning the bronze/ bronze crisis and a steady transition, can be rejected favoring the 'social value system' in which bronze becomes devalued. Needham (2007, 59) stresses that metals are only one factor in this transition period, identifying ceramics, food surplus, salt and agricultural produce, to have key roles. Cunliffe (2004, 21) supports this theory stressing massive social and economic changes of significance were also underway.

Haselgrove and Pope (2007, 4) determined using 26 individual contributing papers, from a seminar reviewing the Earlier Iron Age in Britain that there was indeed a fundamental transformation in Britain around the period 800 BC which spanned over five centuries. Analyzing landscape and human interaction across Wolds from this period highlights this fundamental change. This study has previously discussed how linear earthworks formalized pre-existing boundaries and were able to assert landscape control to watercourses and lands. In conjunction with hillforts situated in pivotal positions, it is possible to perceive indications of social change. A push factor is noted by Halkon (2020, 5) who proposes the key to transformation is climatic instability, arguing a tidal surge and rising sea levels between 800-300 BC would have resulted in social implications, which gave rise to in an increasingly hierarchical society, one which was more willing to engage in warfare as resources were becoming more scarce. Further landscape interaction and social change is evident through the burial and settlement patterns from this period which will be addressed within this chapter.

Within Europe, the Iron Age was classified into two key stages. These stages are names after chief sites; La Tène in Switzerland and Hallstatt in Upper Austria. Neither sites were associated with domestic settlement; Hallstatt has been identified as a key cemetery site for showing typo-chronological sequence, through changing grave goods, for cattle herders and workers from a nearby salt mine, whilst La Tène deposits have led archaeologists to believe the site had some spiritual/ceremonial significance. The sites are chronological; Hallstatt dates from the end of the Bronze Age/ Early Iron Age to the 6th century BC and La Tène represents the mid Iron Age. The ordering of artefacts from these sites provided a basis for chronological dating sequence into typological sequences (Harding, 2009, 2).

Evidence of close contact with Continental Europe is demonstrated through artefacts associated with the styles of swords and daggers of the Hallstatt and La Tène styles. Cunliffe (2004, 16) highlights Britain was part of an intercontinental trade network of ideas and materials exchange.

There are examples of Hallstatt type swords and La Tene styles, however, these are small in numbers and are principally made within Britain, reflecting regional diversity across Iron Age Europe (Harding, 2009, 3). Such artefacts and weapons have been excavated across the Wolds; distinctive metalwork and pottery from a settlement at Staple Howe have been identified to the Hallstatt tradition but La Tene settlement evidence is enigmatic. However, regional variations of La Tene style artefacts are evident at Wetwang, Arras and Pocklington (Dent, 2010, 38, Halkon, 2013, 82, Stephens and Ware, 2010, 23). Large scale production of iron across the Wolds coincides with the Arras Culture, evident through the woodland clearance to exploit timber and fuel for iron manufacture (Halkon, 2020, 9).

Following the introduction of absolute dating, Hawke's (1931) ABC classification became redundant and although the terms Early, Middle and Late are still applied to the Iron Age, Harding (2009, 4) advises that generally within Britain, the Iron Age was an insular development from the Late Bronze Age.

Marne and the Middle Rhine-Moselle are two culturally predominant and influential regions during the fifth and early fourth centuries in northern Gaul and Germany, both situated near major rivers. These areas had a strong influence on the material culture of the neighboring regions with evidence of a mutual exchange of ideas and technologies between the two regions, based on a high concentration of rich burials which include artefacts, chariots, weapons and fine jewellery. It is these artefacts which make these two regions stand out against the other regions. However, the importance of these regions is noted in other geological locations, for example Marnian pottery, a pot which is often painted or slipped, showed to be from the Aisne-Marne region, is distributed over large parts of Northern Gaul including Belgium and the southern Netherlands. This pottery is evident in burials and within settlements (Anthoons, 2010, 130)

Belgian Ardennes is another region which demonstrates the influence from the Middle Rhine-Moselle and the Aisne Marne sites have a northern and southern group of burials separated by a 12km empty zone. Both cemeteries have low round barrows without ditched enclosures. Chariot burials are restricted to the southern group. Anthoons (2010, 130) suggests from excavation data that the northern group were immigrants from Middle Rhine-Moselle whilst the southern group were immigrants from Aisne-Marne, however, this is debated, as the southern areas has characteristics from both regions (Cahen-Delhaye, 1998a and 1998b)

The regions of Middle Rhine-Moselle and Aisne-Marne are both regarded as core areas not just for the rich with chariot burials but also the influence they have had over other areas in that pottery was copied, and burial rites, although the finest examples of pottery and rich burials remains attested to the two major core areas. Other regions may not have felt the need to have elaborate burials, investing their resources elsewhere, but this does not mean they would have had a less complex social structure (Anthoons, 2010, 131)

By 300 BC in Northern Gaul the Middle Rhine-Moselle and the Aisne Marne are no longer the key players, chariot burials and other rich burials appear in other areas, Paris, Normandy, the Belgian Ardennes and East Yorkshire. In contrast to the earlier periods there are less numbers of chariot burials and they tend to be less richly adorned. The highest concentration has been found in East Yorkshire and the area continues to reveal further chariots (as seen in Pocklington excavations as recent as 2017), with assessments suggesting close similarities to the burials within the Paris area (Halkon, 2013, 87).

It has in the past been argued, that the appearance of any kind of new culture, is due to a mass migration and a key factor regarding the introduction of the Iron Age into Britain are its continental counterparts. Scholars, such as Hawkes (1960) assumed this new emerging practice and material culture was brought through an invasion from the Marne region in Northern France (Halkon 2013, 14). Stead (1991) identified the Parisi tribe from Gaul to have similarities in their chariot burial practices to those in East Yorkshire. However, it is likely any degree of mobility and influence was from smaller groups or individuals. More recent research by Jay *et al* (2012) deduced from isotopic analysis that it was not a large-scale migration but does not exclude some small-scale migration.

Anthoons (2010, 136) argues information between the core areas and the periphery regions took place with interregional contacts, whilst long-distance contacts and could have happened in several different ways; cascading or through weak ties. Strong ties are slower at disseminating information; however, weak ties are a quicker form of communication. Both ways make up a small world network. The role of the Humber estuary in the transmission of ideas must be considered, whether that be trade, or cultural practices, as discussed in the previous chapters. The Bronze Age was a route for cultural exchange, as was the Thames estuary, highlighted by (Cunliffe 2005).

Fernandez-Gotz (2020, 186) highlights the archaeological record of finds is only a small indicator of a possible large-scale process and stresses amongst population movement from northern Gaul to north-east England there is often additional external push factors which must be considered and highlights climatic instability as one such example, as highlighted by (Halkon 2020, 5).

The term Arras culture was coined by V.G. Childe (1940) and it stemmed from the first excavated chariot burial located at Arras near to Market Weighton. Chariot burials in East Yorkshire began

around the beginning of the third century and the association with the Paris basin is known through the building of the chariots, which are at the same stage of evolution, later than those at Aisne-Marne.
It is noted that chariot burials are also described as cart burials by scholars, notably Ian Stead, to describe a specifically created vehicle in which bodies were buried.
In Paris and East Yorkshire, the typical inhumation rite is that of burial, however, in Paris the body is extended on its back, yet in East Yorkshire the bodies are place in a crouched, flexed or contracted position, which is an old Bronze Age tradition (Anthoons, 2010, 140).

A further identifying feature of the Arras culture is that of square barrows with an enclosed ditch. These barrows are also identifiable in the Aisne-Marne province but are rare in the Paris basin region. These apparent differences are argued by Anthoons (2010, 140) to suggest that the burial rites of East Yorkshire cannot be linked to one particular region of Northern Gaul, and suggests that the various elements are taken from various regions but also are underpinned by British traditions.

The early third century BC was a time of change; in weaponry but also in burial practices. New cemeteries with the introduction of chariot burials were evident across the continent and in East Yorkshire, demonstrating the region was part of the Northern Gaul network of ideas and material exchange, which had progressed beyond the borders of Gaul and into central Europe.

The world had become smaller, with complex elite networks advancing and were no longer restricted to close neighbours. This development is suggested by Anthoons (2010, 141) to being perhaps due in part to mercenaries originating from several regions or political marriages, fosterage and clientship.

5.3 Iron Age burial practice

The Arras culture funerary rights, seen across the Yorkshire Wolds, are a distinctive characteristic within the British Iron Age. Other nearby areas with a square barrow representation are the North Yorkshire Moors and the Howardian Hills, however, the Wolds have the densest concentration (Halkon, 2013, 70).

The landscape attracted the interest of antiquarian researchers, who in search of Bronze Age round barrows, also discovered Iron Age graves. Arras, one of the largest cemeteries was excavated by the antiquarian and vicar of South Cave, Rev. Edward Stillingfleet. He discovered over the course of 1815, 1816, and 1817 two chariot burials and a female grave adorned with a mirror, glass beads and a gold ring. These burials became known as the Kings, Charioteer and Queens barrow respectively owing to their lavishly adorned graves. A further chariot barrow was recorded by Canon Greenwell in 1876 (Halkon 2020, 3). Other excavations of barrows at Danes Graves, another large square barrow site, were undertaken by Mortimer and Greenwell at the end of the nineteenth century (Fenton-Thomas, 2003, 49).

The cropmarks of square barrows are visible on aerial images, which have been valuable with their identification, as now there is little trace of them within the landscape. Stoertz (1997, 34) identifies the Yorkshire Wolds as exceptional in the square barrow rites noting that formal burial is less common across the rest of Britain. In southern England there are a number of sites with enclosures similar to those of East Yorkshire within the Trent Valley, Welland Valley, Adanac Park in Southampton, Ashford, Sussex and Bedfordshire (Champion, 2020, 168). Excavations of square barrows in Scotland, have been dated to the early medieval tradition, with one excavated exception at Boysack Mill, which dates to the Iron Age (Hunter, 2020, 136). Geographical and regional square barrows demonstrate variabilities which do not have a clearly defined uniformity, unlike the exceptional nature of Arras burials.

Although chariot burials are found across the region from the North Yorkshire Moors to the Humber there are concentrations at Wetwang/Garton, Arras and Pocklington. There are 30 known in the UK of which 27 are in East Yorkshire (Halkon, 2020 76-78).

These burials are identified as burial Rite C by Stead (1991), in which the graves have unusual characteristics including chariot burials and associated fittings. East Yorkshire burials have undergone recent assessment which suggests close continental links particularly with the Paris region (Halkon, 2013,87). The chariot burials are divided into two main types; those in which the wheels were removed from the chariot and those in which the wheels remain attached, demonstrating local adaption (Halkon, 2013, 75, 87). Recent surveys at Pocklington by MAP Archaeological Practice excavated 85 barrows and 172 inhumations, in which there were two chariot burials. The later was remarkable, as both horses remained in their upright position (Stephens and Ware, 2020, 17-31).

The location of square barrows across the Wolds is varied in terms of both landscape and groupings. Several of the square barrow cemeteries are located close to earlier monuments, such as cursus or ring ditches, suggesting that there is a continuation of significance applied to that site; an attachment to ancestry and burial locations (Giles, 2012, 68). The Great Wolds Valley is a prime example, where dense cemeteries have aligned themselves to Maiden's Grave Henge and the Rudston Monolith, with further examples at Burton Agnes field West, Leavening Wold and Raisthorpe Wold.

The morphology of the barrows replicated the style of the earlier Bronze Age barrows, in that they were large, and as the weathering process occurred, the mound took on a round form within the square ditch (Giles, 2007, 115). Conversely, Bevan (1999), proposes there is little connection between the earlier monuments and square barrows, although his study did not include square barrow clusters of less than 10. In addition, Dent, (2010, 22) notes there are no square barrows recorded on the northern escarpment of the Wolds, which is an area where there are still some extant round barrows.

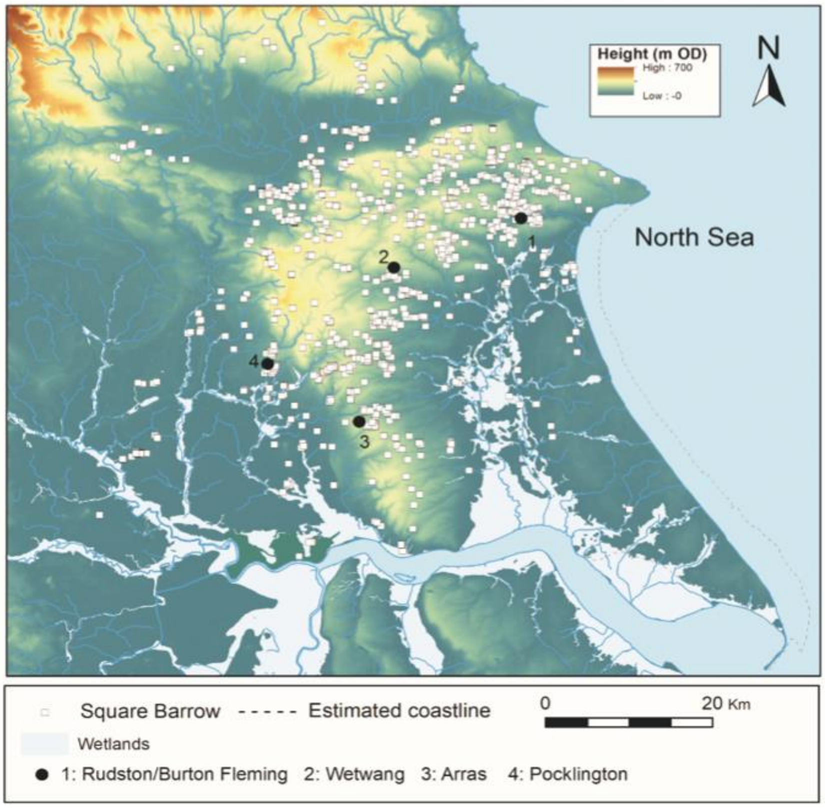
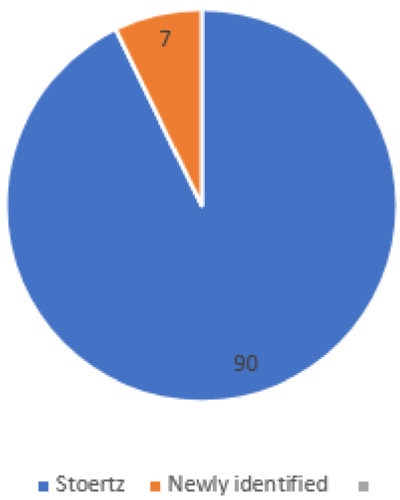


Fig 97; Square barrow sites over the Wolds (Halkon, 2020)

In contrast to the Bronze Age barrows, which are mostly situated on elevated topography with wide visibility, square barrows tend to be more low lying on valley floor locations (Stoertz, 1997, 39, Dent, 1982). However, distribution is still evident over a variety of landscape terrains, including valley floors and elevated topography.

Halkon (2008) examined a 30 x 20km landscape block which extended from the Yorkshire Wolds to the Humber, known as the Foulness Valley, in this area there were 22 square barrow cemeteries, the biggest by far was at Arras. The general distribution mirrored that of the square barrow picture across the Wolds, with different distribution patterns across the cemeteries, which Halkon (2008, 93) suggests represent choice of individuals and groups of the positioning of each grave.



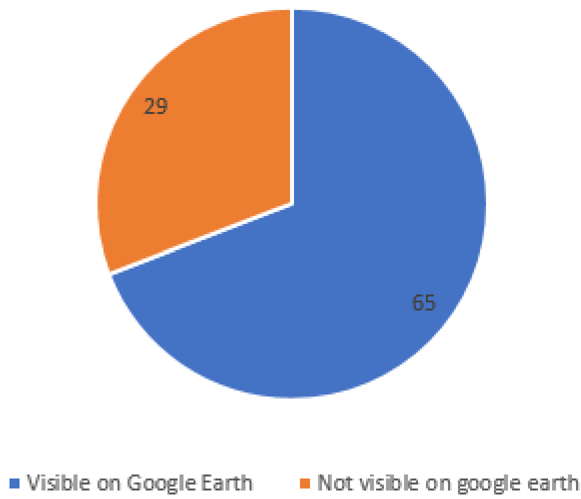


Fig 98; Square barrows visibility on Google earth. *Fig 99; Features identified by Stoertz, and Google earth*

Digitised existing raster data was inputted into ArcGIS 10.3 software from the Stoertz (1997) Yorkshire Wolds mapping project. Each feature was assigned an attribute and description following the NMR Heritage Datasets: Monument Recording Guidelines (Horne, P, 2009),

The analysis of the data revealed that 29 of the 94 features are not presently visible on Google earth. In addition, a further seven new barrows were identified not previously noted from Stoertz (1997) aerial survey at Loaningdale barrow cemetery (SE 84 NE 29). Interestingly the original aerial photographs noted that the cropmarks at Loaningdale were poor, with only 14 square barrows visible, and advises the cemetery was almost certainly larger (Heritage Gateway, 2020).

Within the study area the square barrows are chiefly located on the plateau areas ranging from 145m to 160m OD (fig 100 and 101). Cemeteries on a higher terrain are generally earlier in date than the later, more low-lying cemeteries, which are dated to the middle Iron Age. The largest ones tend to be located at the base of valleys or, like Arras, on higher ground (Giles 2012, 7, 68).

The majority of the Wolds barrows are located close to a water source with a preferred location near to intermittent streams such as the Gyspey Race (Fenton-Thomas, 2003, 52). As seen on fig 100 the spring lines and watercourses are situated at a lower level than the barrows but certainly, within their vicinity. However, the application of this theory to the research area itself, is potentially problematic as the fluctuation of water levels changing over the centuries would impact on the location of streams and spring sites. In addition, Halkon (2020,5) advises that research has demonstrated that during this period there was climatic instability resulting in rising sea levels between 300-800 BC. Potential pressure on lowlands may have resulted in a requirement to utilise the uplands.

The research area square barrows are chiefly in two main areas; Nunburnholme Wold SE 84 NE 55 and Loaningdale SE 84 NE 29 both areas occupying the crest of Nunburnholme Wold, a higher terrain plateau within close proximity to the linear networks (fig 100). The area is a roughly shaped figure of eight which is surrounded by five valleys. The barrows topographic average is 152m OD.

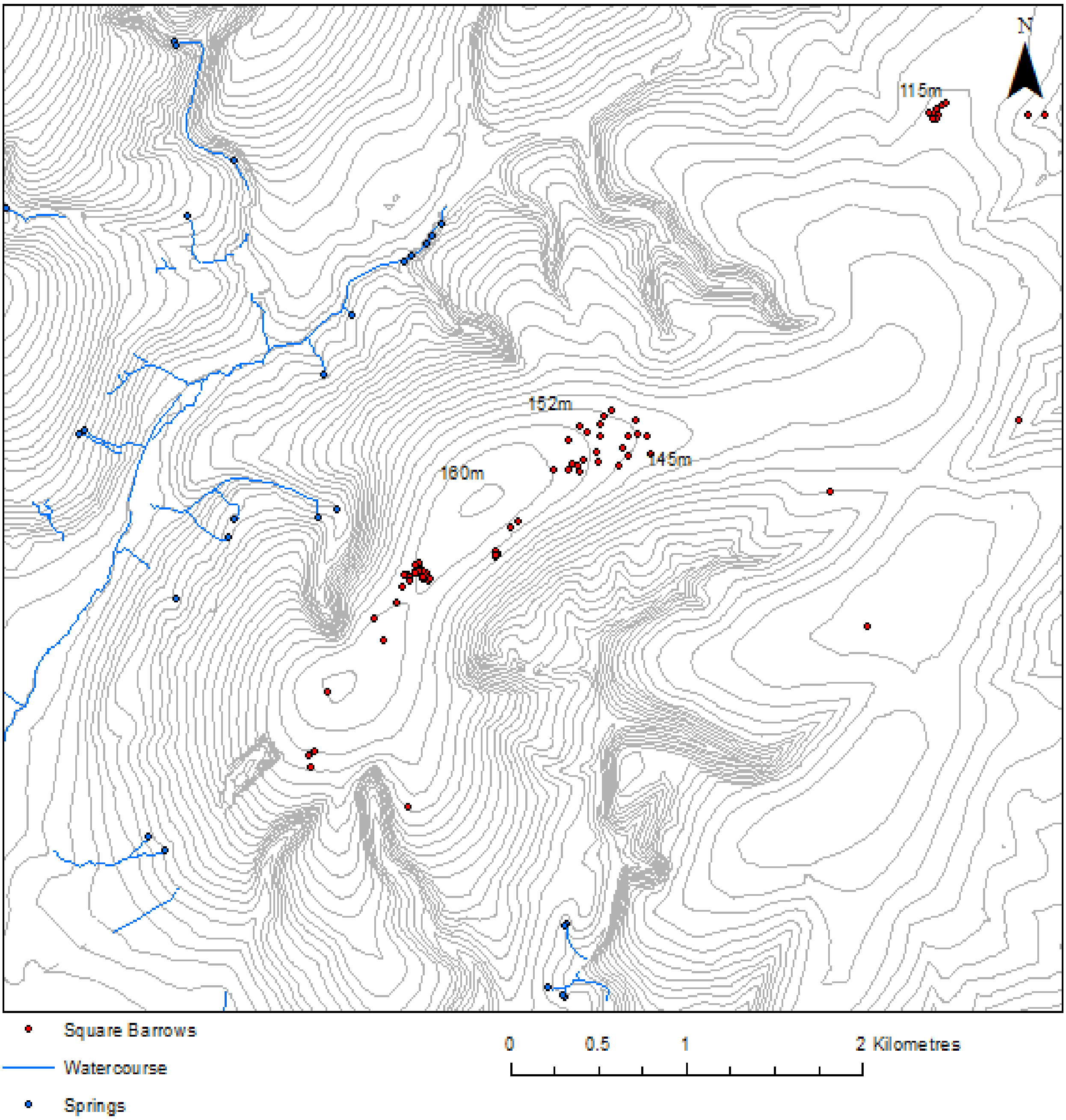


Fig 100; Square barrows shown over land contours to highlight the elevated topography on which they are situated. Elevations shown in metres. Note the watercourse and springs which today are located at a lower elevation, (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3

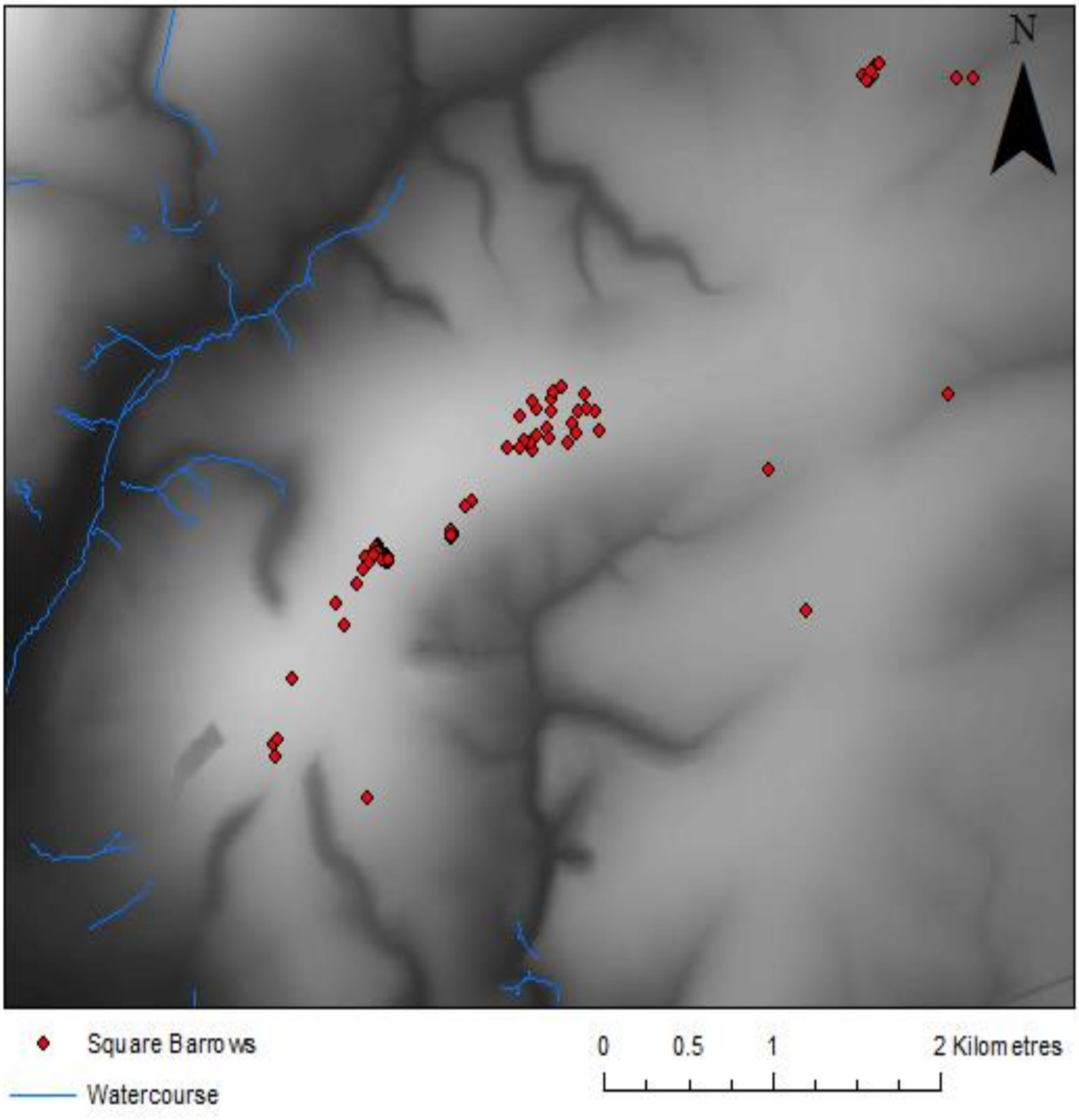


Fig 101; Square barrows shown over DTM to highlight the elevated topography on which they are situated. Note the watercourses which are located at a lower elevation in the valley floors, (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

Bevan (1999), following on from earlier work by Dent and Brewster in the 1980s, Bevan's study of landscape, location, and square barrows notes that, in addition to water sources, cemeteries also have a relationship with trackways. The cemeteries tend to sit adjacent to the long-distance routes, along valley floor communication channels, with a majority of the distributions along the eastern edge of the Wolds (Fenton-Thomas 2003, 56). Halkon's (2008, 85) results of square barrows in the Foulness Valley also determined a correlation between eight of the square barrow cemeteries and droveways. This association is also evident as seen in the research area (fig 102 and 103) where routeways taking a highly mobile Iron Age community to agricultural lands or to access local water sources, would have passed the visuality of the burial ground with frequency. Giles (2012, 223) suggests in doing so a sense of belonging, place, and community would have been evoked and provides a connection between life and death. The linears shown in red traverse the area, with evidence of a trackway through the barrow cemeteries providing accessibility over Nunburnholme Wold, across to Middleton Dale and beyond, a routeway which exists to this day (fig 104).

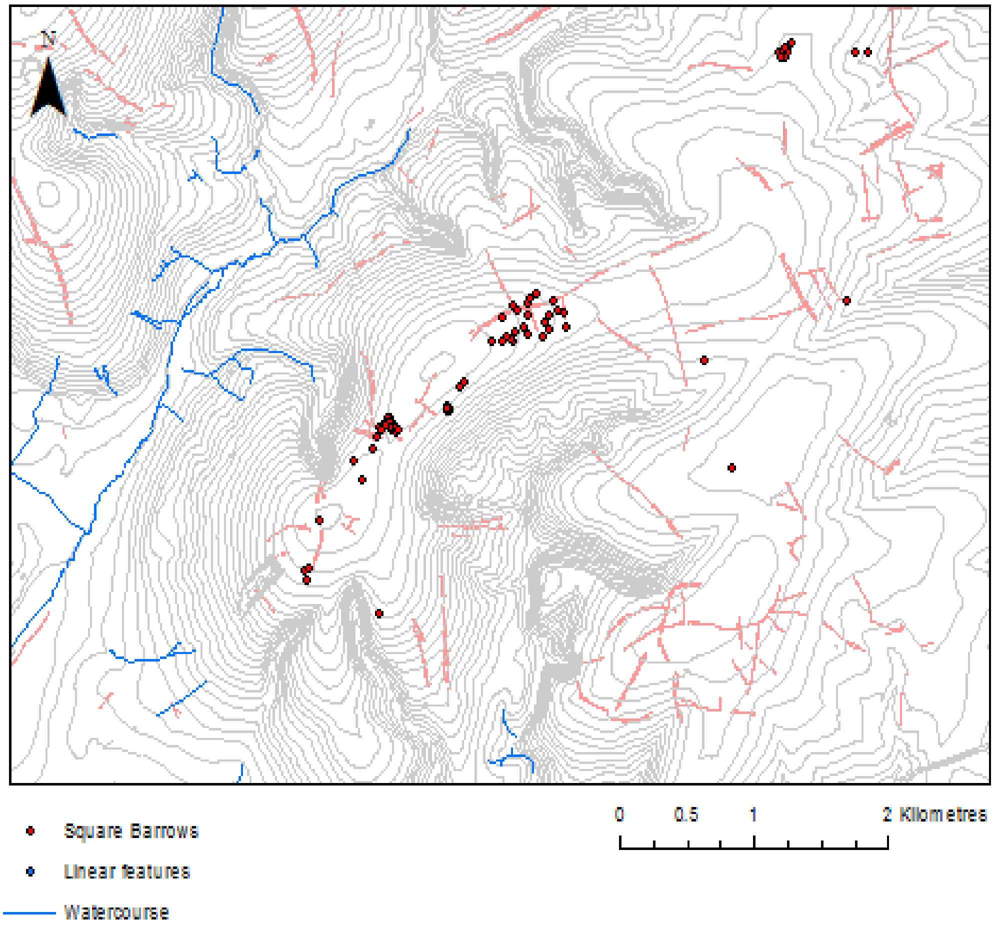


Fig 102; Linears and their proximity to the Square Barrow cemeteries. (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2016). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3 software.)

The square barrows in the research area, as in the Foulness Valley (Halkon, 2008, 72), are more related to double linear droveway features as opposed to single boundary type linear features.

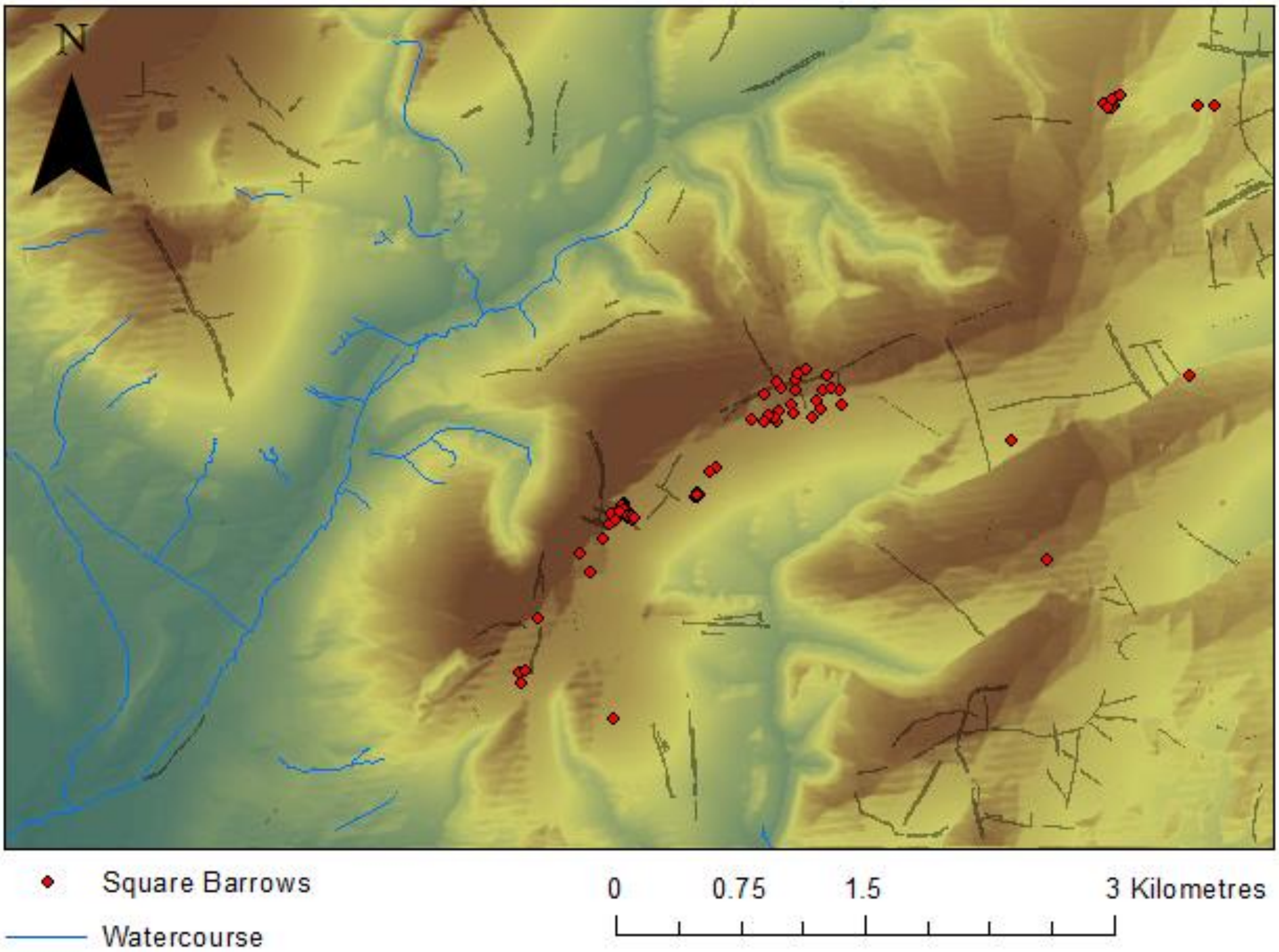


Fig 103; Above Linears, topography and square barrows (A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap)10.3 software).

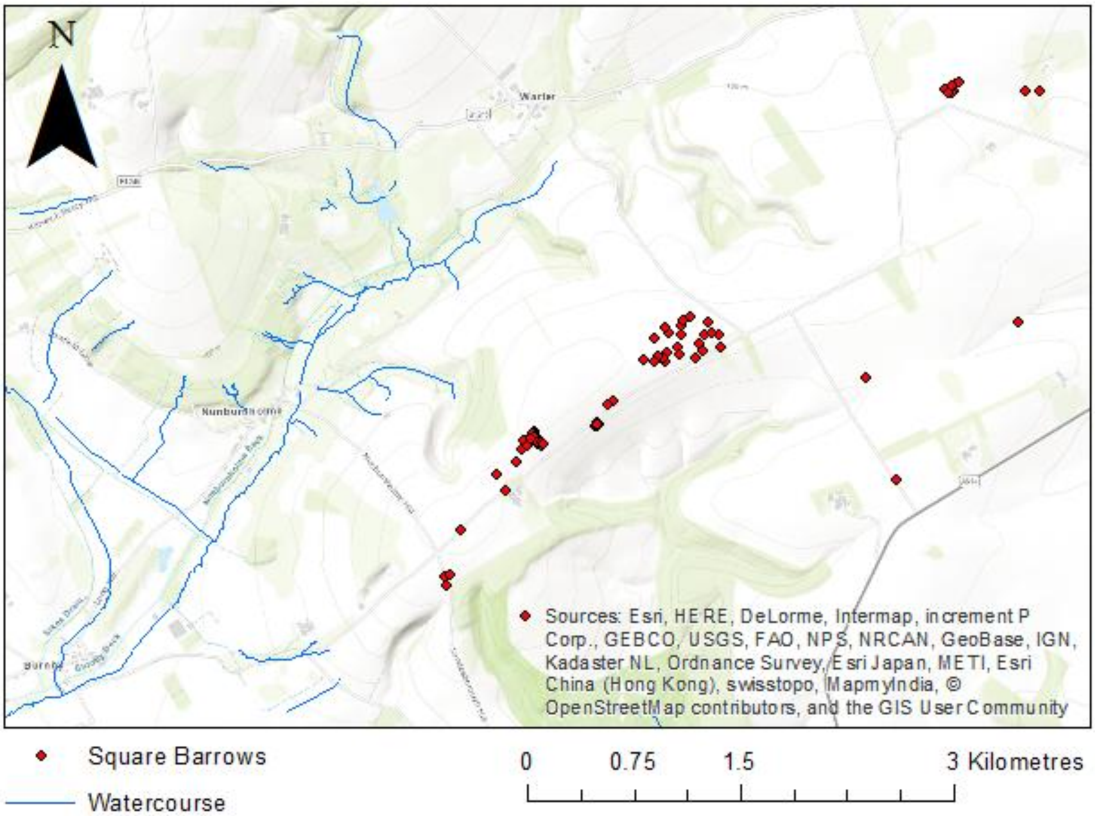


Fig 104 Square barrows. Note how the present day road runs the same route as the linear pathways of the Iron Age. (World topographic map. An EDINA supplied service mapped in ArcGIS 10.3 software)

The study area barrow distribution pattern demonstrates similar patterns to that of the Yorkshire Wolds square barrows; presented as isolated barrows, small cluster groups, and large cemeteries, with the smaller clusters and isolated barrows constructed on higher ground. Aerial photography identified 3250 square barrows located on the high Wolds and valley floors, with the mainstream of barrows on the slopes of the eastern and southern Wolds. (Stoertz, 1997, 37).

There are three key groups of square barrows as identified by Dent: (1995; 2010)

Group 1: Large enclosures with no surviving central burial. Cemetery position: early

Group 2: Varying enclosure size, medium or occasionally deep graves Cemetery position: early and middle

Group 3: Enclosures which are not big, occasionally curvilinear. Cemetery position: late

An archetypal barrow was 4.0-5.4m sq. with smaller examples of 3m sq. and the bigger barrows measuring 10m sq. Chariot burials are larger with a range between 8m to 12m sq. (Giles 2012, 66). The depth of the surrounding enclosure ditch is difficult to ascertain due to erosion from ploughing, however, Stead (1991, 7), noted the ditches in the Great Wold Valley are approximately 0.85m deep and 2m wide. The square barrows mapped in the research are an average of 14m diameter from the outer edge of the external ditch to the opposite side so cannot be compared reliably to Stead's sizes due to the Google earth trajectory. Some Wolds burials were deposited at ground surface but later they were dug into shallow graves. It was common for the grave to be surrounded by a square enclosure ditch; the soil was cast aloft, which created a mound. Some of the barrows were enclosed within a circular enclosure and others had no encompassing ditch (Stead, 1991, 7).

Heights are generally difficult to estimate due to erosion from ploughing causing many barrows to be ploughed flat, however, there are still upstanding examples at Scorborough where the cemetery includes up to 127 low mounds ranging in height from 80mm to 1.5m and from 2m-12m in diameter (Heritage Gateway, 2020). Antiquarian researchers noted examples on the Yorkshire Wolds of retaining mounds between 15-30 inches up to 3 and a half feet (Giles, 2012, 67). The unavoidable erosion of the mound resulted in a more rounded shape and is a reason attributed to the early researcher's unrecognition of the square ditched morphology (Stead, 1991, 7). Giles (2012, 81) surmises that ditches could be square or round in plan, size is not the overriding issue, the factor that is overriding is the chosen area of burial.

The concentration of square barrows at Nunburnholme Wold SE 84 NE 55 is dense and situated close to the large earlier round barrow/henge, suggesting that there is a continuation of significance applied to that site; an attachment to ancestry. A geophysics survey undertaken by James Lyall, Finn Pope-Carter and Tom Sparrow (2012-2014), provided exceptional data of the site which was subsequently mapped by the author in 2015. The earliest monument is evident as two parallel ditches from a possible Neolithic mortuary enclosure. A large Bronze Age round barrow or hengiform (fig 105), is truncated by triple linears which is unlike any others seen across the Wolds (Mortimer, 1905).

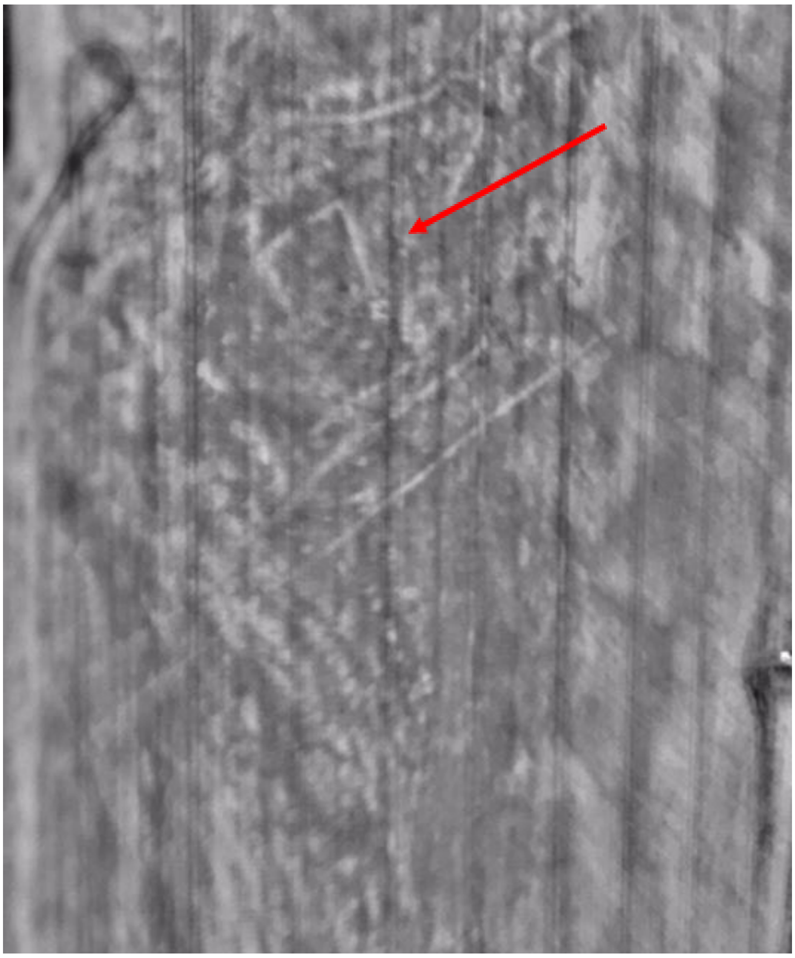


Fig 105; Aerial reconnaissance of Nunburnholme Wold taken in July 2018 over the Nunburnholme site (Whiteley, 2018).

Situated in alignment with the triple linear feature, is a large 20m-wide square enclosure (fig 105 and 106) which has been excavated and revealed a male burial. Halkon (2020, 8) advises that the barrows are from the Iron Age, however, the burial itself dates from 718-914 Cal AD (95% probability). Other Anglo-Saxon burials have been recorded in Bronze Age barrows and Iron Age cemeteries, an example at Garton Station (Stead, 1991).

Fig 106; Original aerial photograph taken over the research site. The arrow indicates the square enclosure. (NMR 12174/16 19-SEP-1991 © Crown copyright. Historic England).

Recent aerial reconnaissance over the research site, shows that the large square enclosure remains highly visible, nearly 20 years after the original photography was taken (Whiteley, 2018).

Fenton-Thomas (2003, 51) suggests isolated barrows or smaller groups situated on higher ground are located away as a deliberate act in which social changes have resulted in, or influenced, landscape roles, with the majority of graves situated within low lying landscapes to fulfill a landscape directive. Dent (2010, 22) agrees and states burial distribution was impacted and restricted by existing land use, with some barrows constructed on uncultivated land which may have been given over to pasture.

The barrows at Nunburnholme are clustered (fig 107) with some sharing enclosure ditches, however it could be argued this is to more be situated within the site of significance than any land restrictions. Dent (1982, 453) suggests that the land available at the beginning of this new rite was not under pressure, but later more compact burials were indicative of pressure on available land owing to an increase in population.

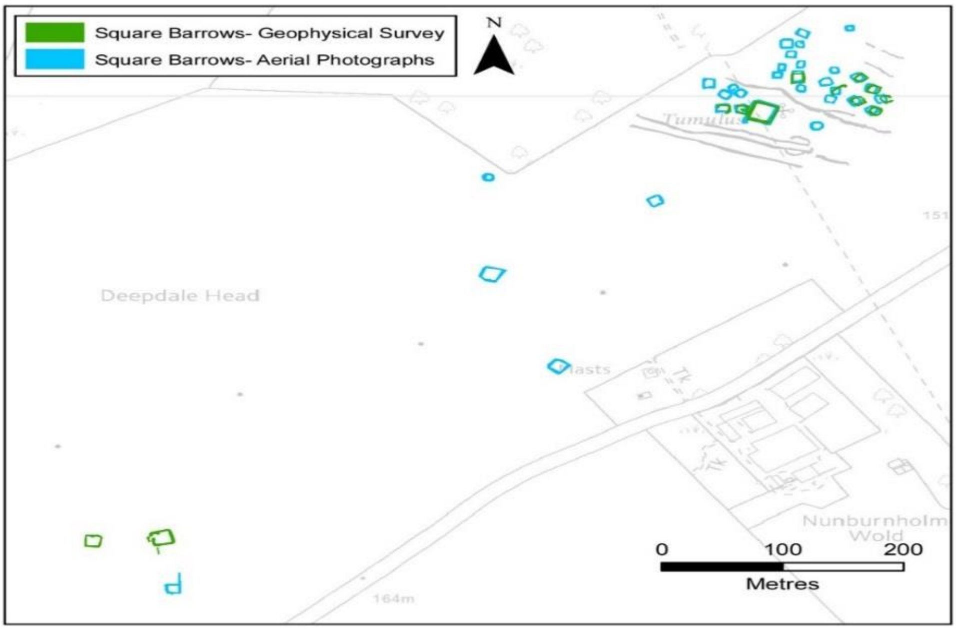


Fig 107; Square barrows from the geophysical survey and aerial photographs mapped in Auto CAD map 2008 (Unpublished geophysical survey Lyall, 2014) (Stoertz, 1997 Yorkshire Wolds mapping project) Ordnance Survey map @ Crown copyright/database 2010. An Ordnance Survey/Edina supplied service

Fig 108; Loaningdale Square barrows from the geophysical survey and aerial photographs mapped in ArcGIS 10.3 software (Unpublished geophysical survey Lyall, 2014) (Stoertz, 1997 Yorkshire Wolds mapping project) Ordnance Survey map @ Crown copyright/database 2010. An Ordnance Survey/Edina supplied service.

Stoertz (1997) identified and mapped square barrows ꟷ Newly identified square barrows

Figure 109; Loaningdale Square barrows (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.2 software) Ordnance Survey map @ Crown copyright/database 2010. An Ordnance Survey/Edina supplied service..

Loaningdale square barrow cemetery SE 880 487 (monument number 910549, Pastscapes) barrows are more spread out than the Nunburnholme site, which give the impression they have clustered together, possibly over time. Several of the barrows share enclosed ditches (see fig 108, 109, 110,112). Like a majority of the barrows, which are situated within larger cemetery locations, they would have progressively changed and grown over the centuries (Giles, 2012, 69). The site is similar to Nunburnholme, as it is situated on elevated ground in a prominent position and in close proximity to trackways heading towards Middleton Dale and would have stood witness to the passing community. These barrows also favour a continuation of site significance, as there are four earlier round barrows within close proximity. There is no excavation evidence available for this group of barrows. Evidence of potentially seven additional barrows was found here using Google Earth (fig 109, 111). Heritage Gateway note the cropmarks are poor and the cemetery would have been bigger

Fig 110; Square barrows with share enclosure ditch at Loaningdale cemetery

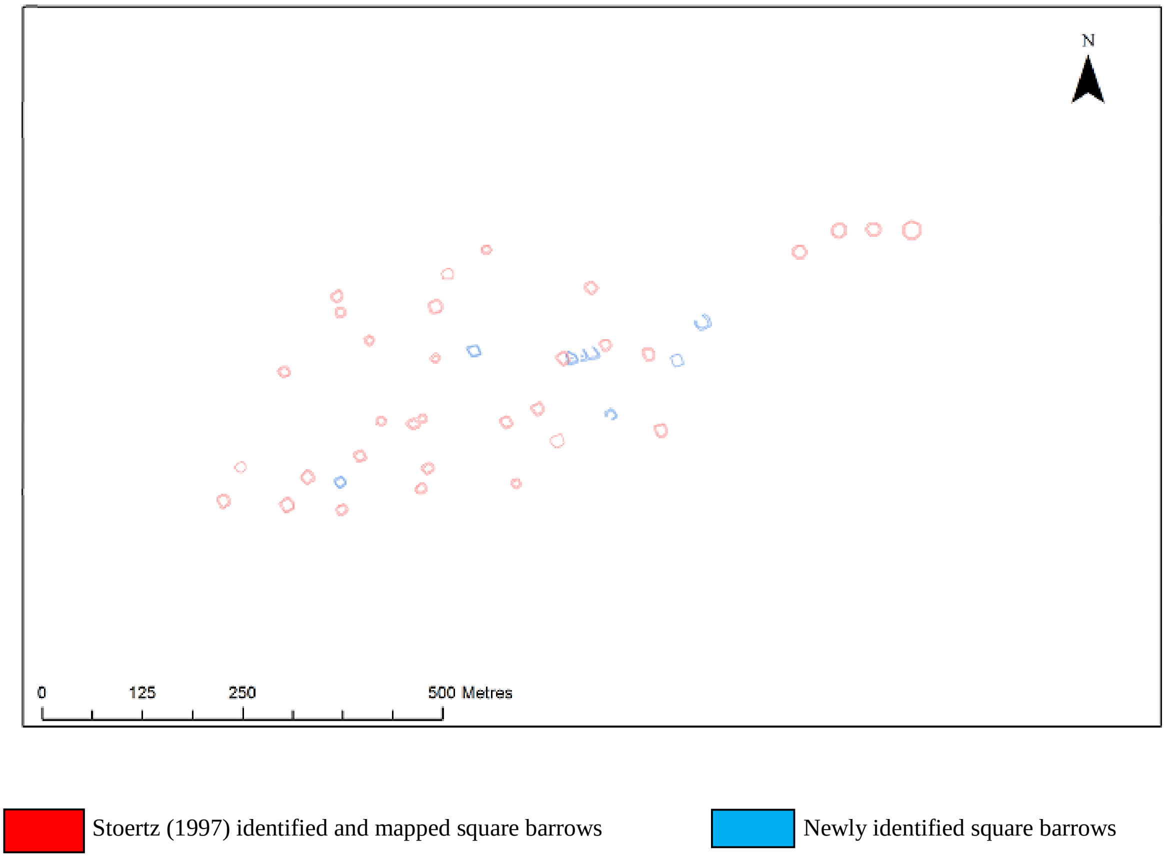


Figure 111: Loaningdale Square barrows, Stoertz (1997) and newly identified barrows (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.2 software)

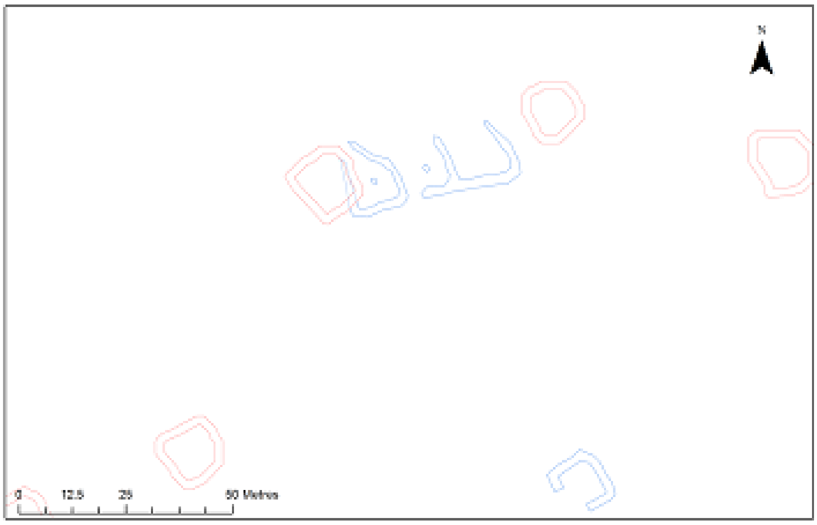


Figure 112; Loaningdale Wold Square barrow cemetery, showing overlapping ditches with grave pits (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

Dent (2010, 22) suggests large cemeteries have developed in size as a result of cluster groups merging and provides Rudston and Burton Fleming as examples. Wetwang Slack spans 250-300 years. It is difficult without excavation to date Loaningdale, however, overlapping ditches as seen in fig 112 would certainly suggest these barrows were added at a later date. In conjunction with the positioning over elevated topography perhaps this site did begin in the earlier part of this burial rite tradition.

The square barrows reflect their continental counterparts in morphology, although they are not as rich in grave artefacts, with only a few continental artefacts across the Wolds; which as discussed earlier demonstrates a civilisation which has adopted and adapted a rite into their society whilst retaining indigenous practice (Stoertz, 1997, 34). Grave goods are rare in East Yorkshire graves, however, there have been some containing brooches, jewellery, and mutton joints, whilst others contained tools and weapons (Stead, 1979).

Recent excavations by MAP in Pocklington found 18% of the burials to include grave goods which include copper alloy or iron brooches, bracelets, bone objects and beads. One single burial contained a complete pottery vessel (Stephens and Ware, 2020, 23). Other goods included a glass bead, bone and antler toggles and a partial skeleton of a juvenile pig.

Pigs are also associated with excavations of square barrows at Nunburnholme Wold. In 2014 the Nunburnholme Community Heritage Project excavated a square barrow under the supervision of Malcolm Lille, then Reader in Archaeology and Geography at Hull University. The central grave was deep and was surrounded by a shallow square ditch. Within the pit was a decayed planked coffin and in the usual Arras tradition, the skeleton was placed in a crouched position (Fig 114). It was aged either late/ middle or early old age with arthritic joints and few remaining teeth. At the feet were the bones of a small pig, suggestive of a higher status burial (Halkon *et al* 2014b).

A further barrow was excavated in 2015 This was a male aged 17-22, and across his lap was the forequarters of a pig, suggestive of a higher status burial (Halkon *et al* 2014).

Fig 113; Excavations of a square barrow at Nunburnholme Wold in 2014 (Halkon and Lyall, 2014)

Fig 114; Nunburnholme square barrow excavation 2015 (Halkon and Lyall, 2016)

Giles (2012, 73) states most burials tend to be single inhumations, however, Halkon (2013, 70) advices excavation can reveal secondary burials.

The body shown in fig 114; was crouched or contracted with the head orientated towards the north end of the grave which faced in an easterly direction. Stead (1991) in his excavations in the Great Wold valley identified four main burials rites; A, B, C and D. Rite A is defined in which the body was in a crouched or contracted position, orientated in a north-south aspect so the body faces eastwards. Both excavated square barrows at Nunburnholme Wold are from this rite. However, there are examples in which the body is placed on the right-hand side facing west. Rite A is thought to date from the fourth-third centuries BC and appears to be a dominant rite. Individual bodies of adults tend to be the characteristics of Rite A, however, there are examples of double burials with some examples of secondary inhumations. 60% of burials are interred with objects, and there is evidence of coffins from soil markings within the grave ditch.

The square barrows within the research area relate closely to the topography and other key landscape features. Cemetery distribution within the area has demonstrated patterns which replicate other areas that of the Wolds general, however, as Dent (2010, 29) notes square barrows above the watershed, an area of land that drains all streams and rainfall to a common outlet, are rarer.

The square barrows mark a departure from the previous Bronze Age monuments, however as seen at both cemetery sites, the Iron Age Society has continued to use to Bronze Age landscape monuments as makers and places of spiritual significance. New burial rites developed at these sites which are associated with the Iron Age culture. Excavation at Nunburnholme Wold has revealed a burial rite associated with that of the Arras culture.

Without excavation reports from Loaningdale, it is difficult to assign dates to these graves, however, the morphological features suggest an ongoing burial practice resulting in clusters which formed a square barrow cemetery. The aerial imagery has enabled a wider picture. Dent (2010, 77) advises chronological implications derived from Iron Age graves suggest that scattered barrows and small cluster groups are earlier in the sequence.

5.4 Iron Age settlement and economy

5.4. 1. Crop mark distribution and topography

This section of the report analyses the cropmark distribution over the research area in order to further understand the nature of Iron Age settlement and land usage. The features identified and associated within this period are curvilinear features, enclosure systems and associated pits. Within the study area two hundred and eighty flour enclosures were identified, analysed and plotted from Stoertz (1997) aerial surveys and Google Earth. Of these, 18 were new features identified through Google Earth imagery.

The features were classified using Stoertz (1997) categories; discrete, regular rectilinear, linear enclosure complexes, curvilinear enclosure complexes and funnel enclosure systems. In addition, the term 'individual enclosures' is used for the purpose of this study, to classify several enclosures together, which could not be viewed with an associated linear, but morphologically, have the characteristics of a linear enclosure complex (Table 8)

The analysis demonstrated that there were more linear enclosure complexes (ladder settlements) than singular rectilinear enclosures. The analysis noted eight large rectilinear enclosures, indicative of field systems. Of particular interest were the funnel type enclosures of which there were four; three of which were clustered overlying Panholes brown calcareous earths (pH) at Londesborough Wold. There is only a small amount of settlement evidence noted from two roundhouses, which are at Kipling House Farm and Londesborough Wold. However, although only two are noted, it is argued many of the enclosures could potentially contain roundhouses, it is just that their ephemeral nature means that only in extreme drought conditions, or if they have deep foundations, will they be evident (Bradley, 2007, 195). Kipling House Farm revealed potentially three phases of roundhouses which only manifested when the topsoil was removed.

Halkon (2020, 9) proposes there is a close correlation between the landscape and settlement, it is therefore the intention of this part of the thesis to analyse the topography, soils and watercourses in relation to the enclosures complexes, and their impact on settlement from the early Iron Age through to the later part of this period.

Table 8: The location and categorisation of enclosures

LOCATION (CENTRE) Enclosure (E)	**MORPHOLOGY**	**SOIL**	**COMMENT**
SE 490327 453946 E1/ E7 (1)	Large Regular Enclosures	Ph	Field system
SE 490413 453693 E2/3/4/5 (1)	Linear Enclosure Complex	Ph	Evidence of subdivisions
SE 490441 453518 E6 (1)	Individual enclosures	Ph	Near to other enclosures
SE 490257 453358 E7/8/9/ (1)	Linear Enclosure Complex	Ph	
SE 490380 452859 E10/11 (1)	Large Regular Enclosures	Ph	Field system. Associated to Linear Enclosure complex E12

SE 490885 452813 E12/14/151/16 (1)	Linear Enclosure Complex	Ph	
SE4 90008 452416 E20/21/22 (1)	Linear Enclosure Complex	Ph	Newly identified
SE 489255 453270 E23 (1)	Curvilinear	Ac	Internal ditches newly identified
SE 489725 452988 E24/25/26/27 (1)	Individual enclosures	Ac	Conjunctions
SE 488032 453424 E28 (1)	Individual enclosures	Ac	Conjunctions and subdivision
SE 488663 453256 E30 (1)	Individual enclosures	Ac	Conjunctions
SE 48795 4252595 E31-E73 (1)	Linear Enclosure Complex	Ac	
SE 488229 452050 E74 (1)	Large Regular Enclosure	pH	Field system
SE 488004 451591 E78-99 (1)	Linear Enclosure Complex	pH	Conjunctions and subdivision
SE 488319 451847 E100 (1)	Discrete	pH	
SE 488319 451847 E101 (1)	Large Regular Enclosure	pH	Field system
SE 487727 451061 E102-124 (1)	Linear Enclosure Complex	Up	Conjunctions
SE 490131 451661 E125-127 (1)	Large Regular Enclosure	Ac	Field system
SE 490772 450839 E128-137 (1)	Linear Enclosure Complex	Ac	Conjunctions
SE 490062 450133 E138-141 (1)	Linear Enclosure Complex	Ac	Conjunctions
SE 490573 449917 E142 (1)	Large Regular Enclosure	pH	Field system
SE 490593 449897	Linear Enclosure Complex	Ac	Conjunctions

E144 (1)			
SE4 87526 451785 E145 (2)	Discrete Regular rectilinear	Up	? RB
SE 484778 450468 E146-160 (2)	Linear Enclosure Complex	Ac	Conjunctions
SE 484808 450321 E160-164 (2)	Linear Enclosure Complex	Up	Conjunctions
SE 487833 449650 E165-166 (2)	Linear Enclosure Complex	Ac	Conjunctions
SE 484522 448848 E250-252 (4)	Linear Enclosure Complex	pH	Conjunctions
SE 484564 446606 E253-258 (4)	Linear Enclosure Complex	Wf	Conjunctions
SE 487308 446446 E258-267 (4)	Linear Enclosure Complex	Ac	Conjunctions
SE 491070 447096 E270 (3)	Large Regular Enclosure	Up	
SE 486917 448719 E269-276 (4)	Linear Enclosure Complex	Up	Conjunctions
SE 486590 447594 E281-328 (4)	Funnel System	pH	Undergraduate Area Research NHW
SE 490941 448593 E210-221 (3)	Funnel system	Up	Funnel system 1 (z3)
SE 490609 449715 E223-227 (3)	Linear Enclosure Complex	Up	Conjunctions
SE 489694 447147 E253-268 (3)	Funnel system	Up	Funnel system 3 (z3)
SE4 89641 447514 E230-253 (3)	Funnel system	Up	Funnel system 2 (z3)
SE 490780 446071 E271-275 (3)	Linear Enclosure Complex	Ac	
SE4 87548 447243	Linear Enclosure Complex	Ac	Conjunctions

E276-283 (4)			
SE 489185 446242 E284 (4)	Large Regular Enclosure	Up	Field system

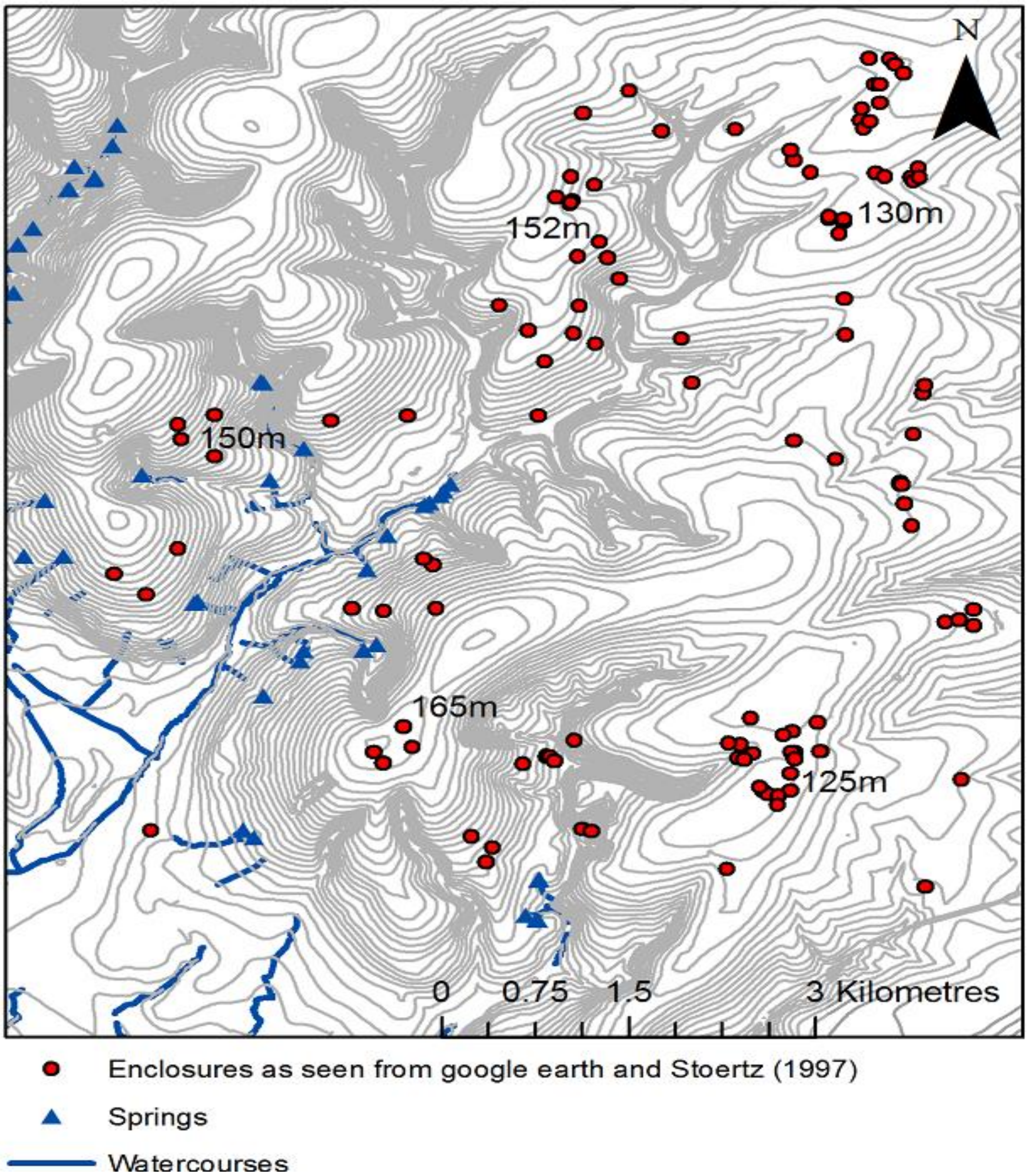


Fig 115; Enclosures shown over land contours to highlight the elevated topography on which they are situated. Elevations shown in metres. Note the watercourse and springs which today are located at a lower elevation, (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2018). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3.

The enclosure systems associated within this period are mainly situated on higher ground with an average topography of 120.5metres OD (see fig 115)

Dent (1995) and Halkon (2008) noted that higher terrains across the Wolds and Foulness Valley have a more dense concentration of ditched enclosure systems. However, it is possible that the lower lying enclosure systems are not as easily viewed, as the glacial sands, gravels, clay and peat soils do not show up the cropmarks features as clearly (Dent, 2005, 3).

There is a correlation with regard to the topography between linear enclosure systems and square barrows. Millett (1990) argued a majority of settlement sites dispersed across the Wolds, replicates burial site distribution. Nunburnholme Wold is a good example of this relationship, where the funnel site is 450 metres from the square barrow cemetery, and there are also individual square barrows within the immediate enclosure site. The funnel enclosures at Middleton Dale are 1km from Loaningdale cemetery, whilst at Dalton Gates there are several square barrow enclosures 100 metres from a single rectilinear enclosure. These findings are complemented by Halkon (2008), which demonstrate an extensive Iron Age activity in the Foulness landscape block. Of the thirty-one singular rectilinear enclosures plotted, twenty-four of them were on the higher land, formed out of sand and gravel ridges, furthermore many are situated within some proximity to square barrows.

Bevan (1999) likewise identified cemeteries occupying positions away from settlements, around long-distance trackways. A good example of this is at the cemetery at Arras where Sancton Dale leads down to the Foulness Valley River systems which Halkon (2013, 73) suggests indicates a control association between the cemeteries, water sources and landscape routes. Figure 117 clearly demonstrates how the criss-crossing linears are connective features providing a routeway across the landscape, which connects the land between the living and the dead. Through the analysis of the linears, square barrows and enclosures, a picture of a community emerges which had a good degree of mobility, enabling them to work a landscape in which both past ancestry and daily activities of life are connected.

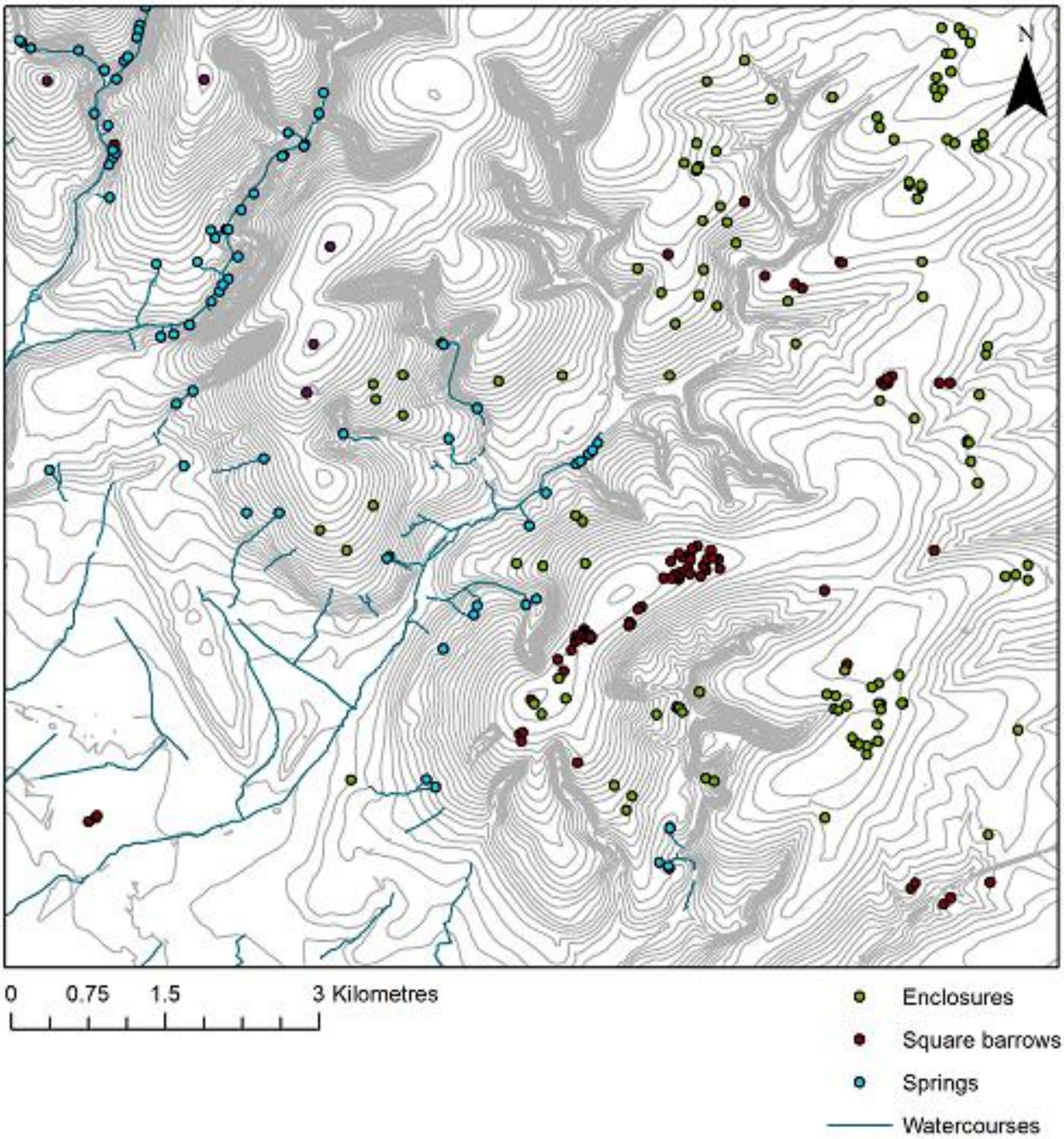


Fig 116; Square barrows and enclosures shown over land contours to highlight the elevated topography on which they are situated. Note the cluster of barrows on Nunburnholme Wold plateaux where they dominate that area. Elevations shown in metres. Note the watercourse and springs which today are located at a lower elevation, (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2018). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3.

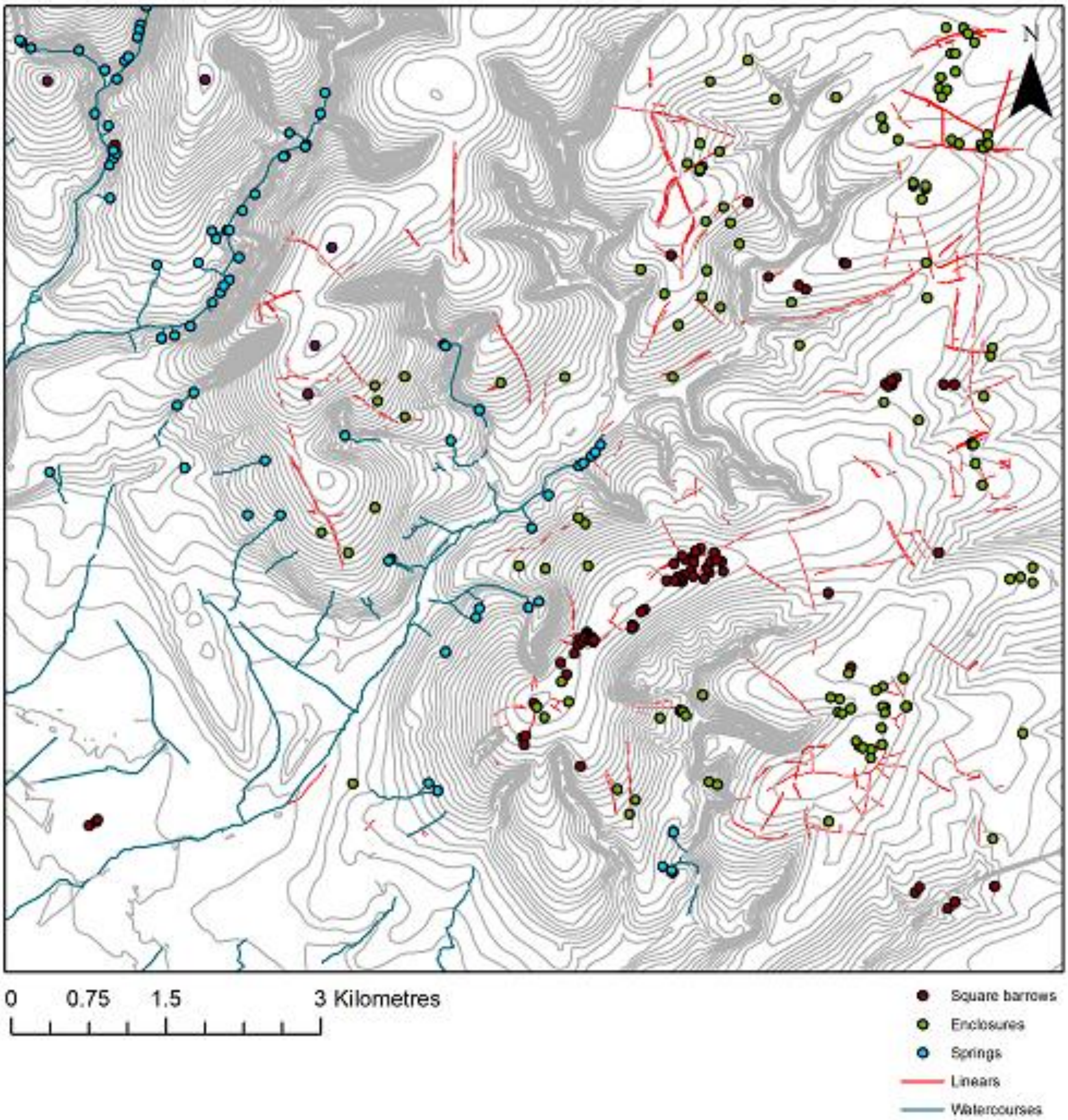


Fig 117; Square barrows, enclosures and linear systems shown over land contours to highlight the elevated topography on which they are situated. Note the cluster of barrows on Nunburnholme Wold plateaux where they dominate that area. Elevations shown in metres. Note the watercourse and springs which today are located at a lower elevation, (Ordnance Survey Map (2013). (DWG geospatial data) 1:50 000, Tiles, SE84nw, SE84ne. SE85se, SE85sw, SE94nw, SE95sw. OS Mastermap, version: December 2013. Available online: http://edina.ac.uk/digimap (Downloaded 06/10/2018). Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. Mapped in ArcGIS 10.3.

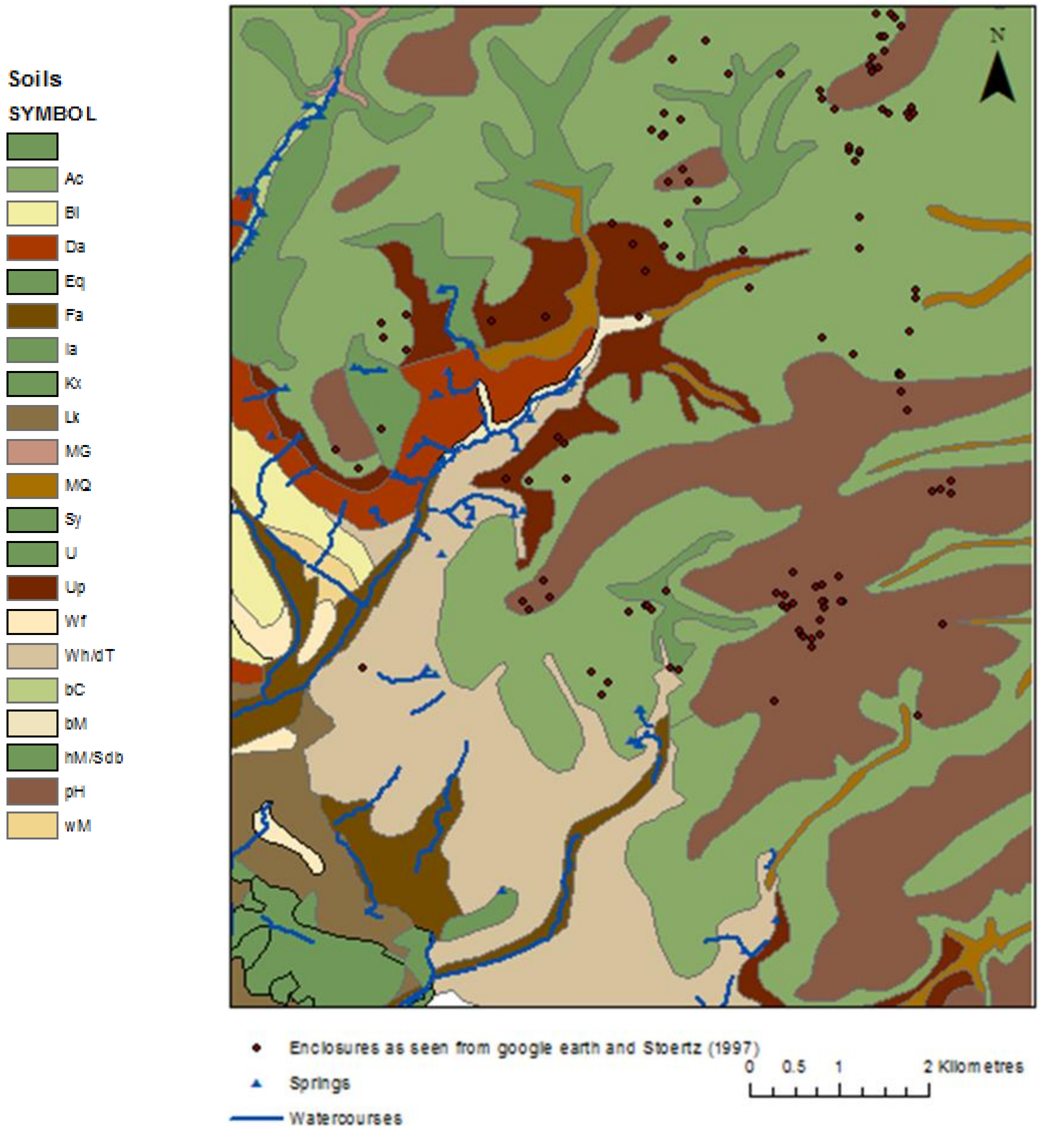


Fig 118; enclosure features overlying soils (after King and Bradley 1987). The letters against the blocks are abbreviated soils types and area and explained in Table 3

The enclosure features overlie Ac, pH, and Up soils; brown calcareous earths and the shallow dark coloured rendzina soils (see fig 118).

The best soils are those which offer good drainage and workability and are fertile enough to be suitable for all crops. However, as discussed it cannot be assumed that there was no settlement or agriculture in the lower lying areas, as the soils may be deeper and hence crop marks are not be as evident (Halkon, 2008, 152).

The enclosures features are not situated directly nearby to water sources, and as discussed in the earlier chapters, there is a lack of evidence of water on the research plateaus (fig 117). This is a problem for humans and cattle who require drinking water. Porter (1991) suggests cattle require daily 12-15 gallons of fresh water, however, this is less so for sheep and crops which can acquire moisture from the soils. Dent (2005, 61) notes the absence of enclosure systems on the high Wolds, which may be a direct result of the lack of water sources. The fact that the research area does have enclosure systems, suggests water is obtained from some source.

Field walking near Huggate revealed brickearths which would have trapped and held water; however, this is only evident in a limited area and cannot be attributed to other parts of the research area. A major source of water is the beck at Nunburnholme, providing a focus for stock; higher sites with morphological features may have had access to water from wells and ponds. An example is shown below in figure 119 of the pond at Warter.

Fig 119; the village pond at Warter, formed at the junction where the Ferriby Chalk formation meets the underlying Redcar mudstone formation (Whiteley, 2020).

The importance of water for humans and animals is the key to living and sustainability, it is therefore proposed water was obtained by means of the trackways which moved stock from higher areas to the lower lying water sources, in conjunction with wells, springs and ponds. The maps show some correlation of enclosure features to water, and in other places it is suggested the linear droveways would have led to the water sources. Halkon (1998, 153) concurs and suggests one of the functions of linears is as a route to water for livestock to drink and controlling access to water supplies.

In summary the cropmark distribution is reflective of landscape in which enclosures plotted are generally on a higher ground and with good workable well-draining soils. Although water is nearer to some features than others, the pattern of linear droveways is suggestive that water was accessible.

5.4.2 Early Settlement

Fenton-Thomas (2003,54) suggests there has been a tradition of bias towards the investigation of funerary monuments which has resulted in less work around settlements in the prehistoric period. Certainly, there is a good deal of evidence from burials, and a lack of evidence of earlier smaller settlements from this period, however, features associated with open settlements such as post holes and pits, are difficult to see from aerial or satellite imagery. There is not a standard model of an Iron Age settlement; components that appear across many sites nationally are more in keeping with their surrounding landscape (Hunter, 2020, 143, Halkon, 2020, 9). The most common form of Iron Age settlement is noted by Speed (2010, 36, 27) to be the individual farmstead, which could easily be overlooked in terms of investigation, in favour of the dominant Hilltop features or spectacular burials.

Early settlements on the Wolds have been located by chance, as suggested by Fenton- Thomas (2003, 54), due to salvage excavations (gas pipeline). Several Iron Age settlements have been discovered on the Easington to Paull natural gas pipeline such as Welwick and Patrick Haven, with other discoveries located at Ellerby, Burstwick and Skeffling (Halkon, 2013, 95). Other settlement evidence has been found through excavations held at burials sites, and as such it is assumed settlement evidence may lie close to large cemeteries.

Excavations at Wetwang Slack and Garton Slack revealed a unique open settlement running alongside a contemporary cemetery (Fenton-Thomas 2003, 55). Eighty round structures, which dated from the early Iron Age belonging to the early ‘open’ phase of settlement, through to the later Roman period were spread over a 2km distance (Dent, 1982, 449). Only four of the houses were enclosed. The houses were arranged into deliberate areas which Halkon (2013, 93) suggests were to facilitate activities; evidence of loom weights, bone combs and spindle whorls were frequent finds. A majority of these structures were representative of roundhouses. In addition to the roundhouses, Wetwang also has a group of more irregular features which were semi-circular in their morphology, Dent (2010, 54) identifies these as possible wind breakers or stock shelters and isolated post holes to be racks or store granaries.

Within these open settlements there are no permanent boundaries. Bounded enclosures, fence lines, ditches, hedging and earthwork features are characteristic of the Later Iron Age, although there may have been areas with cultivation plots separating areas, these will not have left any evidence behind (Giles, 2012, 81). Wetwang Slack is a good example of a settlement which has a continuum throughout the Iron Age period (Halkon, 2013, 89).

Additional settlements have been identified in and around the Wolds, with one of the most renowned examples of Iron Age settlements to the North of the Wolds at West Heslerton site 1, where 20 sub-rectangular structures were found, and a considerable group of roundhouses measuring between 7-8 metres in diameter, some with a porch-like feature. Powlesland (1986, 159) notes the pottery identified within this settlement is from the Early Iron Age, however, Giles (2012, 83) proposes its openness has more affinity in character and features from the middle/late Iron Age settlement at Wetwang /Garton Slack.

Other settlement locations which have been found, relate to the first century BC, with examples at Rudston (Stead, 1980), North Cave (Dent, 2010), Easington, Bempton Lane, Bridlington and Easington (Evans and Atkinson, 2009, 259). Giles (2012, 84) suggests these sites are reflective of a range of both permanent and seasonally occupied sites which have evidence of agricultural activities and crafting. Other sites demonstrate industrial events as evidenced by Halkon (2020, 9) who identified 18 smelting sites in the Foulness Valley and notes the large-scale iron production which coincides with the emergence of the Arras Culture. These sites were at a distance to the main areas of settlement; however, blacksmithing slag has been found within the settlements.

The research area has no identifiable morphological features from early Iron Age settlement identifiable, but that does not mean there was no settlement in the area, rather that the features are ephemeral from the analysis methods used. However, Staple Howe style pottery from the Early Iron Age was excavated at Nunburnholme Wold and Kipling House Farm which provides evidence of activity within the area from this period. Nunburnholme is a good example of the development of ladder type settlements right through the Iron Age, however evidence of early phases of settlement would require further excavation.

5.4.3 Mid- Late Iron Age settlement

It has been argued that the enclosure features become more frequent throughout the Iron Age due to agricultural intensification (Speed, 2010, 36). It is evident enclosures are of high significance throughout this period, symbolising both ritual and practical intentions. It is suggested that a landscape which becomes a mosaic of division indicates an awareness of space and property of the local population.

Space is recognised as a need for all societies and bounding an area is a way of organising activities of daily living. One way of defining a practical and physical space is an enclosure ditch. This can define a settlement and can symbolise both practical and symbolic meaning (Speed, 2010, 29). Enclosures with boundary ditches can be seen on aerial imagery and Google earth in the research area, due to their deep defining ditches. It is advised that enclosure systems should also be considered in terms of settlement as well as stock enclosures, as without excavation, evidence assumptions cannot be made.

The primary function of a settlement boundary ditch, as suggested by Hingley (1990), is for defence; to protect from wild animals, or threats from raiding. It can define areas of domestic activity but may also delineate a symbolic separation between the domestic enclosure and the open spaces beyond. It is suggested by Speed (2010, 29) that these boundaries are representative of a social exclusion, however, the boundary markers could also be viewed as a social divide of space; indeed, ditches are often recut, then reformed, in order to delineate areas and to separate or redefine areas of internal activities within the enclosure. In addition, drainage must be considered as a function for ditches, several settlements along the Easington to Paull natural gas pipeline were designed for wet conditions and paleo-environmental analysis has shown standing water to have been present on occasions in the ditches during ancient times (Halkon, 2013, 95).

A secondary function of the enclosure boundary may be to act as a social status and symbol, as in Hill top forts, which demonstrate a similar reflection of architectural styles, evident through elaborate entranceways and large ditches (Speed, 2010, 35).

The third function may be that of a ritual symbol. Archaeological evidence including human remains, has often been found interred within these ditches as well as material ritualistic offerings. Parker Pearson (2016 b, 123) suggests these offerings are marking the transition from one area to another i.e. the inside of the enclosure to outside of other social groups, or even to link past with the present (Speed, 2010, 36). Discreet rectilinear enclosures are morphologically similar to mortuary enclosures; however, these may be from the Late Iron Age/ Romano-British period (Stoertz, 1997, 49).

5.4.4 Enclosure types within the research area

Analysis has shown there are various morphological forms of enclosure within the research area. Speed (2010, 36) suggests the reason for the various forms of features is due to the landscape, noting the geology and location surrounding the settlement, influences the enclosure morphology. Permeable soils (river gravels) tend to be more heavily exploited for the use of enclosures systems, whilst large areas of woodland would have been cleared for field systems within a managed landscape.

On higher ground, Speed (2010, 39) proposes enclosures tend to be more irregular in their form as they are not required to fit within an organised, bounded system, and may have been situated within a wooded area. This theory does not wholly apply to the research area, as the enclosures are generally a regular rectilinear formation and from the linear enclosure complex morphology, suggest land clearance prior to their construction.

The main concentration of enclosures in the research areas are on elevated topography, with an association to trackways, which provide access to water sources. An agricultural economy across workable soils, requiring stock management and access to water is proposed for this area.

Stoertz' (1997, 49) aerial survey of enclosures mainly identified rectilinear enclosures, which compromised of a single ditched feature around 0.5 ha or less. Regular rectilinear enclosures are generally noted from areas in which the landscape has been developed into field systems and tend to be alongside boundaries (fig 121). There are eight of these large rectilinear features across the research area, with the majority situated towards the east of Blanch Farm southwards to Middleton Dale over higher terrain (fig 121). The enclosures are majoritively situated adjacent to, or beyond, enclosures and trackways of linear complexes and therefore may have been used for arable crops and have been associated with the nearby smaller enclosure systems (Stoertz,1997 53).

In some cases, it is noted that sub-division and ditches broader than average, are within rectilinear enclosures (fig 121), the purpose of which may have differed greatly in use. Speed (2010, 49) proposed their use as animal pens, metalworking areas, food storage areas and ritual areas. However, there is a scarcity of internal features within the enclosures on analysis of the area.

Figure 120; An example of a regular rectilinear enclosure at Londesborough Wold, SE 49107 447096 note how the modern-day northern boundary may be a continuation of an ancient feature which can now not be seen on aerial or satellite imagery.

Fig 121; Example within the research area to the East of Blanch Farm of Large Elongated Rectilinear Enclosure (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software) SE 490380 45285

The aerial image below (fig 122) taken by D Riley in 1982 at the Minningdale Ladder complex at Warter Wold SE 487727 451061 clearly shows an enclosure system with a broad regular rectilinear enclosure, which is adjacent to the linear trackway. It is not possible to see an entrance, however, the ditches to the side may have been used to funnel or hold stock as in a 'pen' type system.

Fig 122; Original aerial image taken by D Riley 1982 SE 487727 451061 and shown below (Stoertz 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

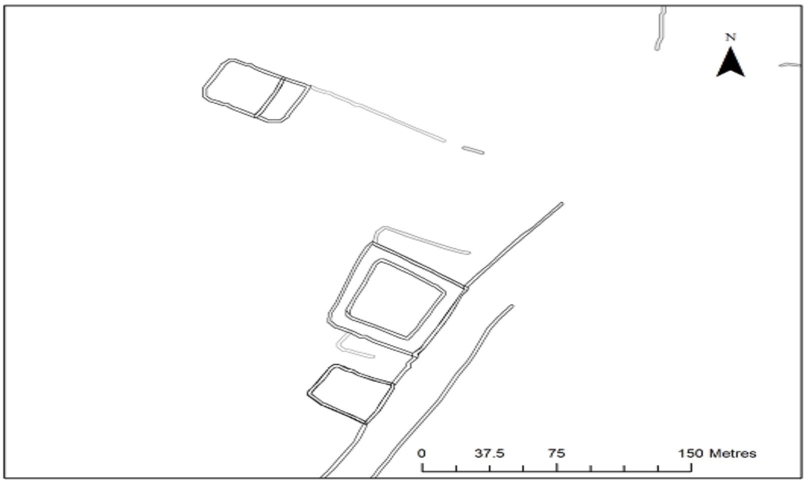


Fig 123; SE 487727 451061 and shown below (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

Without excavation it is difficult to date, however, its form is comparable with other examples from the Romano-British period. It is argued that the linear/trackway may predate the enclosures which were later editions, as is the case with a comparative example evident from the Thwing project. A geophysical survey at Far Field on the 'Stretch south of Willy Howe' at Thwing illustrates a linear trackway which predates the rectilinear rectangle ditched enclosure, with internal subdivision and the smaller rectilinear to the west, containing a roundhouse. The larger enclosure contains a rectilinear structure which Ferraby *et al* (2017, 64) suggest is a successor to an earlier roundhouse. In addition, both features superseded the linear. Metal detector and surface finds to date, produced seventy-six Iron Age and Roman coins, ranging in date from the mid-first century to the late fourth or early fifth century AD. Two deliberate and structured coinage depositions occurred from the second to the late 4th century and it is suggested the site possessed some links to the Roman army or had a local administrative function (Ferraby *et al,* 2017, 74).

An additional example of a very regular rectangular shape which contrasts with the other, less uniformed enclosures of the area lies to the east of the Minningdale linear enclosure complex at Warter Wold (fig 124). It is a double ditched enclosure with evidence of an additional outer ditch to its north east side, and has smaller enclosures which are conjoined to the outer ditches and exhibit subdivision. Double-ditched enclosures elsewhere in Britain are attributed to the Iron Age and Riley (1982) has recorded their occurrence in both Yorkshire and Nottinghamshire.

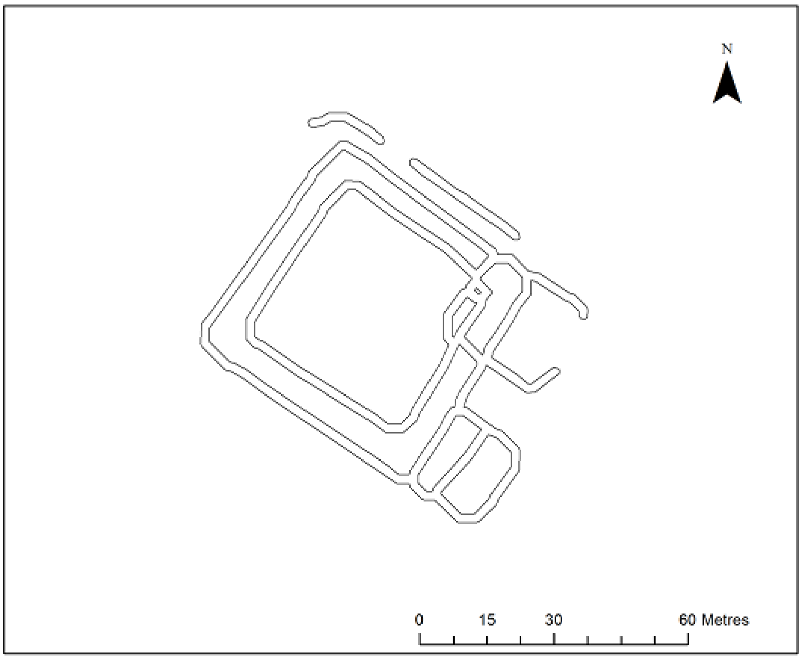


Fig 124; is an example of a double ditched enclosure with clear superimposition at Warter Wold. (490327 453946). (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

At a comparable site at Starnhill Farm in Nottinghamshire, Coleman (1979) found Roman grey ware, Dales ware and samian ware. Further field walking yielded fifty-five sherds of Roman and a single sherd of Iron Age pottery. The overall assemblage of pottery is comprised of domestic ware, dating to the later third until the mid-fourth century. However, there is also undated grey ware which may represent earlier activity. More work is required to be able to confidently date this double ditched enclosure which may have originated in the late Iron Age; however, the pottery and undiagnostic ceramic building material does indicate some Roman buildings. Taking this site as a comparable it may be indicative of a Later Iron Age/ Romano-British feature within the research area (fig 125).

Fig 125 overleaf illustrates a comparable example to the Minningdale enclosure at Warter Wold. An aerial photograph highlights a comparable double-ditched enclosure situated to the south of Starnhill Farm, Bingham, Nottinghamshire.

Figure 125; An air photograph of the double-ditched enclosure to the south of Starnhill Farm. Bingham Nottinghamshire ©English Heritage. NMR (Jim Pickering Collection)

Stoertz (1997, 51) suggests discrete enclosures may be representative of ceremonial and settlement features from various dates. There are two discrete enclosures plotted and it is difficult to assign precise dates or functions without excavation. Caution must be applied when classifying isolated discrete features as shown in figure 126 as often they are often associated with other enclosures or linear features, this features is 400 m away from any other features.

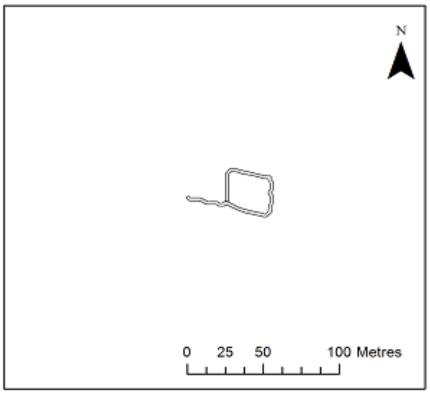


Fig 126; An example of a possible discrete enclosure (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software. 488032 453424

D-shaped enclosures are generally found at the corner of fields as they have two parallel sides running alongside a boundary. The D shape enclosure at Nunburnholme superimposes the elongated rectilinear, demonstrating a chronological sequence of cutting/ recutting ditches and land distribution. A small-scale excavation was carried out in August 2014 by members of the local community, Hull University archaeology students and members of the East Riding Archaeological Society. Three trenches were opened; A, B and C, plus associated pits in the northernmost droveway. The trenches across the enclosure (trench A on the western boundary and trench C on the east) exposed substantive enclosure ditches that were c. 1.40m deep and almost 2m wide. In addition is was evident that the enclosure ditches had been re-cut several times, with trench A demonstrating the alignment, depth and width of the enclosure boundary (fig 127 and 128). The finds from the ditches included animal bone and hand thrown pottery (Halkon and Lyall, 2014).

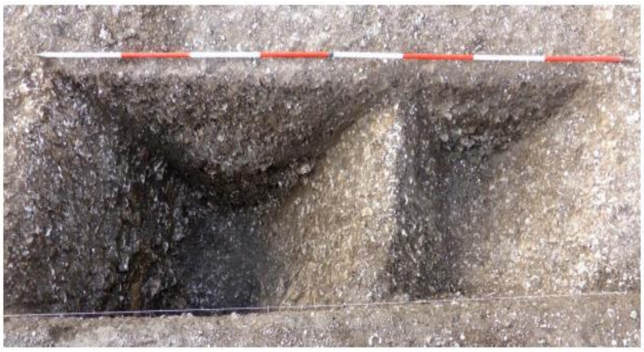


Fig 127; Section across the ditch in Trench A on the western boundary of the D shaped enclosure, shown with meter scale.

Fig 128; The D shaped enclosure at Nunburnholme Wold (unpublished geophysical survey, Lyall, 2014) mapped in Auto CAD map 2008 software (Whiteley, 2015).

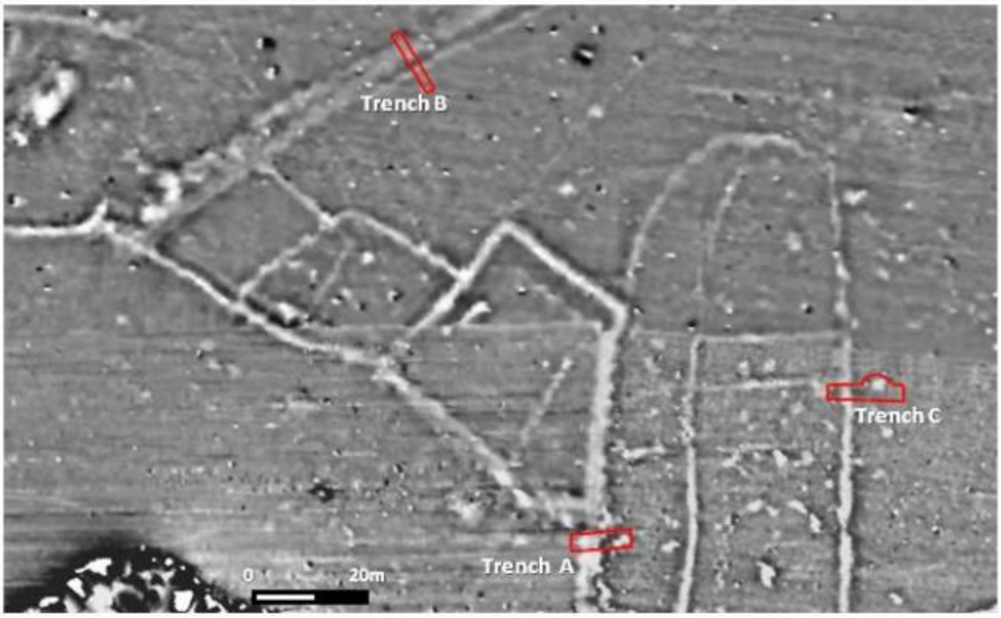


Fig 129; Plot of the geophysics showing the position of the excavation trenches (unpublished geophysical survey, Lyall, 2014)

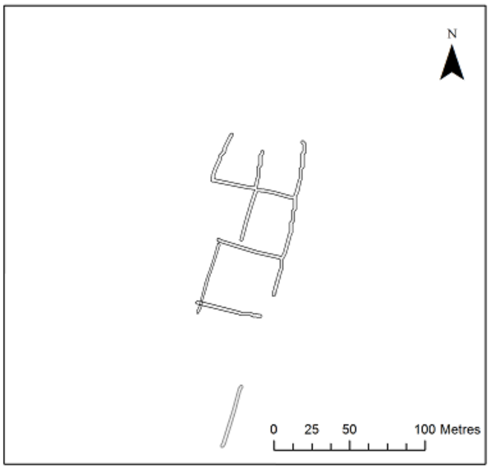


Fig 130; Example of a rectilinear enclosure entranceway (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

Entrances are of great importance to any area or building as they define the outside from the inside, with the most common form being a break in the outer ditches generally three to five metres in width. The research area entrances which are visible, face all orientations, suggesting there is not a clear foci or direction to follow (example in fig 130). Other enclosures may appear to not have any evidence of an entranceway and Speed (2010, p39) suggest this may be a symbol of a bridge or a causewayed entrance.

There is one ovoid/circular enclosure within the Warter area at Blanch Farm SE 892553, as previously discussed in detail in chapter four. Fig 131 illustrates the deep double ditched feature. The blue ditches are newly identified ditches from Google earth satellite imagery. Permission was requested to survey this site but was denied by the landowner.

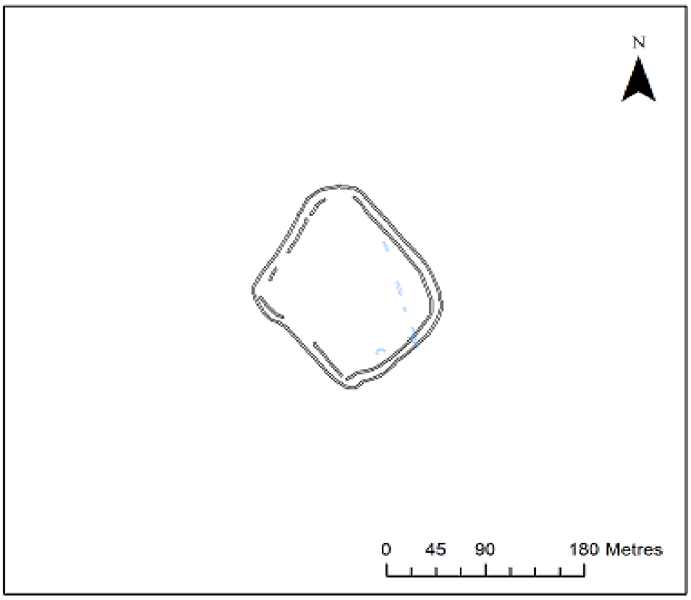


Fig 131; illustrates a curvilinear /ovoid enclosure at Blanch Farm SE 892553 (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

The writer has flown over this site once and Dr. P Halkon four times, yet it has failed to show in the crop marks, including the very dry summer of 2018, which was a bumper year for viewing ancient landscapes (see figure 85 for Google earth imagery).

5.4.5 Ladder Settlements

Enclosed Linear Complexes are well known in the area, in part due to the deep ditches which are seen more visibly on aerial imagery. Aerial survey has recorded approximately one hundred and twenty-five linear enclosures across the Wolds and Stoertz (1997, 51) proposes the character of the crop marks indicate they are settlements of village size, which included paddocks or small individual holdings. The size of the complexes run from several hundred metres to more than 2km in length. There are smaller ladder settlements (92 in the aerial survey by Stoertz 1997) which have between one and three enclosures of which may be outlining holdings of the larger sites.

The complexes are frequently situated alongside a trackway or boundary (Fenton-Thomas, 2005, 70-71), and compromise of a string of ditched rectilinear enclosures with a linear presentation (Atha, 2007, 101). The date of the complexes establishment is around the end of the 1st millennium BC and they appear to have continued to be constructed into the Roman period, as was the case elsewhere (Derych, 2012, 33).

Fenton-Thomas, (2005, 67) argues that the sites must have proved viable in their social and economic functions as they experience little interfering or involvement following the Roman invasion. However, Millett and Wallace (2017,18), agree that linear aggregations of enclosures continue into the Roman period, they also highlight examples, such as Swaythorpe farm in the Great Wolds valley, the Burton Fleming excavation, and the six roundhouses and large enclosure ditches at the site of the Rudston Villa which were actually constructed in the Roman period. The archaeological enquiry has tended to be focused on the high-status stone buildings known as villas, however, their relationship with the smaller settlement 'farms' is largely unanswered. Fenton- Thomas (2009, 243, 252) suggests a change in the usage of the ladder settlements, or abandonment in the third century AD.

Within the research area there were 21 Ladder type enclosure complexes. The largest plotted, is over 2km at Minningdale, Warter Wold, SE 487952 45295 (fig 132) where the linear can be seen to extend northwards to Huggate Dykes and Newcotes SE 484778 45046 (fig 132). None of these have been excavated, in contrast to funerary monuments, and Derych, (2012, 33) proposes this is in part due to cost and logistical reasons. In addition, they are difficult to view at ground level and are more noticeable from aerial imagery where they are revealed as cropmarks. That said, the Thwing project has provided a coherent synthesis of the chronology and economic development of the ladder settlement there (Ferraby *et al*, 2017).

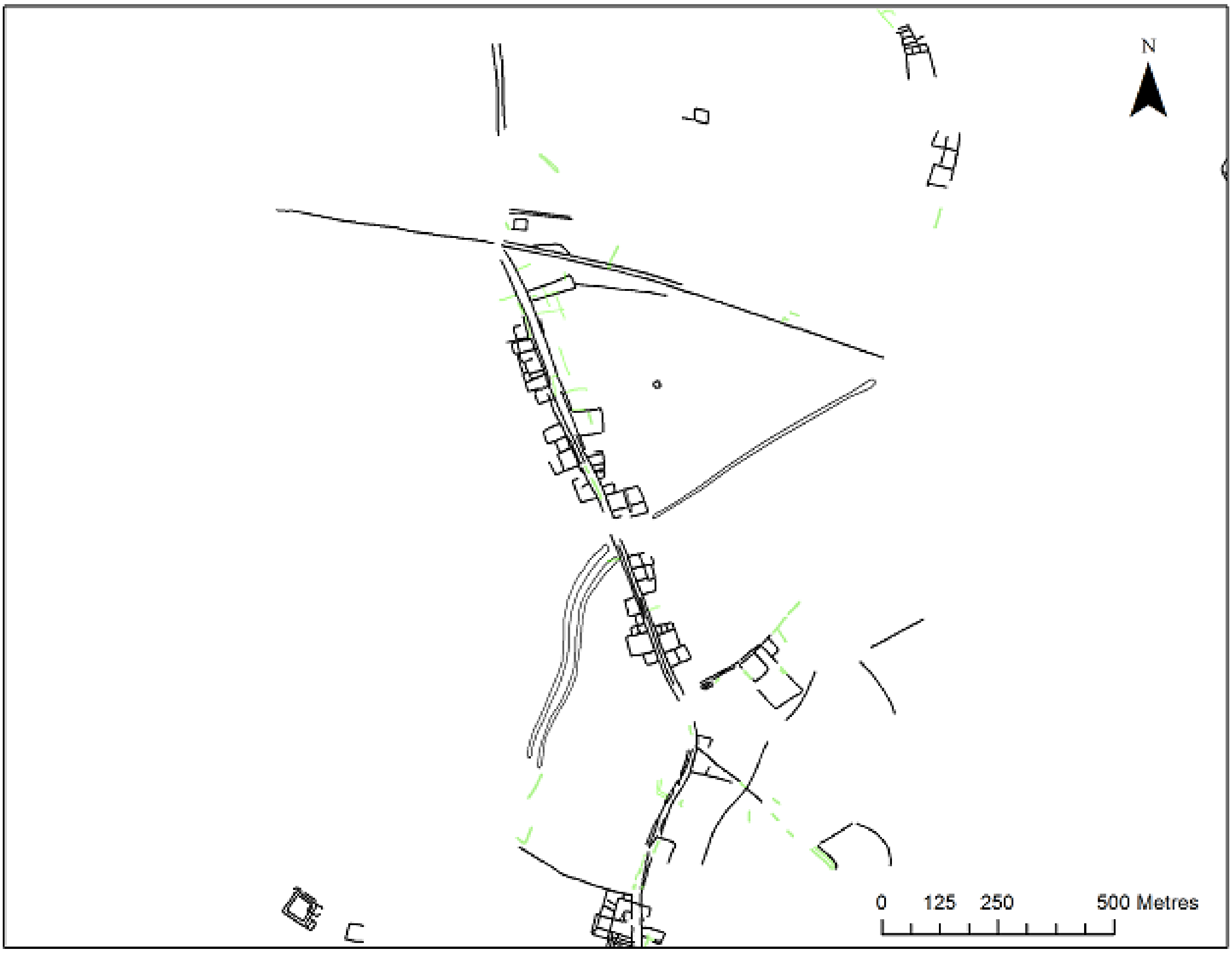


Fig 132; the largest ladder enclosure complex at Minningdale Wold, Warter 487952 45295 **(***Note the green newly identified ditches) (Stoertz, 1997 Yorkshire Wolds Mapping project Shapefiles manipulated in ArcGIS 10.3 software)*

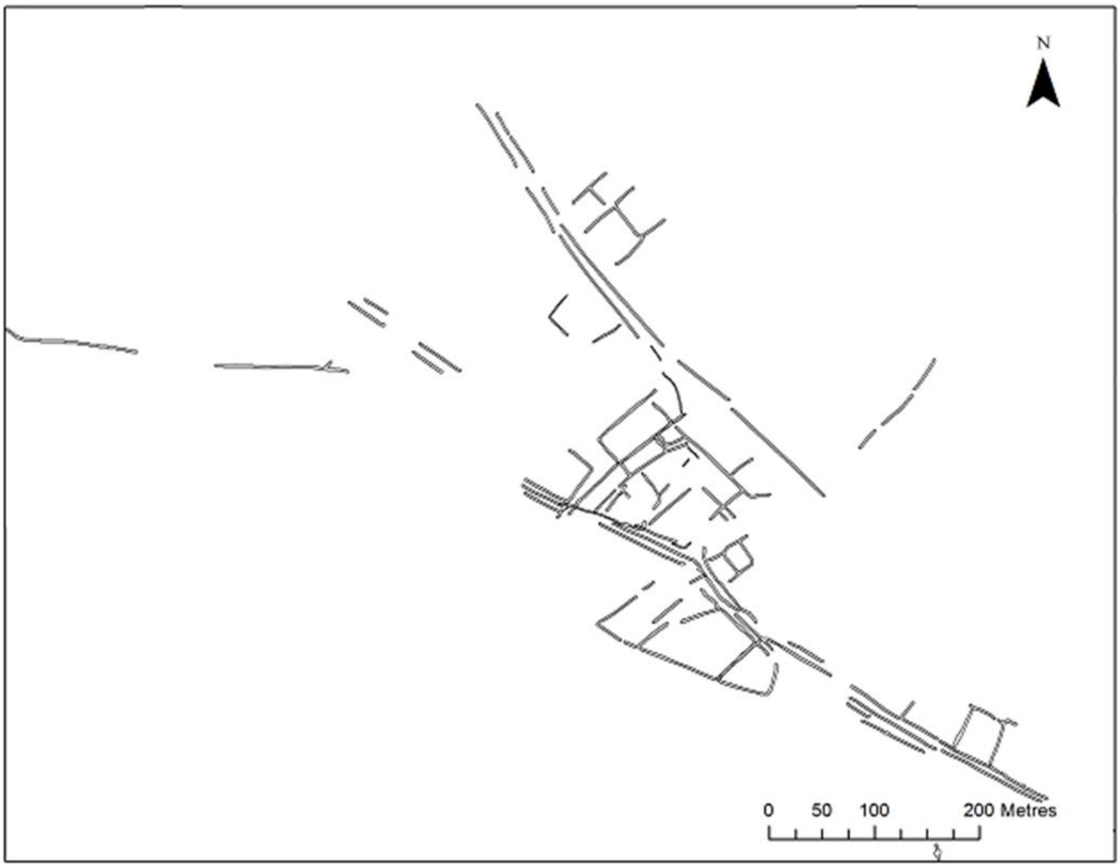


Fig 133; The Linear enclosure complex at Newcotes fields SE 484778 45046 Stoertz, 1997 Yorkshire Wolds Mapping project. (Stoertz, 1997 Yorkshire Wolds Mapping project Shapefiles manipulated in ArcGIS 10.3 software)

Evidence of activity within the linear enclosure complexes from the research area, was found by Christopher Thompson, who discovered whilst fieldwalking at Londesborough Fields (HMR 9775), two sherds of pottery over the enclosure site of the Holme on Spalding Moor grey type from the late 3/4th century. Excavations have been undertaken at Wetwang and Rudston in which artefacts have placed them to the Late Iron Age but they were probably used into the Romano-British period, when roundhouses would have been placed within the representative rectangular shape from this period (Dent, 1983, Stead,1991).

The enclosures interlock and are generally rectangular or square in morphology and are lateral to parallel double ditched trackways and demonstrate length and enclosure variability. Occasionally within the area there is no apparent trackway associated with the enclosures, which Stoertz (1997, 53) suggests is due to the lack of ditches. Without an earthwork, aerial imagery is unable to identify them as cropmarks.

The ladder settlements across the Wolds and the Foulness valley demonstrate both examples which were established in a single stage and others which appear through evidence of retrenchment and expansion, to have been adapted through time (Stoertz, 1997). The complex at Minningdale, Warter Wold site SE 487952 45295 (fig 132), is 2.3km in length and is complicated in its development and features some wide gaps which Derych, (2012, 37) suggests could be interpreted as various phases of construction. Halkon (2013, 99) provides an example of linear complex system at North Dalton which demonstrates a degree of regularity, as the enclosures conform to a regular size and are set at consistent intervals.

It is proposed within the research area, that a majority of the linear enclosure complexes are generally more in line with an organic development. This is due to the lack of consistency in sizes of the enclosures, which are varying and display irregular arrangements, and in addition space between which gives the impression of a settlement which has been added to over time. Figure 134 below left illustrates a linear enclosure complex at Londesborough Field SE 487038 446446 where the enclosures are of different sizes and may have been added over time, as demand required additional enclosed space, as opposed to the linear arrangement at Middleton Dale SE 490609 449715 where the enclosures display consistency in their size and arrangement perhaps to be used for stock management purposes (fig 134- right). This development will be discussed in further detail in the chapter five.

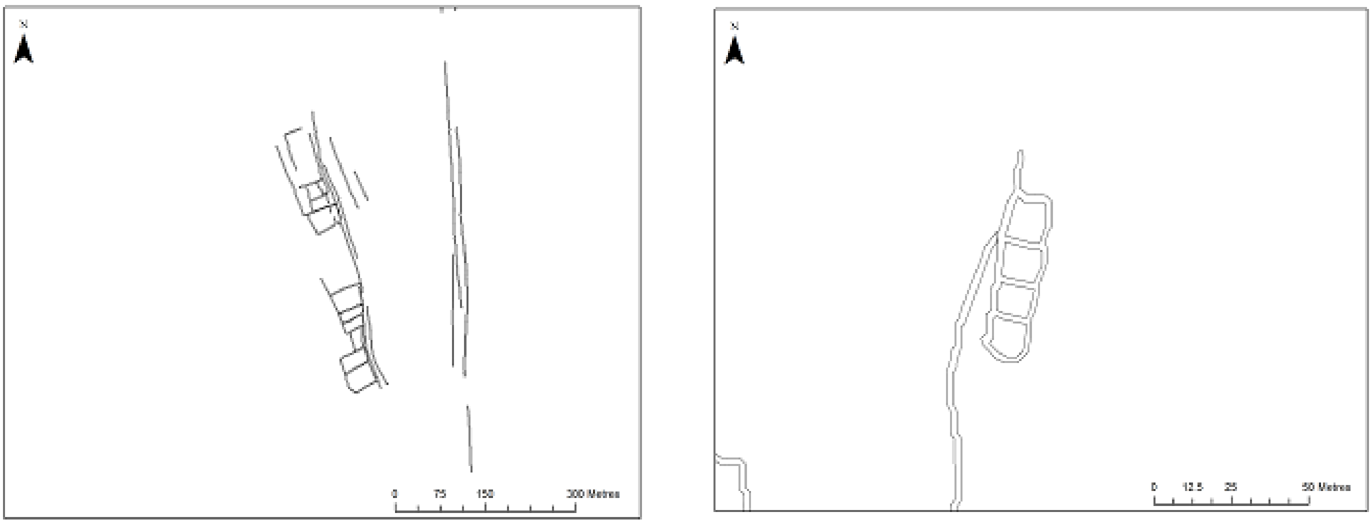


Fig 134; Linear enclosure systems at Londesborough Field 487308 446446 and Middleton Dale 490609 449715. Stoertz, 1997 Yorkshire Wolds Mapping project. (Stoertz, 1997 Yorkshire Wolds Mapping project Shapefiles manipulated in ArcGIS 10.3 software)

There is evidence of ring ditches at the Warter Wold linear complex, which is consistent with many of the Wolds ladder complexes, indicating the presence of round barrows. Dent (2010, 25) suggests this signifies that the complexes infer nucleated settlements. Although the burial rite of round barrows and square barrows was dwindling at the time, the ancestry connection may have dictated the settlement patterns (Derych, 2012, 39).

Dent (1983) argued that the enclosures were for stock rearing. Alternatively, a later proposition by Dent (1995) is that they may have acted as holding areas to contain stock from wandering onto arable lands however, Fenton-Thomas (2003, 58) advices that because animal carcasses may have been found in ditches, this does not necessarily imply stock enclosures, linking the increased division of land more towards social changes between the land and its inhabitants. The role of the enclosures is important, but of greater importance are the factors which contributed towards the way the land was used, resulting in the need for enclosures. The arrangements of the complexes are suggestive of some degree of land management.

5.4.6 Funnel Type Enclosures

Other categorised enclosure features are the 'funnel' type entrances which appear within the 'open' landscape, possibly for the funnelling of stock across the landscape, controlling the movement of herds between paddock areas and pasture (Halkon, 1998, 79).

Ladder sites which open into a funnelled area demonstrate a relationship with good pasture (Fenton-Thomas, 2003, 58). The area has four funnel type enclosures at Nunburnholme Wold, Londesborough Wold and Middleton Dale (see figs 135,136). At Londesborough the droveway ladder settlement terminates into a funnel type entrance, which is suggestive of driving animal stock, perhaps in an effort to move from the high Wolds to a lower terrain and water sources/springs

An additional theory is that around Nunburnholme Wold horses and cattle graze feely on wide areas of pasture such as Millington Pastures. At certain times of the year stock are driven into the funnel and from the open space which may have performed as a market/central meeting or centre from where the stock can be driven down the droveways and vice versa

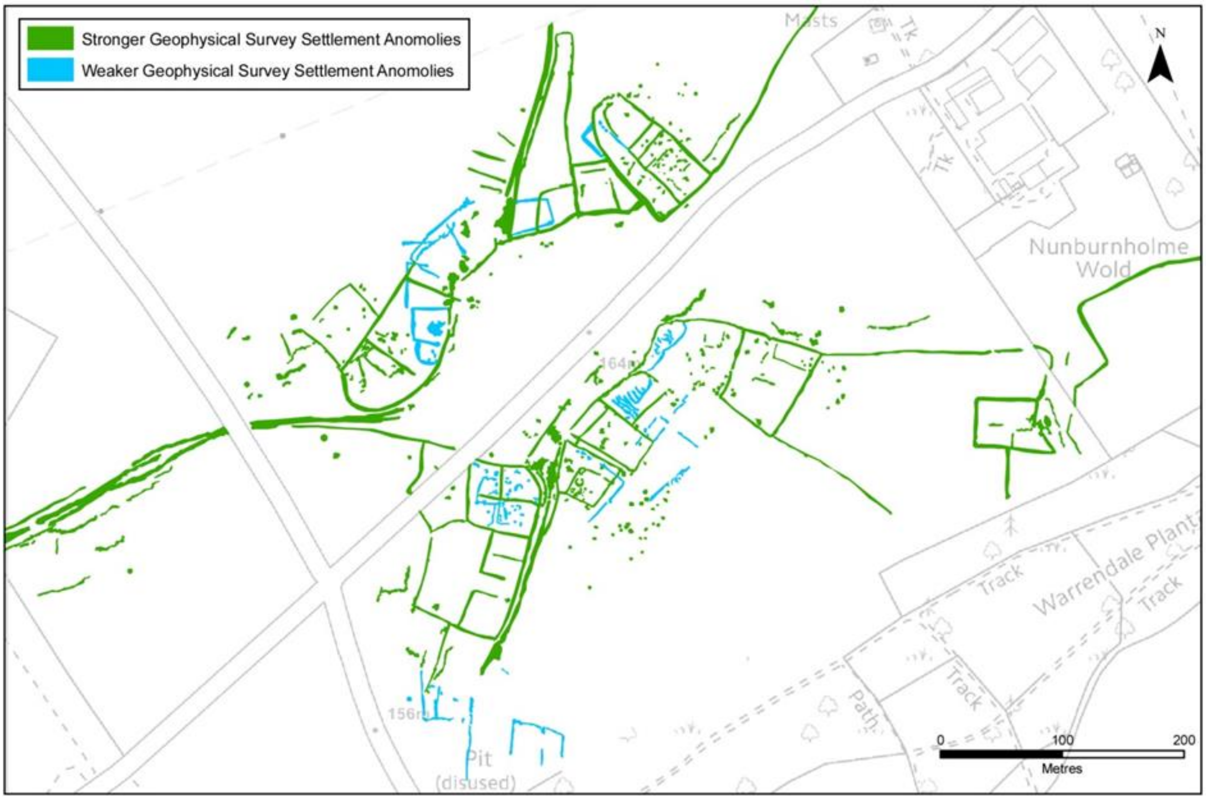


Fig 135; Nunburnholme Wold (unpublished geophysical survey, Lyall, 2014) mapped in Auto CAD map 2008 software. (Whiteley, 2015).

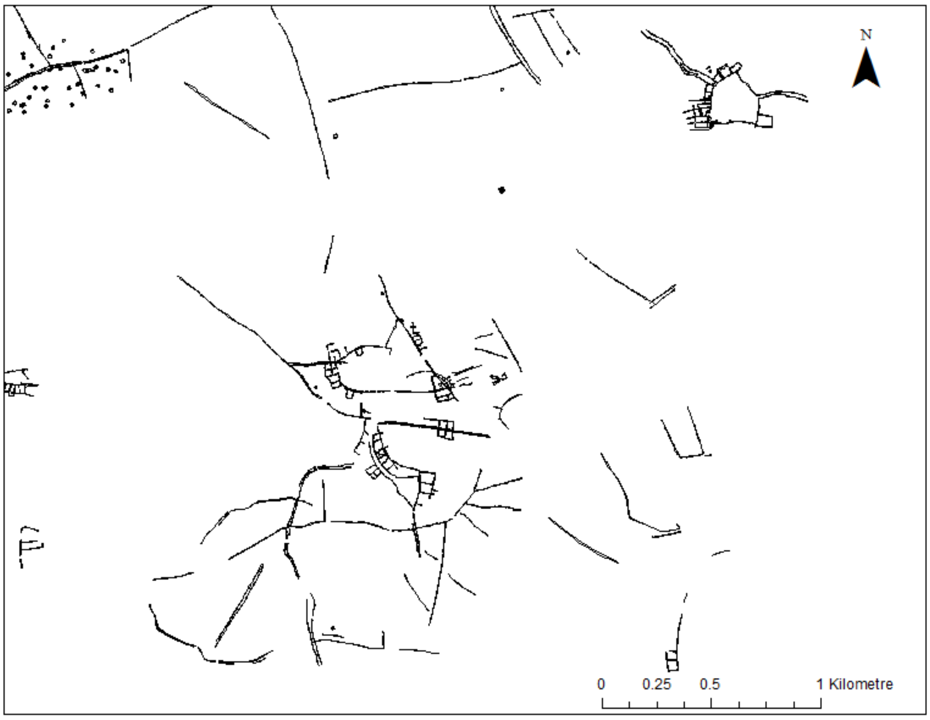


Fig 136; Three funnel enclosures at 489514 446952 (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

Fig 137; The funnel enclosures at Londesborough Wold SE48951 446952(Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software).

It is apparent that these enclosure systems have required an open area, but the activity which necessitated that space may have been different at each site. What is comparable between all the funnel type systems is the requirement for a clear open area as seen in figures 138 and 139.

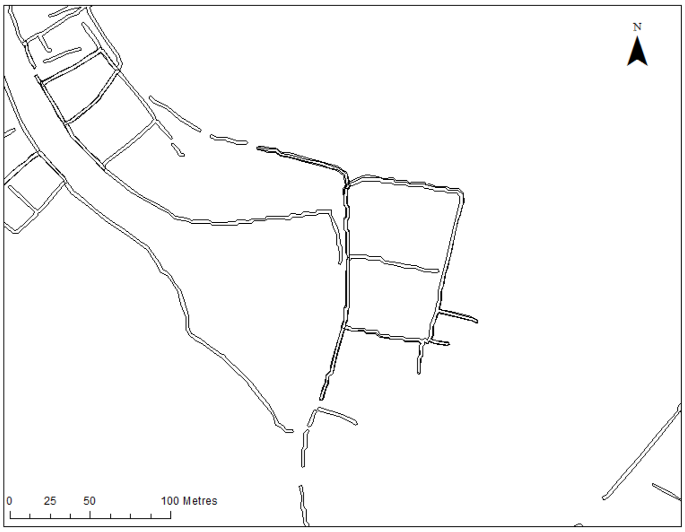


Fig 138; A closer image of the funnel enclosure as seen from Stoertz (1997) (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software).

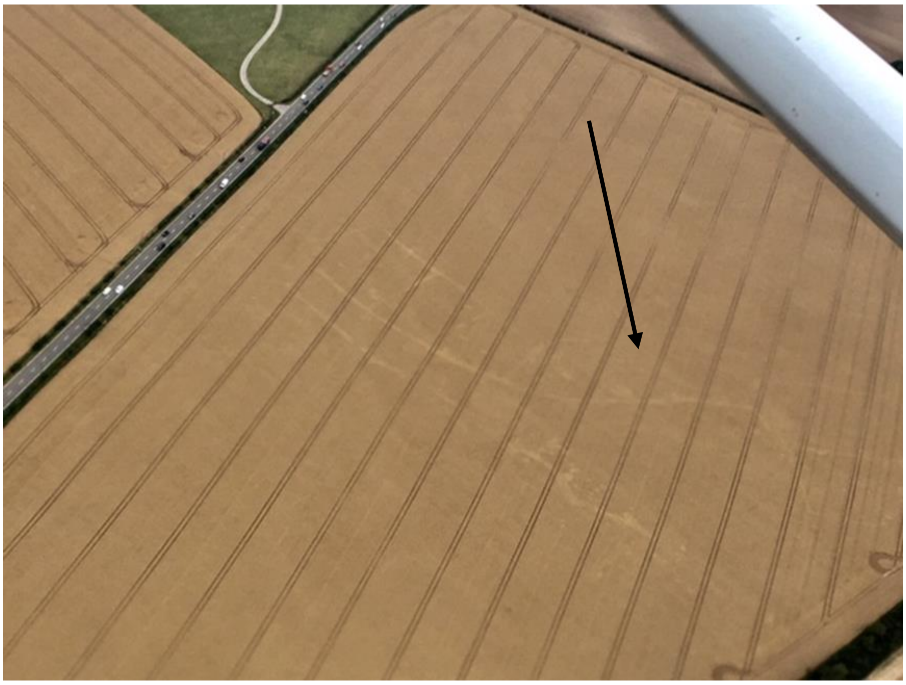


Fig 139; A closer image of the funnel enclosure as seen from aerial photograph SE 489474 446978 (Whiteley, 2018).

There are regional examples of open configuration sites at Went Hill and Ledston in West Yorkshire. Within these sites there were a cluster of pits in which there were skeletal remains, Roberts *et al* (2010, 50) suggests this implies a communal pasture with ritual associations. A comparable example of an open area is evident at Wattle Sykes in West Yorkshire where two extended enclosure areas and a further enclosure border create a space measuring 400m long and 120m wide (Fig, 140) (Roberts *et al*, 2010, 26).

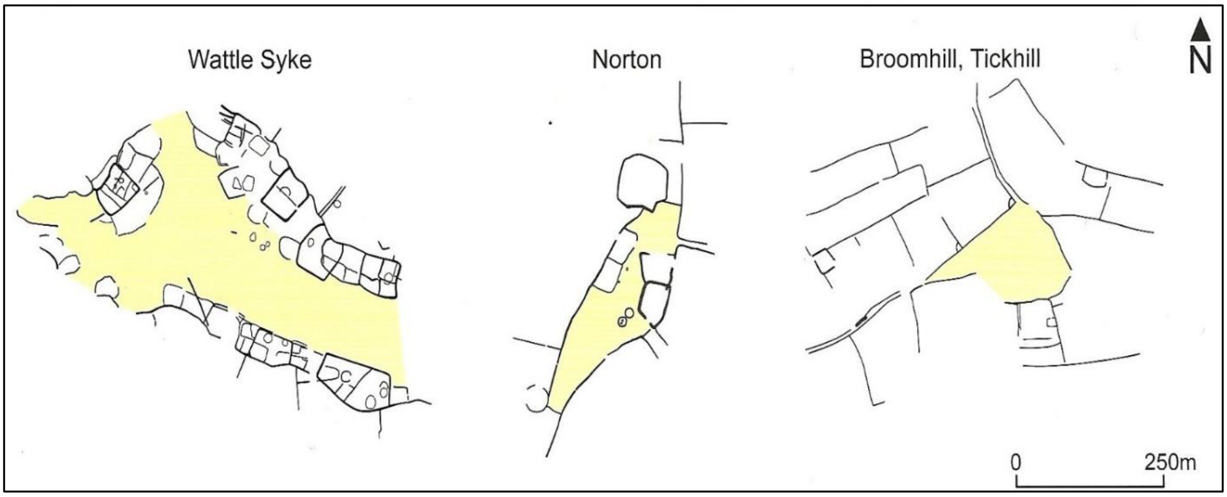


Figure 140: Open areas at Wattle Sykes, Norton and Broomhill, Tickton. (Roberts et al 2010)

5.4.7 Pits

Prehistoric pits tend to be associated with either settlement or burials. Many pits associated with earlier monuments, have been located on the high Wolds and are suggested to be burials demonstrating a continuance of significance applied towards ceremonial sites (Fenton- Thomas 2003,55).

Pits present on aerial imagery as clusters have been interpreted as evidence of open settlements and they tend to be found in groups within or outside the enclosure systems (Halkon, 2008, 86). They are identified as a characteristic from the Iron Age period; originally believed to be habitations in the 1930s, and are now believed to be silos used for the storage of seed grain. Pits within a settlement context would have initially provided storage and then backfilled with waste when they were no longer required (Cunliffe, 2005 69).

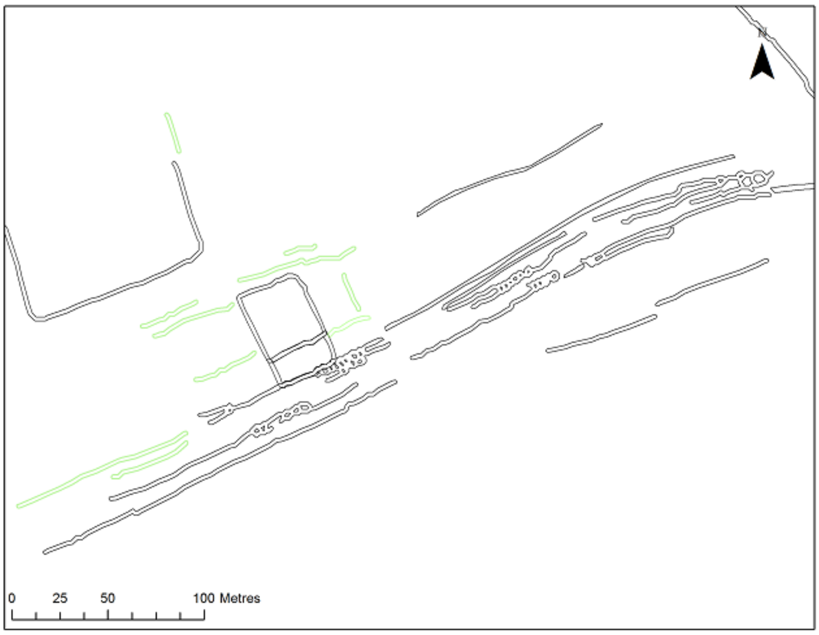


Fig 141; The droveway at Middleton Dale (Note the green newly identified ditches) (Stoertz, 1997 Yorkshire Wolds Mapping project Shapefiles manipulated in ArcGIS 10.3 software)

They often contained domestic rubbish, grain residue or in some cases 'special deposits' which Cunliffe, (1992, 76) defines as human bodies, animal burials and pottery.

Rigby's Pots in Pits: East Yorkshire Settlement programme (2004) involved a survey of pottery from sample sites, in order to establish a pottery sequence. The project which analysed a sequence of pottery over a thousand years, reinforced domestic interpretation. Of interest to this thesis, were findings across Tuft Hill/West Field Burton Agnes, in which a thousand pits were situated between two droveways. Within the research area there is a comparable droveway at Middleton Dale in which there appear to be pits situated within the feature (fig 141). Alternativley this feature may have had several epiosdes of recutting and realignment throughout its usage and would need further invetigative groundwork.

Stoertz (1997, 17) also applies the term maculae in association with pits. Within the Bronze Age chapter there were nine new maculae's plotted. These maculae type features are not surrounded with a clear ring ditch feature on satellite imagery, however, there is further historical documentation and association with other features to propose their purpose was as a round barrow. In addition, geological factors must be considered when analysing maculae pits.

Excavation at Nunburnholme Wold in 2014 excavated ditches and associated pits. The pits were half sectioned and contained animal bones and pottery.

Figures 142 and 143; The copper alloy axe from Trench c pit in situ and after conservation.

The most significant find was a miniature copper alloy socketed axe which may have been hung as a pendant to a necklace. This find may have been the result of a casual loss or placed as a votive offering (figs. 142 and 143). Halkon and Lyall (2014) note it is like an example which was located at Arras in 1815-17 at the Iron Age cemetery excavation. It should be noted that some miniatures were also Early Romano-British as opposed to being singularly Iron Age (Farley, 2011, 100).

Other pits are seen in the enclosure to the east of Blanch Farm (fig 144). The pits were not viewed on aerial imagery and have been discovered from the satellite images. They can be seen within the enclosures and in the entrance way. In Speed's (2010, 49) analysis of pits within Iron Age settlements they were found to be located towards the back of the enclosures or on the periphery of settlements.

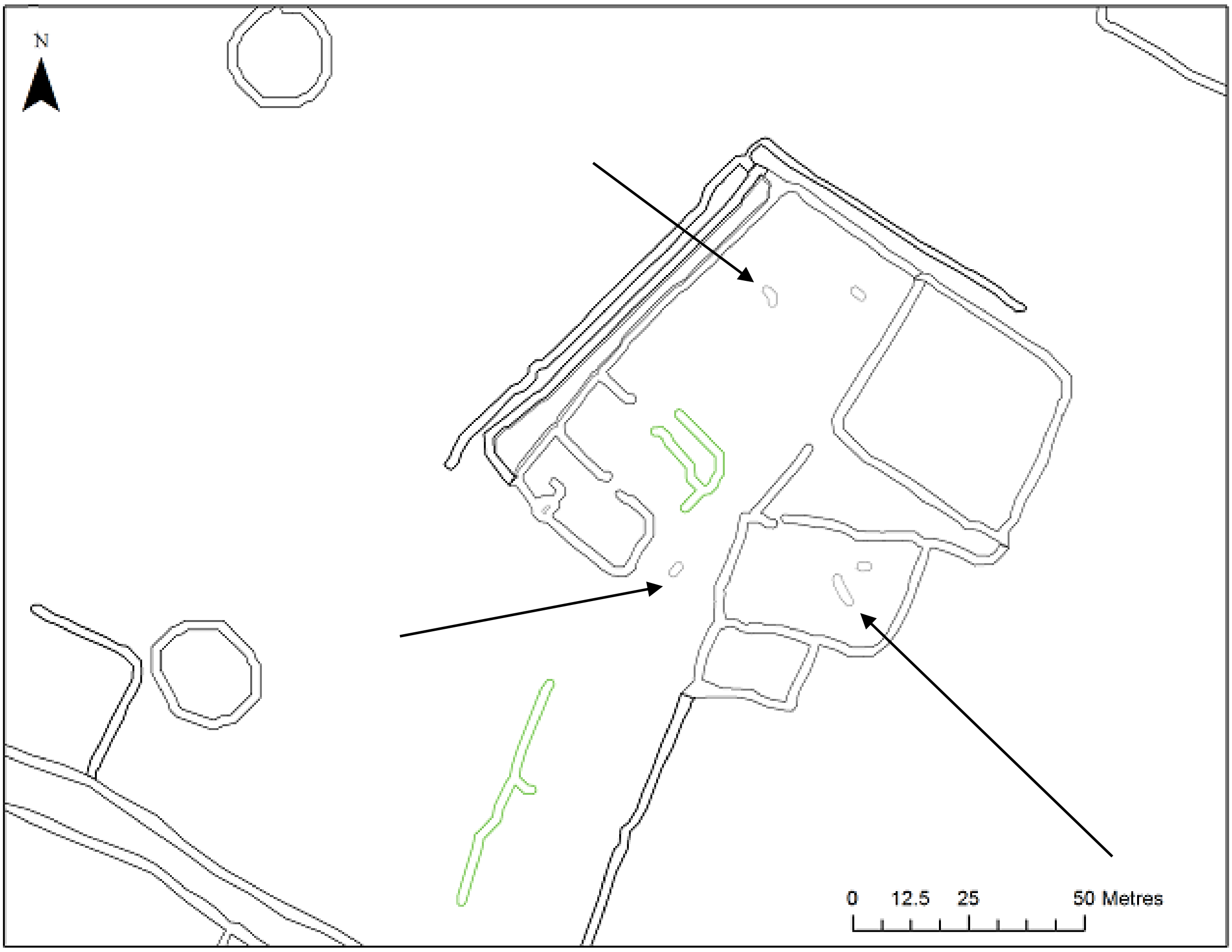


Fig 144; A rectilinear enclosure sub divided with associated pits. SE 490257 453358 (Stoertz, 1997 Yorkshire Wolds Mapping project.) Shapefiles manipulated in ArcGIS 10.3 software.

Other pits have been located within the funnelled entrances to open spaces such as Weaverthorpe (Fenton-Thomas, 2003,55). Aerial imagery and the satellite images did not highlight any pits within the droveways of the four funnel systems enclosures at Londesborough Wold and Middleton Dale, however satellite imagery has shown pits within the enclosures which had not been noted previously (fig 145).

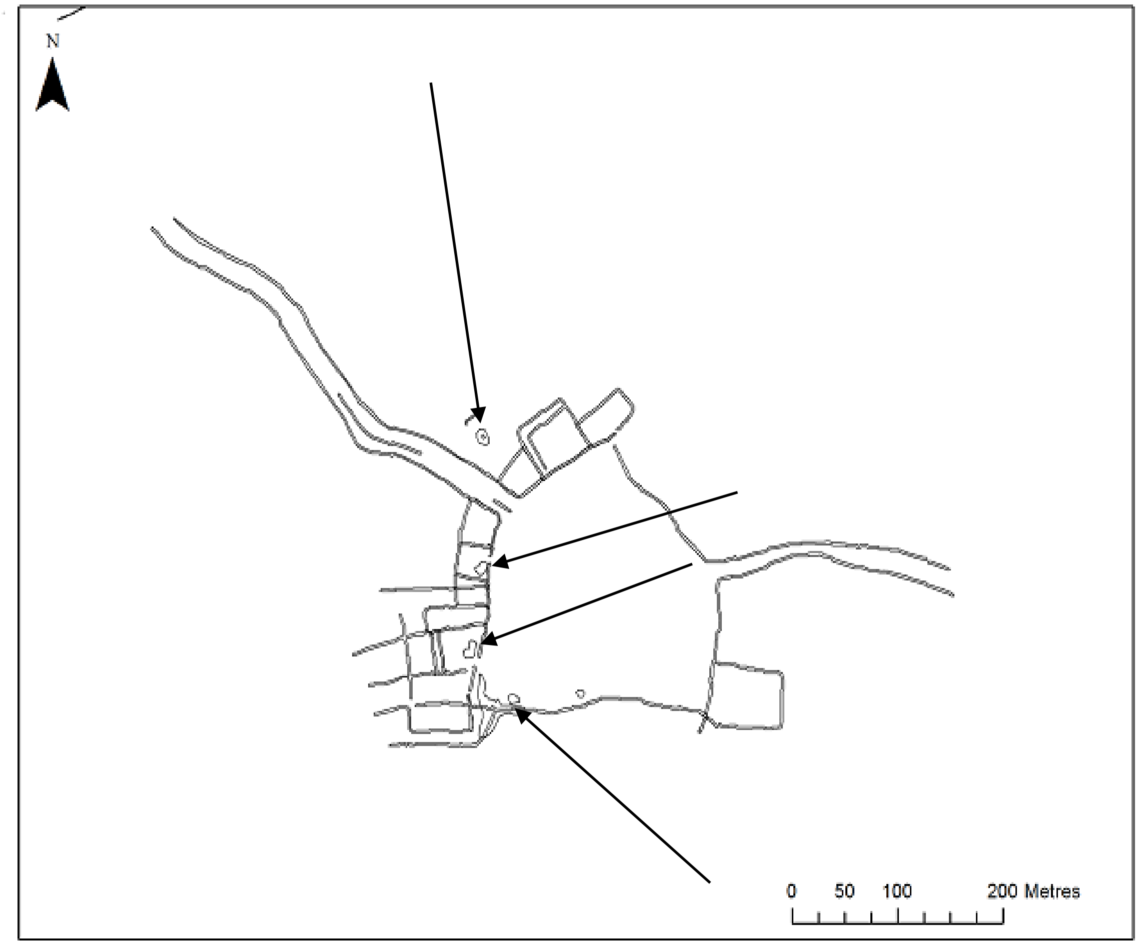


Fig 145; Middleton Dale Funnel Enclosure Complex with pits SE4 90941 448593(Stoertz, 1997 Yorkshire Wolds Mapping project). Shapefiles manipulated in ArcGIS 10.3 software)

Pits are difficult to see from aerial imagery unless they are fairly large and as discussed, further analysis is required to determine if these features have geological or burial associations. In addition, dating is very difficult from aerial and satellite imagery and Halkon (2008, 87) advises can only be achieved when analysing other associated features and or excavation.

5.4.8 Roundhouses

A well-known characteristic associated with the Iron Age is the roundhouse, also called 'circular structure'; the most common form of domestic dwelling in the Middle to Late Iron Age (Parker Pearson, 1994, 47). Some houses would have been located in a linear village whilst others may have been situated at outlying farms or small hamlets.

Dent (2010, 48) identified two main forms of roundhouses to be either double ring houses or single ring houses, semi-circular gullies and post squares. Giles (2012, 85) suggests that the post ring-built houses or ring and groove houses are from the Middle to Late Iron Age period. Some of the houses had terminal postholes or porches and a good proportion had external drainage gullies (Dent, 2010, 20). Generally, the morphological form is of a shallow gully ditch, which would have collected water from the roof. Iron Age houses could sustain many generations with the necessary repairs; East Yorkshire houses tend to be rebuilt upon existing foundations suggesting a consecutive history and an important ancestral connection to the house (Giles, 2012, 87).

Fenton-Thomas' (2003,54) suggestion that there has been a tradition of bias towards the investigation of funerary monuments, which resulted in less work around settlements in the prehistoric period is borne out. Certainly, there is a good deal of evidence from burials, and an imbalance of evidence of earlier smaller settlements from this period, however, features associated with open settlements such as post holes and pits, are difficult to see from aerial or satellite imagery. Hence, Halkon (2008, 86) suggests representation of roundhouse features may be grossly underestimated, due to the transient nature of ring ditches, related to the roundhouse. In addition, unlike the stone houses from the uplands areas of Britain, houses within settlement areas from East Yorkshire were made of organic matter, such as wood and earth, which can leave little trace on the surface, hence data is required from excavations (Halkon, 2013, 91).

In East Yorkshire the houses were circular, as were their Bronze Age predecessors, and constructed from wattle, daub and timber. A reconstruction of an Iron Age roundhouse of 12.8m, would have taken 200 trees worth of timber, therefore double ring construction, shifting to single ring may have been a result of over exploitation of wood due to increases in population (Halkon, 2013, 91).

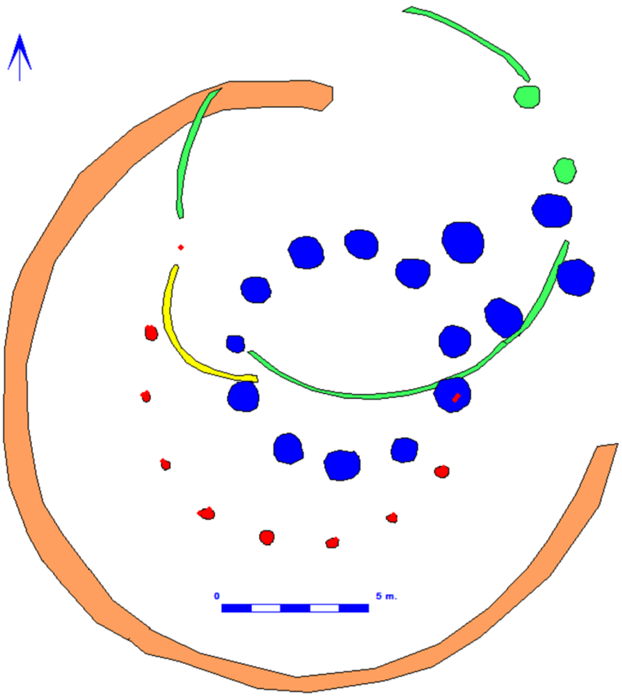
The research area has revealed two circular-structure morphological features and the working assumption is that they were more likely to be used as roundhouses. The first roundhouse as noted in chapter four was exposed from surveys and excavation by P. Halkon and J. Lyall involving the writer in 2018, at Kipling House Farm, which supersedes the earlier round structure. Pottery dating from the earlier round feature by Dr T.G. Manby is believed to be from the later Bronze Age, similar to pottery from Paddock Hill, Thwing.

The Kipling House Farm roundhouse, positioned over the earlier feature (figs. 146 and 147) within the landscape demonstrates reuse of the site and the significance of its position in the landscape. A key element could be that the main entrance faces east.

Fig 146; Aerial view over Kipling House Farm excavation 2019 (Halkon and Lyall, 2018)

Later Bronze Age circular feature

Later roundhouse. The gulley is comparable to Iron Age houses at Wetwang.



Har*Fig 147; The Bronze Age roundhouse and enclosure of Kipling House Farm superseded by the later Iron Age feature shown in green (unpublished geophysical survey, Lyall, 2018/2019) mapped in ArcGIS 10.2 software (Halkon and Lyall, 2018)).*

The gulley detail, shown here in orange, may have been an eaves-drip gulley, for the red post-hole structure (fig 147).

In addition to the roundhouse at Kipling House Farm, one further circular feature was mapped centrally within a rectilinear enclosure at in the funnel enclosure at Londesborough Wold (fig 148).

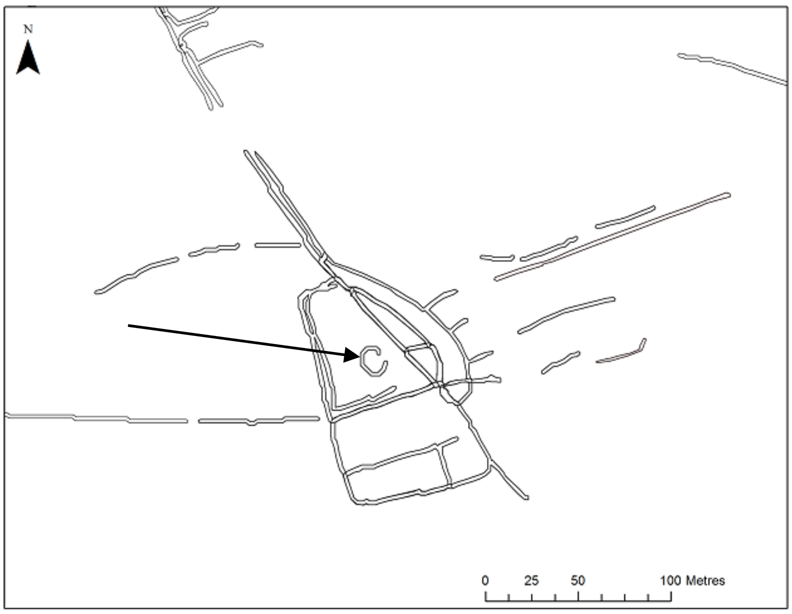


Fig 148; A roundhouse or storage building 12.8metres diameter (Stoertz, 1997 Yorkshire Wolds Mapping project Shapefiles manipulated in ArcGIS 10.3 software)

Dent (2010, 50) notes in the Wetwang / Garton complex, most roundhouses had an average diameter of 10m. The diameter of the roundhouse at Londesborough Wold, at 12.8m, is located to the centre of the enclosure, where they tend to be larger than those positioned to the periphery (Harding, 2009, 27).

The orientation of roundhouses has been central to Iron Age roundhouse studies and Parker Pearson has been a leading figure in exploration. Research has demonstrated that a majority of roundhouses are facing towards the east, southeast or north-eastwards. Londesborough Wold's roundhouse entrance faces directly eastwards, which Parker-Pearson (1994) suggests would have avoided westerly winds and provided optimum morning sunlight, whilst Halkon (2013, 92) suggests a shift occurred in entrances from the Bronze Age towards the east, potentially as a resultant of climatic instability.

Pope (2007), analysed a large sample of roundhouses across Europe and Britain and highlighted the orientation of houses were towards the south east, and proposed it is a probable result of wanting to make the most of the daily sunlight and provide shelter. Fitzpatrick (1994, 68) suggests orientation indicates two key cycles in Iron Age life, diurnal and seasonal, the orientation of which is a response to daily activities which were influenced by the moving light, suggesting domestic activities were to the south side and sleeping areas to the cooler, darker north. Parker Pearson and Richards (1994, 54) also reasoned that the space was 'concentrically ordered' with key tasks been carried out in the central areas and other activities of living such as sleeping and food storage was in the outer areas.

Further theories identify orientation to be in line with major cosmological events, notably the rising of the sun at the equinox and midwinter (Oswald, 1997) (fig 149).

A cautionary note from Harding (2009, 27) advises roundhouses should not be the main and only focus when investigating settlement and emphasizes the need to analyse the assemblage in terms of material culture, domestic crafts or ritualistic deposits.

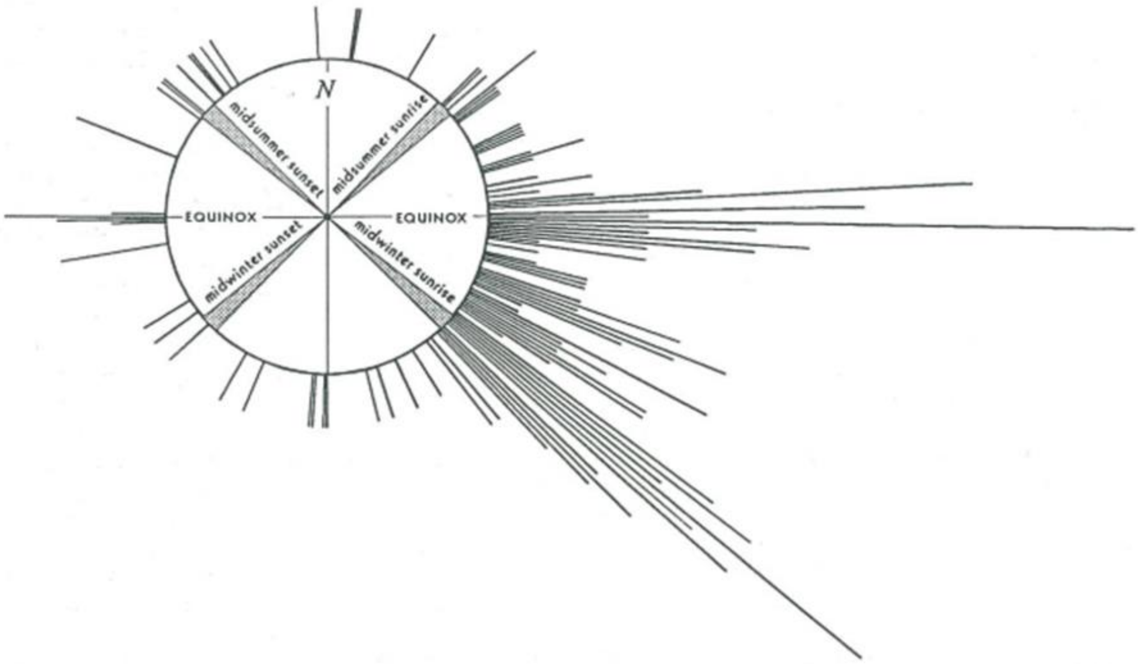


Figure 149: Doorway orientation of Iron Age roundhouses in relation to cardinal solar directions (Oswald, 1997, 90).

The landscape features point towards an agricultural community and this will be discussed in greater detail in the discussion chapter. But what more is known of who they were and what is known about them? Giles (2012) compiled data from more recent excavations undertaken across the Wolds in order to provide information on the ages and sex of the people who lived there. The sites contextual and osteological analyses of 815 burials from Acklam Wold (Dent 1983), Garton Slack and Wetwang Slack (Brewster, 1963) Wetwang Slack (Dent 1984) Cowlam (Stead 1986), Rudston, Burton Fleming, Garton Station and Kirkburn (Stead 1991). In addition, burials from Stead's excavations, including Arras (1979), brings the total to over 100. Stoertz (1997) aerial survey highlighted 3200 square barrows across the Wolds, of which many will have possibly had secondary internments. Giles (2012, 94) admits this population sample is only a small representation.

In the key findings, age data suggests a population consistent with that of an agricultural community. Based upon the osteological analysis of physical characteristics, notably the pelvis and skull, 57% were female and 43% male.

There is a peak in mortality in the neonate-early infant (under 0 to 1) bracket, which indicates difficulties during labour, post birth infections and haemorrhages, still births and failure to thrive as a new-born. However, the figure may be higher when assessed contextually due to neonates being buried as a secondary internment into barrows or ditches or found as a double burial, in addition the graves may have been shallow and, as a result, would have been ploughed out. From ages 2-3 the child has its own burial, which Giles (2012, 95) suggests no differentiation in treatment between children and their older ancestors.

There is another increase in the mortality peak in the age bracket of 15-25 year and 25-35 years more dominant in females. This again may be attributed to pregnancy related complications, however, Giles (2012, 96) notes the higher bracket would be experiencing a drop in fertility and so pregnancy may not be a factor, in addition males of this bracket were also dying prematurely with only a handful of case's related to trauma. It could be therefore argued that disease and agricultural working may have been morbidity factors. There is a decrease in representations of bodies aged 45 upwards, which suggests the generations did not live into their 50's and 60's.

Giles (2012, 100), using mainly data from Steads (1991) analysis of the Great Wold Valley cemeteries, revealed a fairly healthy and well-nourished population. On average a male was 5ft 7in and women were 5ft 2in. Teeth showed evidence of periodontal disease and Giles (2012, 101) suggests a gritty diet (grain processing on quern stones) would have contributed towards this. Isotope evidence presented by Jay (2008) compared data analysis from Wetwang cemetery and settlement sites, with other Iron Age sites nationally. The Wolds diet appears to have been comparatively high in animal protein, suggesting a diet based on meats and diary produce. Breastfeeding appears to have been a short-lived act following delivery, after which infants' diet has been supplemented by animal milk or gruel from early on. The main meat interred with burials is sheep with occasional goat. There is also evidence of suckling pig. Settlement evidence demonstrated little evidence of the consumption of beef, rather it been used for blood and dairy. Giles (2012, 113) suggest beef was consumed but in community feasting events.

In terms of disease and injury the most common trauma were frequent fractures, these were to several bones and are consistent with trips and falls involving the wrist and hands which were more frequent in adult men. In addition, there are examples of left and right clavicle fractures.

Working the land has resulted in cervical spine atrophies, osteoarthritis with compression fractures, also noted in the wrist, ankles, lumbar and thoracic parts of the body. Osteoporosis is consistent with repetitive tasks such as ploughing, harvesting, load carrying, stock tending and food production (Giles, 2012, 103).

From this evidence we can determine that the Iron Age communities were active, resulting in typical 'accidental' injuries. Halkon (2013,102) notes that the Wolds settlements have an affinity to agriculture, with livestock being a dominant feature within the economy, and mutton or lamb to be the principle meat in diets.

5.5 Conclusion

The analysis and plotting of the research area has demonstrated features which shed light on the connection to the landscape. Transiency appears to have reduced in favour of permanence, demonstrated through a continuingly divided landscape. The factors influencing the division are wide reaching, from climatic to territorial influences, with tenurial rights becoming evidently more significant.

Square barrows replacing the earlier Bronze Age round barrows are reflective of connections with continental counterparts of the Arras culture. Earlier small groups of barrows are replaced with denser cemeteries. In association with the cemeteries, domestic structures appear, with some contemporality. However, these are more difficult to locate due to their transient nature, unlike the enclosures, in which the deep ditches demonstrate a mosaic of activity evident from the analysis of aerial and satellite imagery. These enclosure features appear as individual small enclosures, to long linear features and are suggestive of an agricultural community. It is difficult to assign enclosure usage without excavation, but evidence points towards an agrarian existence in which enclosures and trackways are closely associated with each other. It is apparent that the landscape is a key influence towards the features plotted; a higher terrain, workable soils and some degree of access to water being significant factors.

The next chapter will discuss the chronology of the archaeology, from the Neolithic to the Iron Age, within the environment and explore how the external factors have influenced and impacted on human/landscape interaction.

Chapter 6 Discussion

6.1 Introduction

The previous chapters have focussed primarily on the cropmarks and environment in the specific periods of the Neolithic, Bronze and Iron Age. Having considered the morphological development in these periods it is the aim of this chapter to understand how the landscape has developed using a wider, holistic and chronological perspective of all periods. The topography, soils and watercourses are analysed to understand to what extent they have influenced the growth of manmade features throughout these periods.

The morphology of manmade cropmarks from the Stoertz (1997) aerial survey, and interrogation of satellite images from Google Earth, have been analysed against the topography, soils and watercourses, in order to understand how the landscape has been utilised or has influenced any settlement. In addition, accompanying evidence has been collected from archaeological survey, excavations, aerial reconnaissance and field trips across the area.

In the previous chapters it was suggested that the environment has had a significant impact on the distribution of manmade landscape changes. The next section will analyse all of the crop mark distribution and its relation to the natural environment. This will be by considering the following:

- the topography
- soils
- watercourses, springs

Having considered these factors and the cropmark distribution, the chapter will discuss the landscape development, function and phasing of the early pre-historic landscapes, through to the later historic landscapes. It aims to demonstrate a chronological and collaborative approach towards the development of the landscape.

6.2 Crop mark distribution and topography

The study area demonstrates a wide range of elevations, a characteristic of the Yorkshire Wolds, (Lewin, 1969). These elevations range from 20m OD in the valley floor below Nunburnholme Wold and up to a 165m OD on the plateau at Nunburnholme Wold. The topography is consistent with the wider Wolds, evident through valley floors, elevated plateaus and dissecting valleys, created from the thawing of peri-glacial permafrost during warm periods in the last Ice Age, as seen below in figure 150.

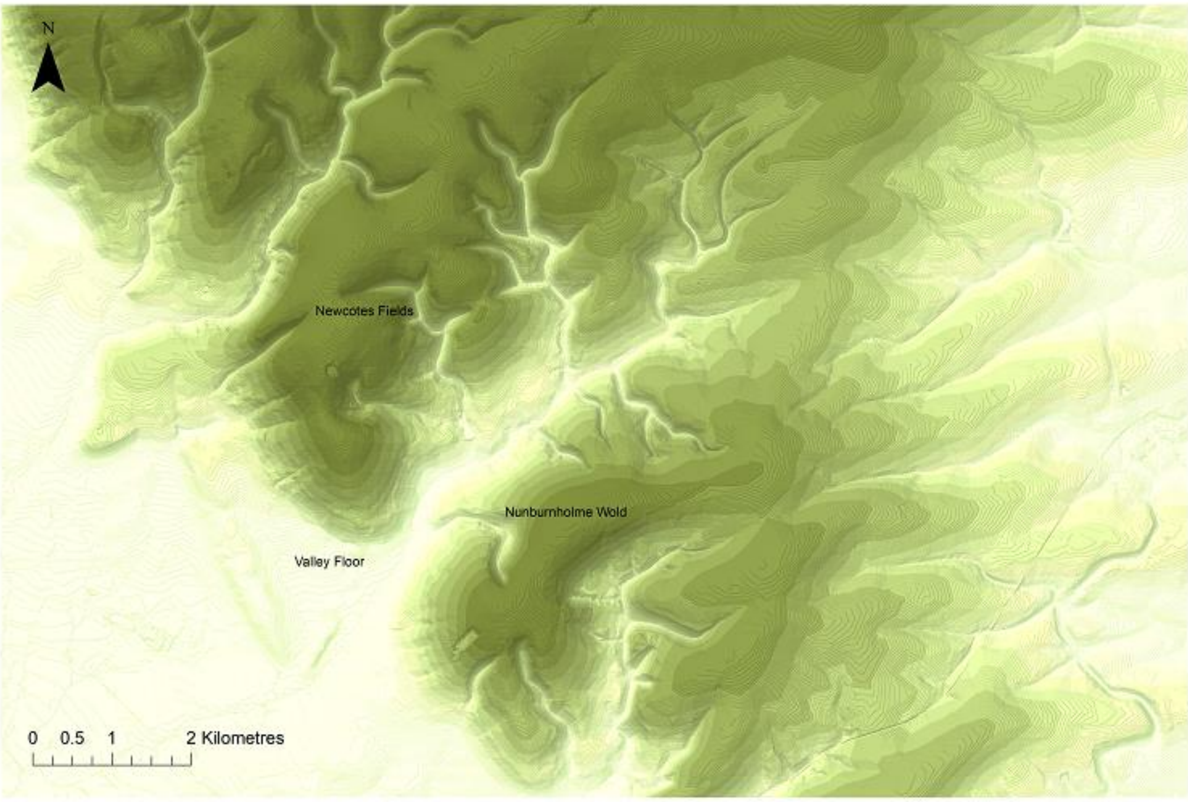


Figure 150; A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcGIS 10.3)

When the cropmarks are overlaid (see fig 151) a prehistoric landscape of past societies is evident in that the topography appears to have been utilised to fulfil several uses. The most striking elements are the criss-crossed linear features, which not only provide a routeway over the higher terrain, but also a direct link to the water sources in the valley floors below. It is plausible that the linears, to some extent, deliberately morphed the watercourses. The topography has dictated the necessity to create an access to water sources or likewise, to the higher terrain, however, it is possible to see how past societies have adapted and overcome landscape obstacles in order to utilise the landscape through the creation of linear features.

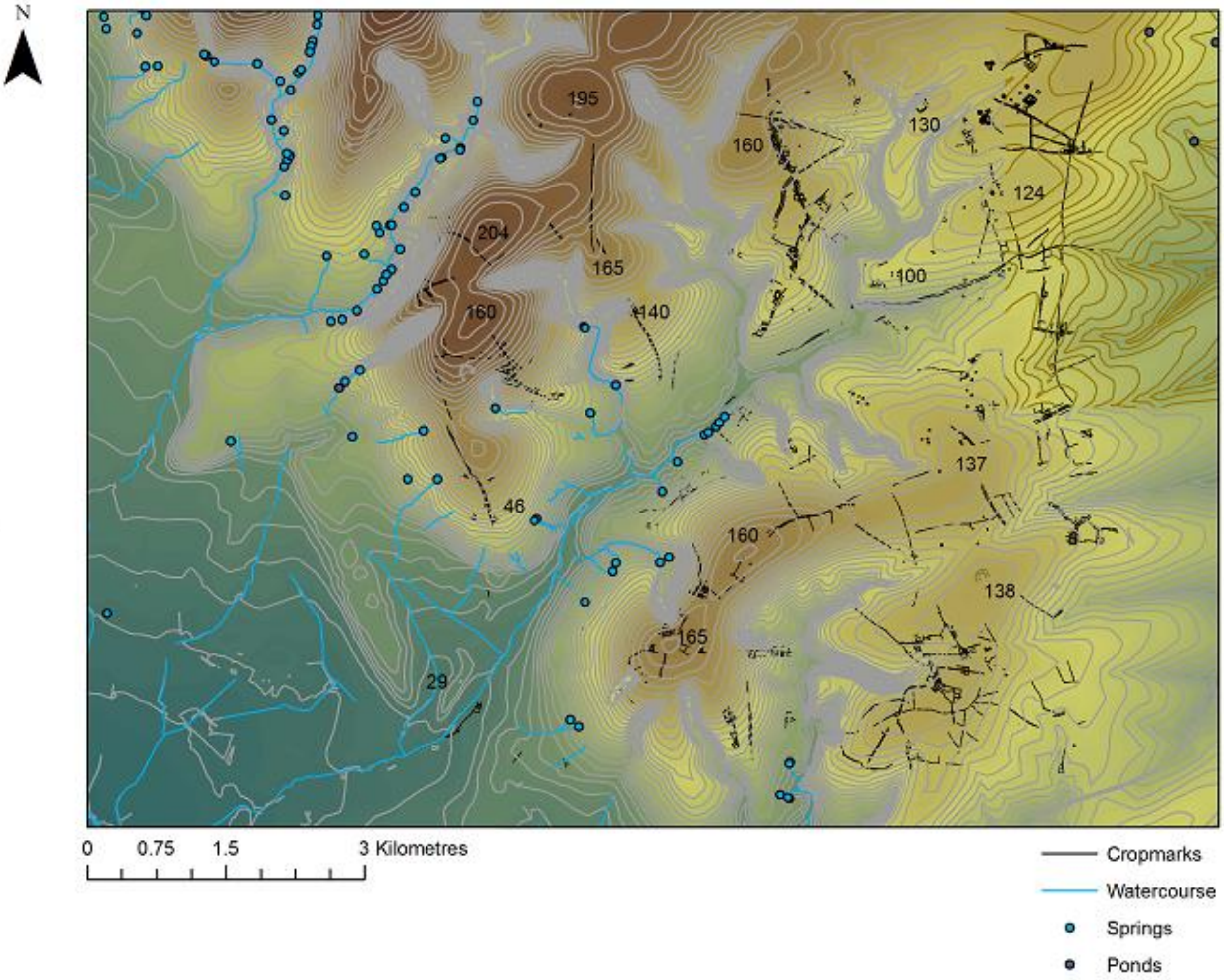


Figure 151: Topographic elevations of the research area (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

The higher terrain demonstrates the most dense cropmark distribution in contrast to the lower lying features; however, these may be masked by the alluvial soils of the valley bottoms (Halkon, 2008, 150). In addition, another factor to consider are the valley bottoms being used primarily for grazing. Lack of surface finds, as a control, reinforce this factor. A band of cropmarks on the east side of Nunburnholme Valley, which include funnel type enclosures, larger field systems and smaller enclosures, run from Blanch Farm, across the plateau, in a southerly direction, to Londesborough Fields. This area, to the east of Nunburnholme Valley, also holds the most burial features which include both round and square barrows. When discussing the location of ceremonial monuments and cemeteries, the far-ranging views from the elevated topography of Nunburnholme wold SE 84 NE 55, Loaningdale SE87 NE48, and Dalton Gates SE89 NE 50, seem to be of great significance and suggests that initially, higher ground was specifically chosen.

To the west of Nunburnholme Valley SE 84 NE 55 the crop marks lean more towards the ladder enclosure systems (as seen at Warter Wold and Newcotes fields) and are in conjunction with large triple and double linear features (fig 152).

There are less cropmarks visible on the raised plateau to the immediate west of Nunburnholme Valley, however, this may possibly be due to the woodland around Warter priory, which is evident on the 1850's OS map named 'The Park', which indicates it may not be an ancient woodland.

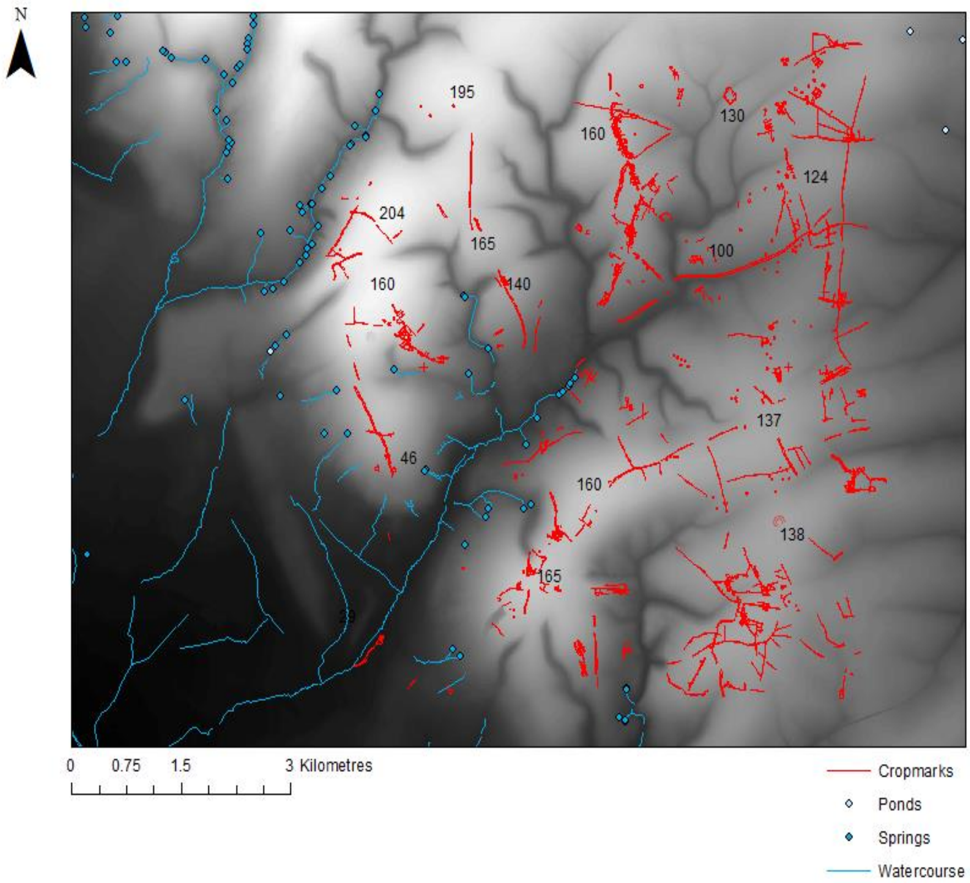


Figure 152: A merged raster set of the research are illustrating elevations (m OD) dendritic drainage, cropmarks watercourse and springs (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service)

6.2.1 Crop mark distribution and soils

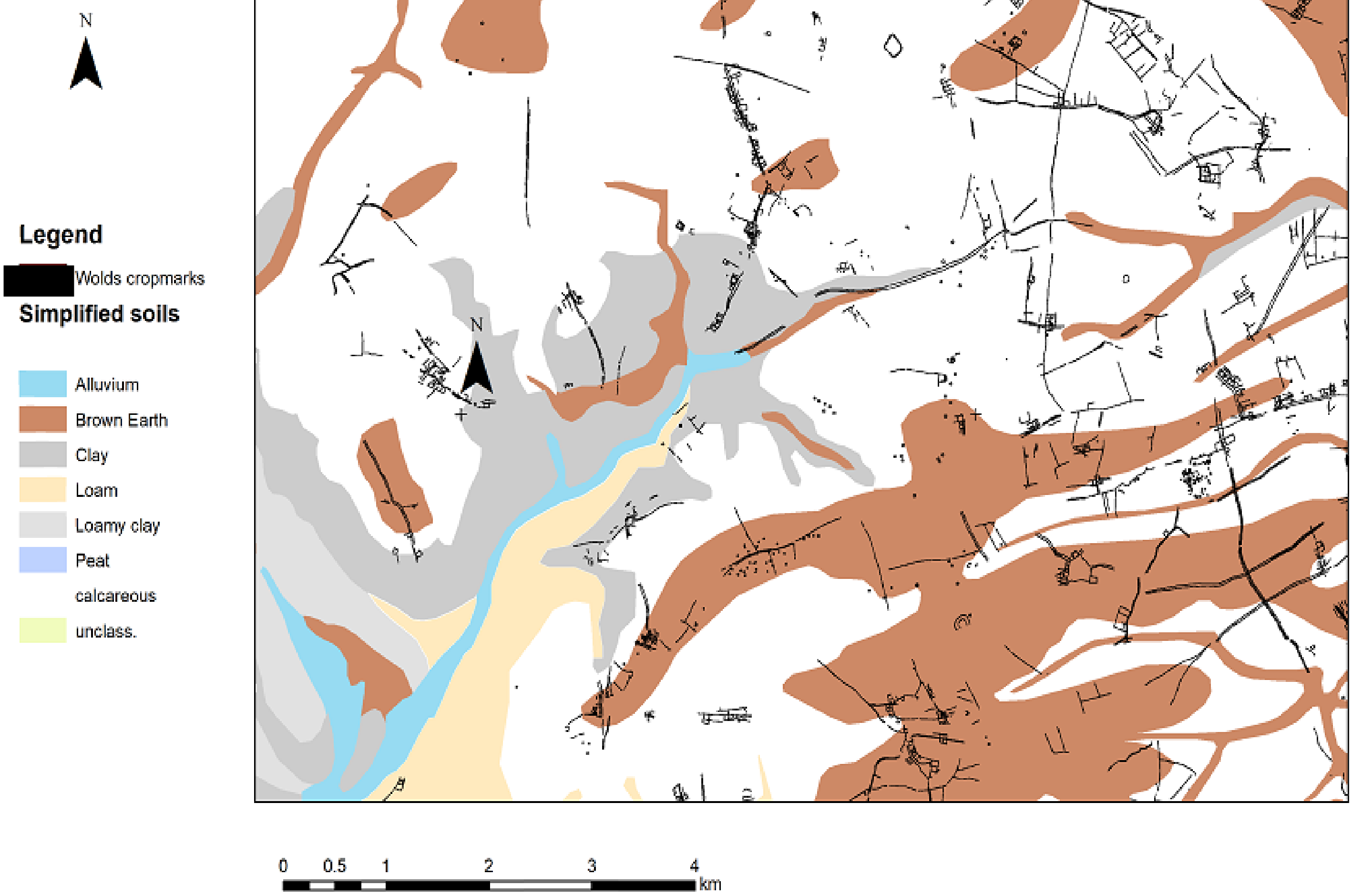


Fig 153; Cropmarks shown overlying simplified soils. (Shapefiles manipulated in ArcGIS 10.3 software with permission of Peter Halkon)

When discussing the distribution of cropmarks, the soils are influential to the cropmark distribution. The key influential factor in crop mark visibility is argued to be the soil moisture and differential drainage (Historic England, 2020). As expected, the settlement patterns are positioned over the better drained soils; with no features evident on the alluvial soils of the bottom valley floors and reveals potential for further investigation (fig 153). From the plotted data it appears that past people have relied on the well-drained calcareous soils of the plateaus; however, this theory is applied with caution as the features may be masked by the valley floor alluvial soils where there is less variance in between drainage properties of cuts of features and they show up less than on the well-drained soils of the calcareous/brown earths (Halkon, 2008, 150, Ellis and Newsome 1991, 59 and Stoertz 1997, 3).

Cropmarks of the enclosure systems can be seen to overlie brown earths and calcareous soils with no obvious preference for one loam over the other. Although the larger field systems overlie both soils, they are more predominant over the calcareous soils, with the four funnel type enclosures overlying the brown earths. The workability of these soils is good, and they are fertile enough to be suitable for all types of crops, hence explaining the positioning of these enclosures (King and Bradley, 1987). Two of the ladder enclosure systems at Warter Wold and Newcotes Field overlay loamy clay/ clay soils, which have an average drainage and workability profiles, Myerscough (2020) suggests clay filled dolines would have held more moisture than the chalk-based soils and could be an explanation for the situation of the linear enclosure complexes.

As the terrain drops and the elevation is lowered towards the valley floor, there are no visible cropmarks, whereas the soils from the Denchworth series move from clay soils to soft mudstones and brown earths, which have poor drainage and workability. The valley floor of Nunburnholme is an example of this soils series and although areas are used for cereal crops, they can be difficult to harvest during wet climates. During the winter seasons the ground would have provided boggy conditions, and it is possible that the pattern illustrates areas where there was no settlement.

The cropmark distribution has a higher density towards the soils workability, favouring the well-drained soils, however, it is known that soils can change their characteristics and Manby (1980) has demonstrated this by highlighting the contrast between soils buried underneath monuments and modern-day soils. When this change occurred is debated with Stoertz (1997, 3) suggesting soil erosion began in the Bronze Age, whist Manby *et al* (2003, 70) propose Iron Age agriculture is the causative factor.

The cropmark distribution does show variation; however, the majority overlie workable soils, indicating an agricultural existence in which the development of cropmarks has been influenced by the environment specifically soil moisture and differential drainage.

6.2.2 Cropmark distribution and water

The availability of water on the higher Wolds has been a source of discussion within the archaeological discipline for many years. It is fundamental in sustaining life and therefore a necessity for any settlement or agriculture.

The main water sources within the research area are Nunburnholme Beck and Millington Beck which run along the valley floors. The becks run into the River Derwent, a tributary of the River Ouse, and they appear to be fed from the many springs which are situated where the permeable Cretaceous chalk meets the clay layers of the Lias Bench (Lewin, 1969, 3).

Nunburnholme, Millington and Warter are plentiful in springs where the chalk meets the clay (Myerscough, 2018) (fig 154).

Away from this geological stratum to the east of the area there are fewer springs and the water supply would have been from a series of meres and ponds; within the research area there is only one pond mapped. It is important, however, to remember that over the last century the water table has dropped significantly, as it has been extracted from the Rivers Derwent and Ouse (Hayfield and Wagner, 1995, 63).

An additional source of water could have been Romano-British wells, as discussed in work by Stead, (1980) and Brewster (1980), one of which is situated within the research area, between Warter and Nunburnholme (Halkon, 2008 28).

An interesting proposition put forward by Hayfield *et al* (1995 401) is that chalk pits across Wolds tops may have originated as dolines, formed through the solubility of the deep chalk, resulting in the collapse of the overlying chalk and subsequently creating a hollow in the landscape, trapping surface water. The research area has many chalk pits across the Wolds plateaus, which appear randomly in the centre of modern enclosure fields, if as Hayfield *et al* (1995) suggest, they held water, it would be plausible that they provided a water source. Previous work by Whiteley (2015) argued a disused chalk pit central to a cluster of enclosures at Nunburnholme Wold may have originated as a doline and then held water.

The linear cropmark distribution in relation to the water sources is shown in figure 154. The distribution suggests they provide trackways to the becks and springs to move stock from higher terrain to water. Nunburnholme Wold has a linear trackway which leads directly to Deepdale Head; a double linear cropmark runs across The Belt dropping down towards the valley floor and its associated springs and water. Linears from the enclosure systems at Sky Gates and Warter Wold, also head down the valley slopes towards the beck and springs.

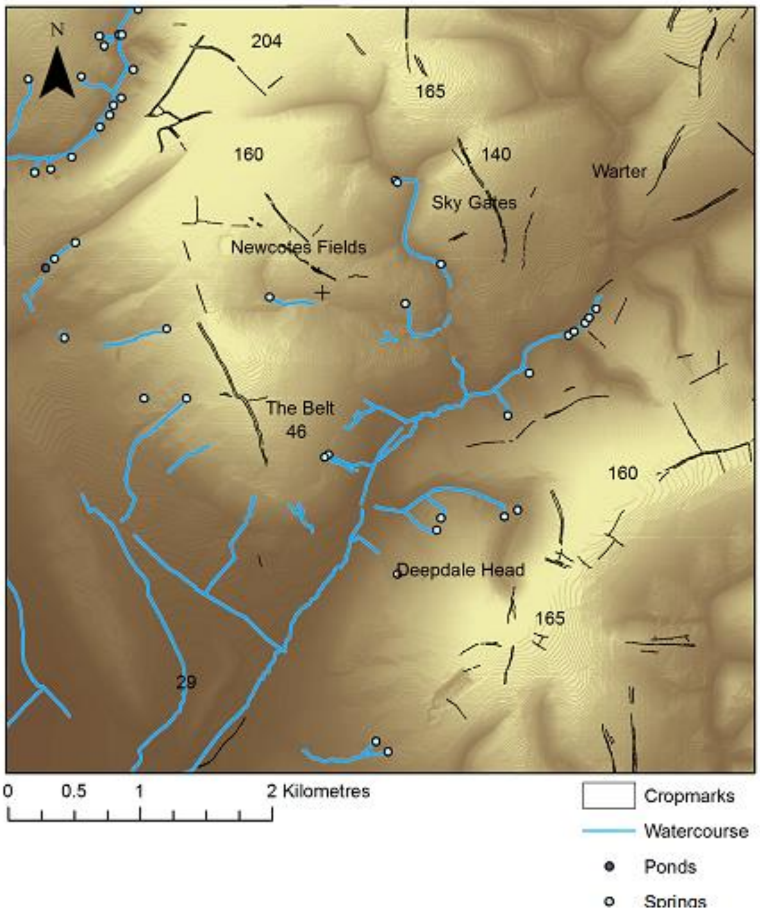


Figure 154; Linear features shown in association with watercourse and springs over topographic elevations of the research area (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

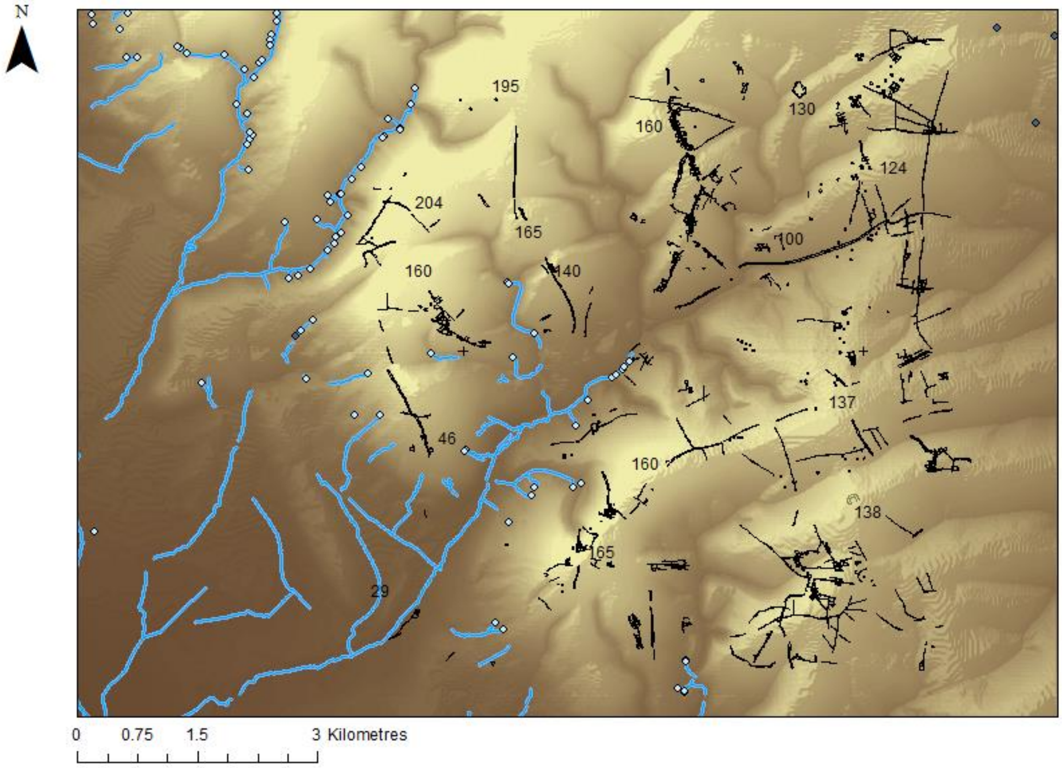


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Figure 155; Linear and enclosure features shown in association with watercourse and springs over topographic elevations of the research area (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

Figure 155 illustrates all the cropmarks within the study area and it is possible to see the most dense concentrations are actually situated away from the watercourse to the eastern aspect of the area. It is suggested that the priority for these enclosures were the calcareous soils that were used for crops / stock exchange, whilst any settlement was located in the larger linear complexes, with a more direct routeway to water sources.

In summary the most accessible water source within this area are the becks in the valley bottoms at Nunburnholme and Millington. There are many springs within the research area where chalk meets the Lias clays, however they are situated well below the workable soils of plateaus. It would have been possible to transport water, however, to date there has been no evidence of any archaeological material which could be attributed to such function. There is a lack of evidence for water on the research plateaus, however with a drop in the water table it is difficult to say whether any Wolds top surface streams were present in these periods.

6.2.3 Cropmark distribution and the environment summary

The cropmark distribution, in respect to its environment, is highly dependent on the visibility of cropmarks against the soils and therefore it is essential that when interpreting the landscape, it must be recognised that the pattern may not be entirely representative of the past. That said, it is a landscape in which there has been widespread activity from all prehistoric periods, in which it is argued terrain and water have not seriously affected the impact on visible crop mark distribution.

Nevertheless, soils do appear to have been influential, acknowledging the soil profile has changed, although the precise period is not identifiable (Manby *et al* 2003). Ladder enclosure complexes overlie brown earths with good workability, whilst the larger field systems overlie both soils, with a prominence over the calcareous soils.

It is clear that the higher areas have more visible cropmarks, whilst acknowledging that there are cropmarks which are not visible, which is argued to be due to the key factors in crop visibility which are soil moisture, differential drainage and colluviation. The loam soils to the east of Nunburnholme beck show no cropmarks but this may not necessarily reflect the distribution accurately. Halkon's (2008) survey of Holme-on Spalding Moor demonstrated settlements were located on sandy ridges. In addition, field walking in Nunburnholme valley has shown archaeological patterns of ridge and furrow created by the plough and demonstrates that during later periods valley floor areas have been cultivated, potentially masking earlier sites.

There is a direct correlation between the cropmark distribution and watercourses. Despite some of the features being on the higher terrain, linears are utilised to lead stock to water. It is proposed that in the past, before the water table lowered, it would also have been accessible through ponds, surface streams, dolines, or quarried chalk pits.

This section has discussed how the topography has impacted on cropmark distribution throughout all periods. The next section will evaluate how societies from each period of the Neolithic to the Later Iron Age have utilised and interacted with the environment.

6.3 Landscape development of the research area

This section of the study aims to analyse, through broad archaeological periods, how the environment of hydrology, soils and topography has impacted on the Neolithic cropmark distribution. It aims to demonstrate a chronological and collaborative approach towards the development of the landscape by using data from aerial reconnaissance, Google Earth, Stoertz (1997) aerial survey, field trips, excavation and geophysical surveys.

6.3.1 Landscape influences in the Neolithic

East Yorkshire is renowned for its Neolithic archaeology and the evidence available is extensive. Indeed, Gibson *et al* (2009,39) identify the research significance of the Neolithic and Bronze Age within the area to be second only to Wessex, observing that the land of both areas provides excellent visibility of monuments and features.

The Neolithic chapter discussed the analysis of the cropmark data from Google Earth, which plotted a potential feature from this period; and in addition, geophysical data from Nunburnholme Wold has revealed a feature which may have its origins from the Neolithic period.

The first feature appears as wide ditches visible from Google earth at SE 489880 452160, (fig 156) an area which has been known to have other documented and researched archaeological features. The ditches themselves are not documented through any previous aerial or investigative surveys but are of interest, especially when comparing surveys which exhibit similar morphological features, such as Esh barrow at Helperthorpe.

Stoertz (1997) suggest short linear ditch pairs may represent unchambered long barrows across the Wolds, as seen on aerial survey in the parishes of Huggate SE 871576, Bishop Burton SE 956394, Sherburn SE 949741 and Rudston TA 077675,

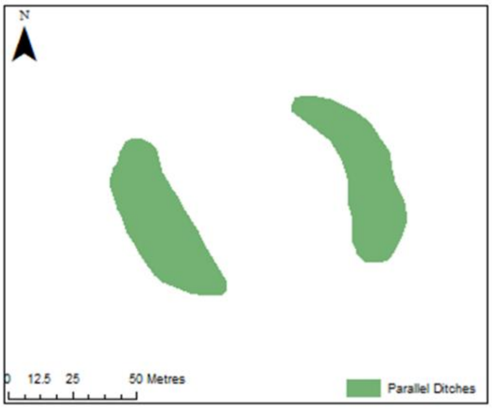


Fig 156; parallel ditches at Thirty Acres SE 489880 452160(mapped in ArcGIS 10.3)

Other features within the area which may indicate Neolithic features are noted at Nunburnholme Wold SE84 NE55 (fig 157). A geophysical survey was undertaken by James Lyall of Geophiz.biz in 2014, as part of the Nunburnholme Community Heritage project and revealed a landscape of ritual features. Two linear ditches on a northwest to southeast axis lie within proximity to a large round barrow and a square barrow cemetery. The ditches are 47m long and 18m apart and appear to widen towards the eastern end.

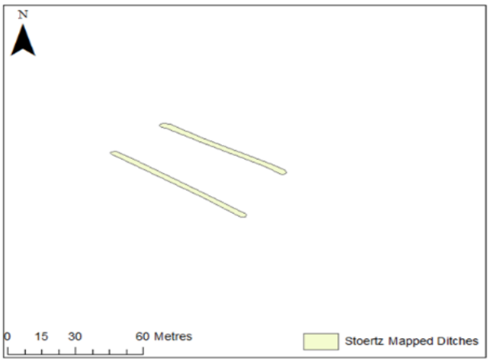


Fig 157; Parallel ditches at Nunburnholme Wold (mapped in ArcGIS 10.3)

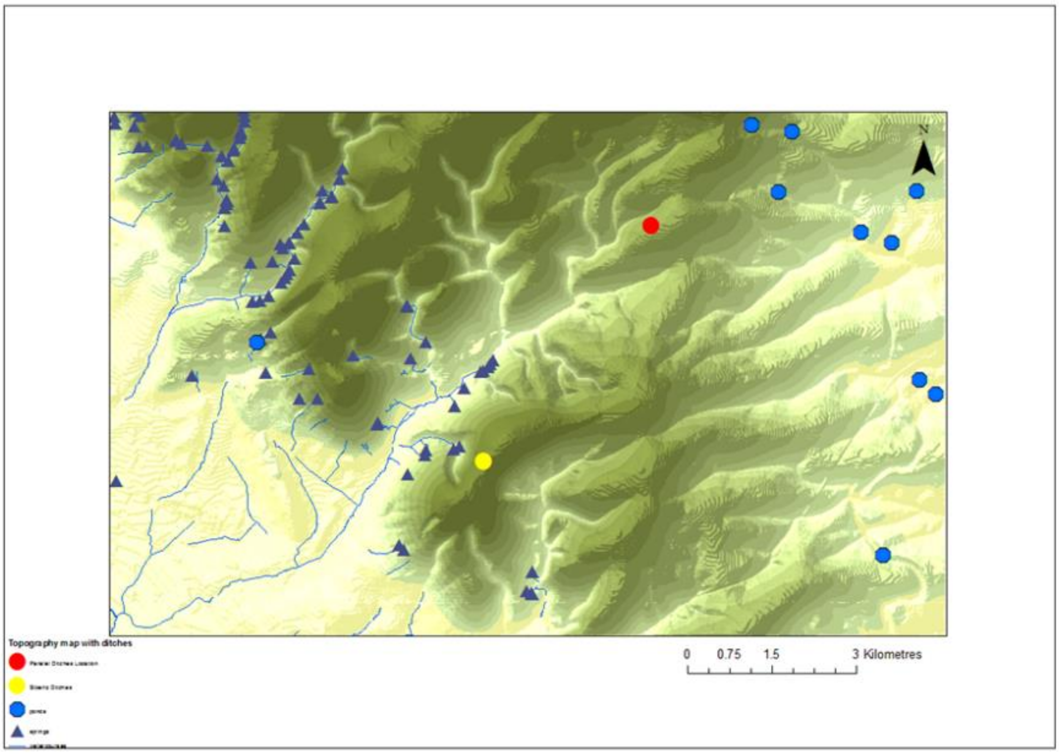


Fig 158; Both Neolithic features seen in relation to watercourse and the topography (A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

Figure 158 illustrates the two features which may potentially belong to this period across the topography. It gives the impression that landscape planning is nothing new, as both features are positioned on elevated terrain and have far and wide-reaching views. Neolithic civilisations often linked complexes of person-made monuments to incorporate natural features like rivers, springs and hills, English Heritage (2020) although hydrology does not appear to be the principle factor in this instance. Indeed Stoertz (1997, 60) notes many of the small long barrows from this period across the Wolds, are evidentially located alongside slopes rather than alongside streams.

The potential Neolithic features in the study area are within close proximity to linear routeways, this is also seen across the Wolds, with notable examples at The Great Wold valley where seven long barrows lie on the slopes above the Gypsey Race and are associated with linear features (Millett and Wallace, 2017, 7).

As always, caution is applied in interpreting these features and assigning dates without excavation and supporting published information, however, it is thought provoking that these ditches may be the first visible evidence of any human activity within the study area. It is known that the Wolds were in use during this period, however, the lack of any domestic evidence from this time does present a bias towards the larger funerary monuments.

It is also of interest that manmade features in the form of the later Bronze Age barrows are constructed within the immediate vicinity of these ditches, suggesting a continuance of significance applied to both sites.

Existing Neolithic landscapes certainly became a focus for raising Bronze Age round barrows and this is evident within the study area.

6.3.2 Landscape influences in the Prehistoric Bronze Age

There is a high density of round barrow distribution in the study area, which illustrates the development of the landscape and is representative of features dating from the early-middle Bronze Age. Figure 159 clearly shows how the burial sites are represented across the research area, and are within proximity of the potentially earlier funerary features. As there are no other morphological features plotted that can be attributed to this archaeological period it is proposed that the settlements are unenclosed at this time and as such these features are not easily detected within the landscape. Hence there is a bias in these maps towards the burial patterns from this period.

As discussed in earlier chapters, there is a representation of barrows standing alone, clusters and group arrangements. A significant factor is how they are all positioned at elevated heights ranging from 108m OD to 132m OD across an elevated plateau which runs in a north-south orientation. This elevation is meaningful itself in how visible the barrows would have been from afar. Chronologically they are the earliest Bronze Age monuments within the study area and supersede any features from the Neolithic period. They are believed to predate later Bronze age linears (Millett and Wallace, 2017, 5). Mortimer (1905, 150) noted himself how the linears respected the earlier round barrows at Aldro 88 and 256. This is also evident within the research area with notable examples are at North Plantation, where the triple linear feature avoids an isolated barrow, and also the large double linear which runs from Warter towards North Dalton and respectfully avoids the cluster of barrows.

The barrows are generously spaced apart, with no evidence of overlapping of other features within the area, which is suggestive of no obvious land pressures during this period. This may be in part due to the barrows providing a sense of place and a focus for the construction of surrounding trackways, settlements pit alignments and funerary practices (Cooper, 2016). The dispersion of barrows, in figure 159, is suggestive of a cultural preference to the east, generally avoiding highest points of terrain.

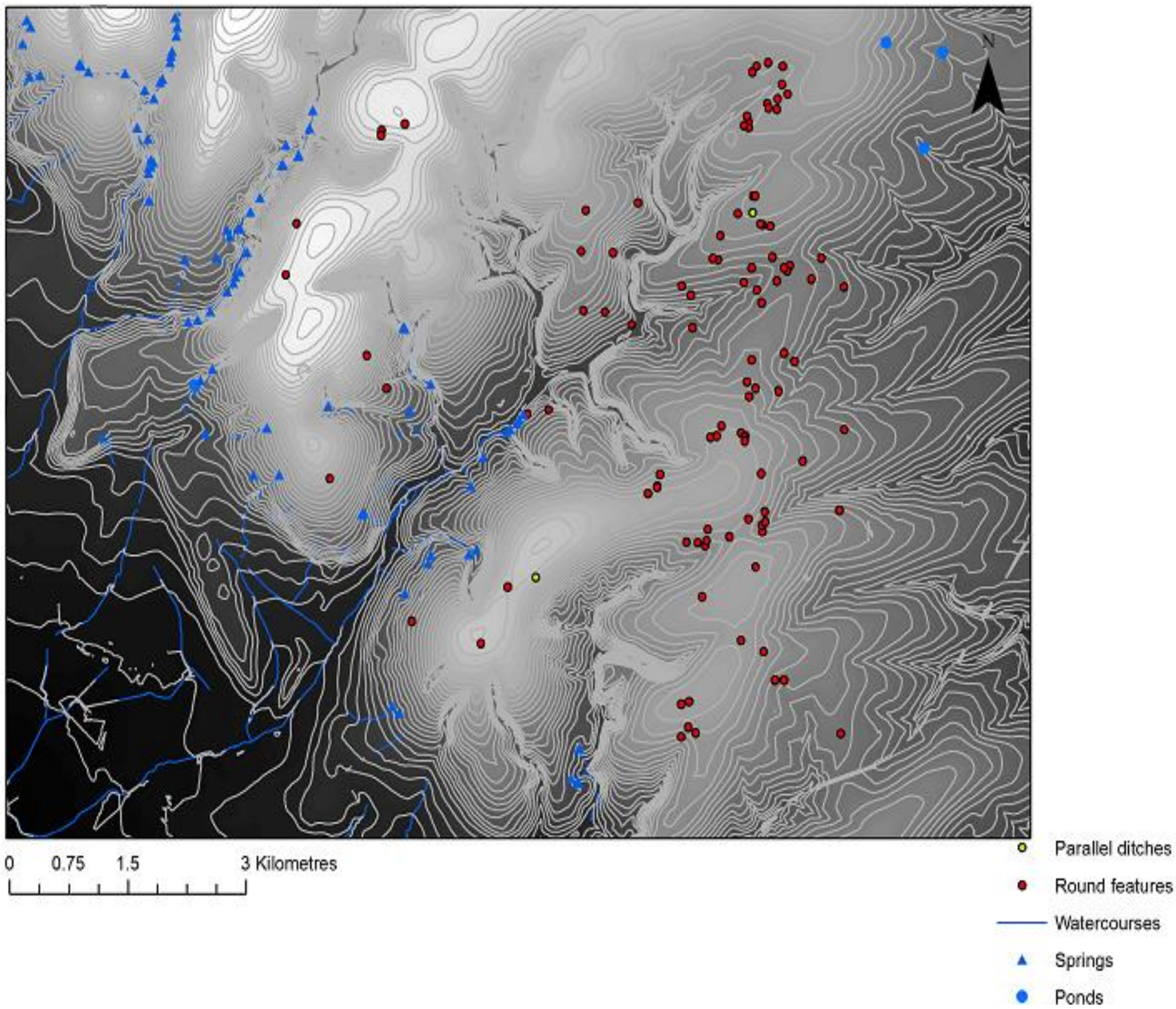


Fig 159; The distribution pattern of ring ditches and parallel ditches (A merged raster data set of the research area illustrating the valley systems, Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

6.3.3 Identifying linears as points of control; Later Prehistoric landscapes and landscape organisation

Following the utilisation of the landscape from the round barrows, the landscape undergoes major modifications, during the Later Bronze age reflective of societal and economic changes (Fenton-Thomas, 2003, 32).

These changes impact the landscape in the study area and are characterised through defensive structures and linear features, which divide land through the construction of ditches. The representation of triple, double and single linears traversing the study area are multi-functional; enabling an expanding population that moved from area to area but also appearing to section land and divide areas (Halkon, 2008, 155).

The landscape of valleys and elevated plateau have dictated the linear courses, through a social necessity, to traverse the land, manage the landscape and gain access to water. The dykes respect the contours of the land, whilst others lead from the elevated topography down steep valley sides into the valleys. The study area has sixty-five plotted linears, however, there are three which appear more substantial and although Stoertz (1997, 62) notes size is not essentially an indicator of importance, these features are argued to be of significance due to their relationship with the topography and are noted here as 1,2, and 3 (fig 160).

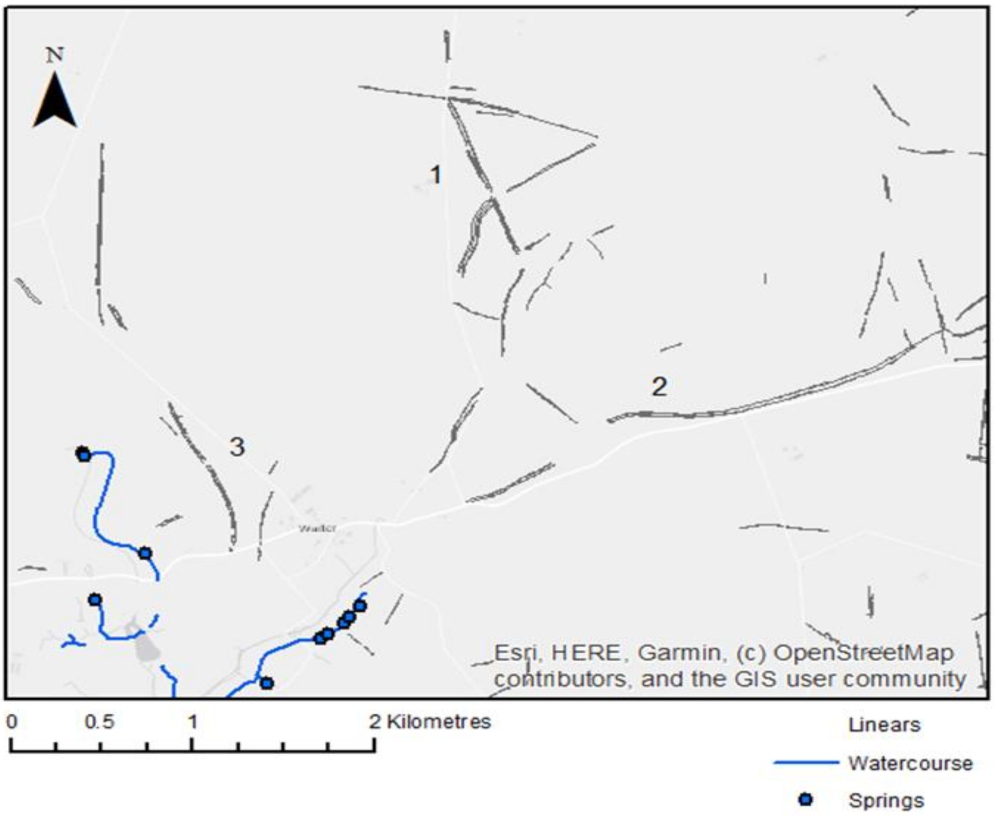


Fig 160; The key linear features (mapped in ArcGIS 10.3)

1. The linear on a north-south trajectory from Huggate Dykes to Warter
2. Double ditched linear feature from Warter towards North Dalton
3. Double Linear at Skye Gates

Within the study area the most visible prominent linear feature (1) appears to extend from Huggate Dykes, a large and complex ditch and bank system which is documented as part of a major routeway across the Wolds (Fenton-Thomas, 2003, 39). This linear in conjunction with linear 2 present as a Y shaped system of double linear features which leads to the springs and the watercourse at Nunburnholme beck.

Linear (1) measures 2.4km in the study area itself, but is considerably greater in length when in view of its potential starting point at Huggate Dykes. This linear appears to converge with the large double ditched feature (2) running in an east-west orientation from the direction of North Dalton. These two linears delineate a large block of land which wraps around the double ditched square feature at Blanch Farm SE 489255 453270 (see fig 160). Each linear is part of a linear enclosure complex, which is suggested to be later than the original features as seen in other comparative examples such as the Thwing ladder settlement (Ferraby *et al*, 2017).

In addition, linear 1 has a clear association to the spring line and watercourse, which in conjunction with the linear feature 2 may suggest wide scale animal husbandry within the area. It is argued that the landscape must have been de-forested during this time to allow a complex series of droveways and trackways to allow such fluidity across the landscape.

The linear feature (3) extends from Sky Gates and although it appears disjointed from the Stoertz (1997) images, it was probably conjoined with the double linear feature northwards at Cold Wold. The linear drops down the valley to the becks and springs in the Nunburnholme Valley, adding greater weight to the theory of this area was being a well organised, managed landscape. It is clear from figure 156 that the linears appear to protect, gain access or conversely restrict access to the springs and streams.

An additional linear of note is the series of double and triple features at Millington SE 485601 451705. These linears are respectful of the round barrow features and are still visible today as earthworks in the woods leading down into Deep Dale. The linears appear in conjunction with the natural topography of Deep Dale to be sectioning and controlling areas of land. It is possible there is a relationship between them and ladder settlement at Newcotes Fields.

Fenton-Thomas (2003, 36) identifies with the difficulty of dating linear features and notes they may have been reused and adapted throughout their usage. It is argued that chronologically the construction of the linear features postdate the earlier Bronze Age barrows. Evidence of this is seen in the study area on an east-to-west orientation from Warter towards North Dalton SE 490328 451003 where the earthworks have followed the contour of the landscape and have respectfully avoided any intrusion with the barrows (fig 161).

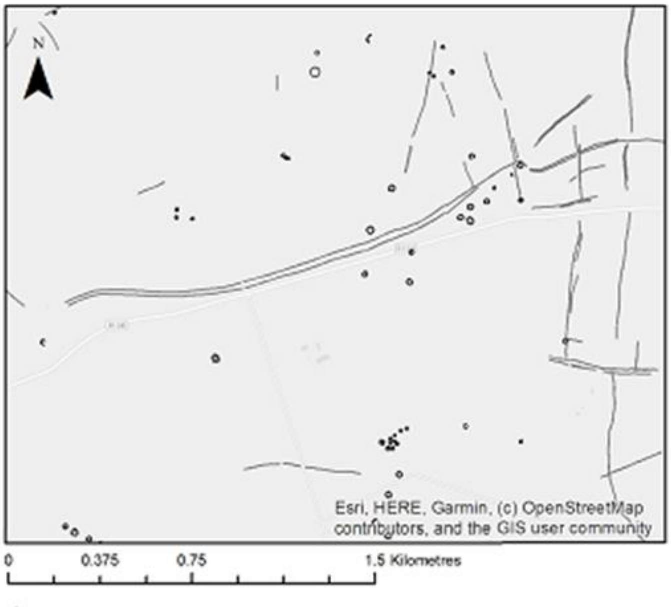


Fig 161; Double linear feature respectful of barrows SE 490328 451003 mapped in ArcGIS 10.3 software.

Conversely there is the large round barrow / hengiform feature at Nunburnholme Wold, which was truncated by linear ditches in what could be perceived as an aggressive act (Halkon, 2016).

However, the relationship between barrows and linears in both cases does indicate and confirm that the barrows predate the large linear boundary features.

6.4 Hillforts as points of control

A monument type associated with the linear features are hillforts (Powlesland 1988, Manby *et al,* 2003, Ferraby *et al,* 2107) which Giles (2012, 55) notes are from around the same date.

Halkon (2013, 59) suggests hillforts are in response to climatic instability as indicated by environmental evidence, which resulted in increasing societal tension. As resources became progressively scarce due to climatic instability, a society which was more hierarchical and aggressive was developing. These resources required secure storage and Halkon (2013, 65) notes a potential function of these forts may relate to cereal storage and processing.

In addition, the emergence of hillforts indicates some degree of protection was required. Johnston (2008, 277) suggests the large-scale division of land is a direct response to population increase, which required land management to meet demand, whilst Mulville (2008, 238) proposes new settlement patterns would require interactions within community groups and external groups. Both factors which could be argued to facilitate a defensive culture as noted by Mercer (1999, 143) who suggests typically warfare causative factors include trade and its ambition as a means of progression, and the acquisition of land to enhance and grow the economics of a community.

There are opposing arguments to an Iron Age hierarchical system (Robins 1999) instead viewing the Iron Age as more of an equal society. Giles (2012,54) proposes each site has a different role, depending on the groups, arguing that part of the population were still highly mobile and used sites during certain times of the year, without a territorial link to land rather a tenureship. However, the construction of linears and the development of hillforts suggest there is some tension or threat and the previous ways of life are challenged.

The few hillforts that are evident within the archaeological record across the Wolds are evenly spaced Stoertz (1997, 78) as seen in the study area and it is argued that due to land pressures they were acting in association with linear systems as territorial land markers and an example of this is at Thwing where the large circular enclosure lies close to a major linear system (Manby *et al*, 2003).

When examining the study area, linears and any impact on organising the landscape, shows there are three features; Kipling House Farm SE 489917 448179, Blanch Farm SE 489255 453270 and Grimthorpe SE 816534 (outlying the study area) which warrant attention as they may have been influential focal points in the land division or as territorial control measures. Each site is situated at an elevated topography which would offer far and wide-ranging views across the valleys.

As discussed previously, aerial imagery from the RAF noted a large circular ditched enclosure at Warter Wold, situated on a chalk spur 500ft north west of Minningdale farm, however this is not included as a potential control point, as the feature was not seen by D Riley in his aerial reconnaissance and has not been observed at any other time. This opens the possibility to there being other similar sites, not recognised, for what they might be, elsewhere on the Wolds.

The relationship between hydrological sources, topography, linears and defensive sites

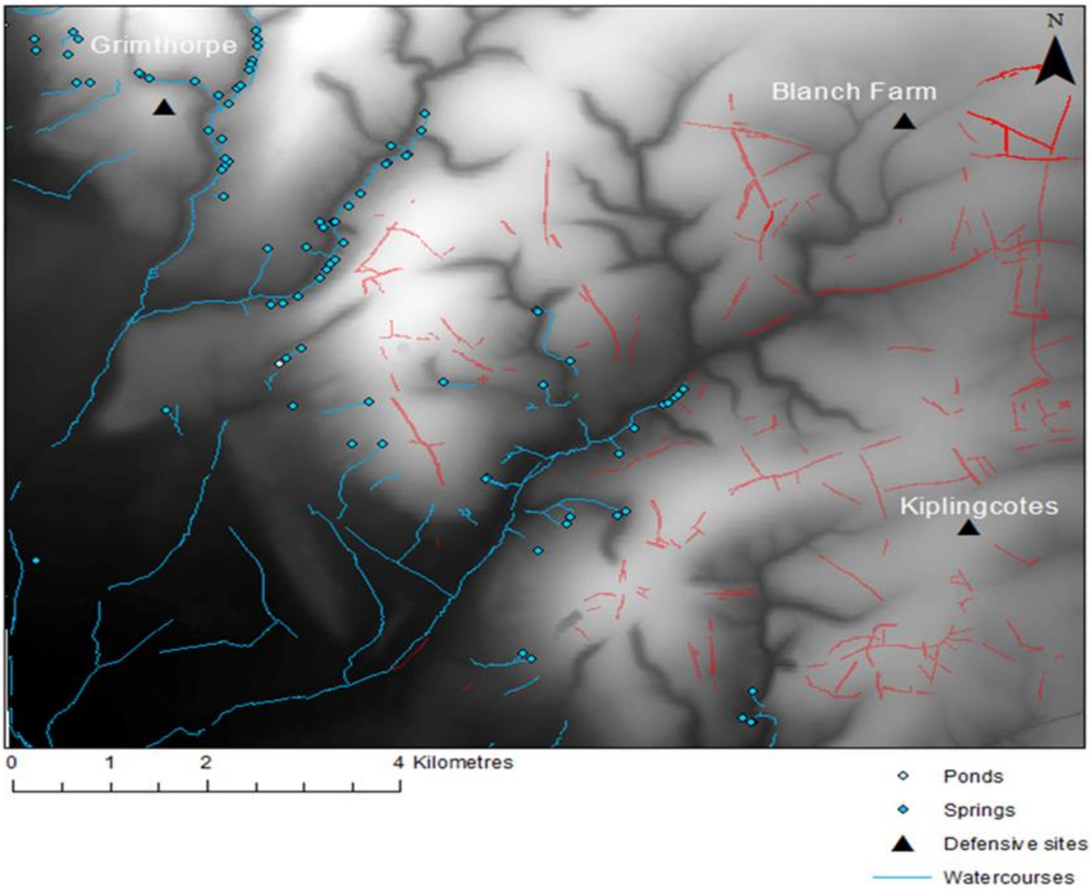


Fig 162; The distribution pattern of three suggested defence points and linear systems (A merged raster data set of the research area illustrating the valley systems (Terrain_5-dtm-1653408. An Ordnance Survey/Edina supplied service mapped in ArcMap 10.3 software).

Figure 162 illustrates how each potential defended site, is regularly spaced and situated within a different topographic landscape block, with Blanch Farm and Kipling House Farm situated either side of the Y shaped linear system (Halkon, 2008, 155). It is plausible that the division demarcates landscape areas and control of access to water sources and springs. Grimthorpe sits on the same topographic band as Blanch Farm and is separated from the other features by the dales, watercourses and the Y shaped feature. Caution must be applied to any interpretation of Blanch Farm due to the lack of evidence which has been obtained. The writer has not succeeded in securing access to the original photograph.

Although the Y shaped feature could be organic and added to in a piecemeal fashion over time, as indeed the sites mentioned may have adapted their status and functions over time, it does present an interesting theory of land division and control.

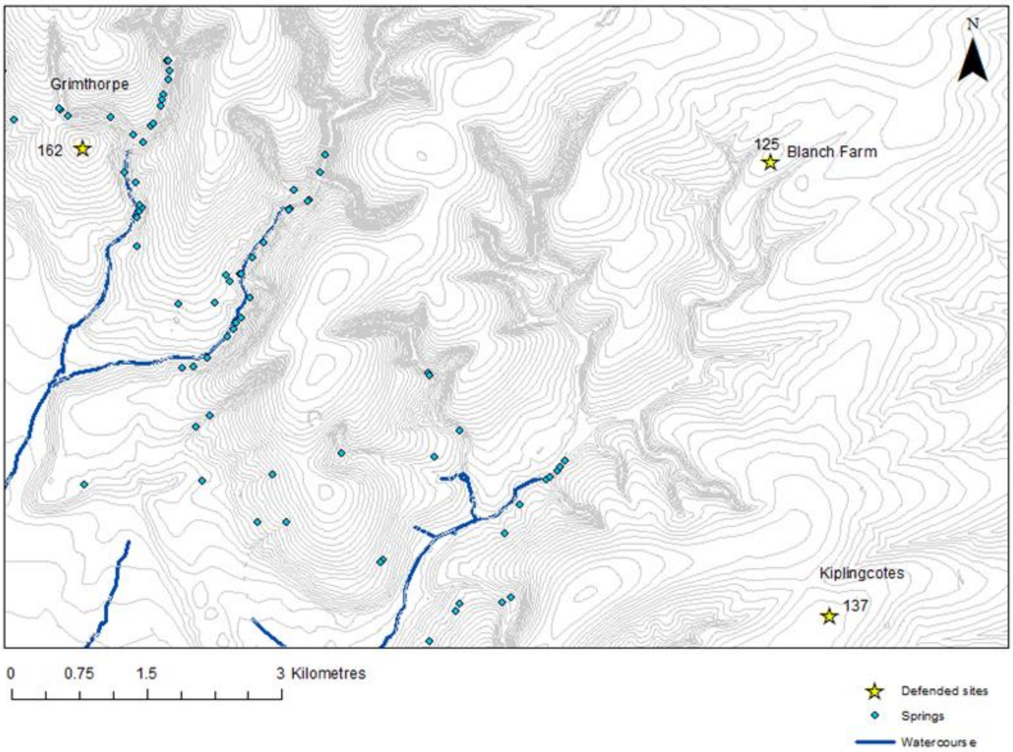


Fig 163; the distribution pattern of potential defence sites and the relationship with water (mapped in ArcGIS 10.3)

It is questionable whether these features are all contemporary and interrelated. Excavations at Grimthorpe (fig 163) in the parish of Millington, an Iron Age hillfort, placed the construction to be in the late 2nd millennium BC, with occupation believed to be until the later 7th Century BC, although if this was a continuous occupation period, is not known (Stead, 1968, 190). All surface indications have been removed by ploughing, although the single regular curvilinear rampart it is still clearly seen from cropmarks by air. The site has commanding views and is closely situated to the watercourses and springs. Further work is required at Blanch Farm SE 892533 in the Warter parish, which is illustrated on aerial photographs as traces of a chalk bank between two ditches. Its morphology is very similar to Hod Hill in Dorset and Walbury camp in Berkshire, in that it has multivallate defences (Payne *et al*, 2006). Regardless of the lack of investigative work, its position and size do need considering when exploring control points within the study area.

Excavations in 2018, 2019 and August 2020 at Kipling House Farm have demonstrated that the site was highly significant within the landscape. Dating of pottery from the 2018 excavation, which mainly consisted of handmade heavily gritted fabrics, was identified by Dr T.G. Manby as being of later Bronze Age date (Halkon and Lyall, 2018). Excavation trenches in August 2020 were placed over the western side of the outer square enclosure which had an outer ditch, an inner and much narrower slot, which was almost certainly a palisade slot. The skulls of ten cattle were found in the south west corner, running up to around halfway up the slot. According to bone specialist, Claire Rainsford, the heads had been deposited fleshed and complete. In the north-west corner were red deer antlers and jaw bones. A likely explanation for this is an act of structured deposition after the palisade was removed in an act of closure (Halkon, 2020).

The outer ditches of the site were approximately 4 metres wide and 4 metres deep, which implies the outer banks were imposing structures and were visible for many miles. The landscape around Kipling House Farm is zigzagged with linears, and it is argued that they were providing a routeway to a place of special significance and connecting / anchoring the feature itself to the surrounding landscape. There is a double linear feature 0.5kms to the north east SE 490059 448800 as noted by Stoertz (1997), and a newly identified linear extension of this feature positioned 0.4 km northwards, seen only on Google earth SE 489972 448911, which is respectful of three round barrows. It is possible that this linear continues northwards and conjoins the significant double ditched linear feature from Warter Wold towards North Dalton SE 490328 451003 (as seen in fig 161). In addition, there is a single linear approaching Kipling House Farm from a south westerly direction.

The importance of the study area linear features and trackways across the landscapes linking spiritual and socio-economic places is clear and must have played an important role in connecting communities with specific areas of land.

Positioned centrally to all these sites is Nunburnholme Wold, where past excavations and surveys have revealed a site which began as a funerary landscape, undergoing a change at some point in the usage of the area; evident as the enclosing of land into a series of ditched and hedged fields which at points, have assimilated the trackway. It is suggested this area became a focus for stock handing and exchange; the constricted width of some of the droveways indicates drafting areas/stock movement and inspection, consistent with exchange system requirement (Whiteley, 2015).

6.5 Function

The dating evidence obtained from investigative studies at these sites, with the exception of the features at Blanch Farm, indicate usage during some point in the later Bronze Age, with Grimthorpe potentially being the earliest feature. It is tempting to view these sites as contemporary and operating as control points, partly defined by linear earthworks, within their landscape block, or complementing each other in their functions to facilitate societal living. Each site had commanding all-round views provided by their prominent position, and would have been visible from long distances. It is intriguing to consider that the Kipling House ringfort was able to be viewed from the site on Nunburnholme Wold and was probably contemporary (Halkon, 2018).

The tension for land and resources led to the linear construction and the emergence of hill forts and curvilinear enclosures, however it is questionable that an area of this size would require three defensive features. It is therefore proposed that the features were used for complementary purposes and may have spanned different periods. Grimthorpe is viewed as defensive from its morphology, whilst evidence from Kipling House Farm indicates a ceremonial and feasting area for a large area and population of the landscape. Features at Nunburnholme and the funnel enclosures at Londesborough Wold SE 4892473 are indicative of a more managed agricultural landscape for the purposes of stock exchange or holding areas. Feasting is also evident from the cattle bones found in the ditch excavations at Nunburnholme Wold (2014/5) and Kipling House Farm (2020) and must have played an important function within the communities.

Although it is tempting to assign functions to each of these features, it is important to consider that as in present day, functions of sites are adapted and changed over time as seen at Nunburnholme Wold and this is probable with other features. It is however, argued that their spatial relationship to each other is complementary and that they were significant and central places for the surrounding area, with some degree of chronological overlap.

So far this section has focused on the larger linear and defensive/ceremonial features of the landscape and their relationship to the topography. A great deal more work is required to understand the chronology of the features, however, it is suggested the linears have delineated large scale landscape blocks and have a relationship with water and springs.

6.6 Development of the Landscape: Iron Age Square barrows

The next part of this chapter analyses the square barrow and settlement development from the Iron Age. Linear features and the natural topography continue to provide a focus for the next chronological stage within the study area's landscape development; asserting control over the positioning between square barrows, water sources and trackways. These factors influence the positioning of square barrows and settlement enclosures, as they did with the earlier Bronze Age round barrows. Chronologically, the square barrow features are believed to have originated from the Middle Iron Age and are characteristically of the Arras culture (Stead 1979, 1991, Dent, 1985, Anthoons, 2011, Halkon, 2013, 69).

The square barrow rite is evident in the study area through discrete clusters, which Fenton-Thomas (2003, 52) suggests is a way of ancestral communities having connection with their land. The research area square barrows are chiefly in two main areas; Nunburnholme Wold SE 84 NE 55 and Loaningdale SE 84 NE 29; both areas occupying the crest of Nunburnholme Wold, a higher terrain plateau within close proximity to the linear networks and within areas of previous round barrows, suggestive of a continuation of a spiritual area or indeed a tenureship of land and control. The square barrows tend to be on a north west- to north east axis which is in contrast to the earlier round barrows which are on a north-south orientation, but all are overlooking the major valley systems, which would have been used to travel through the Wolds (fig 164 overleaf)

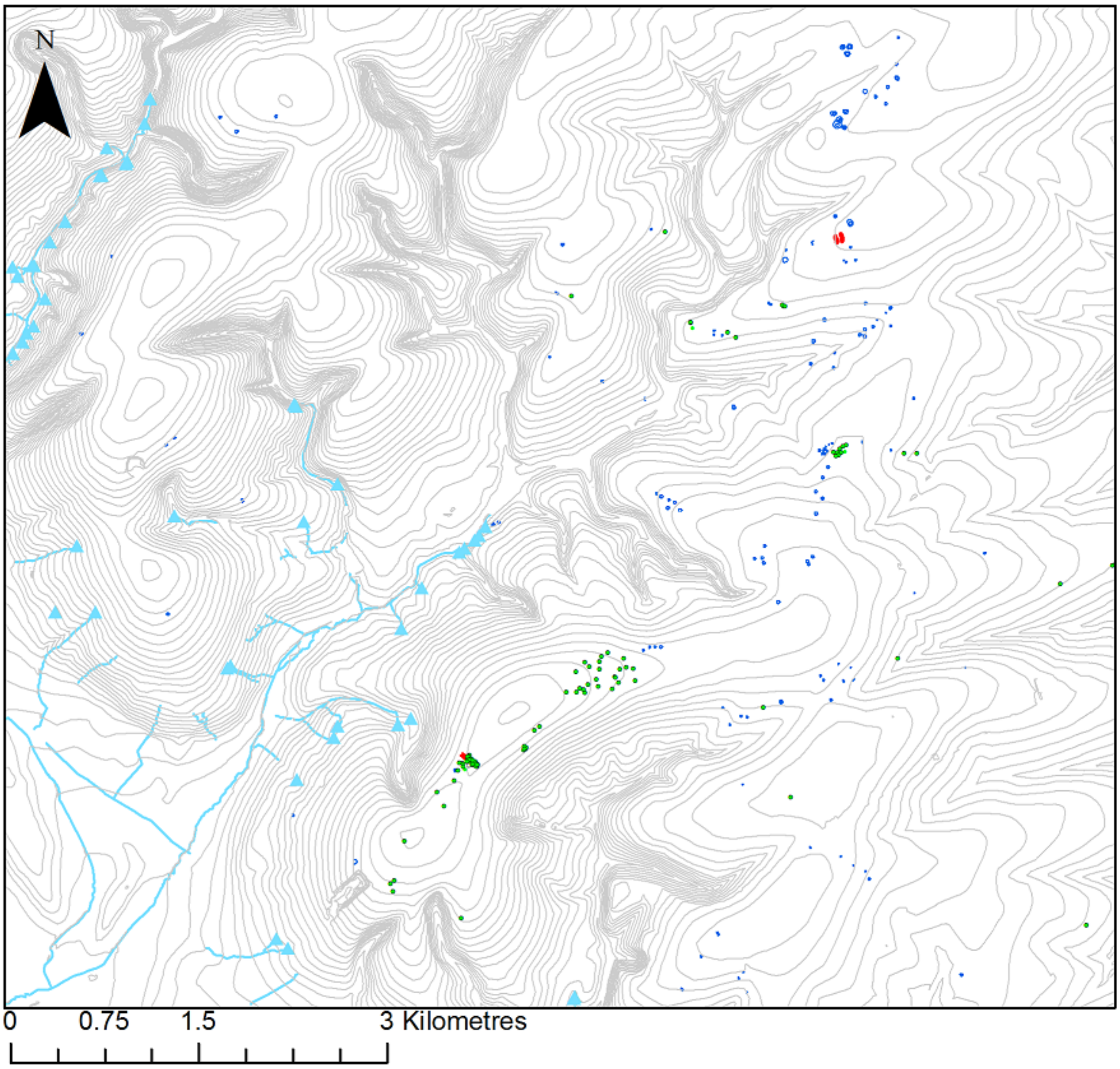


Fig 164; the ceremonial landscapes of the Neolithic, Bronze Age and Iron Age. Note the elevated terrains in which they are all positioned.

A majority of the Wolds barrows are located close to a water source with a preferred location being near to intermittent streams such as the Gypsey Race (Fenton-Thomas, 2003, 52). This theory relates to the square barrows in the study area which are situated at a higher topography than the lower level spring lines and watercourses within the study area but they are certainly within their vicinity (fig 164). It is important to consider that the fluctuation of water levels changing over the centuries would impact and the effects this would have on the previous locations of streams and spring sites (Hayfield and Wagner, 1995, 63).

The key topographic influences in the positioning of the barrows are the plateaus which provide clear viewpoints over the valley systems, with water sources argued as a secondary consideration. Of equal significance is the strong relationship between barrow cemeteries in the study area to any mobility in the landscape created by the linear features; double linear droveway features are more prevalent than single boundary type linear features. The barrows are positioned within close proximity of trackways/boundaries and it is suggested this is a landscape intervention to assert control as a visible marker to the passing mobile Iron Age community (fig 165). This would also have provided a sense of place and an ancestral connection to a local population accessing agricultural lands or local water sources.

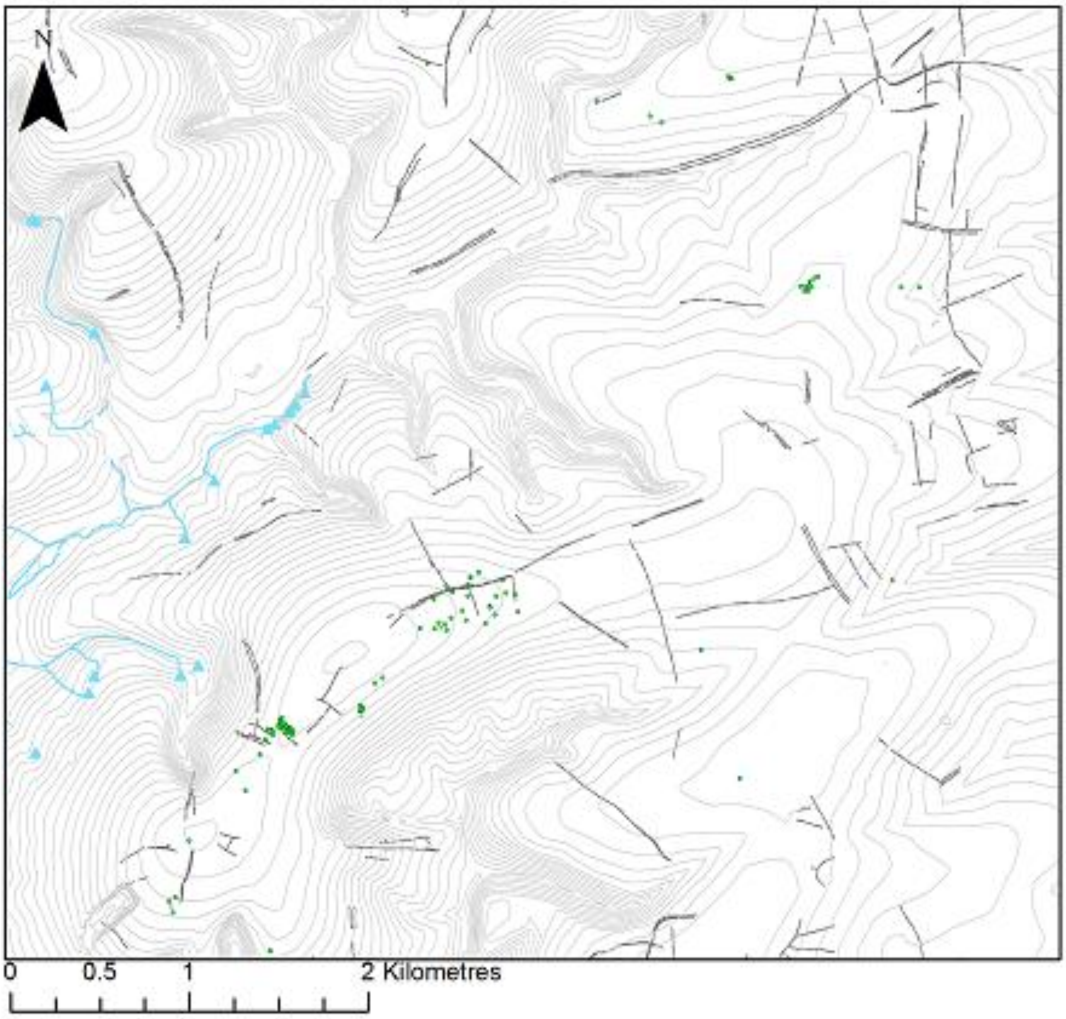


Fig 165; Square barrows positioned along boundary features (mapped in ArcGIS 10.3)

6.7 Development of the Landscape: Settlement and economy development

Chapter five interrogated the plotted data in order to understand the pattern of settlement in the study area and what influences the landscape has played in the positioning and development of enclosures. The key point highlighted, was that the enclosures are on higher grounds, as seen in comparable examples across the wider Wolds and Foulness areas (Halkon, 2008). However, caution is advised as ditched enclosures are more difficult to see on clay and peat soils of the lower lying valleys.

The enclosures favour Ac, pH and Up soils, all of which have good drainage and workability and are favourable for growing a range of crops. There is not an obvious direct correlation between the enclosures and water sources, therefore it is suggested the linear systems provided routeways through the landscape to a water supplies. Whilst it is known sheep require less water (Porter, 1991), and could be argued to be the dominant livestock across the area, evidence from the excavation at Kipling House Farm and Nunburnholme Wold leaves no doubt that cattle were very much part of the agriculture.

The study area has identifiable features that can be attributed to the Early Iron Age. Excavations at Nunburnholme Wold and the Kiplingcote both revealed occupation-based pottery (Halkon and Lyall, 2016, Halkon, 2020, 9). Excavation at Kipling House Farm in 2020 demonstrated that the entranceway showed close similarities to Thwing, (Manby, *et al* 2003) a site which had a long and complex sequence and was extensively remodelled in the Later Bronze Age. In the study area, ladder settlements and funnel enclosure complexes constitute the majority of enclosures within the study area and are discussed in greater detail below.

6.7.1 Ladder settlements

The twenty-one complexes in the study area are found to be running alongside the trackway or boundary ditches and it is argued that the main influencing factor for the position of the enclosure systems, are the linear systems. Almost all these enclosure complexes are associated with one linear, with a predominance situated next to parallel linears. Stoertz (1997, 53) advices a single linear feature may be the result of being the only remaining feature visible of a double linear, or alternatively a single boundary.

Unfortunately, there is little excavated evidence available to aid the dating of these linear enclosure complexes in the study area, other than the Nunburnholme Wold 2014 excavation, in which a trackway was excavated and proved to be a holloway which had been recut several times. Artefacts recovered were a small iron stud and some small sherds of Romano-British greyware pottery (Halkon and Lyall, 2014). The excavations at ladder settlements at Rudston (Stead,1980), and Brantingham (Dent,1989) revealed an origin from the Late Iron Age into the early Romano-British period. The ladder settlements are certainly thought to be, as a general rule, later than the square barrow rite. Further evidence from across the Wolds is shown by Dent (1983, 36-39) where excavations at Wetwang Slack also indicated that the enclosures defined by ditches were later than the earlier open settlements from the Earlier Iron Age, also noted by Millet in the surveying of Thwing Ladder settlement (Millett, 2017, 24).

It is again difficult without excavation to determine a sequence of chronological construction of the enclosure systems and the linears in which they are adjacent to. Across the Wolds it is known that some were constructed in a single stage, whilst others were more organic in their development. It can be seen however, that there are examples of ditches recut, subdivision and expansion within the study area which is indicative of a complex development within the settlement areas, as discussed in the forthcoming section of this chapter. There is a lack of evidence for roundhouses within the study area, due to the selected methodology and the difficulty of smaller cropmark features such as circles of postholes or shallow ring marks being substantial enough to be visible on the aerial survey or satellite imagery. Proof of this was seen in during the 2019 excavations at Kipling House Farm where the Bronze Age roundhouse and enclosure of Kipling House Farm was superseded by the later Iron Age roundhouse feature was only visible on excavation (Lyall and Halkon, 2019).

The study area has examples of both single stage construction and organic developments of linear enclosure complexes. Single stage enclosures are more difficult to note as most of the enclosures across the study area are of varying degrees of shapes and sizes, however a good example is evident at Middleton Dale SE 490609 44915 in which the enclosures are a regular size (fig 166 below).

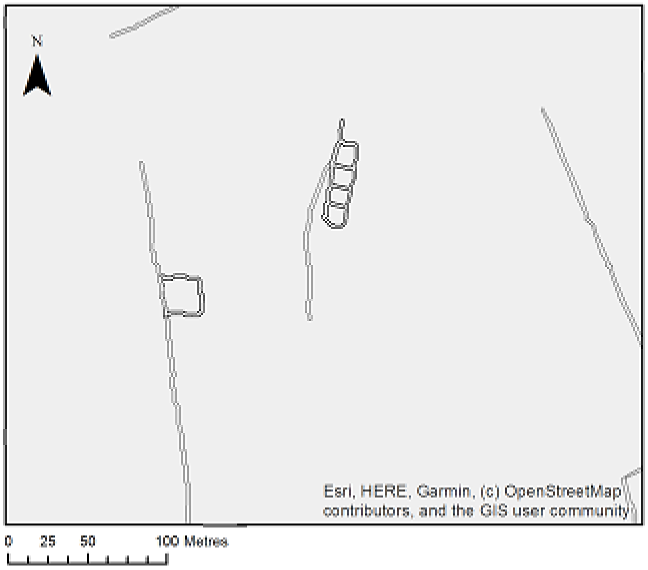


Fig 166; Middleton Dale enclosure complex (mapped in ArcGIS 10.3 software)

It is proposed from the available evidence that a majority of the ladder enclosure complexes are organic in their development and are later than the large double ditched linear features.

Evidence for this theory can be demonstrated at the sites of Newcotes field (fig 167). This ladder settlement consists of chronological features from the Bronze Age through to the Iron/Romano-British periods, and is a good example of the chronology across the landscape. The double ditched droveway (E1) is suggested to have initially been a boundary due to its close proximity (0.6km) to a system of interconnected triple linear and double linear features at North Planation SE 484067 451262. The ditches are respectful and avoid the associated round barrows. There appears to be possible recutting / organisation of the double ditched feature throughout the settlement, which may be due to usage or expansion of size of the Middle to Later Iron Age. The droveway at this site would have been a high traffic area for the movement of stock to the springs and watersources at a lower level. Droveway (E2) may have been created as an expansion of the adjacent enclosure to act as a funnelling type system for stock managing and sorting area to calm animals or enable inspection, before or after, moving stock (Pryor, 1996, 316).

There is a series of enclosures, all rectangular in forms, which display some evidence of recutting, and subdivision (fig 167).

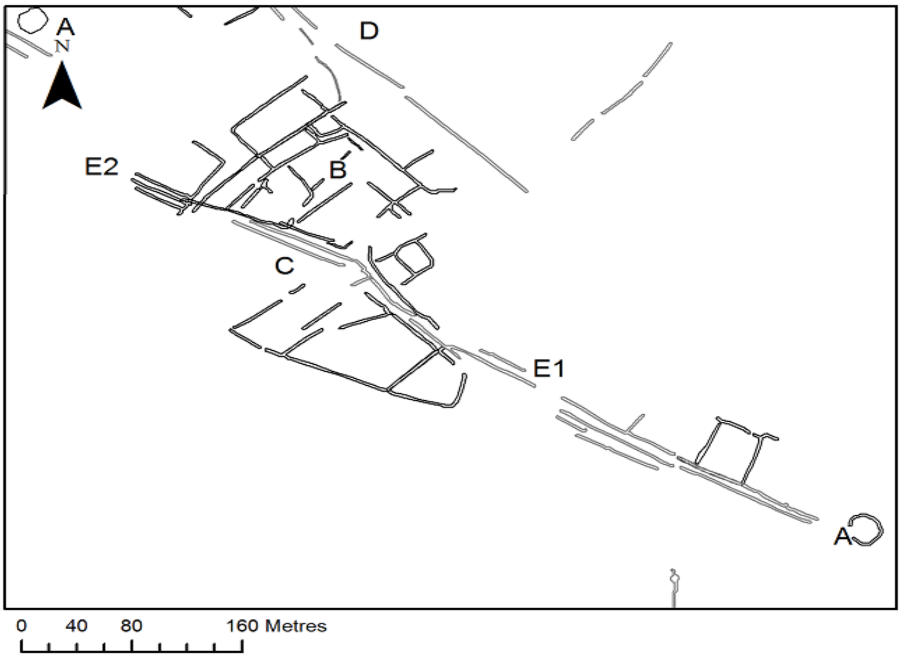


Fig 167; Newcotes field ladder settlement (mapped in ArcGIS 10.) A= Round Barrows B=Enclosures with sub-divisions C= Double ditched droveway D= Double ditched droveway E1=Evidence of recutting of droveway E2= expansion of the adjacent enclosure to act as a funnelling type system.

A further example of a large linear enclosure complexes can be seen at Warter Wold (fig 168 overleaf) which is suggested to have been part of a junction system at Huggate Dykes. The complex is a very clear example of an organic development, as the enclosures are varying shapes and sizes, with groups of enclosures along the main droveway linear feature.

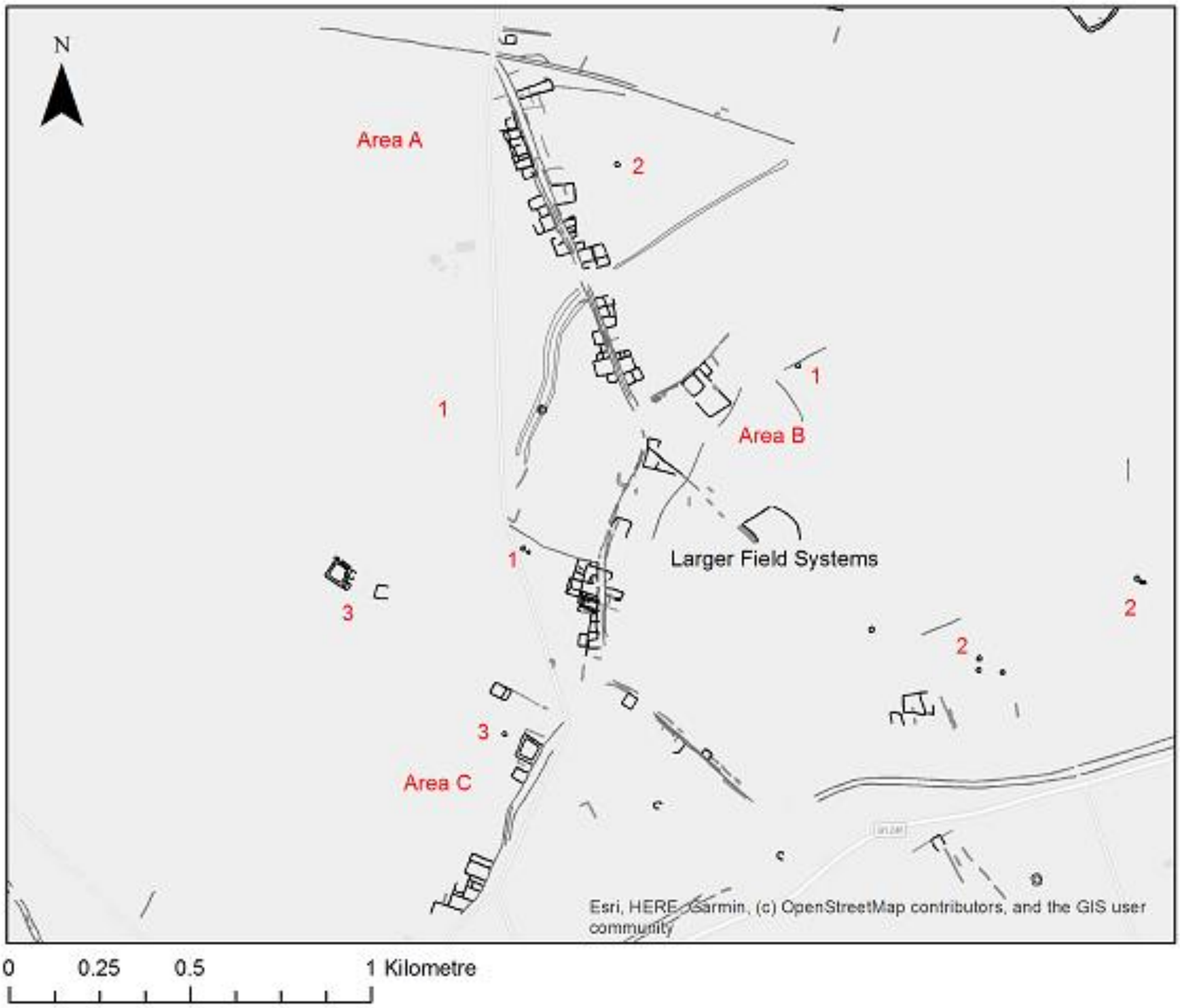


Fig 168; Warter Wold linear complex illustrating the three discussion areas. (mapped in ArcGIS 10.3)

1. Round Barrows 2. Square Barrows 3. Double ditched rectangular enclosures

Warter Wold complex is structured around a series of major ditches on a rough North to South alignment. Although without excavation, dating is difficult but, does appear that the ditches play a key role in the organisation of the enclosures and are a focus for this settlement. The relationship of the main ditch to Huggate Dykes (2.6km) suggests its primary function was as a major boundary leading down the slope to Golden Valley at Warter. Pervious work completed at the comparable ladder settlement at Thwing, has illustrated through geophysical survey, that enclosures were successive to the primary boundary ditches which ultimately formed a nuclei for the enclosure complexes. Each area is discussed in more detail below.

Area A

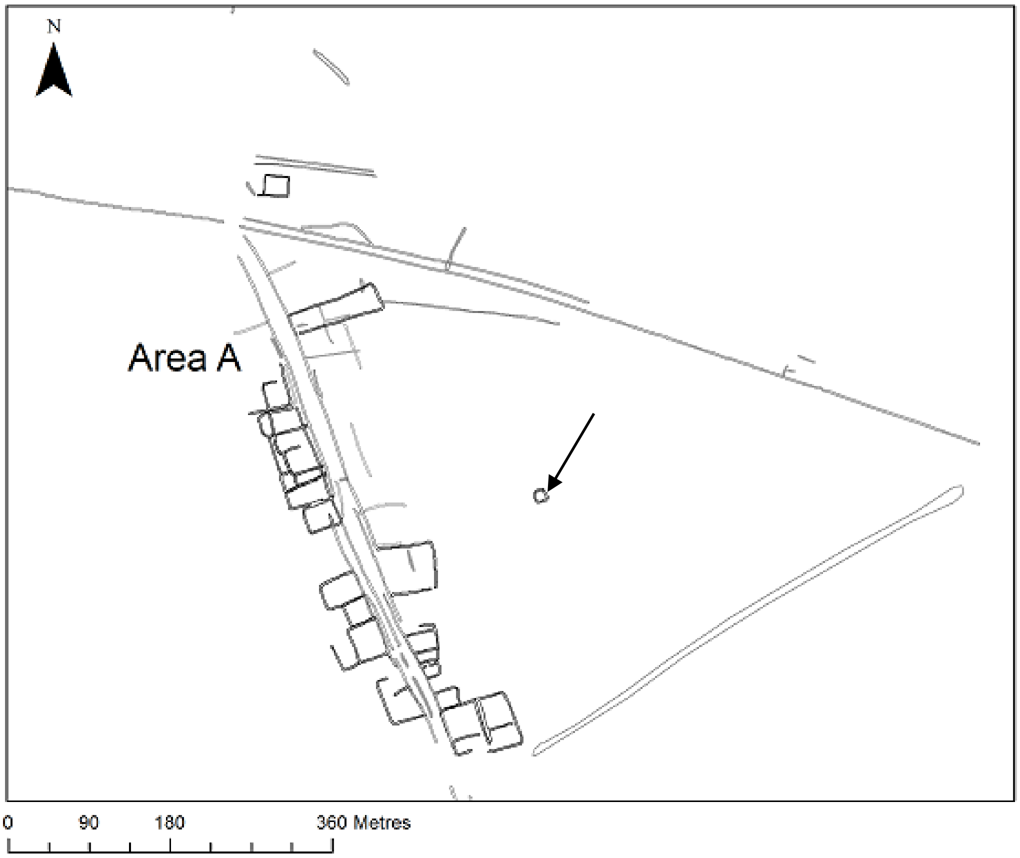
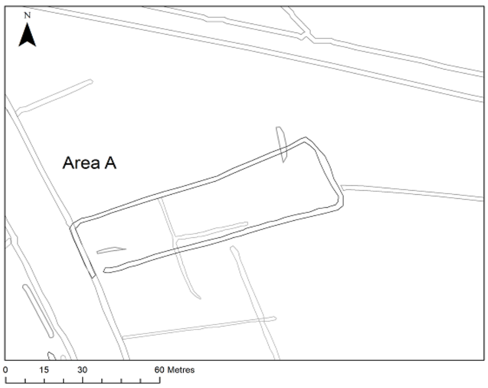


Fig 169; Area A of Warter Wold enclosure complex system (arrow to square barrow) (mapped in ArcGIS 10.3)

Area A illustrates the varied sizes of rectangular enclosures parallel to the droveway. A majority of these enclosures display some evidence of partitioning, and there is evidence of some recutting of ditches as seen in figure 170.



Without a geophysical survey it is difficult to be specific which ditch predates the other, however, it highlights the requirement to changing the function/size dependant on the needs at that time. The variation in sizes is indicative of a development within the enclosures complex history.

Fig 170; Evidence of recutting of the ditches in an enclosure at Warter Wold

There are two square barrows associated with this complex, one barrow is encompassed by linear features (fig 169). It is suggested the landscape is significant in the positioning of this barrow, as it is on higher ground and within the vicinity of round barrows, and would have been highly visible from the trackways and possibly would have been a commemorative monument. The barrow obviously has a relationship with the linear enclosure complex, a similar example is noted by Halkon (2013, 99) at Arras as an example of where there is a relationship between square barrows and the linear droveways.

The linear feature itself has evidence of recutting, suggesting it was a past droveway, with high traffic. The aerial image shows a small break within the linear feature as it extends into area B. There is what appears to be a junction at this point, in which a single linear feature from the east then develops into a large double ditched feature, extending to the west in the direction of Scarn Dale dropping down the topography into Golden Valley. This feature appears to truncate a double ditched round feature. An opinion was sought from the Geologist Richard Myerscough regarding the likelihood that this may be a natural feature as opposed to a linear, however, it is believed to be manmade

Area B

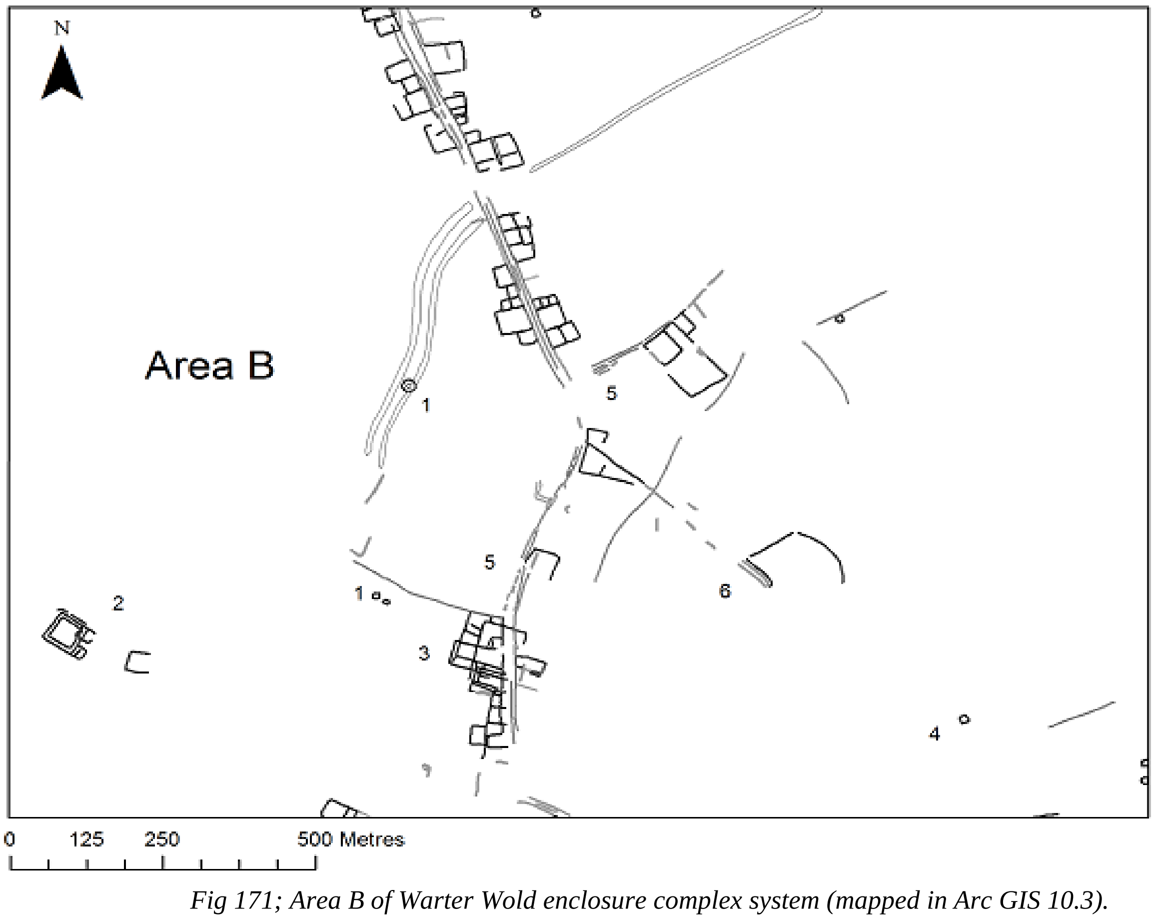


Fig 171; Area B of Warter Wold enclosure complex system (mapped in Arc GIS 10.3).

1.Round barrows 2. Double ditched rectilinear enclosures 3. Subdivided rectilinear enclosure

4. Square barrow 5. Possible recutting of linears 6. Associated field system

Area B's regular rectilinear enclosures are not visually as organised in the layout as seen in area A. Here it seems a separate construction stage has occurred, as the direction of this complex takes a more south-westerly orientation, and in conjunction with some large fields systems (5) indicates an arable cultivation for the nearby enclosures (Stoertz, 1997, 53). One of the large square field systems has a triple ditch appended to its south side (6) which may have been used for sorting of stock or to lead into the large open surrounding spaces (fig 171).

Figure 172 provides an example of Area B's subdivided rectilinear enclosures, there are no associated pits or round features seen on aerial and satellite imagery.

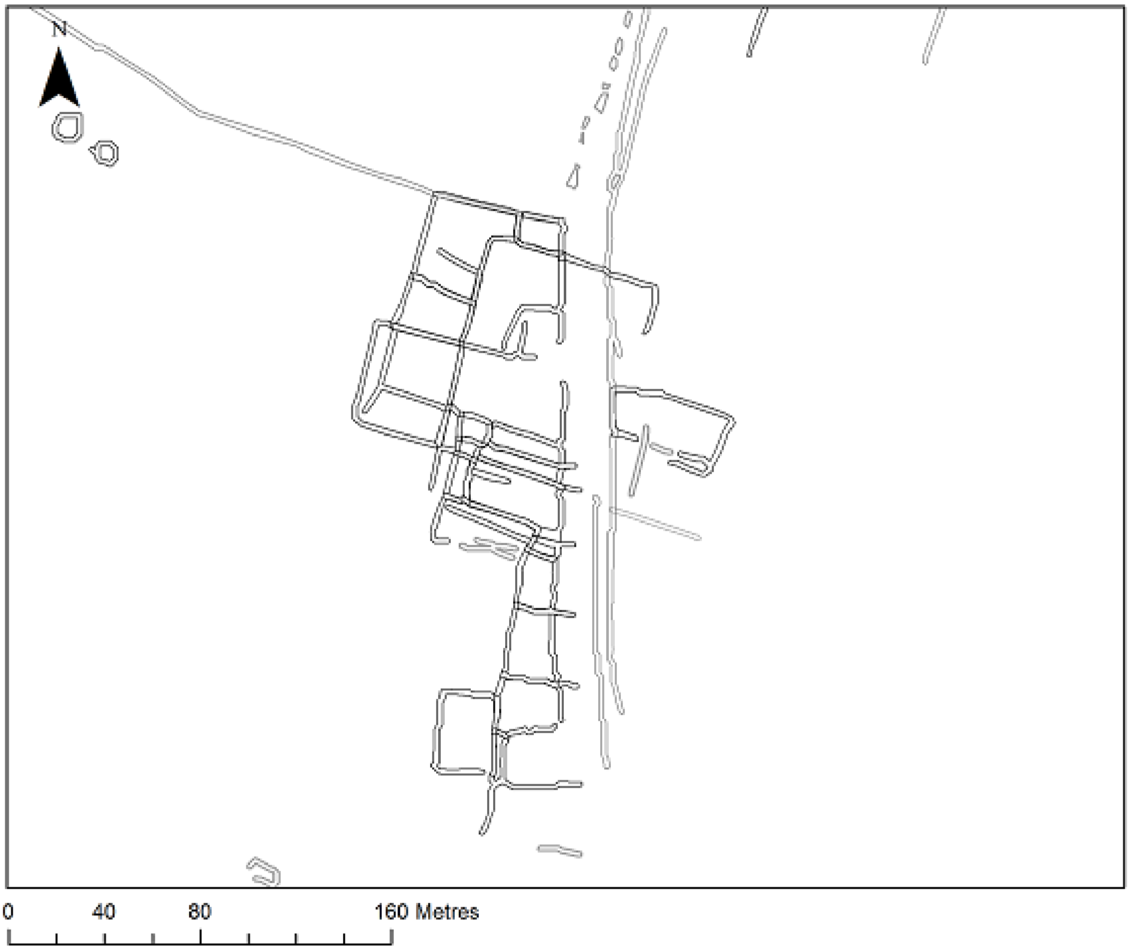


Fig 172; Subdivided rectilinear enclosures associated with the linear complex in Area B (mapped in ArcGIS 10.3)

As noted in the previous chapter there is a double ditched rectilinear feature (2) which displays superimposition, in which there is overlapping of rectilinear enclosures (fig 173).

Without excavation evidence is it difficult to date, however, its form is comparable with other examples from the Romano-British period and demonstrates how the landscape continued to be developed. The latest excavations at Kipling House Farm square enclosure have revealed a morphologically similar example in which the ditches are filled with animal bone and presents as some ceremonial type feature (Halkon and Lyall, 2020).

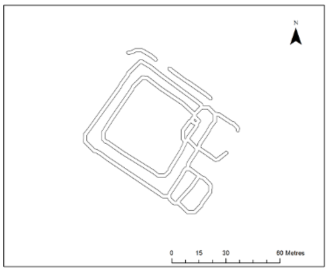


Fig 173; Double rectilinear enclosure with evidence of superimposition

Area C

Area C heading down to Warter is less concentrated with enclosures than the other areas of this complex system. The enclosures are situated to the left side of the linear and the spacing gives the impression of an organic later development of the complex (fig 174).

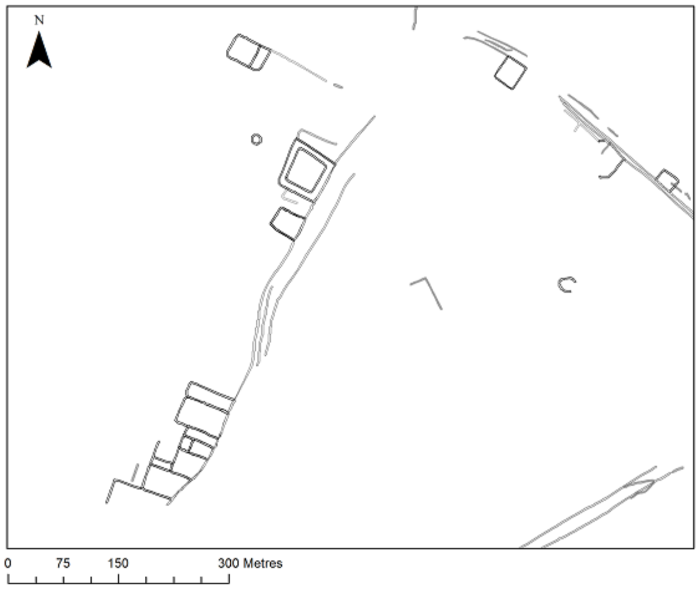
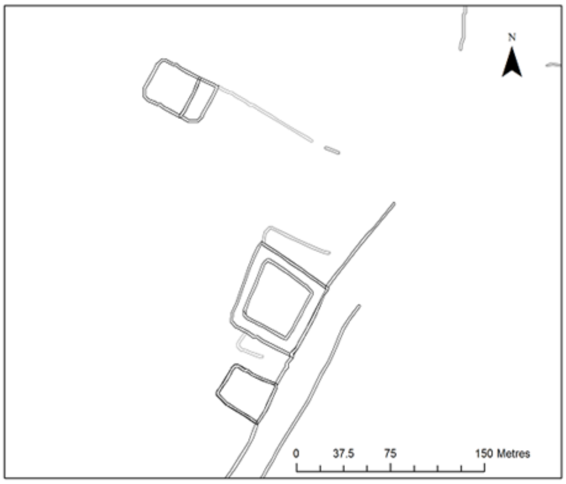


Fig 174; Area C of Warter Wold enclosure complex system (mapped in ArcGIS 10.3).

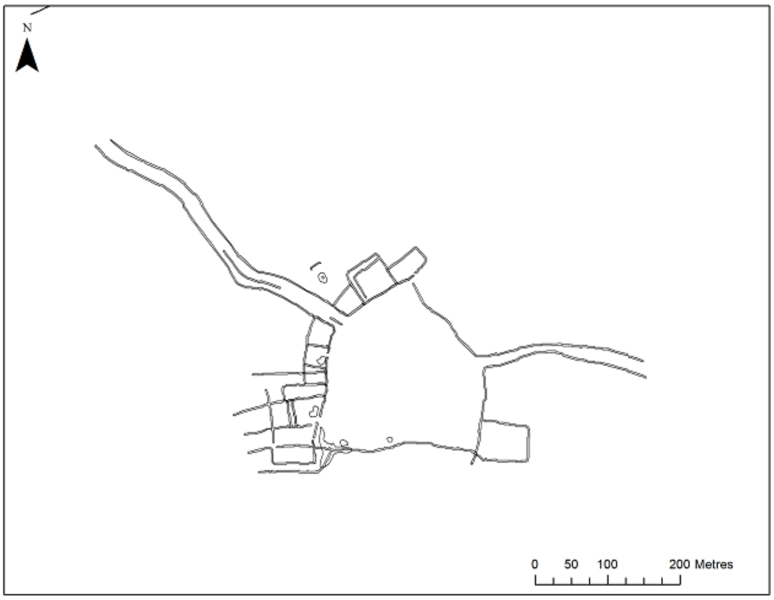
Fig 175; example of a double ditched enclosure with clear superimposition at Warter Wold.



There is a further comparable example of a double ditched feature in Area C as discussed in the previous chapter. It has ditches appended to its north and south sides which may have aided stock management. Double-ditched enclosures elsewhere in Britain are attributed to the Iron Age and Riley (1982), has recorded their occurrence in both Yorkshire and Nottinghamshire. By using nationwide comparable examples such as Starnhill Farm in Nottinghamshire Coleman (1979) suggests the likelihood is a continuation of the complex during the Later Iron Age to Romano-British periods. (fig 175). It is likely that the enclosures here are later than the ditch as a morphologically similar feature from the Thwing geophysical survey at Far Field, south of Willy Howe, has shown the enclosure to predate the boundary.

6.7.2 Enclosure Funnel Systems

Four enclosure systems within the study area have a funnel like entrance into an open space.



The site at Middleton Parish (fig 176) has two trackways which lead into a large expanse. It has a string of rectilinear enclosures, some with subdividing to the eastern side and associated internal pit like features. It is in close proximity to the funnel system at Londesborough Wold in the Middleton parish SE 908485

Fig 176; The funnel enclosure at Middleton Parish SE908485(Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

There are twenty-nine enclosures at the Londesborough Wold complex, which are enclosed or bordered by a linear feature. There are two large open areas and a series of larger defined areas (fig 177). The complex is suggestive of a very well managed landscape in which settlements are standing within a distinct selected area.

Fig 177; The funnel enclosures at Londesborough Wold SE48951 446952 (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software)

An element within this complex is a double-ditched enclosure complete with a potential roundhouse may indicate some special function or status. The substantial ditch may have been required for defensive purposes and is an example of recutting (fig 178).

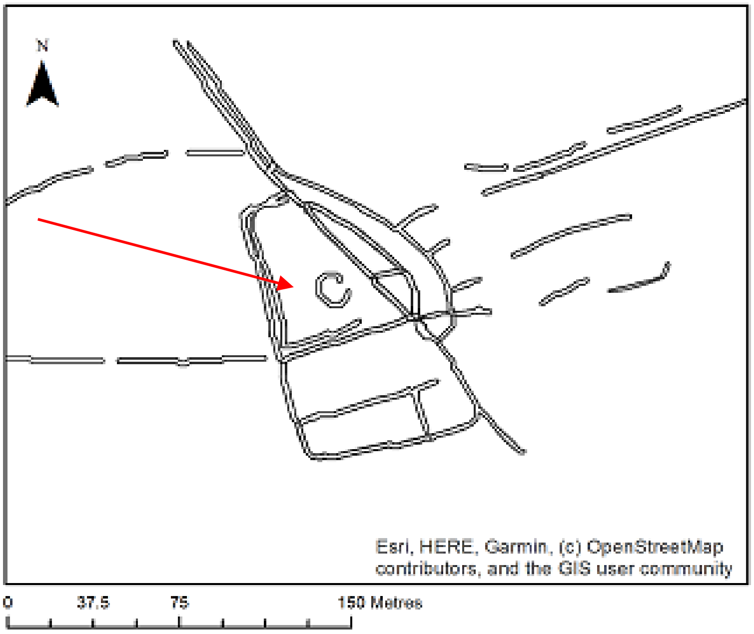


Fig 178; The double ditched enclosure at Londesborough Wold SE48951 446952 (Stoertz, 1997 Yorkshire Wolds Mapping project. Shapefiles manipulated in ArcGIS 10.3 software).

In terms of chronological, zoning and land division the ladder settlements are suggested by Stoertz (1997,55) to be from the Late Iron Age into the Romano-British period. The expansion, contraction and number of enclosures indicate settlement areas which have been a focus for a community whose subsistence is reliant on an agricultural economy. Although it is not easy to assign dates without further investigation to these areas, it is tantalising to suggest they were part of a well-defined managed landscape. Whether they are contemporary is questionable.

The plotted enclosure system distributions, can augment the square barrow cemeteries, and a good example is noted at Nunburnholme Wold, as seen in figure 179.

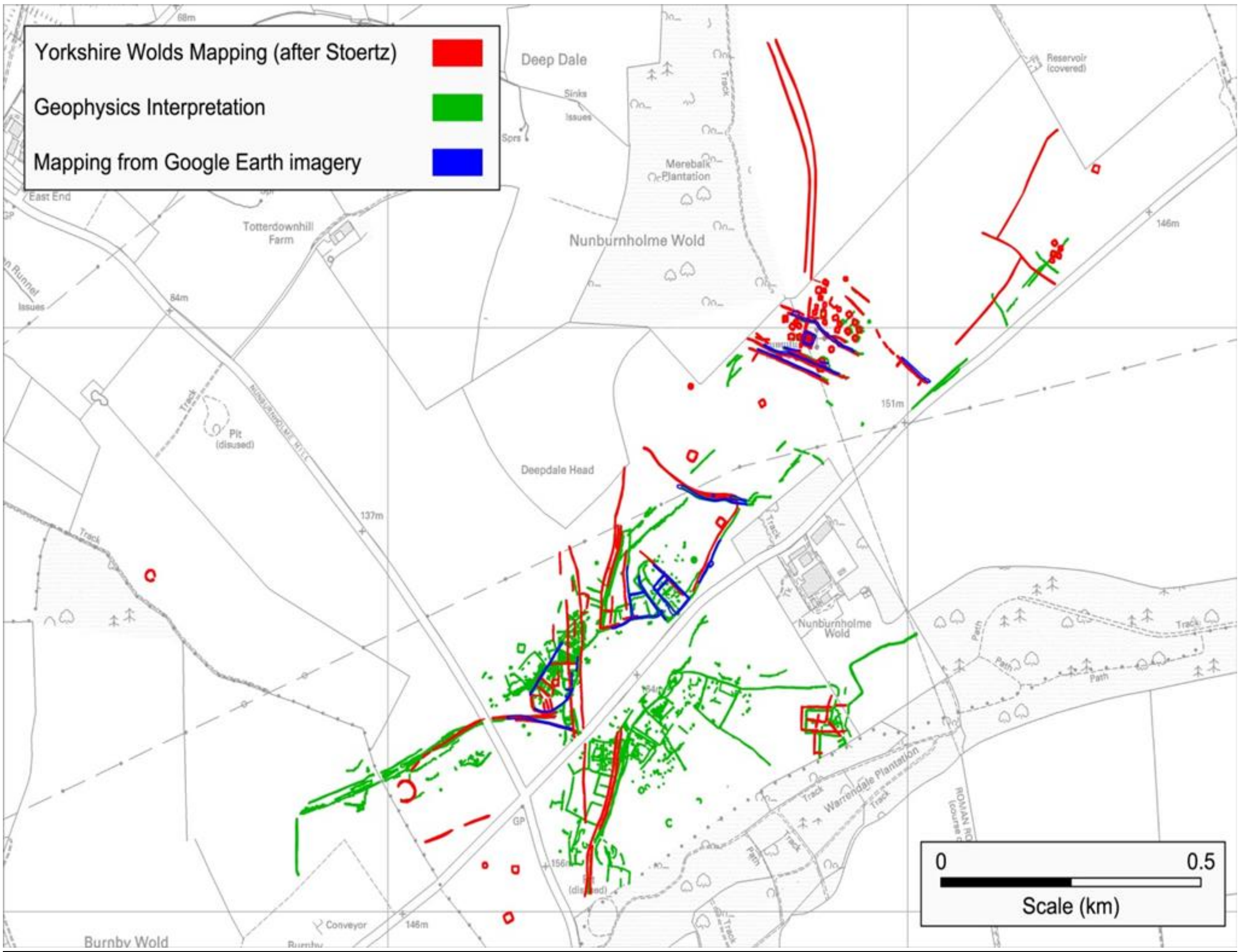


Figure 179: Digitised existing mapping data in AutoCAD 3D 2008 software of geophysical survey data (James Lyall, 2014, unpublished geophysical survey), Yorkshire Wolds mapping project (1997), and rectified Google Earth imagery (© 2014 © Infoterra & Bluesky) and Figure 18: Digitised existing Raster mapping data in AutoCAD Map 3D 2008 software, obtained from the geophysical survey data (James Lyall, 2014, unpublished geophysical survey). Ordnance Survey map @ Crown copyright/database 2010. An Ordnance Survey/Edina supplied service. (Whiteley,2015).

6.8 Chronological summary of Landscape development

The evidence from aerial and satellite imagery, geophysical survey, excavations and desktop surveys have demonstrated that the study area shows much prehistoric activity. This activity was obviously planned, not haphazard and exploited the natural resources of the land available. Where obstructive landmark forms have dominated, past peoples have overcome and adapted to be able to use the land to their advantage.

The plotted crop marks have demonstrated that human activity has been influenced by the environment and has for the most part utilised the higher terrains where the soils are workable and have good drainage. These cropmarks dominate to the east of Nunburnholme Valley and it is possible woodland may have occupied the west, where there is a dearth of cropmarks by comparison. The maps (figures 180- 185) will illustrate how the landscape developed over the periods.

Although Neolithic features are explored and suggested within the area, it is the density of Bronze Age barrows which are the most identifiable first manmade features noted within the study area. The development in the later part of this period continues with the introduction of linear systems which traverse the areas, and in association with the natural terrains are seen to represent large scale territorial division (Bradley, 1984).

Hill forts / defensive type structures make an appearance around the same time and can be interpreted as a reflection in the rise of a hierarchical society and social and economic change, which may have been due to the pressures on resources from climatic instability (Halkon, 2013, 59).

When the defended sites are no longer in use, the linear earthworks have continued to be in use and developed to provide a focus for the later Iron Age/Romano-British settlements and provided a significant communication route for a mobile population. Larger field systems have developed within proximity of the ladder enclosure complexes, suggestive of a continuation of landscape planning, through significant change possibly due to an increasing population.

The entirety of study area points towards an agricultural landscape driven by the environmental factors of soils, topography and watercourses. This is a change in usage from the earlier periods in which a ceremonial landscape dominated.

Much of this argument is based on the large and established linear enclosure settlements in which there is evidence for recutting, and subdivision. In addition, previous work at Nunburnholme drew the conclusion of a stock handling and exchange centre (Whiteley, 2015). Three further funnel complexes, two with associated field systems, add further weight to this argument.

The following conclusion will consider how the data sets have contributed to a greater understanding of the archaeological problem solving and understanding in relation to phasing of the landscape.

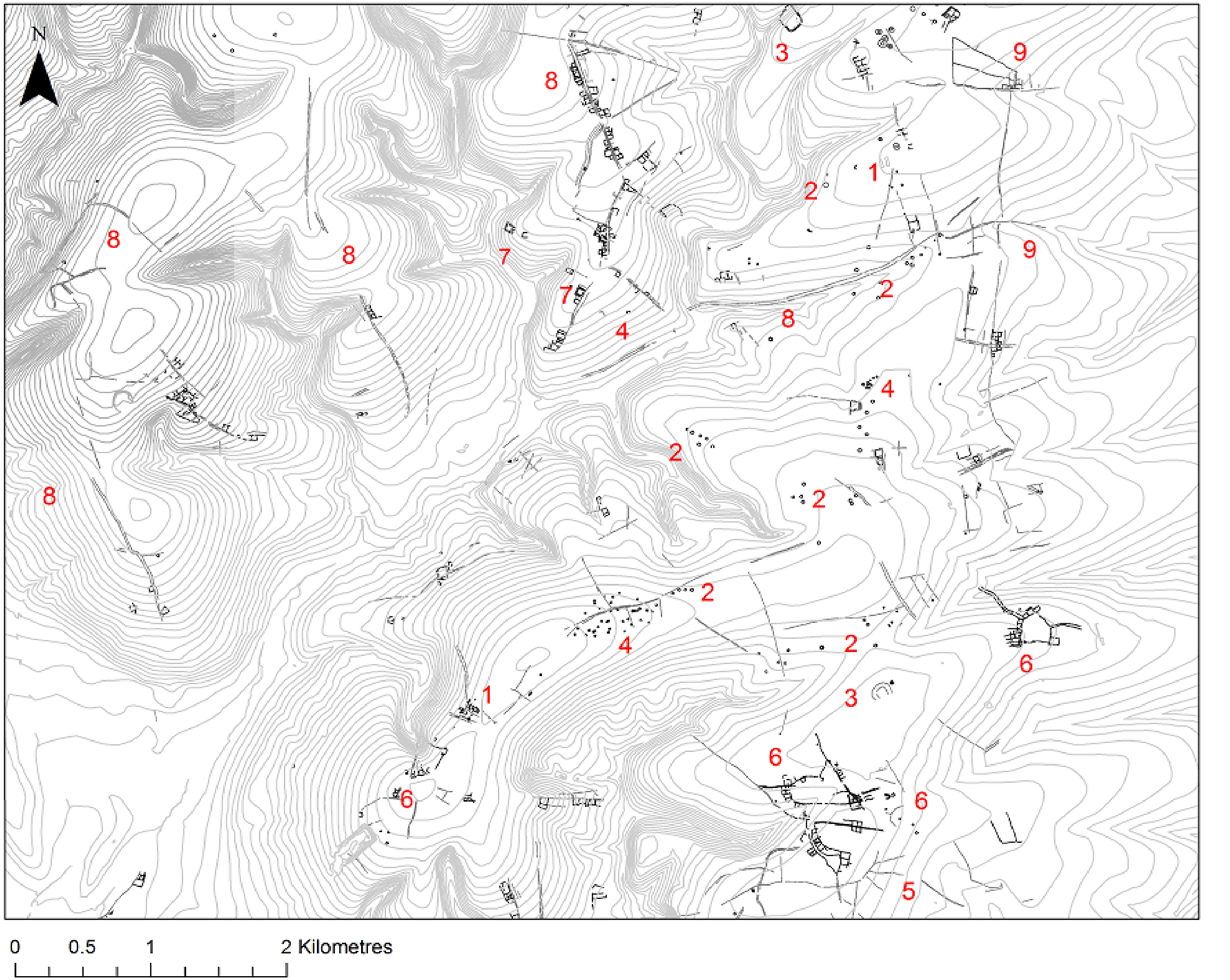


Fig 180; A simplified version of the study area which emphasises the open areas in contrast to the settlement areas. (Mapped in ArcGIS 10.3)

1.Neolithic features

2. Bronze Age round barrows

3.Defensive structures

4.Iron Age square barrows

5.Fields associated with Funnel systems

6. Funnel enclosures

7.Romano-British feature

8.Boundary markers

9 Large regular rectilinear enclosures/field systems

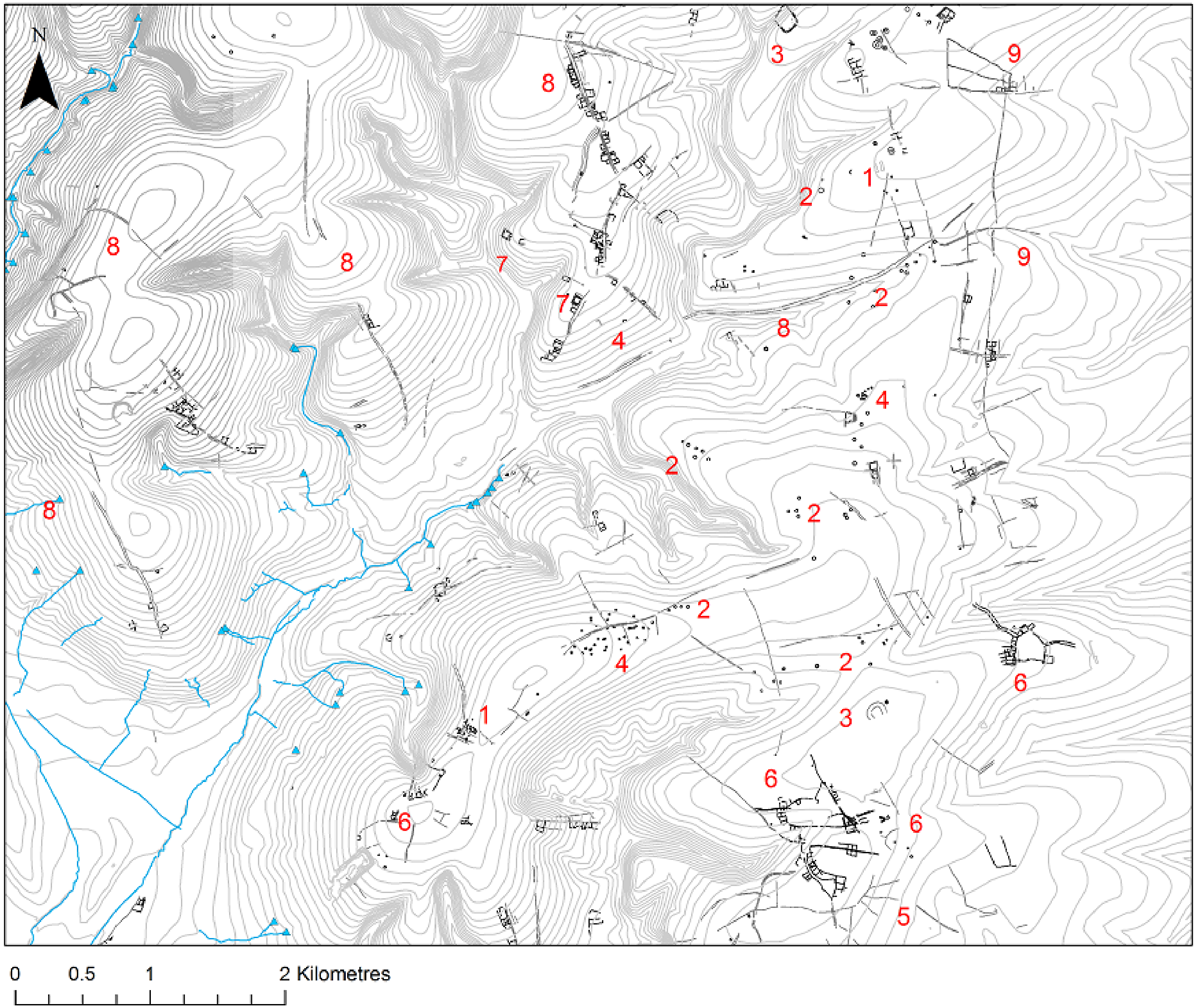


Fig 181; All cropmarks of the study area and their relationship with water sources and the topography. (Mapped in ArcGIS 10.3)

1. Neolithic features

2. Bronze Age round barrows

3.Defensive structures

4.Iron Age square barrows

5.Fields associated with Funnel systems

6. Funnel enclosures

7.Romano-British feature

8.Boundary markers

9 Large regular rectilinear enclosures/field systems

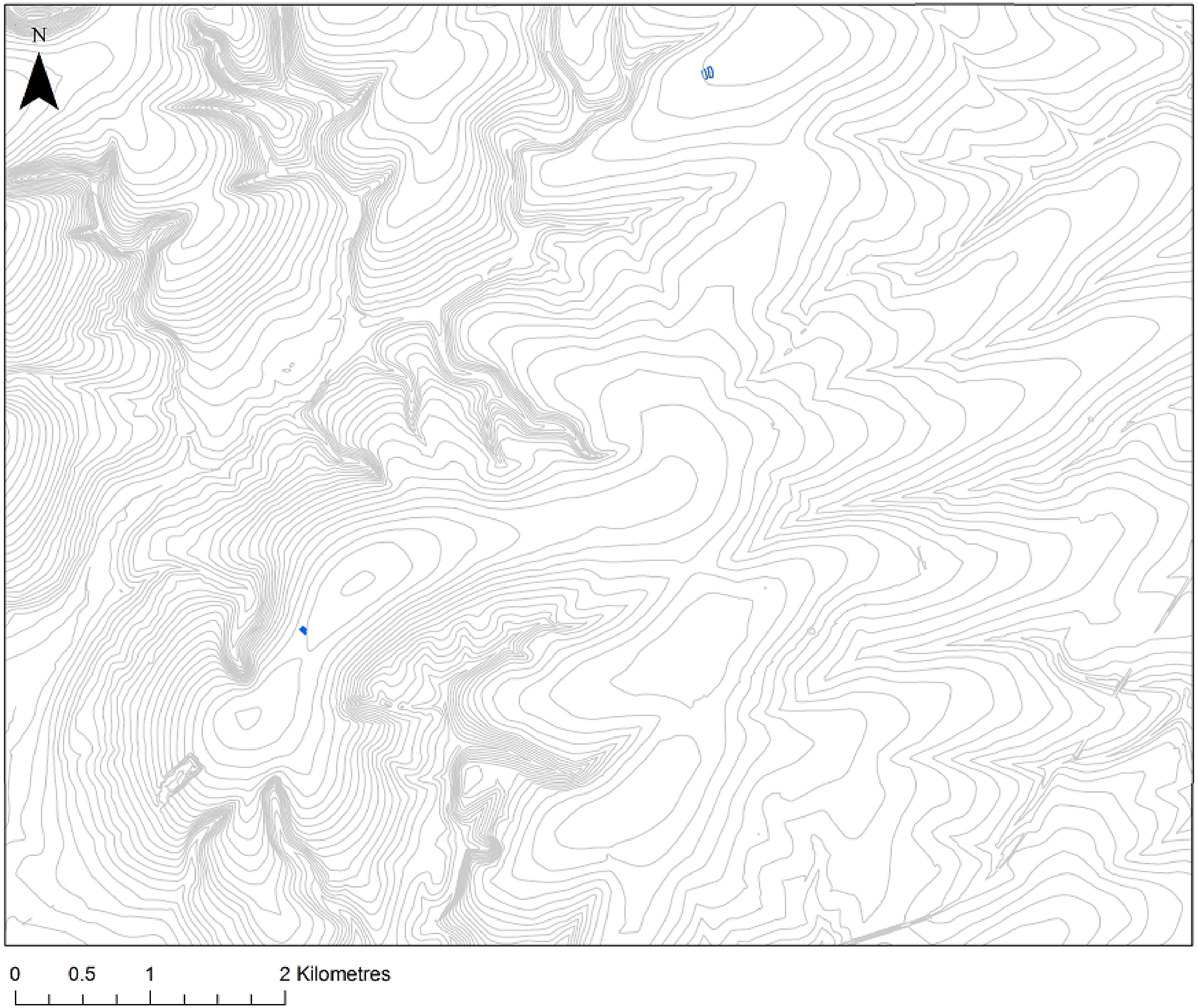


Figure 182; Chronological Mapping; The Neolithic -The Beginning of a landscape

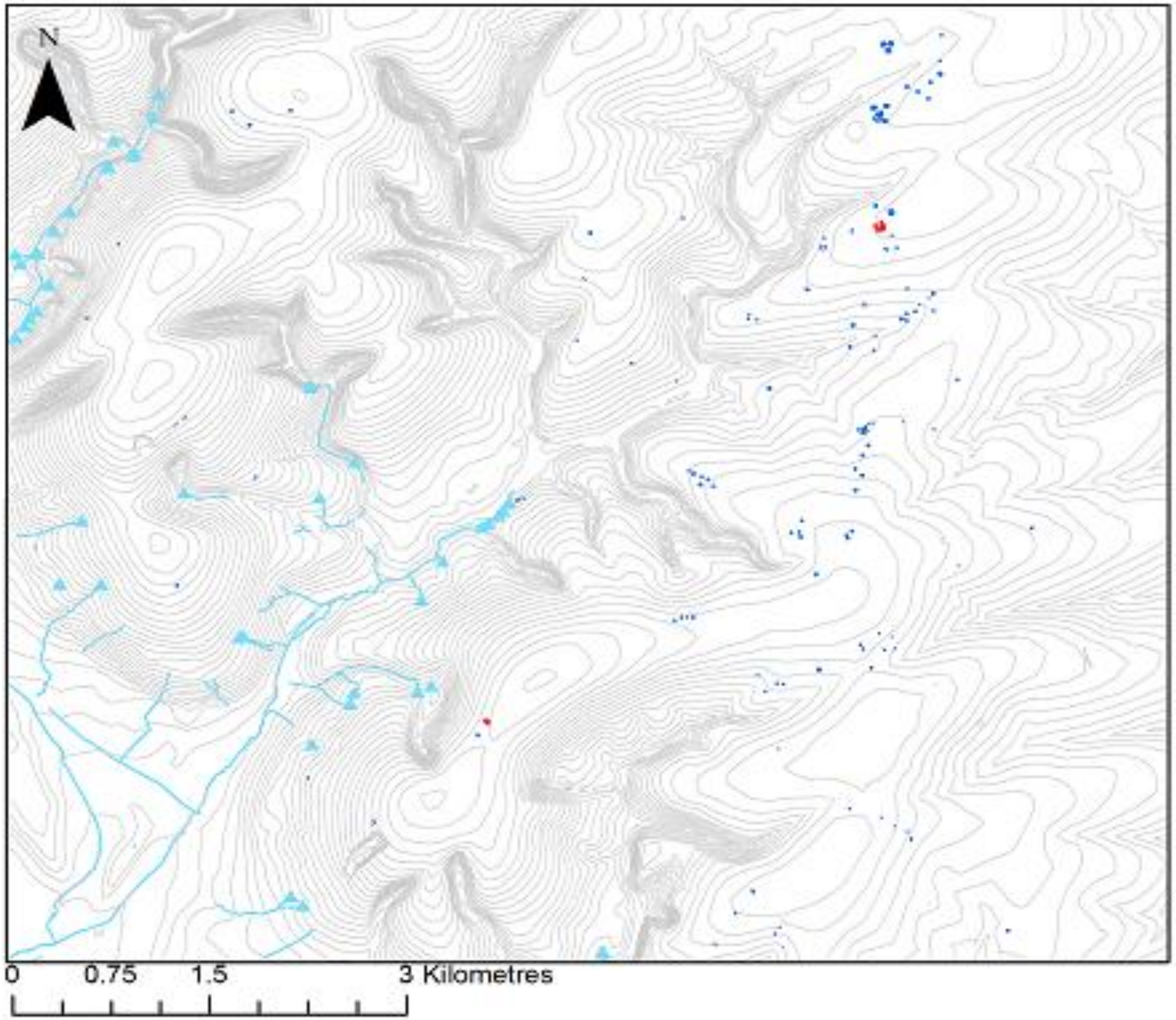
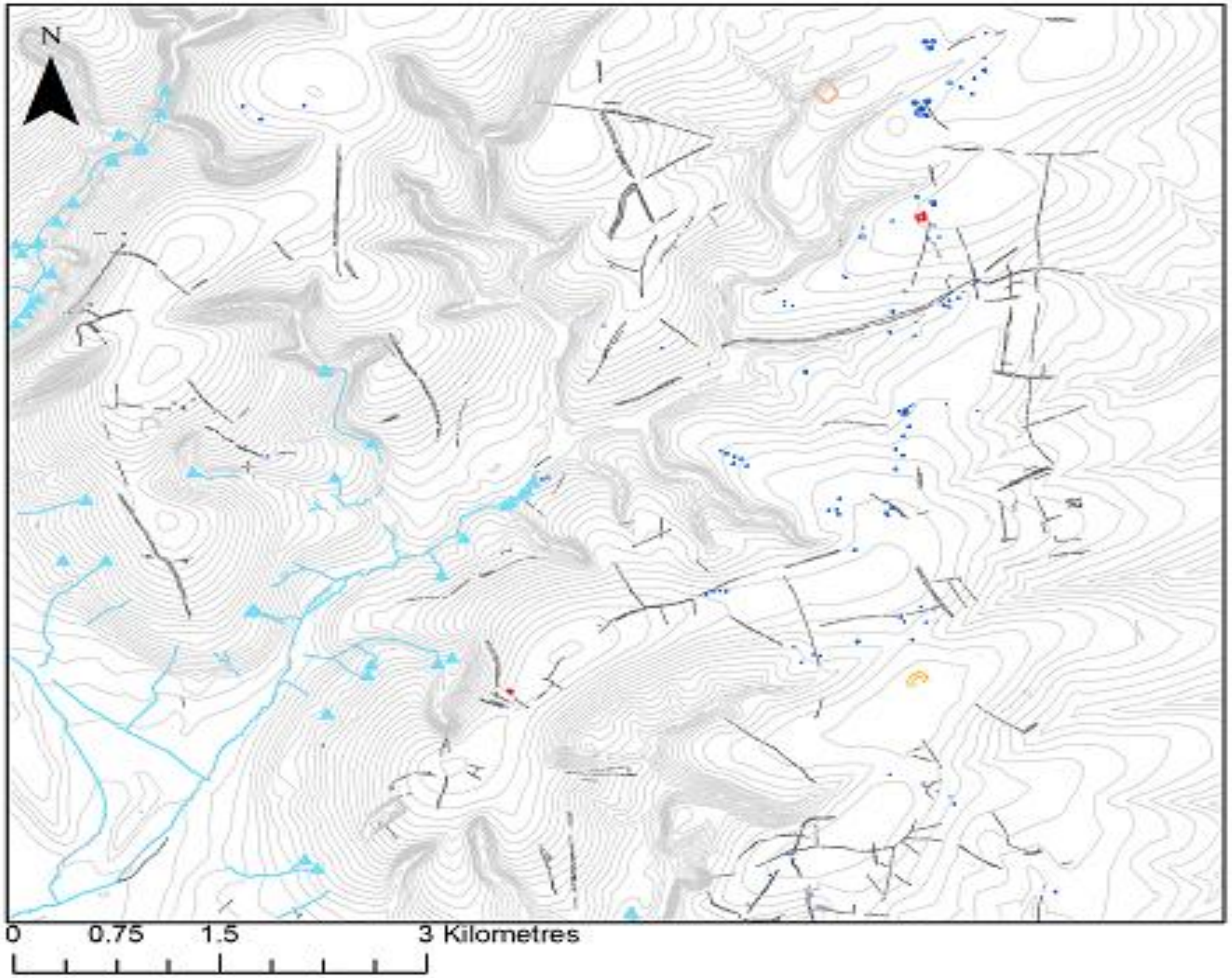


Figure 183; Chronological Mapping: The Earlier Bronze Age Barrows

Figure 184; Chronological Mapping: A division of the landscape



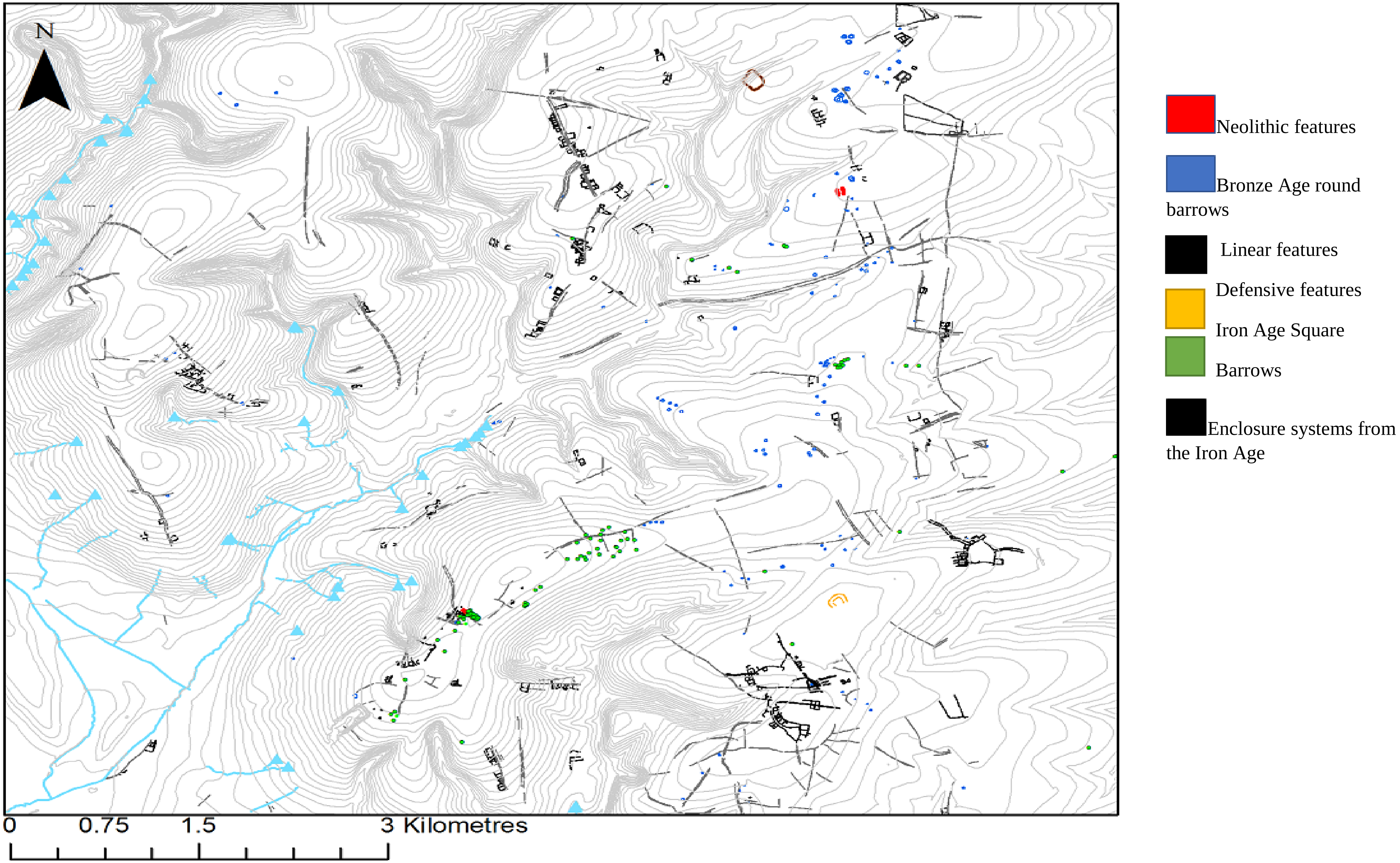


Fig 185; The final map in the cropmark sequence distribution shown over the topography with watercourses using a chronological approach (mapped in ArcGIS 10.3)

Chapter 7 Conclusion

7.1 Introduction

The research undertaken for this study block has demonstrated a wealth of archaeological and landscape activity representative of all the periods. Plotting of features from Google Earth, Earth (© 2014 Google © 2014 Infoterra Ltd and Bluesky), and the transcribing of existing raster data from the Stoertz (1997) aerial survey has revealed 1,296 features. Of these, 985 were existing cropmarks revealed from the Stoertz (1997) aerial survey. Detailed analysis of the landscape using the computer software programme Google Earth, identified a further two-hundred and fifty (19% of the total) features. The importance of a combined use of archaeological methods cannot be over-emphasised and this thesis has demonstrated the significance of using more than one survey method. Examinations of museum records, field work, geophysical survey, aerial reconnaissance and excavations have revealed human activity which has significantly altered the landscape throughout the periods identified within this study. The research aims and objectives are concluded within this chapter.

7.2 The Environment

One of the main aims of this study was to assess the extent which the topography, soils and watercourses, influence settlement patterns. Two episodes of climatic instability were identified; the Neolithic, in which there was a shift from warmer and drier conditions, to cooler and wetter conditions and the Bronze Age, in which changes occurred in sea levels (Heath and Wagner, 2009, 36). Hence climatic instability is suggested to be a significant influencing factor in the cropmark distribution pattern, which is denser over higher topographic elevations which range from 24m OD to 165m OD at the highest point.

Wolds hydrology has been at the centre of discourse when analysing settlement patterns across the area. It is fundamental to sustaining life and therefore a necessity for any settlement or agriculture. This study has demonstrated clear correlations between watersources and cropmarks. There are water sources located within the study area; Nunburnholme Beck and Millington Beck which run along the valley floors; in addition the area is rich in springs where the chalk meets the clay (Myerscough 2018). There is a lack of evidence for water on the research plateaus, however, caution should be applied as a drop in the water table over the last century has meant that the water table has dropped significantly (Hayfield and Wagner, 1995, 63). This thesis has proposed various explanations for sources of water; however, it remains unclear exactly how this was achieved across the Wolds plateaus.

The soils, the health of the soil, what is grown and how it is grown is utterly critical to life on earth. This is reflected in the cropmark distribution over soils, where there is a higher density towards the soils workability, favouring the brown calcareous earth's well-drained soils of the upper areas, where they are fertile enough to be suitable for all crops. Drainage is pivotal to the quality and workability of the soils, as noted in the valley floor, where there are no plotted cropmarks over the poor draining and difficult to work alluvial soils.

7.3 Stoertz validity

One of the research aims was to test the validity of the Stoertz (1997) mapping programme. Stoertz's (1997) excellent survey was dependant on aerial photographs taken from a set time. Satellite imagery has provided an additional two-hundred and fifty features, as it captures historical data which provides several opportunities to view crop marks at various times of the agricultural years; 2005 and 2007 have proved the most useful for the landscape study.

Aerial photographs are prone to distortions and a margin of significance to be ±5-10m can occur (Cousins *et al*, 2017). This has required caution when plotting satellite features as some are close to previous mapped aerial imagery cropmarks.

It is difficult to confidently test the validity through the computer software, and supplementary archaeological investigative work is required. Nunburnholme Wold (Whiteley, 2015) revealed a wealth of features from a geophysical survey and from this study. Kipling House Farm has also demonstrated how a combination of archaeological methods are crucial to fully understand the development of a site. Therefore, the aerial mapping programme must be viewed as a primary source from which further supplementary evidence is required.

7.4 The agricultural, societal and economic development

The development and characteristics of the study area are in response to several factors; migration, mobility and climatic instability. Each period has demonstrated some level of migration which has enabled a transmission of ideas and assimilation of cultures, which has altered and impacted on the landscape.

This study has presented a chronological assessment of the landscape development of each period. The key findings of this research are the re use of areas/sites, notably at an elevated topography. This is proposed to be in response to a continued significance attached to the site, and a need to develop society, the agriculture and economy, which is achieved through local and ancestral knowledge of the soils and drainage. The Kipling House Farm site has been the most significant development of this study, identifying the site as having potential to reveal more about the societal development of the study area has proved highly significant, not only to this study but also significance for the Wolds in general and national archaeological studies.

What is less clear is the lack of cropmarks along the valley floors, however, drainage is suggested to be the main factor as opposed to the alluvial soils masking any features. Hydrology remains difficult to explain, however, there is a clear correlation between features and watersources. Field walking at Huggate, where unmapped brickearths were found, only highlights the importance of the soil profile to understanding human/landscape interaction.

7.5 Limitations to the study

There have been limitations to this study, and it is fair to say that the denial of access to the Warter Estate has meant a key feature, requiring geophysical survey, has prevented a fully holistic approach. In addition, the Covid 19 pandemic has meant various facilities have not been fully open and accessible, notably the long-term closure of Historic England's archive to the public.

7.6 Recommendations for future work

There is a lack of investigative work around ladder settlements, with historically, a heavy focus on the ceremonial landscape taking precedence. It is suggested that this focus continues to shift more towards settlement. Ladder enclosure complexes, such as the Warter Wold ladder system, could enlighten further, the agricultural and societal practice from this period. Excavation is required to provide more reliable dating than cropmark analysis.

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Whiteley (2018) Aerial Reconnaissance

9.0 Appendices

Appendices Table A: Plotted Round Features taken from the Stoertz (1997) Aerial mapping programme and overlaid into Google Earth (GE)

Feature no.	SE COORDINATES	MORPHOLOGY	ADDITONAL EVIDENCE	COMMENTS	PERIOD
C16	490253 453602	Ring ditch	Google Earth & Mortimer	Barrow 240 Mortimer	BA
C20	490187 453324 Cobdale Farm	Large Macule	Google Earth & Mortimer	Barrow 266 Mortimer	BA
C21	490083 453337	Ring Ditch	Google Earth	Barrow 269 Mortimer	BA
C22	490198 453438	Ring Ditch	Google Earth	Barrow 265Mortimer MHU 4611 SMR 21106	BA
C35	487759 452188	Double Ring Ditch	No GE	Ring ditch with possible central grave. Truncated by linear ditches	BA
C36	487701 451728	Ring Ditch	No GE	Close proximity to C37	BA
C37	487701 451728	Ring Ditch	No GE	Close proximity to C36	BA
C38	489095 451235	Irregular Ring Ditch	No GE	Barrow cemetery Grouped 38-43 MHU 4619	BA
C39	489095 451235	Ring Ditch	No GE	Barrow cemetery Grouped 38-43 (larger barrow) MHU 4619	BA
C40	489095 451235	Ring Ditch	No GE	Barrow cemetery Grouped 38-43 MHU 4619	BA
C41	489095 451235	Ring Ditch	No GE	Barrow cemetery Grouped 38-43 MHU 4619	BA
C42	489095 451235	Ring Ditch	No GE	Barrow cemetery Grouped 38-43 (larger barrow) MHU 4619	BA
C43	489095 451235	Ring Ditch	No GE	Barrow cemetery Grouped 38-43 MHU 4619	BA
C44	488977 451336	Ring Ditch	No GE	Grouped 44-46- similar sized	BA
C45	488977 451336	Ring Ditch	No GE	Grouped 44-46 similar sized	BA
C46	488977 451336	Ring Ditch	No GE	Grouped 44-46 similar sized	BA
C47	488421 452268	Ring Ditch	No GE	Singular barrow	BA
C48	487727 451061	Ring Ditch	No GE	Singular barrow	BA

C51	489995 451149	Ring Ditch	No GE	Barrow Cemetery Within proximity to C52/53/54/55 MHU 6734	BA
C52	489942 451141	Ring Ditch	No GE	Barrow Cemetery Within proximity to C51/53/54/55 MHU 6734	BA
C53	489942 451141	Ring Ditch	No GE	Barrow Cemetery Within proximity to C51/52/54/55 MHU 6734	BA
C54	489768 451375	Ring Ditch	Google Earth	Barrow Cemetery Within proximity to C52/53/51/55 MHU 6734	BA
C55	489868 451539	Ring Ditch	Google Earth	Within proximity to C52/53/54/51	BA
C56	490001 452024	Ring Ditch	No GE	Within group C56-59 smallest	BA
C57	490001 452024	Ring Ditch	No GE	Within group C56-59	BA
C58	489979 452030	Ring Ditch	No GE	Within group C56-59	BA
C59	490102 452005	Ring Ditch	No GE	Within group C56-59	BA
C60	490350 451568	Ring Ditch	No GE	Within group C60-70	BA
C61	490350 451568	Ring Ditch	No GE	Within group C60-70	BA
C62	489435 451629	Ring Ditch	No GE	Within group C60-70	BA
C63	489373 451644	Ring Ditch	No GE	Within group C60-70	BA
C64	489373 451644	Ring Ditch	No GE	Within group C60-70	BA
C65	490753 451649	Ring Ditch	Google Earth	Within group C60-70	BA
C66	490753 451649	Ring Ditch	Google Earth	Within group C60-70	BA
C67	490753 451649	Ring Ditch	Google Earth	Within group C60-70	BA
C68	490753 451649	Ring Ditch	Google Earth	Within group C60-70	BA
C69	490278 451542	Ring Ditch	No GE	Within group C60-70	BA
C70	490753 451649	Ring Ditch	No GE	Within group C60-70	BA
C71	490131 451661	Irregular Ring Ditch	No GE	Roundhouse within enclosure	BA
C72	490411 450487	Ring Ditch	No GE	Isolated barrow	BA
C73	491038 451322	Ring Ditch	No GE	Isolated barrow	BA
C74	490209 450154	Ring Ditch	Google Earth 6” 1855 OS maps	Dugdale Fields barrow cemetery Group C74-88 MHU 013420 SMR 21130	BA

C75	490209 450154	Ring Ditch	No GE 6" 1855 OS maps	Group C74-88 Surveyed 1967- no visible remains in 1991 (J Hicks) MHU 6522	BA
C76	490209 450154	Ring Ditch	No GE 6" 1855 OS maps	Group C74-88 MHU 4597	BA
C77	489807 450254	Ring Ditch	No GE 6" 1855 OS maps 25" 1892 OS maps	Group C74-88 MHU 4625	BA
C78	489807 450254	Maculae	Google Earth 6" 1855 OS maps	Group C74-88 MHU 4123	BA
C79	489865 450502	Ring Ditch	Google Earth	Barrow cemetery Group C74-88 some square barrows within group MHU 6737	BA
C80	489865 450502	Ring Ditch	Google Earth	Barrow cemetery Group C74-88- small group of larger cluster group. square barrows within group MHU 6737	BA
C81	489865 450502	Ring Ditch	Google Earth	Barrow cemetery Group C74-88- small group of larger cluster group. Square barrows within group MHU 6737	BA
C81	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group	BA
C83	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group, square barrows within group MHU 6737	BA
C84	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group, square barrows within group MHU 6737	BA
C85	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group, square barrows within group MHU 6737	BA
C86	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group. Some square barrows within group MHU 6737	BA
C87	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group. Square barrows within group MHU 6737	BA
C89	489865 450502	Ring Ditch	No GE	Barrow cemetery Group C74-88- small group of larger cluster group Possibly some square barrows within group MHU 6737	BA
C97	484085 452035	Ring Ditch	No GE	Isolated barrow MHU 2241	BA
C98	485460 453159	Ring Ditch	No GE	Mortimer Barrow 253 Cobdale Farm/part of the barrow group 252/253/254/255MHU 4604 Scheduled Monument no: 2118	BA

C99	485164 453085	Ring Ditch	Google Earth	Barrow 255 Mortimer Scheduled Monument no: 2118	BA
C100	485159 453034	Maculae	Google Earth	Barrow 254 Mortimer-	BA
C105	483947 451462	Ring Ditch	Google Earth	Isolated barrow MHU 6744	BA
C108	484980 450559	Maculae	Google Earth	Situated close to C110 and linear enclosure system MHU 4599	BA
C109	485226 450186	Irregular ring ditch	No GE	Large barrow	BA
C111	487022 449896	Ring Ditch	No GE	Close proximity to C112	BA
C112	487292 449941	Ring Ditch	Google Earth	Concentric ring ditch Close proximity to C112MHU 7612	BA
C116	488701 449221	Maculae	Google Earth	Part of a group C116-119 MHU 9755	BA
C117	488667 449087	Maculae	Google Earth	Part of a group C116-119MHU 9755	BA
C118	488664 449076	Ring Ditch	No GE	Part of a group C116-119 MHU 9755	BA
C119	488548 449004	Ring Ditch	Google Earth	Part of a group C116-119. The largest barrow MHU 9755	BA
C120	489040 448455	Ring Ditch	Google Earth	Part of a group of 4 barrows C120-121 and new features plotted C145/146	BA
C121	489186 448453	Ring Ditch	No GE	Part of a group of 4 barrows C120-121 and new features plotted C145/146	BA
C122	489588 448519	Ring ditch	No GE	Large double ring ditched relatively isolated barrow MHU 17949	BA
C123	489484 449763	Ring Ditch	Google Earth 6"1855 OS maps	Dugdale fields barrow cemetery Part of a group C123-126 MHU 13422 SMR 21143	BA
C124	489484 449763	Maculae	Google Earth 6"1855 OS maps	Dugdale fields barrow cemetery Part of a group C123-126 MHU 13423 SMR 21133	BA
C125	489421 449650	Ring Ditch	Google Earth6 "1855 OS maps	Dugdale fields barrow cemetery Part of a group C123-126 MHU 13424 SMR 21133	BA
C126	489340 449634	Ring Ditch	No GE6 "1855 OS maps	Dugdale fields barrow cemetery Part of a group C123-126	BA
C127	489787 449654	Ring Ditch	Google Earth 6 "1855 OS maps	Dugdale fields barrow cemetery Part of a group C127-129 MHU 4167 SMR 21134	BA

C128	489734 449682	Ring Ditch	No GE 6 "1855 OS maps	Dugdale fields barrow cemetery Part of a group C127-129 MHU 4167 SMR 21134	BA
C129	489782 449640	Ring Ditch	No GE 6 "1855 OS maps	Dugdale fields barrow cemetery Part of a group C127-129 MHU 4167 SMR 21134	BA
C130	489781 449595	Ring Ditch	Google Earth	Isolated barrow near to group clusters C123-126	BA
C131	489825 448718	Ring Ditch	No GE	Part of group C131-139 MHU 17949	BA
C132	489825 448718	Ring Ditch	No GE	Part of group C131-139 MHU 17949	BA
C133	490002 448575	Ring Ditch	No GE	Part of group C131-139 Largest barrow MHU 17949	BA
C134	489987 449230	Ring Ditch	No GE	Part of group C131-139 MHU 17949	BA
C135	489996 448648	Ring Ditch	No GE	C131-139 Part of group MHU 17949	BA
C136	489996 448648	Ring Ditch	No GE	Part of group C131-139 MHU 17949	BA
C137	490039 448686	Ring Ditch	No GE	Part of group C131-139 smallest barrow MHU 17949	BA
C138	490039 448686	Ring Ditch	No GE	Part of group C131-139 MHU 17949	BA
C139	490034 448799	Ring Ditch	No GE	Part of groupC131-139	BA
C142	490515 449371	Ring Ditch	No GE	Isolated barrow	BA
C143	491045 449720	Ring Ditch	No GE	Part of a complex linear system	BA
C144	489917 448179	Ring Ditch	Google Earth	Kipling House Farm defensive MHU 19510	BA/IA
C147	489731 447353	Ring Ditch	No GE	Roundhouse	IA
C148	490161 446906	Ring Ditch	No GE	Close to C149 and unmapped C159/160? Greenwell	BA
C149	490277 446906	Ring Ditch	Google Earth	Close to C149 and unmapped C159/160? Greenwell	BA
C150	490995 446307	Ring Ditch	No GE	Isolated barrow	BA
C151	489074 446662	Irregular ring	Google Earth	Situated next to C154	BA
C152	489064 446379	Irregular ring	No GE	Within proximity to C152	BA
C153	488973 446267	Ring Ditch	Google Earth	Within proximity to C152	BA
C154	488973 446635	Ring Ditch	Google Earth	Situated next to C151	BA

C161	484507 449172	Ring Ditch	No GE	Isolated barrow	BA
C162	485552 447570	Irregular Ring Ditch	Google Earth	Isolated barrow	BA
C163	486429 447321	Ring Ditch	Google Earth	Significant large barrow at Nunburnholme Wold	BA
C164	486766 447956	Ring Ditch	No GE	Truncated barrow at Nunburnholme Wold	? Neolithic

Appendices table B; New identified round features from all Google Earth <u>but not recorded</u> from Stoertz (1997) aerial survey

Feature NO.	SE COORDINATES		MORPHOLOGY	EVIDENCE	COMMENTS	PERIOD
C1	489470	451900	Large Maculae	6 "OS 1885-1900 + NMR Barrow A GE	Large diameter	BA
C2	489807	453244	Ring Ditch	GE	Mortimer Barrow 258 MHU 14564 Scheduled Monument no: 21101	BA
C3	489825	453183	Ring Ditch	1885-1900 GE	Mortimer Barrow 260 MHU 14567 Scheduled Monument no: 21102	BA
C4	490265	453804	Ring Ditch	GE	Penannular ring ditch within linear and enclosure system.	BA
C6	489829	453117	Ring Ditch	1885-1900 GE	Mortimer barrow 261 MHU 14568 Unlike other	BA
C8	490066	453386	Large Maculae	Not on OS maps GE	Maculae in close proximity to Mortimer barrows 240/269/265/266 Part of barrow cemetery MHU 4611	BA
C10	489773	453138	Ring Ditch	6" OS 1885-1900 GE	Mortimer Barrow 257.MHU 14565 Scheduled Monument no: 21100	BA
C11	490078	453846	Ring Ditch	6" OS 1885-1900 GE	Part of group C11, C12 C23A (Barrows 237 and 238 Mortimer) Not evident on OS maps/ aerial or Mortimer but can be seen on satellite imagery	BA
C12	489875	453743	Ring Ditch	Not on OS	? Mortimer Barrow 238. Situated next to C23 (Mortimer's barrow 237)	BA

				maps GE	MHU 7631Scheduled Monument no: 21125 Pastscapes 61750	
C13	490325	453493	Ring Ditch	Not GE on OS	Ring ditch in close proximity to Mortimer barrow group 240/265/266/269 Part of a barrow cemetery MHU 4611	BA
C23	489930	453806	Ring Ditch	OS 6" 1885-1900 GE	Mortimer Barrow 237 Part of group C11, C12 C23A -very large barrow, merged into field spread due to ploughing MHU 4602 Scheduled Monument no: 21125 Pastscapes 61750	BA
C24	489807	453244	Ring Ditch	OS 6" 1885-1900 GE	Barrow 259 Mortimer. One adult inhumation, four flint chips and two scrapers MHU 14566 Scheduled Monument no: 21102	BA
C30	489691	452146	Ring Ditch (incomplete)	OS 6" 1888-1913 GE	Ditch identified around old chalk pit- tumulus recorded here on 1888-1913 OS map	BA
C31	489914	452350	Ring Ditch	GE	? Barrow 262 Mortimer.	BA
C32	489886	452352	Ring Ditch	GE	Close proximity to Barrow 262 (C31)	BA
C49	488341	450898	Irregular Ring Ditch	GE	Close proximity to C50	BA
C50	488003	451043	Irregular Ring Ditch	GE	Close proximity to C50	BA
C92	489116	450866	Ring Ditch	GE		BA
C94	490278	450583	Large Maculae? ring ditch visible	GE	Near to C72 and Group C74-88- small group of larger cluster group	BA
C110	484980	450559	Maculae	GE	Close to C 108 and part of a complex linear system	BA
C113	487292	449941	Maculae	GE	Next to C112	BA
C140	489313	448600	Small Maculae	GE	Situated within two linear parallel features	BA
C145	489273	448418	Ring Ditch	GE	Situated close to C120 and C121	BA
C146	489296	448474	Ring Ditch	GE	Situated close to C121	BA
C155	490981	448819	Ring Ditch	GE	Situated just outside funnel enclosure system? pit inside ring ditch	BA
C156	489237	447842	Irregular Ring Ditch	GE		BA
C157	489156	446317	Irregular Ring Ditch	GE		BA
C158	489156	446317	Ring Ditch	GE	Close proximity to C 157.	BA
C159	490018	447227	Maculae	GE	Close proximity to C148 and C149	BA

Appendices Table C: Linear Triple Features

FEATURE NO.	SE COORDINATES	ORIENTATION	MORPHOLOGY	EVIDENCE	COMMENTS	LENGTH (M)
L170/171/172/173/175	SE 484067 451262	E-W	Double linear feature in parts triple. Part of a complex system	Stoertz 1997 and Google Earth	Respectful of barrows and is triple running into Deep Dale. Extant earthworks visible in woods MHU 6743 Dyke	586.96
L200 a-k L201 a-k	SE 486861 450800	N-S	Double linear feature in parts triple	Stoertz 1997 and Google Earth	May have been a continuation of L155. Runs from elevation of 139 OD at Sky Gates down the valley slops to 80 OD into Warter	1030
L356/357/358/407/408/409	SE 487476 446479	N-S	Double linear feature in parts triple	Stoertz 1997 and Google Earth (new feature identified)	Running from elevation of 104m at Londesborough Field to 89m into Londesborough MHU 9776 linears	899
L136/141/146/147/148/150/167	SE 490589 449893	E-W	Part of a complex system of triple and double linears	Stoertz 1997 and Google Earth (new feature identified)	Potential part of a longer system running across to Nunburnholme wold	448

Appendices Table D: Double Features- Boundaries

Feature no.	SE COORDINATES	ORIENTATION	MORPHOLOGY	EVIDENCE	COMMENTS	LENGTH (M)
L101/102/103/111/30/31/32/29a-h	SE 490484 451654	E-W	Double linear system	Stoertz 1997 and Google Earth	Follows contour Running 87m Od elevation. Respectful of barrows even incorporating one into feature MHU 6733 Dyke	2785
L93/92	SE 487940 450693	NNE-SSW	Double linear system	Stoertz 1997 and Google Earth	Potentially associated with feature above. Newly identified part of feature identified	595
L17/18/19/21/22/24/42/45/49	SE 490471 452806	E-W	Double linear system	Stoertz 1997 and some elements visible on Google Earth	Double linear feature running from The Meadows plateau at 122m OD to 104m OD down the valley side	1162
L26 / L23/L43	SE 490851 452109	N-S	Double linear system	Stoertz 1997 and Google Earth	Part of a complex system of linears. L23 presents as singular but is associated as a continuum of L26	680
L27/28/55	SE 490833 452123	NNE-SSW	Double linear system	Stoertz 1997 and Google Earth	Potentially some association with L30 and L11 as a complex linear system	292
L29a-h/ L30	SE 490639 451949	W-E	Double linear system, going into single linear to eastern aspect of feature	Stoertz 1997 and Google Earth	Continuation of L102 double linear system MHU 6733 Dyke	769 (including L102 2818)
L33/L34	SE 9048251566	N-S	Double linear system	Stoertz 1997 and some elements visible on Google Earth	Extension of L26	184

L62/3	SE 487875 453082	N-S	Short double linear system	Stoertz 1997	Would have potentially joined up with double linear feature at ladder settlement at Minningdale and northwards towards Huggate Dykes	
L64b/65	SE 487875 453082	E-W	Long linear which presents as double for majority	Stoertz 1997 and some elements visible on Google Earth	Runs from Stain toft Dale over the plateau to Lavender Dale	1361
L151/152	SE 8802552326	NEE-SWW	Double linear	Google Earth	Continuation of singular L153, cuts across Minningdale ladder settlement. Truncates round barrow site	495
L38/36	SE 9036151494	W-E	Double linear	Stoertz 1997 and Google Earth	Part of a complex system of double linear boundary features	271
L154/155 L162/163	SE 484800 452569	N-S	Double linear system (L162/L163 short parallel linears in close association to L154/155)	Stoertz 1997 and Google Earth	Runs across plateau MHU 3014	1148
L164/165/166/167/168/169	SE 485339 4451970	SSE-NNW	Double linear system	Stoertz 1997	Has a right-angled bend and crossroads feature. Is associated with the triple feature of L170-175. Respectful of barrows. Runs across plateau contour at elevation of 188m OD	1304
L347/348/349/350/351/352/353	SE 48488 4649027	NNE-ESS	Double linear system	Stoertz 1997 and some elements visible on Google Earth	Feature runs across plateau and then down towards Nunburnholme valley and spring line. Dog leg feature within linear	1220
L393/394	SE4 89852 447364	N-S	Double linear system	Stoertz 1997	Associated with square barrow cemetery on Nunburnholme Wold Drops elevation of 156-140m OD towards spring line	394

L366/367/368	SE 488855 446704		Presents as parallel ditches with L366 the longest	Stoertz 1997 and some elements visible on Google Earth	Potentially join L368/370/371	Total length of all linears 1173
L364/365	SE 4896794 46576	NNE-SSW	Short parallel linears	Stoertz 1997 and some elements visible on Google Earth		82.67
L215/218/111/225/223/219/213/242	SE 488211 448777	SEE-NNE	Double linear system	Stoertz 1997 and Google Earth	Double linear respectful of barrows becoming one linear. Runs from Nunburnholme Wold into Lothingdale 159-137m OD	1271 Including L242 1918
L234/223/231/232	SE 490130 448885	N-S	Double linear system	Stoertz 1997 and Google Earth	Runs from 136m OD to 116m OD. Close to Kipling House Farm	512.29
L204/239/240/315	SE 489972 448911	NNE-SSW	Double linear system	Google Earth	Newly identified feature respectful to round barrow clusters. Potential links to L234/L223	335
L315a-f L316a-c L317	SE 489193 446739	N-S	Complex double linear system	Stoertz 1997 and Google Earth	Running close to funnel enclosed settlement. Respectful to barrows	745
L343/344/318	SE 489214 446191	N-S	Double linear system	Google Earth	Potential extension of L315/316	329
L307/308	SE 8906346300	NNE-SSW	Double linear system	Stoertz 1997 and Google Earth	Elevation 135m OD to 120m OD Leading from Londesborough Wold plateau down the valley slope towards spring line MHU 8055 Ditches	429
L309/310/311/312/131/314	SE 488674 446175	W-E	Double linear system	Stoertz 1997 and some partially visible on Google Earth	Follows contour line (L333 mat be a newly identified continuation) MHU 8055 Ditches	696.58

L258/259/256/257/260	SE 491045 449720	Various	Complex feature of single and double conjoined linears	Stoertz 1997	Complex feature of linears convening at Curvilinear feature 143	Minimum of 48m to maximum of 115 in length

Appendices Table E: Linear Double Features- Integrated into Ladder systems

FEATURE NO.	SE COORDINATES	ORIENTATION	MORPHOLOGY LADDER (L) DROVEWAY (D) TRACKWAYS (T)	EVIDENCE	COMMENTS	LENGTH (M)
L66- L91	SE 48802552326	NNE-SSW	Ladder	Stoertz 1997 and Google Earth	Minningdale ladder settlement Runs across the plateau	1740
L96-103	SE 488135 451229	NNE-SSW	Ladder	Stoertz 1997 and some partially visible on Google Earth	Scarndale Hill running down valley slope towards Warter- probable continuation of Minningdale settlement	600
L129/130/131/96/97/110	SE 490350 451568	NNW- EES	Ladder	Stoertz 1997 and Google Earth	Running at a right angle from Minningdale settlement. Some new features	519
L180-192	SE 484968 450440	NNW-E	Ladder	Stoertz 1997 and some partially visible on Google Earth	Elevation range of 186m OD to 98m OD from Newcoates Field towards spring line	1058

Appendices Table F: Linear double and single features- Integrated Field systems/droveways/trackways /boundaries

FEATURE NO.	SE COORDINATES	ORIENTATION	MORPHOLOGY LADDER (L) DROVEWAY (D) TRACKWAYS (T)	EVIDENCE	COMMENTS	LENGTH (M)
L1/2/3/4/5/6/10/11	SE 490517 453728	W-E	Droveways (Singular)	Stoertz 1997 and Google Earth	Trackway double at one point, integrated within large enclosure	1000
L9/L7	SE 490683 453657	NNW-SSE	Droveways (Singular)	Stoertz 1997 and Google Earth	Droveways which has been incorporated into Enclosure system (E11/12)	989
L58	SE 489983 453078	NNW-SEE	Trackway (Singular)	Google Earth Only	Linear feature running through round barrow site at Blanch Farm	318
L43	SE4 90203 452918	N-S	Trackway (Singular)	Stoertz 1997 and Google Earth	Extending from L43 and becoming part of E16	787
L104/105/154	SE4 89979 452030	NNE-SSW	Trackway (Singular)	Stoertz 1997 and newly identified feature on Google Earth	Respectful of barrows running towards large double linear 101	318
L133-135	SE 489722 450310	W-E	Trackway (Singular)	Stoertz 1997 and some partially visible on Google Earth	Encompasses Enclosure 141	548
L115/126	SE 490687 450368	NE-SW	Boundary	Stoertz 1997	Meets up with double linear boundary feature in valley outside research area at Staveley Wold	

L113/114	SE 491144 451127	N-S	Boundary	Stoertz 1997	Continuation of L43/23/26/33/ long linear boundary feature double in parts, mainly singular Visible on mapping to Haywold Sheep walk (Huggate)	639
L125	SE 490687 450368	N-S	Boundary	Stoertz 1997	Continuation of L43/23/26/33/113/113 long linear boundary feature double in parts, mainly singular	792
L116	SE 490953 450273	N-S	Boundary	Stoertz 1997	Continuation of L43/23/26/33/113/113 long linear boundary feature double in parts, mainly singular	Total of all linears conjoined: 3768
L106/11/109 (L40 parallel)	SE 490350 451568	N-S	Boundary	Stoertz 1997	Linear (double in parts) terminates at barrow ditch 61 Runs from Thirty Acres down valley side 123m -108m OD	611
L48/49	SE 490424 451784	N-S	Integrated field systems	Google Earth	Cuts across boundary linears L29/31	295
L107/108/112	SE 49020 4451919	N-S	Trackway/ field system	Stoertz 1997	Encompasses E 121	444
L81/83	SE 488229 452050	NNE-SWW	Integrated field systems	Stoertz 1997	Runs along the contours at Ringland's parallel to ladder settlement	483
L178	SE 484682 451587	NNE-SWW	Boundary	Google Earth	Singular newly identified feature which would have joined L169 as boundary markers	134
L82	SE 488229 452050	NNW-SSE	Trackway/Field system	Stoertz 1997	In close proximity to Minningdale Ladder settlement	134

L95	SE 488421 452268	SSW-NNE	Boundary	Stoertz 1997	Respectfully passes C47a barrow with ditch touching router ring ditch but not truncating	129
L75/76/77	SE 488164 452200	SSW-NNE	Droveways	Stoertz 1997 and Google Earth	Associated with E 74 and E 75. Evidence of re-cutting of droveways	152
L179/196	SE 484311 450659	E-W	Boundary	Stoertz 1997 and Google Earth	Single linear with linear running perpendicular northwards from it, potentially a continuation of triple linear boundary feature L173	298
L197a/b/c	SE 485335 450166	E-W	Trackway	Stoertz 1997 and Google Earth	Singular trackway leading up valley slope towards Ladder settlement at Newcotes Fields	147
L180/181/182/183	SE 484968 450440	NNW-SSE	Droveways	Stoertz 1997	Double short linear parallel ditches	111 in total
L192a/b/c/	SE 484964 450361	NNW-SSE	Trackway	Stoertz 1997	Single trackway leading towards Newcotes Fields ladder settlement	
L204a/b/c/	SE 486880 450461	NNE-SSW	Trackways	Stoertz 1997	Runs from direction of Coate Gares down valley side towards Warter	440
L208	SE4 86786 450805	SW-NE	Singular Trackway	Google Earth	Newly identified feature in close proximity to Skygate Farm	80
L206a/b	SE 487204 449685	NNW-SSE	Singular Trackway	Stoertz 1997	Singular trackway leading towards Curvilinear barrow feature 111 MHU 4592 linear earthwork	180

L202	SE 8676150795	NNW-SSE	Singular Trackway	Stoertz 1997 and Google Earth	Singular Trackway running in close proximity to triple linear feature L200	135
L212	SE 487945 449391	NNE-SSW	Singular Trackway	Google Earth	Trackway situated near to enclosures	320
L211/210	SE 487840 449552	N-S	Droveways	Google Earth	Newly identified double linear feature running towards Loaningdale and enclosure system	180
L214	SE 8834249128	NW-SE	Trackway	Google Earth	Newly identified singular trackway leading to round barrow cluster (c116-119)	140
L241	SE 9000749780	E-W	Trackway	Google Earth	Newly identified singular trackway	90
L251	SE 490645 449497	N-S	Integrated Field system	Stoertz 1997 and Google Earth	Field boundary respectful of barrows. Situated within proximity to enclosures	341
L252	SE 9060949715	N-S	Trackway	Stoertz 1997	Part of Enclosure system E224/225/226/227	100
L253/254	SE 9075449551	E-W	Integrated field systems	Stoertz 1997	L253 appended to L254	225
L243	SE 9074349215	E-W	Boundary	Google Earth	Continuation of double boundary feature L244	418

L235/236/237	SE 9012748869	E-E L236 N-S L235/237	Single linear integrated and interrelated field systems	Stoertz 1997	Within proximity to enclosures and barrows	L235=269 L236=186 L237=184
L261	SE 490423 447858	NNW-SSE	Trackway/boundary	Stoertz 1997 and Google Earth	Running towards Kipling House Farm defensive structure	434
L229/230	SE 489457 448668	E-W	Boundary	Stoertz 1997 and Google Earth	Long linear respectful of barrows MHU 8057 Dyke	875
L255 and L255a	SE 9086449513	E-W	Single linear integrated and interrelated field systems	Stoertz 1997 and Google Earth	L255a newly identified feature at right angle to L255	287
L305/306	SE 8974946529	N-S	Droveways	Stoertz 1997 and Google Earth	Parallel linear feature from funnel enclosure system	200
L299/297/290/291	SE 8899447574	NNW-SSE	Boundary	Stoertz 1997 and Google Earth	Single linear which becomes double and becomes L297 and L290 L290/291 =MHU 8059 track L299= MHU 8057 Dyke	In total 1670
L336/335/334/318	SE 488855 446704	E-W	Boundary/ Trackway	Stoertz 1997 and some new features only visible on Google Earth	Long new double in parts feature which follows the contour line	573
L332/333/337	SE 489542 446536	E-W	Boundary/trackways	Google Earth	Newly identified linear- double in parts – part of a system of field systems, trackways and enclosures	L 33= 575

L262 L263 L264 L268 L269 L298 L302 L303 L330 L300 L342 L341 L328 L329 L327 L326 L331 L304 L340 L345 L346	SE 490049 447492 SE 489934 447444 SE 489934 447444 SE 489369 447798 SE 489790 447381 SE 489420 446688 SE 490399 446278 SE 490049 446710 SE 489745 446616 SE 490015 447207 SE 490015 447207 SE 490579 446835 SE 490704 446689 SE 490981 446578 SE 490585 446519 SE 489748 446380 SE 489748 446380 SE 489771 446532 SE 489775 446445 SE 489679 446576 SE 489161 446722	N-S E-W SSW-NNE N-S SSW-NNE E-W E-W E-W NNW-SSE NNE-SSW NNE-SSW NNW-SSE N-S E-W E-W E-W N-S NNE-SSW NNW-SSE NNW-SSE N-S	Single trackways Single trackways Single trackway Single trackways Single trackways Single trackway Filed boundary Field boundary Field boundary Single trackway Single trackway Single trackway Single trackway Single trackway Single trackway Single trackway Single trackway Single Trackway Single Trackway Single Trackway Single Trackway	Stoertz 1997 Stoertz 1997 Google & Stoertz Google & Stoertz Google & Stoertz Google & Stoertz Google & Stoertz Stoertz 1997 Google Google & Stoertz Google Google Google Google Google Google Google Google Google Google Google	MHU 8057 Dyke MHU 8057 Dyke MHU 8057 Dyke *Single trackways and associated field systems around Funnel enclosure systems 2 and 3 at Londesborough Wold and Prickett walk Plantation*	274.20 147 81 415 137 1585 186 255 155 48 147 585 133 81 300 379 200
L266	SE 489224 447435	E-W	Droveways	Stoertz 1997	Coming from L299 as a double linear feature entering funnel enclosure	193
L353/a and L352/L351	SE 484289 449178	E-W	Boundary	Stoertz 1997	Short parallel linears associated with L347 large double linears	92.06
L351	SE 484767 449215	E-W	Boundary	Stoertz 1997 and Google Earth	Appended to L347 and incorporates C161 round barrow feature	260

L354/L355	SE 484386 446630	NNE-SSW	Trackway	Stoertz 1997	L345 long single linear leading up from Burnby to Corner Wood with an associated enclosure E254 L355 is parallel but much shorter	530 88
L405/406	SE 484633 447907	NNE-SSW	Trackway	Google Earth	Newly identified trackways	149
L390/391/392	SE 487277 448116	NE-SW	Trackways	Stoertz 1997	Trackways associated with Nunburnholme Wold	L390=168 L391=221 L392=192
L403/404		N-S	Trackways	Google Earth	Newly identified trackways, L4O4 appears to be associated with L403	L403=106 L404=30.5
L366/L367/368/371/379/369	SE 486622 449002	E-W	Trackway/Droveways	Stoertz 1997	Long linear with interruptions with an associated enclosure E272 at Methill Hall Farm	1178 in total

Appendices Table G: Square Barrows

Feature number	Coordinates	Morphology	Google Earth	Stoertz	Feature	Period
Enclosure 167	SE 8804248782	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 168	SE 8803848815	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 169	SE 8803148851	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure170	SE 8798248848	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure171	SE 8804048859	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 172	SE 8805848673	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 173	SE 8770448584	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 174	SE 8770748600	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 175	SE 8778348587	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 176	SE 8778348587	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 177	SE 8774748608	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 178	SE 8774748608	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 179	SE 8787448660	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 180	SE 8789048712	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 181	SE 8790148641	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 182	SE 8790148641	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 183	SE 8787248781	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 184	SE 8794948775	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 185	SE 8794948775	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 186	SE 8856148516	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 187	SE 8856148516	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 188	SE 8856148515	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 189	SE 8856148515	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 190	SE 8856148515	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 191	SE 8856148514	Regular Rectilinear	No	Visible	Square Barrow	IA

Enclosure 192	SE 8856148514	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 193	SE 8856148514	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 194	SE 8856148513	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 195	SE 8856148513	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 196	SE 8856148513	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 197	SE 8856148512	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 198	SE 8856148512	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 199	SE 8786748648	Regular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 200 /b/and pit	SE 8925548526	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 201	SE 8905049334	Regular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 202	SE 9003148693	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 203	SE 8805248835	Regular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 204	SE 8800848800	Irregular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 205 and pit	SE 8800848800	Irregular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 206 and pit	SE 8856148513	Irregular Rectilinear	Visible	Visible	Square Barrow	IA
Enclosure 207	SE 8822448882	Regular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 208	SE 8807948754	Irregular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 228	SE 9104549720	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 229	SE 8994548187	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 238/a	SE 8943747316	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 239/a	SE 8949747811	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 209	SE 8825948893	Irregular Rectilinear	Visible	No	Square Barrow	IA
Enclosure 278/a	SE 8633847073	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 279/a	SE 8627647077	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 280/a	SE 8625147089	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 285/a	SE 8655647672	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 286/a	SE 8654947698	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 290/a	SE 8736048102	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 291/a	SE 8735848173	Regular Rectilinear	No	Visible	Square Barrow	IA

Enclosure 292/a	SE 8735848173	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 293/a	SE 8735848173	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 294/a	SE 8735848173	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 295/a	SE 8731448114	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 296/a	SE 8688148069	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 297/a	SE 8693848017	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 298/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 299/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 300	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 301	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 302/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 303/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 304/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 305/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 306/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 307/a	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 308	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 309	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 310	SE 8740548140	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 311	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 312/a	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 313/a	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 314/a	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 315/a	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 316	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 317	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 318/a	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 319	SE 8687247995	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 320	SE 8691147996	Regular Rectilinear	No	Visible	Square Barrow	IA

Enclosure 321/a	SE 8685047997	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 322/a	SE 8678347872	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 323/a	SE 8691448099	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 324/a	SE 8691448099	Regular Rectilinear	No	Visible	Square Barrow	IA
Enclosure 325	SE 8711248055	Regular Rectilinear	No	Visible	Square Barrow	IA