The Iron Age

Ouse and Derwent

Project

Paul Durdin, Jon Kenny, and Brian Elsey

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Contents

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The Iron Age Ouse and Derwent Project

Dr Jon Kenny

This publication contains the detailed results from the archaeological activities undertaken as part of a community project led by Archaeology North Duffield (AND). AND is the archaeology component of North Duffield Conservation and Local History Society, it is led by Brian Elsey who has project managed two archaeology projects, supported by the Heritage Lottery Fund (HLF), that focussed on understanding the historic landscape around the village of North Duffield and then the landscape delimited by the rivers Ouse and Derwent south of York in North Yorkshire. The first project ran from 2011 until 2014 and achieved a great deal both through archaeological investigation and drawing the community together undertaking, workshops, village festivals, constructing a reproduction Iron Age roundhouse. This project is described in Brian Elsey's publication *North Duffield: Archaeology and the local community.* (2015). I was able to support Brian in making the bid to the HLF and acting as supervisor on the field archaeological aspects of the project. Leading on from our first project Brian and I developed a second project, The Iron Age Ouse and Derwent Project. The new project was managed by Brian Elsey and the archaeology was supervised professionally by the author and Paul Durdin through 2017, 2018 and 2019.

The Iron Age Ouse and Derwent project set out to investigate the Iron Age people's who lived in the Vale of York south of the spot where the Romans later created the settlement known today as York. The area is bounded by the rivers Ouse (west and south) and Derwent (east) with the ice age moraine, the York moraine, to the north. The project undertook field work in a part of Yorkshire that was, when we started, little investigated archaeologically. We would like to think that we have taken forward the understanding of the lowland settlement of this part of the Vale of York during the Iron Age, and almost inevitably given the nature of the archaeology the Romano British period too. The archaeology involved investigation of four sites altogether that were subject to geophysical survey and evaluation excavation.

Figure 1: Excavation under way at Heminbrough in 2017.

This publication contains the reports on each of our investigations, firstly a desk-based assessment undertaken by volunteers on the project. This is followed up by an overall conclusion and discussion of the archaeology written by the archaeological supervisors Jon Kenny and Paul Durdin. The stratigraphic narratives of all four sites are included as are all of the specialist reports undertaken for the project.

This part of our publication also describes the community outreach undertaken by project:

- Community volunteers were recruited from the greater Vale of York, but seeking to recruit from the villages within the Ouse and Derwent area in particular. Recruitment of volunteers was undertaken through people who had worked with us on previous projects but also through newspaper releases and social media. In particular we have a Facebook page entitled Iron Age Ouse and Derwent (https://www.facebook.com/IAOuseandDerwent).
- The project sought to work with young people in the Ouse and Derwent area. We did this by delivering workshops at primary schools in North Duffield, Wheldrake, Elvington, Riccall and Naburn. We also undertook test pit surveys with the pupils at North Duffield which was an annual event.
- We also sought to work with people who may not normally get involved with archaeological projects. People with learning difficulties in particular. We were visited on site at our excavations by York People First, an group of people with learning difficulties that specialises in self advocacy and independent living. We also ran a series of weekly workshops for United Response, an organisation delivering day care for people with learning difficulties.
- The archaeological activity of the project was extensively filmed by John Phillips a community film maker and made available on YouTube and Vimeo. The films on YouTube are available through heritage film group Hidden Context TV: (https://www.youtube.com/channel/UCJGENA_mgYvZpsdYyG3NLCQ)

The short films were drawn together in an hour-long feature that can be viewed at:

(https://www.youtube.com/watch?v=cxGTtbXFuio).

Figure 2: Geophysics workshop led by Paul.

We hope that this publication will give the detail for people to understand the archaeology that we discovered and maybe inspire further investigation of the Iron Age and Romano British landscape in our area.

Dr Jon Kenny 2022

Crockey Hill, York.

The Iron Age Ouse and Derwent Project

Desk Based Assessment

Site locations:	Woodhall Lane, Woodhall, Hemingbrough, YO8 6TG SE 6915 3175
	Hugh Field Lane, North Duffield YO8 5RH SE 6826 3778
	Broad Highway, Wheldrake YO19 6BE SE 6708 4664
Fieldwork undertaken:	2017-2019
HER:	North Yorkshire HER
Undertaken by:	North Duffield Conservation and Local History Society
Report prepared by:	Mary Ratcliffe, Jean Lowe, Jan Mitchell
Report produced:	April 2020

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Summary

This report presents the results of a desk-based assessment carried out as part of an investigation into the Iron Age archaeology of the southern Vale of York. The assessment intends to provide a synopsis of the archaeological environment in which the fieldwork was undertaken, in order to place it in context both geographically and chronologically. To this end, the team searched through the documentary and historical evidence available through local authority Historic Environment Records (HERs), archaeological grey literature and online heritage resources in order to build up a non-exhaustive list of relevant information.

A very large number of records were gathered across the wider area, ranging from find-spots of Neolithic artefacts to previous excavations of Roman period sites. Of particular relevance is the large amount of crop mark evidence indicating Iron Age and Romano-British settlement across the research area. The records were divided up into three zones that loosely correlate to the location of the fieldwork sites.

Overall, this systematic survey of existing archaeological evidence suggests there has been continuous occupation of the research area from the Bronze Age through to the Roman period and beyond, with earlier occupation on the higher ground and later Iron Age and Romano-British settlements developing extensively on the lower levels to the south of York.

Background to the project

The North Duffield Conservation and Local History Society's *Ouse and Derwent Project* investigates the Iron Age (800BCE-100CE) in the Wapentake of Ouse and Derwent, and centres on sites near three local villages: Hemingbrough (site excavation 2017), North Duffield (site excavation 2018) and Wheldrake (site excavation 2018 and 2019) (Kenny 2017).

Major aims of the project include:

1. Making a significant contribution in terms of knowledge of the relatively poorly investigated and understood Iron Age landscape of the lowlands of the Southern Vale of York.
2. Investigating similarities between Iron Age settlements in the Southern Vale of York and those more thoroughly investigated to the east, on the Yorkshire Wolds and in the Foulness Valley.
3. Working with the local community to assist their awareness, understanding and management of Iron Age heritage assets.
4. Working with local schools, residents, and people with disabilities, to provide opportunities to receive training in archaeological techniques, learn new skills and a chance to understand the environment in which they live.

Funded by the Heritage Lottery Fund through the contributions of players of the National Lottery, this major project builds on a previous project by the same society, centred on North Duffield (Historic Landscape Project 2011 to 2015). The earlier project, also Heritage Lottery funded, discovered significant Iron Age archaeology and findings that dated back to the Neolithic Period, providing evidence that people lived in this landscape for a minimum of 5,000 years (Elsey 2015).

The land to the south of York and between the rivers Ouse and Derwent is an area of approximately 200 square kilometres. In the main it is flat agricultural land that has been only infrequently investigated through development-led archaeology, such as that required by PPG16 (Planning Policy Guidance 16) in 1990 and its replacement policies such as the now-current NPPF (National Planning Policy Framework, Historic England 2015). Whyman (2005, 4) confirms that there is much less archaeological investigation than in the uplands which surround the Southern Vale of York. The Humber Wetlands project provides a background to the geology and changing environment since the Mesolithic (11,500 BCE), although it undertook limited surveys in this area (Van de Noort 2004, 8-9).

Prior to World War II, the Vale of York was thought to be only sparsely populated during prehistory, with much of the evidence removed by modern agriculture: in particular through land drainage, and as a result of deep ploughing. However, since the war, aerial photography has revealed the full extent of the occupation of this low-lying land, with extensive field and settlement patterns visible as cropmarks in the landscape under certain conditions. In addition, the reporting of finds to the Portable Antiquities Scheme (PAS) has allowed us to build a picture of the occupation of the landscape through not only the mapping of finds hotspots, but also the chronology through the dating of these finds.

The sites to be investigated are at the following locations: Hemingbrough SE 690 318; North Duffield SE 683 378; Wheldrake SE 671 467 (see Figure 1).

***Figure 1**. Map showing southern Vale of York, with excavation sites indicated.*

This desk based assessment aims to summarise existing knowledge of archaeology from the Mesolithic (11,500BCE) to the end of the Roman Period (500CE), given the main focus on Iron Age occupation. Together with reports from the excavations it will enable comparison of settlement with those to the east, which have already been extensively investigated. For example, Halkon describes

the area to the east of the Derwent, Foulness, as "the valley of the iron masters" where an important source of bog ore was found and used in iron production (Halkon 1999).

Methodology

Initially, data was gathered through a systematic search for archaeological evidence within c.2km of each excavation site, and then more broadly across the southern Vale of York between the rivers Ouse and Derwent.

Sources of evidence include: aerial photographs; find spots; pre-planning desk based assessments; planning applications; archaeological watching briefs; excavation reports.

The following were used systematically as sources of evidence:

- Archaeology Data Service
- Historic England - Heritage Gateway
- City of York Council, York's Historic Environment Record
- North Yorkshire's Historic Environment Record
- North Yorkshire planning portal
- Portable Antiquities Scheme (PAS)
- Roman Rural Settlement Project (Allen et al. 2018)
- Roman Roads Research Association (RRRA)

Each source has its limitations. For example, when dealing with the Portable Antiquities Scheme it is important to remember that the finds are mainly metal artefacts reported by amateur or hobbyist metal detectorists and that the lack of finds in any area could be due to either the failure to report these finds and/or the failure of the landowner to allow access. Together, however, the sources should provide a comprehensive overview of existing archaeological evidence in the southern Vale of York.

Much of the evidence is summarised in the gazetteer which indicates the nature and composition of the evidence, its location, age and source (**Appendix 1**). The gazetteer has been used to generate three overlapping maps across the southern Vale of York, which show the locations of archaeology near each of the excavation sites (**Appendix 2**). The evidence and maps are discussed in sections 4-6, each of which focuses on one of the sites being investigated. References are made to selected entries in the gazetteer (in the form of [**gazetteer number**], e.g. [**132**]) where details of the source and additional information are found.

Geology and geography of the landscape

The bedrock of the southern Vale of York is Triassic Sherwood Sandstone, underlain by Permian mudstone, formed under dry conditions when Britain was closer to the equator than it is today (Shand et al. 2002). The area was extensively glaciated in the last glaciation period, the Devensian, up to c.18,000 BCE. A current topographical map of the Vale of York shows the features resulting

from an ice-sheet moving south-east through the Vale of York (see Figures 2 and 3). Lake Humber formed as a proglacial lake in front of the ice-sheet because meltwater was prevented from draining south-eastwards by ice sheets plugging the Humber Gap between the Yorkshire Wolds and the Lincolnshire Wolds (Van de Noort 2004, 19).

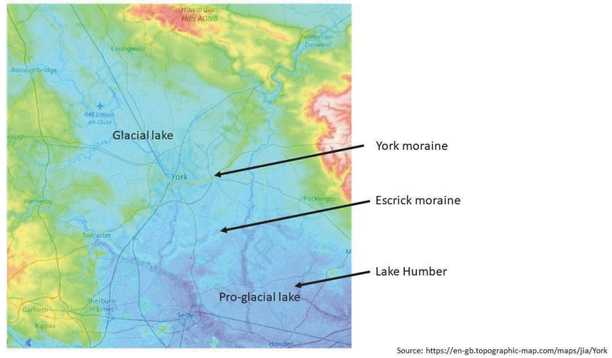

***Figure 2**. Topography of the Vale of York showing features formed during Devensian glaciation*

The Escrick and York moraines formed as a result of deposition from the ice-sheet as it later retreated and melted. Geologists have concluded that the Escrick moraine was the terminal moraine, the last glacial maximum limit to the Devensian ice because no glacial till has been found in the proglacial deposits to the south (Cooper et al. 2007). The York moraine formed as the ice sheet retreated northwards.

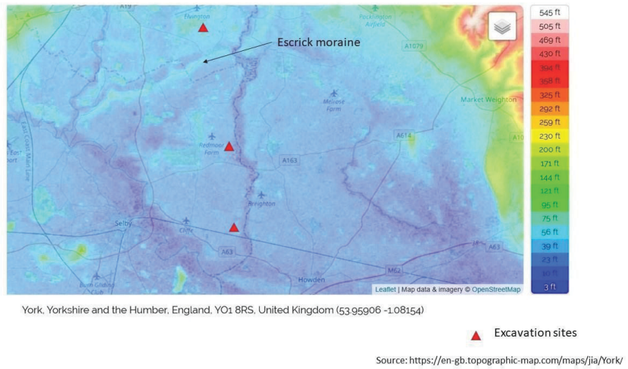

***Figure 3**. Topography of the Southern Vale of York showing excavation sites*

Lake Humber had ceased to exist by c.11,000 BCE – either through the unblocking of the Humber Gap by the melting of the ice-sheet or through silting up. Predecessors of the rivers Ouse and

Derwent formed as the glaciers melted. Initially, these proto-rivers cut many slow-flowing braided channels, giving embankments of lacustrine clays, silts and sands. These deposits were also worked by the winds, forming coversands. These 'Lake Humber deposits' are sometimes called the '25-foot drift', after the maximum height of the material considered to result from wind-blown action. In the late glacial period, after the Humber Gap was completely opened up, the rivers incised deeper channels, typically up to 9m deep (Van de Noort 2004, 19-20). There was a general rise in sea level from 6000 to 1000 BCE, resulting in floodplains and further wetland deposits in the vicinity of the rivers (Van de Noort 2004, 21-25).

The River Ouse, which forms the western boundary of the research area, allowed transport from the Trent and Humber through York and provided onward access to the Yorkshire dales through the River Wharfe, River Ure, and River Swale (Ramm 1978). The River Derwent forms the eastern boundary, and was navigable via Stamford Bridge to Malton and the Vale of Pickering. To the East, beyond the river Derwent, are the chalk uplands of the Yorkshire Wolds, and to the west, beyond the river Ouse, the magnesian limestone and millstone grit of the Pennines.

The southern Vale of York today is characterised by mostly low-lying agricultural land, much with sandy deposits, close to floodplains to the west, south and east. Across the northern edge is the slightly higher ground of the York moraine, while in the middle is the ridge of the Escrick moraine running roughly east-west.

The excavation sites, in the parishes of Hemingbrough, North Duffield and Wheldrake, have slightly different surface deposits, partly relating to their location within or near Lake Humber and their proximity to the floodplain of the River Derwent. The sites at Hemingbrough and North Duffield have surface deposits of the Skipwith Sand Member (sand, clayey). In the surrounding area are deposits of the Breighton Sand Formation (sand) and, adjacent to the river Derwent, alluvium of clay, silt, sand and gravel, or of clay, peat and silt. The site at Wheldrake, north of the Escrick moraine, has surface deposits of the Elvington Glaciolacustrine Formation (clay, silty) with the Naburn Sand Member (sand, silty, gravelly) nearby (British Geological Survey). Although the Vale of York is considered flat, each excavation site is at a slightly different elevation. The Hemingbrough site is mostly 7-8m (23-26 ft) OD, the site at North Duffield is around 8-9m (27-30 ft) OD and the Wheldrake site is 13-14m (43-46 ft) OD (as per spot heights on Ordnance Survey 1:25,000 series).

The nature of the surface deposits and the topography may influence the visibility of archaeological remains to geophysical (and other) techniques (see, for example, section 5).

Hemingbrough and southern area

The southern Ouse & Derwent is bounded on three sides by rivers: the Ouse to the west and south and the Derwent to the east. Within this area are the modern settlements of Hemingbrough, Woodhall, Brackenholme, Babthorpe, South Duffield, Cliffe, Lund, Osgodby and Barlby. Very little archaeological investigation has been undertaken around this area, and is generally limited to pre-construction surveys and aerial photography. In some parts of the area, geophysical surveys and excavations in advance of construction work have helped support and supplement cropmark evidence of field systems and enclosures of Iron Age or Romano British origin (see **Gazetteer 300-331** and **Map 1, Appendix 2**).

The Hemingbrough excavation site is located on agricultural land at West End Farm, Woodhall Lane, Woodhall, Hemingbrough, north of the A63 and Selby-Hull railway line and approximately 2km to

the north east of Hemingbrough village (SE 690 318). Aerial photography has highlighted both pre-Roman and Roman activity around West End Farm, evidenced in cropmarks on the sand subsoils [**Map 1 and Gazetteer 301-307**]. These activities may continue south onto the clay subsoils, where they cannot be so easily distinguished. Possible Iron Age features have been identified as early field systems, enclosures, ring ditches, hut circles and a double ditched trackway extending for c.490m. The overlapping of some of these features indicates several phases of occupation.

About 1.5km to the west of the site is a clay extraction quarry, where evidence of a Romano-British settlement was first discovered in 1959 (Adams 2011). A well, ditches, Roman pottery and a copper camp kettle were unearthed at the quarry site in subsequent years (Hall & Steedman 2012). Several geophysical surveys have been undertaken as the quarry expanded, but most were inconclusive and added little to archaeological understanding. However, a geophysical survey and subsequent trial excavations in 2014, in advance of proposed extension of the quarry, revealed an extensive Romano-British settlement spreading north towards, and likely beyond, the railway. Geophysics indicated high-temperature industrial activity over a large area to the eastern extent, which was confirmed by excavation. Ring gullies, linear features and pits were found to the south-eastern extent and a beehive quern stone, of Iron Age or Romano-British period, was unearthed in a curved linear feature (Jobling 2014). Excavation in the western expansion of the quarry uncovered large ditches marking the presence of a rectangular enclosure measuring approximately 50m long by 40m wide. Within this enclosure were the foundations of a possible corn drying kiln or store, sub-divided by ditches and gullies. Pottery recovered here dated from the 2nd to 3rd centuries CE (Steedman 2015).

Hemingbrough village is located on low lying land, close to the confluence of the rivers Ouse and Derwent. Ordnance Survey maps indicate that, at some time in the past, the Ouse changed course and once flowed much closer to the western side of the current village. Roman finds within the village of Hemingbrough include a coin of Marcus Piavonius Victorinus (269-271 CE) and a few sherds of 2nd century Roman pottery, found in the vicinity of School Lane/Finkle Street. These find spots are located on the higher ground within the centre of the village, and may signify the presence of a small Romano-British settlement (Burn 2017).

An archaeological evaluation was carried out on land south of School Road, Hemingbrough in December 2016. This involved desk based assessment, geophysical survey and trial trenching and revealed a multi-phased Roman military/urban enclosure-based settlement, likely established in the early 2nd century CE and with no evidence for activity beyond the 4th century CE. The archaeology uncovered by the trial trenches included ditches, gullies, pits and post holes, alongside a large quantity of Roman pottery, with the southern side of the site showing the most intense activity. Pottery assemblages were predominantly of military or urban aspect with strong links to Lincoln, Gaul and the Rhineland, highlighting the significance of the location at the confluence of the rivers Ouse and Derwent. There was significant evidence of industrial activity, with Roman CBM (ceramic building material such as roof or floor tile) fragments from an industrial structure, slag, fragments of ferrous metal, highly fragmented animal bone, iron timber nails, tin run off and six fragments of a rare iron sartago or frying pan (Whittingham 2016; Burn 2017).

A number of cropmarks relating to Iron Age or Romano-British field systems, enclosures and boundary ditches are visible around Cliffe, Lund and South Duffield, with some showing ring-ditches that may well be round-houses. A large complex of these features can be seen extending for 700 metres, on a north-west/south-east alignment, to the north-east of Lund [**322**]. A group of four ring-ditches and enclosures indicate further settlement to the north-east of this large complex [**321**].

Further cropmarks are visible on aerial photographs adjacent to Whitemoor Business Park , showing a field system with possible round-house. However, part of this site was destroyed by the construction of Whitemoor Mine as part of the Selby Coalfield development in the 1980s **[324]**.

Barlby is located on elevated ground along the bank of the river Ouse, about 7km to the west of the excavation site at Woodhall, Hemingbrough. The village is bounded to the east by the A19 and on the west and south by the river Ouse. There is no known evidence of pre-medieval archaeology in the village itself, however one find of a stone axe head was made in Osgodby, which lies on high ground to the east of Barlby. Cropmarks to the north of both villages show evidence of possible Iron Age or Romano-British enclosures, field systems and a possible trackway [**325, 327, 329 & 330**].

Geophysical survey and trial trenching, undertaken in preparation for a new housing development south of Turnhead Farm, Barlby, in 2013 suggesting the presence of a Roman military settlement. This was confirmed by excavation of 5.33 ha of the overall development site, which covered 10.89 ha. The excavations revealed a substantial, high status Roman military settlement along the bank of the River Ouse, north of Barlby. Established in the late 1st century CE with temporary structures, the settlement developed and continued in use into the late 4th century. A number of wood-lined wells of various periods were discovered, together with an apsidal bathhouse whose construction was dated to the 4th Century. A Roman military presence was suggested by the discovery of a head pot depicting Caracalla, and evidence of trade via regional and national networks was revealed in the mix of local and imported goods in the finds assemblages. Overall, the evidence indicates there was a market, perhaps under military control, to link the chain of supply along riverine and road networks in the area, potentially trading with the fortress and major settlement at Eboracum (York) (Whittingham 2013; Burn 2016).

North Duffield and central area

The middle part of the southern Vale of York is bounded by the river Ouse to the west and the river Derwent to the east (see **Gazetteer 201-279** and **Map 2, Appendix 2**). It contains the settlements of Stillingfleet, Escrick, Riccall, Skipwith, Thorganby and North Duffield. The Escrick moraine runs roughly east-west across the northern part of this area, resulting in changes in elevation across the region.

The North Duffield excavation site is located in cultivated land about 500m west of the current River Derwent, around 10-11 m OD (SE 683 378). Cropmarks nearby indicated field systems and enclosures [**201, 202, 212**], subjects of previous excavations. These excavations revealed Iron Age round house ditches within the enclosures, along with Iron Age and Romano-British pottery [**201, 202**] (Elsey 2015). A previous desk based assessment centred on Redmoor Farm (SE 674 388), just over 1km to the northwest, highlighted the potential for Iron Age and Romano-British archaeology to be found (On Site Archaeology 2014). This report also indicated the extensive watching briefs (see below) conducted close to crop marks showing potential Bronze Age to Romano-British occupation [**206, 209**].

Archaeological finds relating to the Bronze Age, or earlier, tend to be concentrated on the higher ground around Skipwith Common, about 3km from the North Duffield excavation site. In particular, two groups of Bronze Age barrows, both called Danes Hill, survive [e.g. **247, 270**]. The gazetteer contains only selected entries relating to this Bronze Age activity – more are recorded. The most recent published survey of Skipwith Common (Blythe & Quartermaine 2009) added more possible

Bronze and/or Iron Age barrows to the archaeological record, and also includes a detailed gazetteer and map of all the archaeological finds on the Common.

There may be a number of factors relating to the known density of early archaeology near Skipwith Common:

- The land around Skipwith is slightly higher (c. 12-14m (40-45 ft) AOD) than the surrounding area, and as a result may have held a greater concentration of early settlement in this part of the Vale of York.
- Skipwith Common has remained undeveloped and unploughed for centuries, helping to preserve the archaeology.
- The identification of barrows in the 18th century sensitised people to the possibility of archaeological remains in the area.
- Skipwith Common, which includes the derelict remains of some of Riccall WWII Airfield, is a National Nature Reserve of lowland heath. Its protected status has encouraged environmental and archaeological surveys highlighting known features and, occasionally, indicating new ones (e.g. Anon 1994; Anon 1998; Anon 2003; Blythe & Quartermaine 2009).
- There have been many aerial photographs taken in the area, showing crop marks (e.g. Anon 1994, 20-22).

Archaeological surveys have indicated that the surface geology around Skipwith Common is “a deep stoneless permeable sandy soil”, subject to wind erosion. However, there is a difference between the soil types of Skipwith Common and that of the surrounding area. Skipwith Common is mainly composed of “seasonally waterlogged soils, affected by a shallow fluctuating groundwater table and developed over permeable material” (Everingham & Gilberdyke soil type) combined with “humus and iron-enriched subsoils formed as a result of acid weathering conditions” (Holme Moor & Sandburn soil type). In contrast, the surrounding area is mainly a stoneless, loamy fine sand, with dominantly brownish or reddish subsoils (Kexby soil type) (Cranfield University 2020). This difference in soil types has contributed to the development of land use in the Skipwith area from early times (Anon 1994, 7-11): the Common has remained as heathland, whereas the surrounding area is extensively cultivated.

There is further cropmark evidence for the presence of Iron Age and Romano-British field systems and settlements across the area (see gazetteer). Most of the crop marks have shown up on the slightly higher, less cultivated ground. Apart from the archaeological surveys around Skipwith Common and on the Escrick estate (e.g. Anon 1998; Anon 2003; Blythe & Quartermaine 2009), there have been very few investigations. A 2003 survey of ‘Back Common’, to the north and east of Skipwith, includes a detailed gazetteer and map of archaeology (Anon 2003).

The few previous excavations in the surrounding arable land have been ‘rescue’ excavations during industrial activity [**243, 259, 263**]. A possible Iron Age ‘hut’ and Romano-British ditch were found in advance of the construction of Riccall mine shaft in 1977 [**243**]. Linear ditches, possibly Romano-British, were found during large scale pipeline construction [**259, 263**].

The presence of Bronze and Iron Age archaeology on and near Skipwith Common has influenced how developments progressed in the surrounding agricultural landscape. Between 1998 and 2001 there were a number of archaeological watching briefs that related to insertion of large drainage channels in agricultural land, to the north and east of Skipwith Common (Copp 1998; Holst 2000a, 2000b, 2000c, 2001; Toop 2009). Besides monitoring the insertion of drainage channels, archaeologists undertook extensive test pits, and in total 25 fields were investigated. Although Toop (2009) found no archaeological features, earlier watching briefs highlighted existing and potential archaeology,

with Holst (2001) summarising the findings from investigations around Skipwith. Two of the fields surveyed were adjacent to the North Duffield excavation site. In one of these, twenty-three archaeological features were found, mostly concentrated in the southern half of the field, including possible parts of an enclosure (Holst 2001, 7-9). Overall, the investigations found greater density of archaeological activity on the higher grounds, corresponding to cropmark evidence from aerial photographs. However, they did find many archaeological features where no cropmarks existed to make these visible (Holst 2001, 15-17).

It might be supposed that geophysical survey in the vicinity of cropmarks would reveal underlying archaeology. However, a test gradiometer survey carried out in 1997 suggested that magnetometry is not an effective method of evaluating archaeology in these sandy soil conditions (Whittingham 1997). The test survey was carried out over a 1 hectare site to the immediate north of the western end Skipwith Common, 1.5 km south-west of Skipwith. A few magnetic anomalies were detected, even though there was low contrast between the background soil magnetism and the magnetic anomalies. None of the magnetic anomalies corresponded to features from aerial photographs.

The PAS reports many Romano-British finds to the west and south-west of the North Duffield excavation site. Overall, the existing evidence suggests there was settlement in the land around North Duffield during the Iron Age and continuing into the Roman period.

Wheldrake and northern area

The glacial moraines of York and Escrick form the north and south boundaries of this area, with the rivers Ouse to the west and Derwent to the east (**Gazetteer 101-180** and **Map 3, Appendix 2**). The low-lying land between the two moraines was once part of the postglacial Lake Humber, an area that has been affected by the changing climate and sea level throughout prehistory and is still prone to flooding. Today, the area is flat agricultural land consisting of light sandy soils, likely easy to cultivate in ancient times, together with areas of higher clay content along the river valleys and to the north of the Escrick Moraine. The clay soils are significant in that they are wetter and less easy to cultivate, and are less likely to reveal cropmarks in aerial photography. One low-lying area of clay soil just south of the York Moraine **[121,122,123]** may have been a mere in the past. However, clay was a valuable resource in the past, used in the manufacture of pottery, brick and tile, and as a building material in the form of daub. Peat was also another resource found below the quaternary sand, gravel and clay (Ottaway 2013, 16).

The modern settlements in the area include Wheldrake, Elvington, Deighton and Naburn, with the southern portions of Dunnington, Heslington and Fulford along the northern edge. A large concentration of crop marks around Wheldrake Wood indicated a complex arrangement of field systems, enclosures and ring-ditches, about 3km north of Wheldrake village. The Wheldrake excavation site (SE 671 467) was selected based on a portion of these crop marks that appeared to show ring-ditches, on agricultural land immediately to the south of Wheldrake Wood.

Although there is no record of archaeological excavation close to the site, some significant excavations have taken place within a radius of 6km from the site:

- Lingcroft Farm, York
- Heslington East, York

- Millfield Farm, Wheldrake

These excavations support the interpretation of the cropmarks visible across the region, including those close to the site [**154, 155, 159, 165**], as representing Iron Age and Romano-British occupation of the area. They are discussed further below.

There is some evidence for use of the landscape from as early as the Mesolithic: flints from that period were found near a hillside spring during excavations at Heslington East, suggesting that the York Moraine was first used between 11,000 and 6,000 years ago (Neal & Roskams 2013, 5). However, no Mesolithic evidence has been found in the low-lying area, between the York and Escrick moraines, which may have been marshland at the time (Van de Noort 2004, 35). There are also a very limited number of finds from the Neolithic in this region, and a complete absence of Neolithic settlements, barrows, henges, standing stones or other monuments such as those seen in the East Riding of Yorkshire (Vyner 2018; Butlin et al. 2003, 38).

There are likewise no Bronze Age monuments visible in the landscape (Butlin et al. 2003, 43), but there are a number of reported Bronze Age finds along the Escrick moraine and western area that evidence the change in technology to metal tools. Six Bronze Age stone axes have also been found in the northern once-marshy area, and it has been suggested these were ritualised votive offerings in wetlands (Van de Noort 2004, 95).

There has been little evidence of any principal Iron Age sites in the area, but there are many cropmarks of field systems and enclosures that are thought to date from that period (**Map 3**). The middle of the first millennium BCE was warmer and drier than earlier periods, and there was an increase in agriculture and population (Ottaway 2013, 15). Deforestation of the area was largely complete by Roman times, as much for pasture as for arable land, and there was an associated choking of rivers caused by the erosion of lighter surface soils (Addyman 1984, 16). Evidence from excavation exists for Iron Age occupation at Heslington (Neal & Roskams 2013), Lingcroft farm (Jones R. 1988) and, through the PAS records, at Wheldrake, Fulford, and Naburn.

There are marked differences between the Iron Age evidence in this area and that in the East Riding: it has been suggested that this is down to cultural differences between the Brigantes and more eastern Parisi ‘tribes’ (Ramm 1978, 2; Ottaway 2013, 8). However, Addyman (1984, 11) points out that square barrows, associated with the Arras culture of the East Riding, appear in the landscape as far west as Naburn and Dunnington [**140, 155**], and others suggest that the area may have been a ‘frontier land’ between neighbouring tribal groups (Butlin et al. 2003, 43).

Returning to the location of the many cropmarks, there are three main observations to be made. Firstly, settlements often appear on the higher land or better drained soil. Secondly, many cropmarks appear to sit above faults in the bedrock geology, which may relate to the availability of water from springs. Finally, in the area around Elvington Airfield the type and orientation of the field systems, visible as cropmarks (Jones D. 2001), show some similarity in shape and organisation with those investigated recently at Nunburnholme (Halkon 2017). The trees of Wheldrake Wood cover a central area to which many linear cropmarks appear to converge (see Figure 4), making further investigation by geophysics or aerial photography difficult, if not impossible.

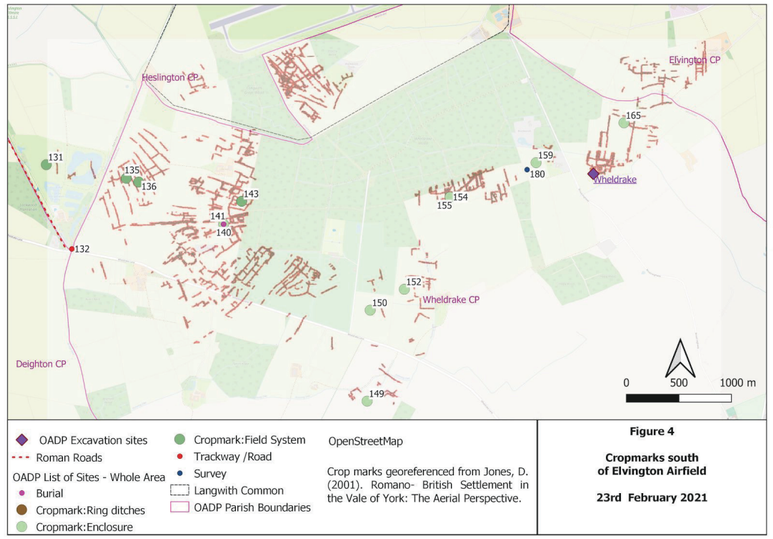

***Figure 4**. Cropmarks south of Elvington Airfield*

Settlement of this region continued in the Romano-British period, with the Roman army occupying an already populated landscape and building the legionary fortress at Eboracum (York). Ottaway suggests that the local elite may have been forcibly removed from the immediate area, as they were at Stanwick (Ottaway 2013, 131), which might be expected to be evidenced by cultural and stylistic changes in any archaeological remains. The standard approach of the Roman army was to take control of an area and re-organise it, primarily for the grazing of horses and cattle (Ottaway 2013, 131). The size and location of the *territorium* of Eboracum, the land required to provide resources for maintenance of the fortress, remains unknown (R.C.H.M.E 1962, xxxiv-xxxv), but can be expected to have covered some miles around due to the legionary population. However, it is possible that settlements like those found at Lingcroft Farm and Heslington, where the fields survived but not the settlement, may have been discontinued due to flooding or soil exhaustion, rather than forced expulsion by the Roman army.

The River Ouse and River Derwent no doubt provided the main means of transportation particularly important for building materials, clay, and peat. The importance of the rivers for transport can be seen on the east bank of the river Derwent [**177, 178**], where Van de Noort identifies a Roman riverside settlement on the banks of the old river course (Van de Noort 2004, 119).

In addition to the tidal rivers, there are four known nearby Roman roads (RRRA 2020), although only the last passes directly through the research area:

- Tadcaster to York [Margary numbers 28b, 28c]
- York to Brough, via Stamford Bridge [Margary number 2e]
- York to Bridlington, via Stamford Bridge [Margary number 810]
- The line of a Roman road, running northwest-southeast through the middle of the Wheldrake research area, is followed by the line of the Fulford parish boundary and the northern end of the Deighton parish boundary, before potentially being picked up by the Escrick parish boundary to the southeast [Margary number 803(x)].

An archeological watching brief in Fulford has suggested that a fifth Roman Road may have gone from Fulford, through Lingcroft Farm, to Deighton, and this is supported by the finding of a Roman sarcophagus close to this suggested route [**110**] (YAT 1997).

The PAS details six coin hoards in the area [**117, 128, 138, 139, 148, 168**], and while the practice of hoarding is still not clearly understood, these do indicate the plentiful supply of coinage at the end of the 4th century (Ottaway 2013, 314).

Van de Noort (2004, 119) and Bray (1997) suggest that the settlement patterns in the landscape were 'reorganised' in the late 3rd century AD. There are no Romano-British villas within the area, but they have been found on the edges of the Vale of York, on the western slopes of the Wolds or the eastern fringes of the Pennines (Butlin et al. 2003, 53).

Archaeological excavations at Lingcroft Farm, Heslington East and Millfield Farm provide further evidence of early occupation of the area.

Lingcroft Farm, Naburn (SE 613 472) [112]

***Figure 5**. Cropmarks at Lingcroft Farm*

An excavation took place during 1980 at Lingcroft Farm, near Naburn, as part of a research project undertaken by Bradford University. Although the aerial photography of Lingcroft Farm showed a

palimpsest of boundaries and linear features (see Figure 5), they could not be dated from the cropmarks alone. The excavation results demonstrated that an Iron Age settlement existed on the site before the Roman occupation of the area in 71 CE (Jones 1988, 169). The landscape was divided into a field system, primarily for arable farming, associated with enclosures containing round-houses. There was little evidence of rebuilding, and it is assumed that the houses did not have a long life before they were removed during the early Roman period and replaced with rectangular structures evidenced by clay floors. Despite the changes, the field system retained many of its characteristics and Jones argues that it may have formed part of the *territorium* of Eboracum (Jones 1988, 161-169).

Finds recorded by the PAS show a concentration of Romano-British finds in the area around Lingcroft Farm, with earlier finds from the Bronze Age and Iron Age suggesting continuity of occupation. However, this apparent concentration may be due to the limitations of PAS records.

Heslington East, York (SE6355 5075) [125, 127, 133]

The development of the new University of York campus at Heslington East in the late 2000s (Neal & Roskams 2013; Roskams 2018) provided an opportunity to excavate and understand past use of the site. Besides extensive evidence for Late Neolithic to Early Bronze Age mixed farming activity along the York moraine, there was evidence of Iron Age and Roman settlements showing a continuity of use. Iron Age and early Romano-British farmsteads were found on the south facing slope of the York Moraine, in the form of round-houses and enclosures built along the spring line, with little change for the first 200 years of occupation. In the 3rd century CE, a road was built along the spring line, followed by the creation of an 'high status' enclosure in the 5th century CE with a tower and floored hypocaust (Ottaway 2013, 66). There was strong evidence for the significance of access to water on the site, from Iron Age unlined wells to a sophisticated late Romano-British well which was ritualistically decommissioned to end its use.

Millfield Farm, Wheldrake SE6320 3510 [161, 158]

A Romano-British settlement, located on high ground in a largely flat landscape just to the west of Wheldrake [158], was partly revealed by excavation for a water pipeline (NAA 2005). The site, known as Millfield Farm, incorporated three phases of late Romano-British activity: a round-house (notably showing a re-cut ring-ditch) and trackway in the first phase, followed by a rectilinear building and cemetery in the second, and finally new settlement activity in the area previously used as a cemetery. Finds recorded by the PAS from around this site include artefacts of both Iron Age and Roman date.

Note on PAS data

The Terms & Conditions for Higher Level (researcher) Access to the Portable Antiquities Scheme database include "not publishing findspots to greater than a four-figure national grid reference, and not distributing any of the personal data (i.e., finders names and contact details) held within the database". To comply with this, all PAS information quoted gives the location to parish level, and only uses information from the PAS website that is available to the general public.

Abbreviations used

CBM	ceramic building material
HLF	Heritage Lottery Fund
NAA	Northern Archaeology Associates
PAS	Portable Antiquities Scheme
RCHME	Royal Commission On Historical Monuments (England)
RRRA	Roman Roads Research Association
YAT	York Archaeological Trust

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Appendix 1: Gazetteer

Date column abbreviations:

- N Neolithic
- B Bronze Age
- I Iron Age
- R Roman
- U Unknown

No	Description	Type	Date	URL	Grid ref
	Wheldrake and the Northern Area				
101	Mainly rectilinear ditched enclosures, which are probably part of an Iron Age/Roman field system, are visible as cropmarks on air photographs. Some of the ditches overlap, suggesting there is more than one phase. Some are also in the same alignment as those which lie to the east (recorded in SE 64 NW 27), but the relationship between the two sites is uncertain.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319839	SE 6024 4611
101	Mainly rectilinear ditched enclosures, which are probably part of an Iron Age/Roman field system, are visible as cropmarks on air photographs. Some of the ditches overlap, suggesting there is more than one phase. Some are also in the same alignment as those which lie to the east (recorded in SE 64 NW 27), but the relationship between the two sites is uncertain.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319839	SE 6024 4611
102	On the 16th of April 1997, York Archaeological Trust was called by the York Coroner's Officer to inspect a stone sarcophagus discovered whilst machine excavating a new drainage service trench at the Fulford A19IA64 interchange road improvement scheme (NGR SE 6135 4790). Following this an archaeological watching brief was carried out on the 16th and 17th of April to retrieve it and the skeletal remains of a burial found inside. The site lies just to the west of the A19 and south of the A64 in what was formerly agricultural land to the north-east of the former Naburn Hospital.	Excavation	R	https://www.york.gov.uk/downloads/file/4210/syo840-a19-a64-interchange-fulford-wb	SE 6050 4800
103	A possible Roman or Iron Age field system was seen as cropmarks on air photographs. The system is very fragmentary and has overlapping elements which may represent more than one phase. The system comprises long sinuous ditches with many shorter ditches branching off from them. There are two possible enclosures in this area, one appears to be appended to one of the sinuous ditches and is semi-circular in form. The other possible enclosure, which is further to the west, is rectilinear, almost square in appearance.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1228602	SE 6055 4447

104	Iron Age or Roman ditched enclosures, which probably form part of a field system visible as cropmarks. One enclosure contains two circular enclosures, 11 metres and 4 metres in diameter, which are interpreted as roundhouses.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319832	SE 6060 4605
105	Iron Age or Roman rectilinear ditched enclosures, which are probably part of a field system, are visible as cropmarks on air photographs. To the west is another group of enclosures (recorded in SE 64 NW 28), but the relationship between the two sites is uncertain.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319835	SE 6060 4605
106	Iron Age or Roman rectilinear ditched enclosures, which are probably part of a field system are visible as cropmarks on air photographs. Some of the enclosures are sub-divided and one is double-ditched. There are groups of pits, possibly of archaeological origin (recorded in SE 64 NW 30), scattered amongst the enclosures, but the relationship between the two is uncertain. To the north are more enclosures (recorded in SE 64 NW 31), but it is uncertain if they are part of the same field system.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319841	SE 6061 4655
107	Iron Age or Roman rectilinear ditched enclosures, which are probably part of a field system, are visible as cropmarks on air photographs. One enclosure contains a roundhouse and two other incomplete curvilinear enclosures are possibly also round houses. There is a field system to the south (recorded in SE 64 NW 29) and a extensive one to the east (recorded in SE 64 NW 32), but it is uncertain if they are all part of the same system.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319844	SE 6066 4704
108	The Oxford Archaeological Unit carried out an Archaeological Watching Brief close to Fu4ford to the south of York on an area of landpreviously occupied by Naburn HospitaL A small number of archaeological deposits andfeatures was located. In the south of the site an Iron Age or Romano-British ditch was located	Excavation	I/R	https://www.york.gov.uk/downloads/file/9851/svo322_naburn_hospital_fulford_wbpdf	SE 6085 4770
109	Located due east of the River Ouse, c.2km south of York, an evaluation identified evidence of a probable field-system which was further revealed by open area excavation. With the exception of several pits and a single four-post structure, the Romano-British features consisted almost entirely of boundary ditches and there was no clear evidence for Romano-British settlement. The excavator suggests that the small, enclosed fields represent a pastoral, rather than arable, farming regime. However, the pottery assemblage from the site was highly suggestive of a settlement with links to the fortress and the Colonia to the north, whilst coins and coin-moulds recovered from a ditch fill were identified as evidence of illegal moneying. The remains dated from the late 1stC to the early 4thC AD.	Cropmark: Field System	I/R	https://archaeologydataservice.ac.uk/archives/view/romangl/maprecord.cfm?id=36080	SE 6110 4945

110	The Gritstone Sarcophagus	Excavation	R	https://www.york.gov.uk/downloads/file/10180/svo840_a19_a64_interchange_fulford_wbpdf	SE 6135 4790
111	A possible Iron Age or Roman field system was seen as cropmarks on air photographs. The system is very fragmentary and essentially comprises a linear boundary and parts of two possible enclosures just to the north. Within the confines of the most easterly of these enclosures is a small roughly circular enclosure, function unknown.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230769	SE 6160 4383
112	Lingcroft Farm cropmarks IRON AGE - SETTLEMENT, IRON AGE - FIELD SYSTEM, IRON AGE - HUT CIRCLE, IRON AGE - ENCLOSURE, IRON AGE - RECTILINEAR ENCLOSURE, ROMAN - STRUCTURE, ROMAN - ENCLOSURE, ROMAN - FIELD SYSTEM	Cropmark: Settlement	I/R	https://archaeologydataservice.ac.uk/archsearch/record?titleId=1917630	SE 6163 4668
112	Lingcroft Farm Excavation	Excavation	I/R	https://archaeologydataservice.ac.uk/archsearch/record?titleId=1917630	SE 6163 4668
113	An extensive Iron Age or Roman field system is visible as cropmarks on air photographs, extending north-south for 1.2km and west-east for 1.3km. It comprises parallel boundary ditches and rectilinear enclosures. Some enclosures are double-ditched and a few contain roundhouses. Where substantial lengths of boundary are double-ditched it is uncertain if they are also functioning as trackways. This area around Lingcroft Farm is part of a programme of study of fieldwalking and excavation, undertaken by Bradford University Archaeological Sciences Department, from 1980 and is ongoing. Dating evidence has confirmed a late Iron Age and Roman date for the field system and roundhouses.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319847	SE 6164 4695
114	Two sides of a possible Iron Age or Roman ditched enclosure are visible as cropmarks on air photographs.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319852	SE 6167 4592
115	Boundary ditches visible as cropmarks on air photographs, are probably part of an Iron Age/Roman field system and a circular enclosure is interpreted as a round house.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319853	SE 6216 4618
116	A possible Iron Age or Roman settlement was seen as cropmarks on air photographs. The settlement comprises several boundaries and double-ditched trackways and parts of five separate enclosures.	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230840	SE 6234 4455
117	A hoard of 2880 Roman bronze coins in a jar dating from after 350 A.D. found in 1966 during building work.	Coin Hoard	R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992330	SE 6242 5079

118	Excavation of an Iron Age / Romano British settlement at University of York prior to building the East Campus.	Excavation	I/R	https://archaeologydataservice.ac.uk/archives/view/heseast_2013/	SE 6250 5050
119	A possible Iron Age or Roman field system was seen as cropmarks on air photographs. The system is fragmentary and the features visible may represent more than one phase.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230859	SE 6280 4375
120	A stone coffin containing an inhumation covered in plaster, with various ornaments and the fragments of a Roman amphora and two glass vessels.	Burial	R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992322	SE 6300 5067
121	ROAD (Roman - 43 AD to 409 AD)	Trackway /Road	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?resourceID=1003&uid=MYO66	SE 6300 4822
122	Iron Age/Roman rectilinear ditched enclosures, which are probably part of a field system, are visible as cropmarks on air photographs.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319669	SE 6305 4885
123	Two sides of a double-ditched enclosure of possible Iron Age/Roman date are visible as cropmarks on air photographs.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319667	SE 6315 4872
124	TREASURE CASE 2012 T888A small hoard of four base silver denari and five base silver radiates dating to the 3rd century AD.	Coin Hoard	R	https://finds.org.uk/database/artefacts/record/id/534766	North Yorkshire County Council- Selby - Barlby
125	Excavation of an Iron Age / Romano British settlement at University of York prior to building the East Campus.	Excavation	I/R	https://archaeologydataservice.ac.uk/archives/view/heseast_2013/	SE 6355 5075
126	Rescue excavation in advance of construction of Riccall Mine Shaft. Developer: National Coal Board	Excavation	I/R	https://archaeologydataservice.ac.uk/archsearch/record?titleId=1921409	SE 6370 3690
127	Excavation of an Iron Age / Romano British settlement at University of York prior to building the East Campus.	Excavation	I/R	https://archaeologydataservice.ac.uk/archives/view/heseast_2013/	SE 6380 5060
128	TREASURE CASE : 2005 T127 Six base-silver radiates, a denomination first introduced in AD 215 as a multiple of the denarius which had hitherto been the main Roman silver denomination. The coins carry a bust of the emperor shown crowned by the sun's rays (in the manner of the Statue of Liberty in New York).	Coin Hoard	R	https://finds.org.uk/database/artefacts/record/id/271586	York Unitary Authority - York

129	Rectilinear ditched enclosures, which are probably part of an Iron Age/Roman field system are visible as cropmarks on air photographs.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319670	SE 6397 4916
130	Farm Roman Rural Settlement Multiperiod, poly-focal site including an Iron Age field-system, contemporary enclosed settlement and LIA/ER 'ladder' settlement. The site is located due north of the Vale of York basin and c.3km east of the fortress and Colonia at York. In Area A1, a number of roundhouse structures were found within a small square enclosure within one corner of a field-system. Further roundhouse structures were erected on the other side of the field boundary, apparently unenclosed. The site has, so far, only been subject to an assessment and the features are not closely dated, but it appears that the settlement was in use during the middle Iron Age and presumably through into the late Iron Age. A small amount of stratified Roman material was recovered from the site, but the settlement and the field-system in which it lay appears to have gone out of use. The deposition of a complete and unworked red deer antler, clearly still attached to the skull, reflects the burial of the head of a hunted deer. The deposit was interpreted as a 'ritual offering' (photo in report). A later deposit included a large (destroyed?) iron object within a spread which also contained a hoard of silver and copper alloy coins of the mid-4thC AD. In Area A2, immediately to the south of Area A1, a very similar enclosed settlement area within the same rectilinear field-system as that seen in A1 was identified. The report describes the site as a 'ladder settlement', but it does not take a classic ladder form. The enclosure, again, was set within one corner of a field and included at least one large roundhouse and a number of smaller curvilinear features. The roundhouse appears to have been maintained over a long period of time, since its gullies show several recuts. By the Roman period, the enclosure has gone out of use and a 'lattice-type' field-system comes in use along the same alignment as the previous network. In the southern end of this system, a keyhole shaped corn drier was inserted. The landscape changes seen at this site into the Roman period were likely influenced by the development of the Roman settlement seen to the east in Area A3 (Site ID 36082).	Cropmark: Field System	I/R	https://archaeologydataservice.ac.uk/archives/view/romangl/maprecord.cfm?id=36082	SE 6320 3510
131	Boundary ditches, which are possibly part of an Iron Age/Roman field system, are visible on as cropmarks on air photographs. There is an extensive field system to the east, but the ditches have a different orientation, therefore it is uncertain how the two field systems relate.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319661	SE 6405 4667
132	Hedges and dykes possibly following the line of a Roman road; no visible remains. Unsubstantiated.	Trackway /Road	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992255	SE 642 462

133	Excavation of an Iron Age / Romano British settlement at University of York prior to building the East Campus.	Excavation	I/R	https://archaeologydataservice.ac.uk/archives/view/heseast_2013/	SE 6425 5100
134	Late Iron Age and Romano-British settlement located c.3km of Eboracum and, more immediately, east of the Iron Age field-system and multiple enclosure site recorded in Areas 1 and 2 at Heslington East (Site ID 36081). The northern part of the site has been excavated by the Department of Archaeology, University of York, and the southern half by On-Site Archaeology. Each excavation has been reported on separately. LIA/ER features included a series of roundhouses with associated hearths and metalworking areas in Field 9, and an ephemeral enclosure and early track in Field 8. The 3rd and 4thC AD saw substantial reorganisation of the features in Field 8, represented by the creation of more substantial enclosures, a metalled trackway and erection of two buildings, one of which was masonry with a hypocaust. Significant boundary ditches were also installed to east of the masonry building, forming a controlled system of access into the settlement area. There was also monumentalisation of the western entrance into the complex with the insertion of a rectangular tower. This building was substantially rebuilt in the 4thC AD and two inhumations burials were inserted immediately to its east. The southern area of the site (excavated by On-Site Archaeology) revealed a peripheral area of the settlement comprising mostly of ditched enclosures, a trackway, a corn-drier, and wells of Romano-British date. But, notably, this site also included a late Iron Age square enclosure with two roundhouse similar to those identified at Site ID 36081. At this site, preserved wood showed that wattle was used to line gullies and some of the wells, whilst a waterhole had a complex timber and cobble revetment (photos present). In the very late Roman period (possibly into the 5thC AD) the landscape in the north of Field 8 was modified, with burials consolidating earlier features. New boundaries and terraces were established and we see the insertion of a kiln, a large rectangular timber-framed building and a four metre deep masonry-lined well. The construction technique used to shore the well is known as 'opus quadratum', a technique rarely found in Britain, and usually only seen in the construction of bridges in the military zone and in certain kinds of classical temple and mausoleum construction, or in public monuments in Roman London. The well included several ABGs and other deliberately deposited items (see zooarch data summary and raw tables in archive, UoY). For further discussion see Internet Archaeology article.	Cropmark: Field System	I/R	https://archaeologydataservice.ac.uk/archives/view/romangl/maprecord.cfm?id=36082	SE 6310 3670

134 *(cont.)*	Analysis of millstones and the animal bone assemblage suggests that settlement in the later Roman period was focussed on arable production, whilst the analysis of metal residues indicates that smithing and welding were also being undertaken. Further east, later activity comprises a narrow ditch near a well, and a second curvilinear ditch, both of which contain possible 'Anglian' pottery.	Cropmark: Field System	I/R	https://archaeologydataservice.ac.uk/archives/view/romangl/maprecord.cfm?id=36082	SE 6310 3670
135	An extensive Iron Age/Roman rectilinear field system is visible as cropmarks on air photographs. It comprises NW-SE parallel ditches, varying between 30 to 60 metres apart, with a few ditches perpendicular to them. Its form is similar to field systems lying to the east (recorded in SE 64 NE 1 and 5) and it may be part of the same field system.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1319652	SE 6450 4660
136	Field System South of Elvington Airfield	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO3475&resourceID=1003	SE 6457 4658
137	The fragmentary cropmark remains of an Iron Age trackway and associated field system. The trackway can be traced for approximately 200m and is aligned east-west. There are traces of three field boundaries to the north and one to the south at right angles to this trackway. These boundaries are roughly parallel to each other and are between 70m and 80m apart. These fields and trackway may form part of a larger field system elements of which have been described in SE 64 NE 1 and 10.	Trackway /Road	I	https://www.pastscape.org.uk/hob.aspx?hob_id=1433029#	SE 6492 4488
138	31 denarii to Septimius Severus. Addenda of 3 denarii to Caracalla (201-206). TAR 1997-98, 127; NC 1999, 24.Treasure numbers associated with this hoard: 2002 T091	Coin Hoard	R	https://finds.org.uk/database/hoards/record/id/2299	York Unitary Authority - South-East York
139	""The remains of a large Roman urn discovered by a ploughman at Langwith, near York, in March 1891. It contained more than 6000 brass coins of Constantine I and his family. - Lord Deramore, 1891."Handbook to York Museum (1891).	Coin Hoard	R	https://finds.org.uk/database/hoards/record/id/2401	York Unitary Authority - Langwith
140	An extensive Iron Age/Roman field system is visible as cropmarks on air photographs. It comprises rectilinear enclosures with associated round houses and trackways. A possible Iron Age square barrow was also identified. The cropmarks are visible to the west and south of Wheldrake Wood.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1305163	SE 6505 4635
141	An extensive Iron Age/Roman field system is visible as cropmarks on air photographs. It comprises rectilinear enclosures with associated round houses and trackways. A possible Iron Age square barrow was also identified. The cropmarks are visible to the west and south of Wheldrake Wood.	Burial	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1305163	SE 6505 4635

142	Aerial photography records the cropmarks of a rectilinear enclosure measuring 50 metres by 40 metres on the west side of Thorn Hill. The enclosure shows a probable entrance on the west side, and is of uncertain date, possibly Iron Age or Roman. A straight section of ditch to the south, and an L-shaped one to the east may be related to this.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318628	SE 651 517
143	Field System South of Elvington Airfield	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO3005&resourceID=1003	SE 6515 4648
144	An Iron Age/Roman field system is visible as cropmarks on air photographs. It comprises rectilinear enclosures, with many double-ditched elements. A sub-circular enclosure, 30 metres across, with a possible double-ditched trackway on its western side, is also identified. The form of the rectilinear complex is similar to one which lies to the south-west (recorded in SE 64 NE 1 and SE 64 NW 14), and may be part of the same field system.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318312	SE 6527 4874
145	A group of straight boundary ditches, which are possibly part of an Iron Age/Roman field system, are visible as cropmarks on air photographs.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318316	SE 6527 4874
146	A short linear track of uncertain date shows as a cropmark to the west of Bore Tree Baulk. It may be related to the possible Iron Age or Roman enclosure to the west (SE 65 SE 24).	Trackway /Road	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318632	SE 6532 5172
147	Ring Ditches	Cropmark: Ring ditches	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO58&resourceID=1003	SE 6554 4469
148	A total of 188 copper alloy coins and two metal objects were submitted for examination as potential Treasure. The two metal objects reported with the coins are thought to be modern gun shot and not associated with the hoard. Most of the coins were legible but had unfortunately been coated in oil which had bound to adhering soil, and some coins were therefore been sent for cleaning in the British Museum's Department of Conservation to allow them to be fully identified, and to separate six coins that were stuck together.The coins are Roman coins of the denomination commonly referred to as a nummus (pl. nummi) and date from the early to middle of the fourth century AD. They span the years AD 317 to 348 and were issued in the name of the emperors, junior emperors and family of the House of Constantine.	Coin Hoard	R	https://finds.org.uk/database/artefacts/record/id/845099	York Unitary Authority - Wheldrake

149	Iron Age/Roman rectilinear enclosures and boundary ditches are visible as cropmarks on air photographs and possibly form part of a field system.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318331	SE 6587 4537
150	Field System South of Elvington Airfield	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO3479&resourceID=1003	SE 6588 4588
151	Two uninscribed Roman altars, found on Dunnington Common in the nineteenth century are deposited in the Yorkshire Museum.	Burial	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992278	SE 66 50
152	A group of rectilinear enclosures and dispersed ditches, are possibly part of an Iron Age/Roman field system, visible as cropmarks on air photographs.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318333	SE 6607 4600
153	The deposits recorded on this site were the ploughed out remains of road metalling, and the cuts and fills of ditches on each side of the road. Additionally there was a surface spread of ploughed soil. The road, of Roman date, appeared to link York, to the west to Stamford Bridge, to the east. Well preserved environmental deposits within the ditch fills suggest that settlement was in close association with the road, but no evidence for this was encountered within the excavated area.	Trackway /Road	R	https://archaeologydataservice.ac.uk/archsearch/record?titleId=581111	SE 6607 5247
154	A field system comprising rectilinear enclosures, with many double-ditched elements, of probable Iron Age/Roman date, is visible as cropmarks on air photographs. Other features include a square barrow and round house.	Burial	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1305168	SE 6632 4652
155	A field system comprising rectilinear enclosures, with many double-ditched elements, of probable Iron Age/Roman date, is visible as cropmarks on air photographs. Other features include a square barrow and round house.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1305168	SE 6632 4652
156	The cropmarks of part of a rectilinear enclosure possibly of Roman date are recorded by aerial photography abutting a modern field boundary to the east of Pit Lane, Dunnington. The field contains cropmarks of former ridge and furrow cultivation of probable medieval date.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318681	SE 6672 5211
157	Field boundaries of probable Roman date show as cropmarks on aerial photographs to the west of the Sewage Works at Dunnington. The main feature comprises a ditch 400 metres long with others branching off it to north and south.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1318675	SE 6674 5188

158	Site of a Romano-British settlement partly revealed by a gas-pipeline and located on high ground on a largely flat landscape. Three phases of late Roman activity could be discerned. The earliest phase included two intercutting ring gullies from a roundhouse and a trackway. The second phase saw the abandonment of the roundhouses, the foundations of which were cut by new gullies. The excavator suggests that these were for rectangular buildings, but the evidence is not clear-cut. This phase saw the construction of a number of rectilinear enclosures/field-system, one of which included a small cemetery. The cemetery included three inhumation graves and a pit with an articulated cow leg. The third phase saw new settlement activity in the area previously used as the cemetery, alongside the trackway, which continued in use throughout.	Excavation	R	https://archaeologydataservice.ac.uk/archives/view/romangl/maprecord.cfm?id=36001	SE 6674 4417
159	Iron Age/Roman ditched enclosures and round houses are visible on air photographs. A possible Iron Age square barrow was also identified. More extensive field systems lie to west (SE 64 NE 3) and east (SE 64 NE 2), but the relationship between this group of enclosures and the field systems is uncertain.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318327	SE 6680 4672
160	Extensive traces of settlement of Romano-British form show as cropmarks on aerial photographs. One cropmark complex centred on SE 670507 covers an area of about 500 metres by 600 metres, and comprises a scatter of dispersed small enclosures. A short stretch of double-ditched trackway 150 metres long runs across part of the area. Towards the centre of the complex there occurs a sub-rectangular enclosure measuring approximately 55 metres by 40 metres defined by a pair of ditches.	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318583	SE 670 507
161	Monitoring of groundworks for a new barn recorded no significant archaeological activity.	Excavation		https://archaeologydataservice.ac.uk/archsearch/record?titleId=1922173	SE 6700 4420
162	7 silver denarii PAS ID: SWYOR-4A3012. Circumstances of discovery:Found by seven finders [names redacted] on a Yorkshire Searchers Club outing on 10th August 2017. The coins were found on cultivated land and were scattered along about 30 meters of a hedgerow.	Coin Hoard	R	https://finds.org.uk/database/artefacts/record/id/870021	York Unitary Authority - Dunnington
163	A Prehistoric or Roman pit alignment and ditch are visible as cropmarks on air photographs. They form a funnel shape and extend for 120 metres. Another ditch, possibly a different phase, crosses the pit alignment and ditch.	Cropmark: Ditch	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318320	SE 6710 4947
164	Boundary ditches, possibly part of an Iron Age/Roman field system, are visible as cropmarks on air photographs.	Cropmark: Ditch	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318318	SE 6722 5003
165	A field system comprising rectilinear enclosures and associated round houses, of possible Iron Age/Roman date, is visible as cropmarks on air photographs.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1305165	SE 6729 4695

166	Traces of settlement of Romano-British form show as cropmarks on aerial photographs of Dunnington Common. One complex is centred on SE 674 513. It comprises a length of ditched trackway 270 m. long, with part of another of sinuous plan , and about 70 metres long, to the south-west.	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318602	SE 674 513
167	Roman vase found at Scoreby.	Find Spot	R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=992280	SE 68 54
168	A group of seven (7) Roman silver coins of a denomination known as a siliqua (pl. siliquae) dating to the period AD 360 - 402.	Coin Hoard	R	https://finds.org.uk/database/artefacts/record/id/925185	York Unitary Authority - Wheldrake
169	Ring Ditch	Cropmark: Ring ditches	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO59&resourceID=1003	SE 6816 4359
170	Cropmarks evidence traces of settlement on Dunnington Common which are probably Romano-British. One cropmark complex covering an area 500 metres by 400 metres comprises blocks of conjoined enclosures of more than one phase which are delimited on the west and partly on the north by a straight linear boundary. Part of a double ditched enclosure shows on the interior adjacent to the boundary. To the north-east of the block there occurs a more dispersed scatter of rectilinear enclosures overlapped in places by linear boundary type features. A ditched trackway about 400 metres long and 10 metres wide, and aligned north-west/south-east runs across the area. Fragmentary linear cropmarks visible to the north-east probably form part of this complex.	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318567	SE 682 513
171	Two sections of possible trackway (comprising parallel ditches) were seen as cropmarks on air photographs. They lie just to the south of the route of Roman Road 81a (Linear 270) with which they may be associated.	Trackway /Road	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1318068	SE 6913 5511
172	Field System, Wheldrake	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO3545&resourceID=1003	SE 6979 4432
173	Excavations revealed an open settlement of Iron Age or Roman date. A central penannular gully surrounded a circular structure. This was later cut by ditches of a trackway or a field system boundary. The ditches contained Iron Age and Roman pottery, and dating evidence indicates abandonment by the close of the 1st century AD.	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1314553	SE 700 540

174	During monitoring of topsoil stripping, Romano-British ditches, enclosures, trackways, boundary ditches, a cemetary and an abundant number of Roman pottery were recorded along with traces of medieval agriculture. [AIP]...	Excavation	R	https://archaeologydataservice.ac.uk/archives/view/romangl/map.html	SE 700 484
175	An incomplete, circular ditched enclosure is visible on air photographs as cropmarks. The date and interpretation of this feature is uncertain. It lies on the alignment of a Roman road and may be contemporary or post-date it, potentially a Roman or Saxon barrow.	Burial	U	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1314236	SE 7006 5438
176	Detailed gradiometer survey, covering approximately 12 hectares, was carried out at fourteen sites along the route of a proposed water pipeline. Magnetic anomalies though to be probably archaeological in origin have been identified on two of these sites,...	Excavation	I/R	https://archaeologydataservice.ac.uk/archives/view/romangl/map.html	SE 701 478
177	Site of an extensive ladder complex running east-west just north of the confluence of the River Derwent and Pocklington Beck. After initial discovery through field-walking and the recovery of a large Roman pottery assemblage, the site became predominantly known from large-scale geophysical survey covering around 10ha, alongside small-scale excavation. Results showed that the settlement existed as a long-running trackway with a co-axial system of field boundaries/plots enclosing numerous rectilinear enclosures, lining both north and south sides. The trackway was seen to run for at least 370m before continuing beyond the confines of the survey area. Numerous magnetic anomalies were observed within enclosures, identifying hearths or kilns, and likely demonstrating domestic activity. Overlapping of features seen on the geophysical survey suggests numerous phases of activity. Two small evaluation trenches were placed across the site, one across the trackway, revealing evidence for a potentially 'wealthy' settlement. The presence of Dales ware demonstrates activity dating between c.AD230 and AD370; the remainder of the Roman pottery also likely dates to this period, but this only represents a very small section of the settlement.	Cropmark: Settlement	I/R	https://archaeologydataservice.ac.uk/archives/view/romangl/maprecord.cfm?id=35066	SE 7080 4480
178	Two trenches excavated across the Roman axial roadway and enclosure complex identified by geophysical survey (Event 1149285).	Trackway /Road	R	https://archaeologydataservice.ac.uk/archsearch/record?titleId=1930997	SE 7080 4480
179	Rectangular Enclosure Ditches	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MYO2274&resourceID=1003	SE 7089 4430
180	Hard Moor Farm	Survey		http://ndchs.org.uk/oanddproject.html	SE 6675 4668

North Duffield and the Central Area					
201	Rectilinear enclosures, forming part of an extensive field system, 730 m by 820m. A circular crop mark feature was excavated by Archaeology North Duffield. Excavation found that the ring ditch was 20m in diameter with an opening 6m wide facing south east and a second opening facing west. Crop marks showed a double ditch but no evidence for this was found during excavation. The ring ditch was dated from the Early Iron Age from pottery recovered from the feature. Roman period pottery of the late 4th or early 5th century was found in the post packing of the west facing entrance	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY36319&resourceID=1009	SE 686 379
202	Rectilinear enclosures, field system & settlement. Field system extends for approximately 800m x 740m and includes trackways and rectilinear enclosures, some containing round houses and some are double ditched. Trial trench excavations recorded finds and features dating from the Romano-British and Medieval pottery distributed across the site. A small research excavation recorded an Iron Age/Romano British round-house	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38745&resourceID=1009	SE 684 377
203	field system features including a boundary or trackway and enclosures.	Cropmark: Field System	B/I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37487&resourceID=1009	SE 671 365
203	field system features including a boundary or trackway and enclosures.	Trackway /Road	B/I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37487&resourceID=1009	SE 671 365
204	possible square barrows and field system and settlement	Cropmark: Field System	B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17589&resourceID=1009	SE 669 396
205	possible square barrows and field system and settlement	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17588&resourceID=1009	SE 668 397
206	Circular enclosure, 18.5 metres in diameter	Cropmark: Enclosure	B/I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1229790	SE 678 387

207	Field system extending over 650 metres, with the main axis of the ditches being west to east and north to south. Some of the rectilinear enclosures are double ditched and some contain round houses. Where the double ditches are continuous they may function as trackways as well as boundaries. Some of the ditches overlap suggesting there is more than one phase. One single sinuous ditch aligns south-west to north-east cutting across the rectilinear field system and its date is uncertain. Within the complex of enclosures is a small square enclosure which may be an Iron Age square barrow. The field system may be part of a larger system, which is in the same alignment and lies to the west, east and south	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=992204	SE 670 398
208	Field system. A boundary/ trackway extends east-west for 740 metres and appears to be multiple-ditched, possibly suggesting phases of re-cutting and re-alignment of this feature. Flanking the boundary are rectilinear enclosures two of which contain round houses. To the west and east are further enclosures and boundary ditches, in the same east-west alignment, suggesting a possible continuation of these features.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=992209	SE 674 366
209	Field system and settlement. System extending over 800 metres, with the main axis of the ditches being west to east and north to south. Some of the rectilinear enclosures are double ditched and some contain round houses. Some ditches overlap, suggesting there is more than one phase In particular are two sinuous ditches aligned north-west to south-east, which cut across the rectilinear enclosures. The date of these ditches is uncertain. The field system may be part of a larger system recorded to the north	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1229721	SE 673 391
210	Rectilinear enclosures and boundary ditches. The alignment of the features suggests they may be a continuation of a field system that lies to the west	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1229711	SE 677 397
211	Rectilinear enclosures and boundary ditches. The alignment of the features suggests they may be a continuation of a field system that lies to the west	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1229701	SE 680 368
212	Rectilinear enclosures, one with round house. The axis of these enclosures is north-west to south-east. It is uncertain how they relate to a larger field system that lies to the south, which lies in a different north-south orientation.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1229741	SE 685 383
213	perpendicular boundaries, possibly forming enclosures	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1324397	SE 709 423
214	enclosure and boundaries. The enclosure has a west-facing entrance. The boundaries form a vaguely perpendicular pattern to the north of the enclosure.	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1324394	SE 706 410

215	square enclosure with east-facing entrance	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1324391	SE 703 407
216	neolithic axehead	Find Spot	N	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10898&resourceID=1009	SE 583 394
217	Enclosure of Possible Bronze Age Date	Cropmark: Enclosure	B	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY13303&resourceID=1009	SE 589 416
218	Barrow, Stillingfleet	Earthwork	B	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17679&resourceID=1009	SE 604 416
219	three sides of rectilinear ditch-defined enclosure	Cropmark: Enclosure	R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1229917	SE 605 383
220	settlement comprising a large enclosure with a smaller internal enclosure	Cropmark: Settlement	I	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1230524	SE 609 401
221	Incomplete rectilinear, ditch-defined enclosures and integral trackway	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1229924	SE 613 375
222	Field System, No Visible Remains Above Ground 290 metres South of Heron Wood	Survey	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY25920&resourceID=1009	SE 613 404
223	enclosure or field system. The main feature is a two sided enclosure with internal sub-divisions	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1230548	SE 616 405

224	Parallel ditches, may form part of a large enclosure or field system	Cropmark: Ditch	I	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230537	SE 616 408
225	Two Neolithic stone axes	Find Spot	N	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992222	SE 620 370
226	field system comprising a linear ditch from which branch long parallel ditches, forming enclosed strips of land	Cropmark: Field System	I	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230542	SE 620 405
227	Field system	Cropmark: Field System	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12095&resourceID=1009	SE 624 382
228	round houses - fragmentary in appearance and seem to represent several phases of development with recutting of the ditches	Cropmark: Ring ditches	I	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230593	SE 624 405
229	Roman Pottery	Find Spot	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12100&resourceID=1009	SE 626 365
230	square enclosure or square barrow	Cropmark: Enclosure	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12124&resourceID=1009	SE 627 369
231	field boundary	Cropmark: Field System	N/B/I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12101&resourceID=1009	SE 627 372
232	field system with definable, rectilinear enclosures	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230601	SE 627 404

233	field system comprising a double-ditched trackway with several ditched boundaries running from it at right angles.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230598	SE 627 406
234	enclosure, almost complete, and possible associated field system	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230848	SE 627 411
235	fragment of ditched field system	Cropmark: Field System	N/B/I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12097&resourceID=1009	SE 628 378
236	Pottery	Find Spot	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12167&resourceID=1009	SE 629 374
237	Field system, quite extensive, comprising several double ditched trackways and large enclosures, as well as some smaller enclosures and pits, possibly indicating settlement.	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37043&resourceID=1009	SE 631 367
238	Field system with trackways	Cropmark: Field System	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12117&resourceID=1009	SE 632 358
239	field system, fragmentary but appears to comprise long linear elements	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230889	SE 633 405
240	Enclosures and field boundaries and a group of possible Iron Age square barrows	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37046&resourceID=1009	SE 634 408

241	A possible settlement of rectilinear enclosures. Some contain internal features which may be hut circles. Sits within wider field system.	Cropmark: Settlement	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12105&resourceID=1009	SE 635 373
242	Extensive field system including enclosures, trackways and possible drove ways	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37044&resourceID=1009	SE 636 405
243	Iron age hut; Roman ditch & cremation	Excavation	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1921409	SE 637 369
244	ring ditches, trackway & enclosures	Cropmark: Ring ditches	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12126&resourceID=1009	SE 639 365
245	A group of seven small, ditch-defined enclosures, probable square barrows	Cropmark: Enclosure	I	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1230058	SE 640 374
246	two round houses, associated trackways and boundaries in field system	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37048&resourceID=1009	SE 640 402
247	A square barrow in Mound Plantation, near Danes Hills. One of several in locality. Other references available	Earthwork	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY25909&resourceID=1009	SE 642 376
248	A complex of rectilinear ditch-defined enclosures and associated trackways	Cropmark: Enclosure	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12142&resourceID=1009	SE 642 378

249	Square Barrow & Ditched Enclosure, partly excavated. Other barrows and trackways nearby	Excavation	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12137&resourceID=1009	SE 643 378
250	Ring ditch measuring c.25 m in diameter	Cropmark: Ring ditches	B	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12147&resourceID=1009	SE 643 382
251	Bronze age settlement	Excavation	B/I	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1856475	SE 645 365
252	An area containing earthworks of part of an Iron Age square barrow cemetery	Earthwork	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12129&resourceID=1009	SE 645 376
253	A rectilinear, ditch-defined enclosure of possible Prehistoric date, associated with a boundary ditch and three ring ditches - possibly hut circles.	Cropmark: Enclosure	N/B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12093&resourceID=1009	SE 645 393
254	A complex of square barrows called Danes Hills, consisting of at least 35 mounds. Some of the features are visible on the ground and from examination of aerial photographs. There are two groups of barrows in the vicinity of Skipwith called 'Danes Hills' (both areas labelled on the 1st edition Ordnance Survey map); a smaller area to the north, on Crook Moor, and the present site which is immediately to the west of Riccall airfield	Earthwork	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12128&resourceID=1009	SE 646 376
255	Field system, quite extensive, comprising several double ditched trackways and large enclosures, as well as some smaller enclosures and pits, possibly indicating settlement	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37043&resourceID=1009	SE 646 408
256	A round barrow consisting of a mound measuring 5 x 5 m, and 0.7 m high. The feature is one of a group of four round barrows in this area	Earthwork	B	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17568&resourceID=1009	SE 652 376

257	Field system extending across an area 900m by 600m and comprising a discontinuous scatter of enclosures of rectilinear form with the main axis running approximately north-south. These probably form part of the same complex recorded to the east and south	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37042&resourceID=1009	SE 654 414
258	Field system, extensive, extending for 750 metres with the main axis of the ditches being west to east and north to south.	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17607&resourceID=1009	SE 655 379
259	A linear ditch was recorded during pipeline construction. It measured 0.8 m x 0.2 m and had a U shaped profile. 1 sherd of Romano-British pottery was recovered from the topsoil	Excavation	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY24078&resourceID=1009	SE 655 411
260	Enclosure and Field System. Romano British ditches excavated in 1998 probably relate to this enclosure system. Pottery finds indicate that the ditches were open until 1st-2nd Century AD.	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17576&resourceID=1009	SE 658 390
261	Probable round barrow. The feature lies amidst cropmarks of part of a field system of probable Roman date.	Cropmark: Barrow	B	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=1231171	SE 659 405
262	Enclosure 284 metres North-East of Bridge Farm	Earthwork	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY25921&resourceID=1009	SE 659 408
263	A linear ditch was recorded to the south of Mount Pleasant Farm during pipeline construction.	Excavation	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY24079&resourceID=1009	SE 659 418
264	Earthworks of a mound and a cairn probably representing Bronze Age barrows	Earthwork	B	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37375&resourceID=1009	SE 660 379

265	A Neolithic flint axe with ground cutting edge. It is in the Auden Collection (York Museum)	Find Spot	N	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992208	SE 660 380
266	neolithic axehead	Find Spot	N	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17560&resourceID=1009	SE 660 385
267	Wash Dyke is a pond measuring 170 x 150 m with steep sides in places. There may have been ditches draining into it and it was interpreted as a former peat pot/peat extraction site	Earthwork	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY25706&resourceID=1009	SE 663 376
268	Field system extending over 1000 metres, with the main axis of the ditches being west to east and north to south. Some of the rectilinear enclosures are double ditched and some contain round houses. Where the double ditches are continuous they may function as trackways as well as boundaries. The field system may be part of a larger system, which is in the same alignment and lies to the east.	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=992203	SE 663 396
269	Field System. The main boundaries follow a north-south alignment, and some are double-ditched, presumably to act as trackways. Part of a wider system of enclosures and boundaries in this area.	Cropmark: Field System	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17704&resourceID=1009	SE 663 404
270	A group of prehistoric burial mounds is located at Dane's Hill, Crook Moor. This represents 1 of 2 areas known as 'Danes Hills'. The larger group of Danes Hills barrows is located to the south, immediately to the west of Riccall airfield. Up to 8 barrows have been recorded by surveys. The mounds are represented by breaks of slope standing up to 0.5 high, surrounded by square ditches. The best preserved mound survives up to 0.6m high and is 10m in diameter, with a surrounding ditch.	Burial	B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17552&resourceID=1009	SE 666 399
271	A bank feature runs parallel to a main drainage ditch on Skipwith Common, north of Danes Hills. It is a part of an existing complex and has a rectilinear pattern with the ditch on the outside. The height of the bank varies up to a value of 0.5 m and measures 1.5-2.0 m in width. It has been interpreted as a possible Iron Age field boundary	Earthwork	I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37386&resourceID=1009	SE 666 402

272	possible square barrows and field system and settlement	Cropmark: Field System	B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY26171&resourceID=1009	SE 668 400
273	A ditched sub-rectangular enclosure of the romano british period, dated by excavated finds	Cropmark: Enclosure	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY24075&resourceID=1009	SE 662 424
274	Earthwork ridge and furrow	Earthwork	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY25915&resourceID=1009	SE 631 418
275	polished stone axe	Find Spot	B	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17660&resourceID=1009	SE 628 425
276	Two conjoined rectilinear enclosures	Cropmark: Enclosure	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1231220	SE 655 437
277	field system or enclosure	Cropmark: Field System	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1230720	SE 618 423
278	possible round barrow	Cropmark: Barrow	B	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1231197	SE 672 415
279	field system and settlement - extensive, extending about 3km, with the main axis of the ditches running approximately north-south and east-west. At the southern end of the complex there occur several round houses. These features form part of a large cropmark landscape of settlements and field systems extending to the south	Cropmark: Settlement	I/R	http://archaeologydataservice.ac.uk/archsearch/record.isf?titleId=1231180	SE 670 415

Hemingbrough and the Southern Area					
301	Hut Circle & Ring Ditch - Lies centrally within the southernmost of the 2 enclosures with entrance to the east	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10590&resourceID=1009	SE 691 319
302	Enclosures - 2 small enclosures sharing a common boundary. The southernmost is square and about 40m long. The northern enclosure although 4 sided is less regular in shape and narrows to the south.	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10589&resourceID=1009	SE 690 319
303	Field System & Settlement	Cropmark: Settlement	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=58043	SE 688 323
304	Hut Circle & Ring Ditch	Cropmark: Enclosure	N/B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10579&resourceID=1009	SE 687 325
305	Field System - The field system is made up of small square or rectangular fields subdivided in some cases into much smaller enclosures, at least 2 contain probable hut circles.	Cropmark: Field System	N/B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10575&resourceID=1009	SE 685 326
306	Hut Circle & Ring Ditch	Cropmark: Enclosure	N/B/I	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10577&resourceID=1009	SE 685 327
307	Farmstead & Enclosure - A small square enclosure with various other very small enclosures attached, within it there is a probable building plotted as a square structure but actually with very round corners.	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10578&resourceID=1009	SE 684 328

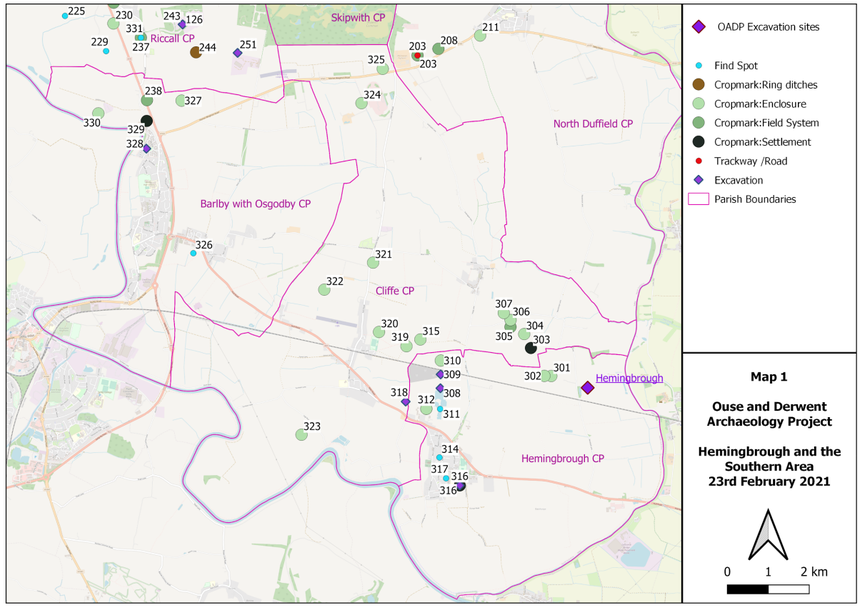
308	Industrial Settlement - Two ring ditches and a curvilinear gully along with linear ditches and a pit were recorded, one containing an Iron Age or Roman beehive quernstone. No pottery was recovered from these features.	Excavation	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38082&resourceID=1009	SE 675 317
309	Industrial Activity - Series of pits, ditches and enclosures of probable Iron age or Roman date was recorded. Successive clay-lined ditches were found to run into large clay-lined pits, several other linear features were recorded which may represent a number of enclosures. Most of the features contained fire cracked stones and charcoal, some others contained burnt clay and iron slag. A small amount of hammerscale was identified. Pottery recovered from the site was dated from the 2nd to 3rd centuries AD.	Excavation	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38081&resourceID=1009	SE 675 319
310	Ditched Enclosure	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37083&resourceID=1009	SE 675 321
311	Roman Camp kettle found in 1962	Find Spot	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17524&resourceID=1009	SE 675 314
312	Settlement - Partially excavated prior to destruction, probably focus of settlement was to east	Cropmark: Settlement	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17523&resourceID=1009	SE 673 314
312	Settlement - Partially excavated prior to destruction, probably focus of settlement was to east	Excavation	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17523&resourceID=1009	SE 673 314
313	Ditched Enclosure	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY10573&resourceID=1009	SE 673 314

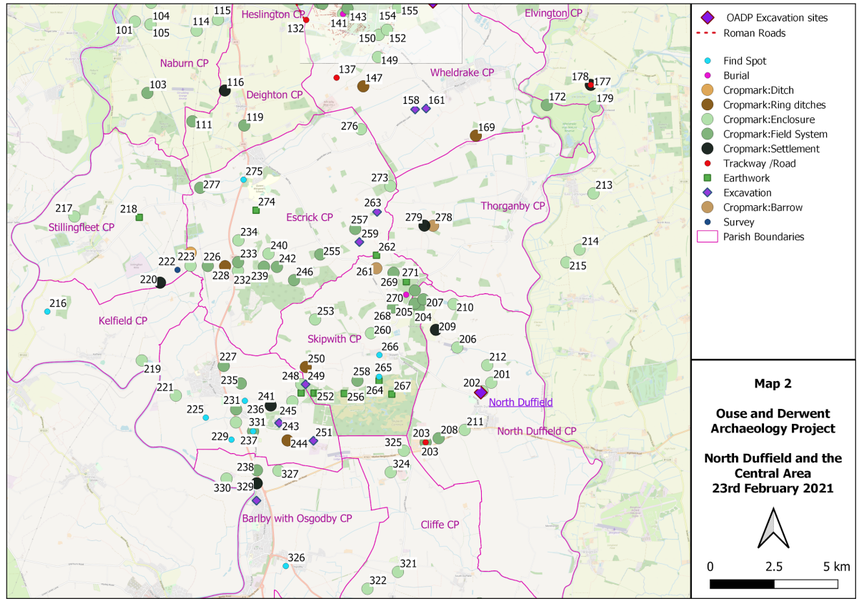
314	Roman Coins	Find Spot	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17516&resourceID=1009	SE 675 307
315	Rectilinear Enclosures, Field System & Round House	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1306832	SE 672 324
316	Settlement - multi-phased Roman military/urban enclosure-based settlement	Cropmark: Settlement	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38932&resourceID=1009	SE 678 303
316	Settlement - multi-phased Roman military/urban enclosure-based settlement	Excavation	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38932&resourceID=1009	SE 678 303
317	Unidentified Object	Find Spot	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17517&resourceID=1009	SE 676 304
318	Farmstead - Rectangular ditched settlement enclosure of probable Iron age or Roman date.	Excavation	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38080&resourceID=1009	SE 670 315
319	Rectilinear Enclosure	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1074936	SE 670 323
320	Rectilinear Ditched Enclosures & Round House.	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1306821	SE 666 325
321	Ditched Enclosures	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1074942	SE 665 335

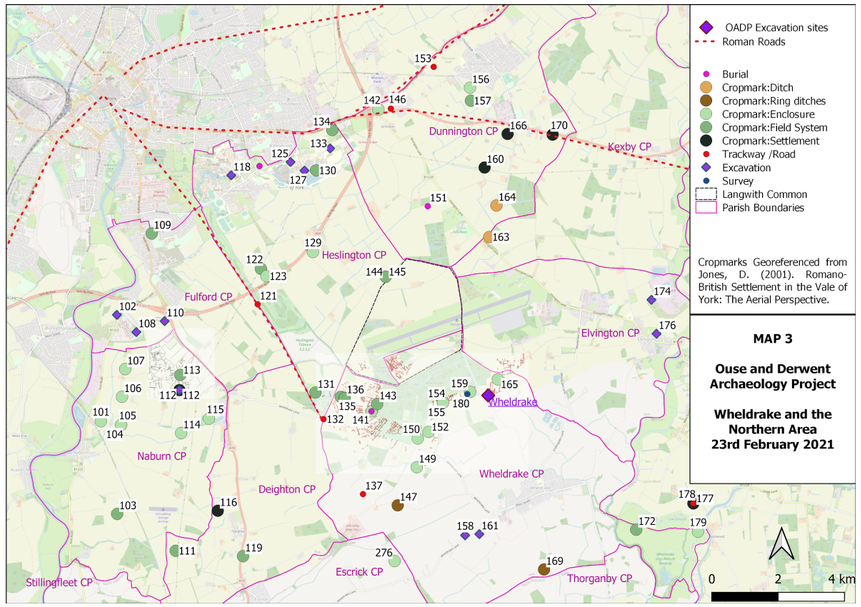
322	Rectangular Enclosure	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1074943	SE 658 331
323	Fragmentary, Rectilinear Ditched Enclosures	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1306881	SE 655 310
324	Rectilinear enclosures & Round House	Cropmark: Enclosure	I/R	https://www.pastscape.org.uk/hob.aspx?hob_id=1312594	SE 663 358
325	Enclosures - The general east-west alignment of the boundary ditches suggests these may be a continuation of features that lie to the east.	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY37177&resourceID=1009	SE 666 363
326	Polished Stone Axe Head	Find Spot	N	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17479&resourceID=1009	SE 639 336
327	Enclosures - Crop marks show a linear arrangement of rectangular and square enclosures on both sides of possible track	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12116&resourceID=1009	SE 637 358
328	High Status Settlement	Excavation	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY38706&resourceID=1009	SE 632 351
329	A sub-circular enclosure, possibly a hut circle, of Iron Age date seen lying in a possibly larger incomplete curvilinear enclosure. These features are seen as cropmarks and earthworks on aerial photography. - Complex pattern of field boundaries and a possible trackway.	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12114&resourceID=1009	SE 632 355

329	A sub-circular enclosure, possibly a hut circle, of Iron Age date seen lying in a possibly larger incomplete curvilinear enclosure. These features are seen as cropmarks and earthworks on aerial photography. - Complex pattern of field boundaries and a possible trackway.	Cropmark: Settlement	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12114&resourceID=1009	SE 632 355
330	Rectangular Enclosure	Cropmark: Enclosure	I/R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY12109&resourceID=1009	SE 625 356
331	Romano-British Pottery	Find Spot	R	https://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MNY17648&resourceID=1009	SE 631 367

Appendix 2: Maps







Iron Age Ouse and Derwent

Conclusions and Interpretation

Round-houses at Wheldrake, 2019

Jon Kenny, Brian Elsey, Paul Durdin
March 2022

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What were our Objectives?

Our project objectives have their roots in a community project that Archaeology North Duffield undertook between 2012 And 2014, led by Brian Elsey and supported by the Heritage Lottery Fund. We had been inspired by evidence, then unpublished, of settlements dating to the Iron Age or Roman period around North Duffield village (since published as Horne *et al.* 2021). We were motivated to reveal more about the settlements that came before the Anglian / Anglo Scandinavian village, moving the history of our historic landscape back in time!

For the Ouse and Derwent Project we were more ambitious, looking at understanding the prehistory of the low lying, riverine, landscape between the rivers Ouse and Derwent south of York. We undertook three excavations at Hemingbrough, North Duffield, and Wheldrake, with a small evaluation at Hardmoor Farm (also Wheldrake). Our work on the earlier excavation at North Duffield gave us a good spread of Iron Age and Romano-British evidence to consider, along with the evidence collected during our desk-based survey. The sites mentioned in this report are located on the map in Figure 1.

We set out to:

- Understand the character of late prehistoric settlement and land use in the area.
- Look for change or continuity in the Iron Age and Roman periods (e.g. could we see a change in land use relating to the building of a large military and civilian fortress and capital on the edge of the area?).
- Better understand evidence for variations in status between and within sites and through time.
- Understand the domestic nature of the agricultural settlements that we investigated.

Our project did not focus on burial practice and, despite evidence for square barrows on Skipwith Common and around Langwith Common (see Figure 1), no cemetery or burial evidence was included. Similarly, while earlier prehistoric activity was not a part of the project, we took note of such evidence as it suggests that the Vale of York immediately south of York was more extensively used for settlement than previously thought.

We drew the following conclusions from our desk based assessment, the earlier excavation project at North Duffield and our four current excavations.

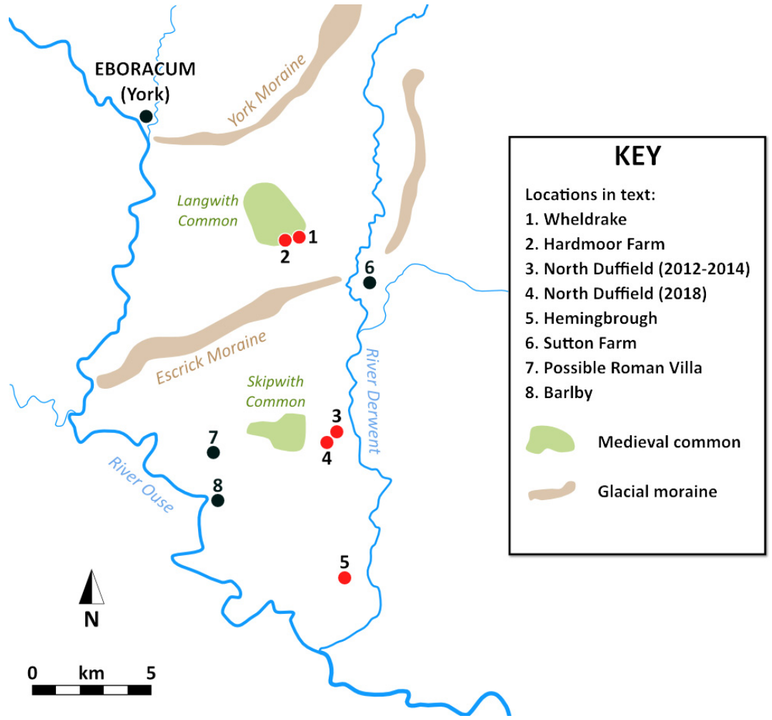

***Figure 1**: Map of the Ouse and Derwent research area, south of York.*

Pre-Iron Age activity in the Ouse and Derwent

As a community project we were interested in finding evidence for occupation before the Iron Age, and our excavations and prior field-walking projects with Archaeology North Duffield revealed several worked flint fragments. Discussion with Peter Makey, a flint specialist, suggested that this flint was coming from a source relatively nearby (Makey *pers. comm.*). This source was probably not, however, the Yorkshire Wolds to the east and the flint may have been derived from waterborne or glacial deposits in the landscape nearby. Although not the Iron Age and Romano-British focus of our project, we also observed this long occupation in the results of our desk based assessment. Evidence in the form of flint fragments, polished stone axes, henges (nearby up the river network at Ferrybridge, Kexby, Newton Kyme and a cluster between the Devils Arrows at Boroughbridge and Thornborough) all suggest Neolithic settlement nearby. Bronze Age burials, land divisions and droveways (not unlike those located on the Wolds to the east) are present on Skipwith Common, and radiocarbon dates recovered from charred grain during our excavations indicates continued arable agriculture between the rivers Ouse and Derwent from the Neolithic until the Iron Age.

Iron Age landscape settlement formation

Iron Age or Romano-British field systems and round-houses have been identified across the area by the English Heritage (now Historic England) aerial survey programme (Horne *et al.* 2021; see Figure 4). This is the evidence that we set about researching in more detail, through geophysical survey and excavation, taking our sense of community understanding of the landscape back beyond the early mediaeval origins of our villages. The Iron Age evidence we recovered from our desk based assessment and from the excavations revealed a progressively complex and intense occupation on the sandy subsoils: a trajectory that seems to go on from the Iron Age into the Roman period with some rearrangement of fields through time.

Living in the Iron Age landscape between the Ouse and Derwent means that you are never far from a river network. This network leads you from the North Sea to the east, into the north and west uplands, and even into the midlands to the south. A riverine network such as this is both an important immediate resource of rich ings marshland and a vital routeway, allowing prehistoric movement by boat across the British landscape. This mobility may well have linked Neolithic ceremonial sites in what we call Yorkshire today. The river network was clearly available in the Bronze and Iron Ages, too, and would have allowed local family-based groups to link to others, possibly leading to larger tribal linkages across wider areas.

Away from the water, however, crop marks seen in aerial photography suggest extensive trackways running across the Iron Age landscape, linking fields and farmsteads. These would have been just as crucial to the local communities, and we found evidence in our excavations for one such trackway delimited by a ditch at North Duffield (see Figure 2).

Although our project did not set out to investigate the rivers themselves, we can anticipate that they played a significant role as both a source of natural resources and means of transport, and their importance in prehistory and the Roman periods would be an excellent and highly relevant subject for future research

Iron Age social stratification

By social stratification, we mean the development of a ruling elite and possibly religious or craft based social groups, who might be expected to build larger structures or have more valuable possessions to reinforce their 'high' status in society. We hoped that we could identify higher status sites in our excavations, and the very large (22m diameter) round-house discovered in the 2012-2014 excavations at North Duffield (see Figure 1, no 3) may have suggested this. However, excavations and desk-based work during the present project suggests that this large house size is unusual in this area in late prehistory.

The very large Iron Age round-houses appear to originate during the Middle Iron Age, while later structures tend to be slightly smaller. The example discovered during our 2012-2014 excavation at North Duffield was dated to the Middle Iron Age (3rd century BC), as was the largest (more than 16m diameter) building uncovered at Wheldrake. We didn't get a date from the very large round-house excavated at North Duffield in 2018, but it was stratigraphically the earliest ring-ditch on the site and a Middle Iron Age date was obtained from another feature. These large round-houses seem to be common in our area during the Middle Iron Age, and perhaps we need to think of alternative uses for them: domestic accommodation, animal housing (or a mix of both), meeting spaces for clan or tribal gatherings, or communal work spaces are all possibilities.

Developing in the Middle Iron Age along with the large round-houses, we also saw surrounding enclosures at two of our sites, North Duffield (see Figure 2) and Wheldrake (see Figure 3), but not at Hemingbrough (see Figure 4). These enclosed farmsteads suggest social stratification and group organisation in the family clans beginning before Roman influence in the area.

Despite the enclosure of some farmsteads, we did not recover any obviously high status artefacts, suggesting a social hierarchy that was not driven by wealth, in the Ouse and Derwent area at least. Other sites further to the east, on or next to the Yorkshire Wolds, have revealed the expression of more wealth and an interest in martial activity through grave goods. This burial data is sparse in the Ouse and Derwent area, but we do have cemeteries of square barrows on Skipwith and Langwith Commons (see Figure 1). None of the excavated examples, however, have revealed artefactual evidence suggesting wealth or high status, apart from the fact that they have been afforded a square barrow.

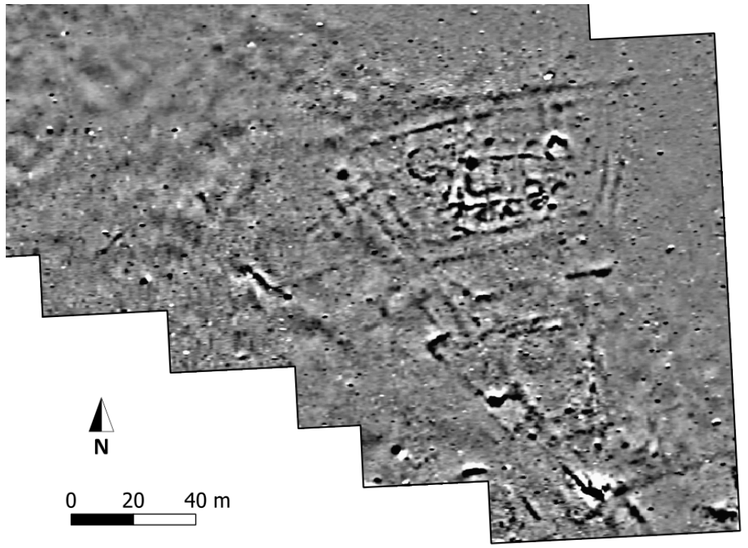

Figure 2: *Magnetometry results showing the large enclosure investigated at North Duffield.*

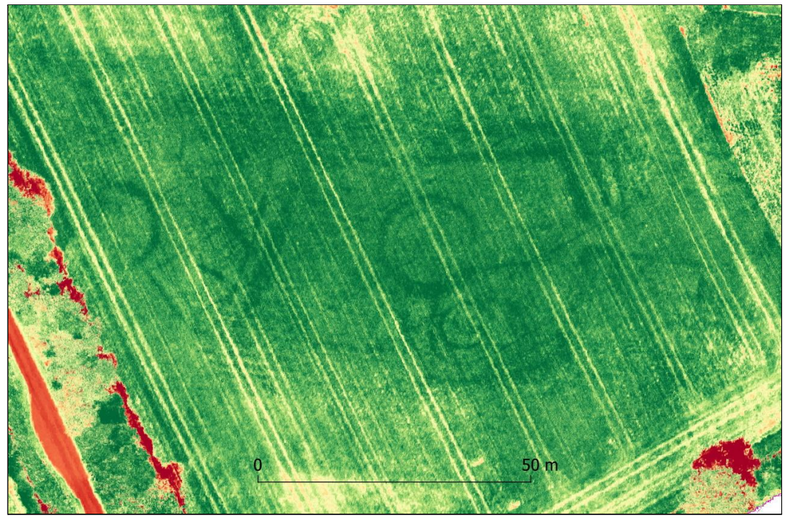

Figure 3: *The enclosure at Wheldrake, seen as crop marks in NDVI (Normalised Difference Vegetation Index) drone photography. Image: Tony Hunt/YAA Mapping.*

Iron Age domestic activity

In aerial photographs, the lowland Iron Age settlements appear to cluster on the sandy subsoils of the Ouse and Derwent, although this may be a result of crop marks appearing less clearly on the clays and gravels. The settlement pattern tends to take the form of large fields demarcated by ditches, and within these fields there sit either individual or clusters of round-houses. These clusters have been observed to the west (Chadwick 2009) and east (Halkon 2013 and Giles 2013) to become larger, taking on the appearance of more enclosed settlements. This is also the case for our sites at Wheldrake and North Duffield, which include enclosures containing unusually large round-houses as well as multiple smaller structures.

Artefactual evidence recovered during the excavations suggests there is significance to domestic activities such as weaving and iron working. We recovered several broken and partial clay loom weights discarded in ditches, along with a single unbroken loom weight which was placed in a clay post foundation pad in one of the round-houses at Hemingbrough. The reuse of an important part of a loom in the rebuilding of a new home, incorporating a still-usable part of a vital domestic activity in the construction, may have signified that weaving held more than merely functional importance to the builders. While we may never really know, it is easy to speculate that the round-house was built for a weaver, and that the loom weight, as a vital part of their life, was sacrificed to provide a spiritual or mystical foundation for the building.

Less evocative, but also suggestive of the work of craft workers, we had evidence of iron working, in the form of slag and waste materials, from our excavations at Hemingbrough (see Figure 1, no 5), North Duffield (see Figure 1, no 4) and Hardmoor Farm (see Figure 1, no 2). Peter Halkon has identified significant iron working sites a few miles to the east in the Foulness River valley: like those, our Ouse and Derwent area also contains sources of bog iron, that can be used for iron smelting, previously identified by the Soil Survey of England in a map in published in a paper discussing the historic landscape of Wheldrake (Sheppard 1966).

Our excavation at Hemingbrough also revealed partially germinated barley grains typical of malting processes, suggesting the brewing of beer or ale.

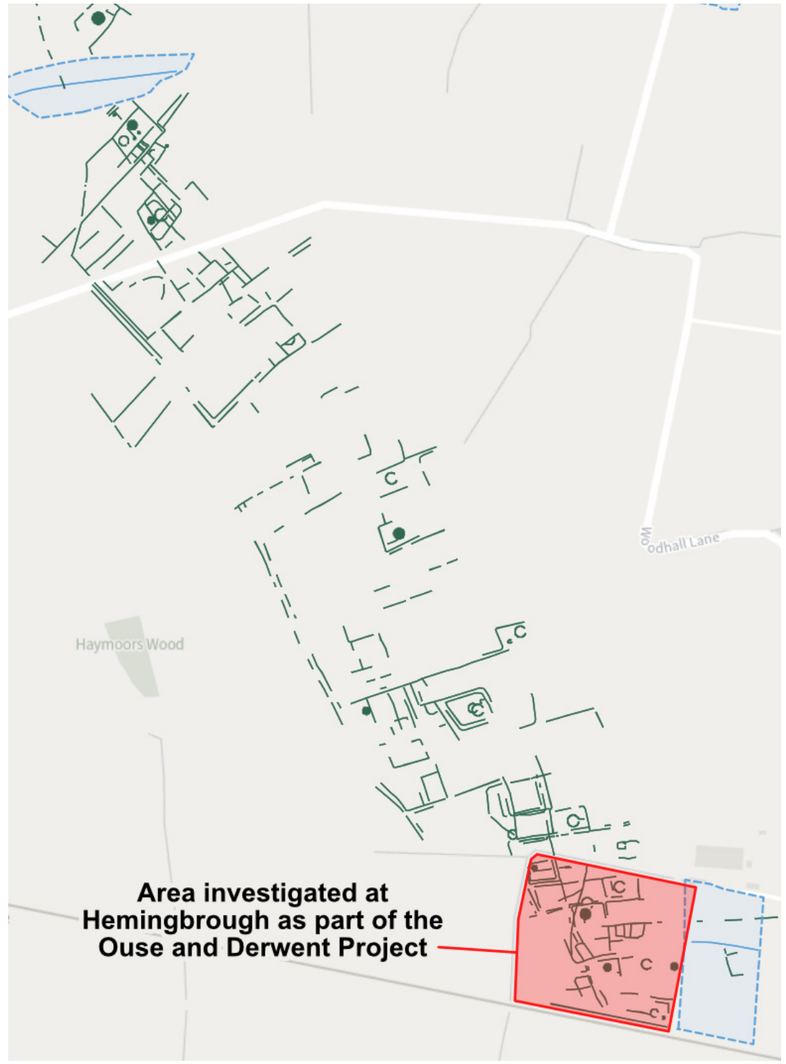

Figure 4: *Settlement patterns at Hemingbrough as identified from crop marks by Historic England's National Mapping Programme (Horne* et al. *2021). Image: Historic England.*

Iron Age summary

Although our Iron Age activity does not appear to display the wealth that is seen to the east in particular, we do still clearly have Iron Age peoples occupying and exploiting the land between the rivers Ouse and Derwent. We also see the development of enclosed farmsteads, with unusually large round-houses, that may represent the homes of clan or community leaders.

The low-lying lands of the Ouse and Derwent had plenty of sandy subsoils that are easy to work for arable crops, and the lowland climate provides a longer grass growing season for pasture. The sandy, slightly higher locations were not subject to seasonal flooding, although no one was far from marshy ings and the resources of the shallow river valleys. Whyman and Howard have suggested that the lowlands may have only been visited seasonally (Whyman and Howard 2005), but the domestic evidence we've found suggests otherwise. It is not impossible that the lack of wealth on display in the Ouse and Derwent area is a side-effect of only seasonal occupation, with valuables kept elsewhere. However, the investment of time and resources to create the enclosed farmsteads and large round-houses certainly suggests a more permanent settlement, occupied and used year-round.

The large, enclosed round-houses in the Middle Iron Age are of particular interest. Do they represent an adaptation for raising animals that can share accommodation during the winter with the humans, or are they meeting places for the lowland clans, a role that is elsewhere held by communal structures such as hill forts? Or are they 'merely' extra large homes for an extended family group, a societal configuration that changes later to be split amongst several smaller buildings? We noted a growth in complexity, although slow, through the later Iron Age and into the Roman period.

Increasing complexity into the Roman period

Our research, originally aimed at the Iron Age landscape, could not but continue into the Roman period as the sites straddle both eras. As we noted in the Iron Age evidence, the settlement pattern progressed from scattered fields to a more formalised laying out of boundaries, leading to more rectangular, measured systems in the Roman period. As it did in the Iron Age, this appears to represent a movement towards communal efficiency in agricultural and industrial activity, whereby production is increased by communities working together. However, this was not accompanied by any noticeable change in the expression of wealth, whether by better-off clan members or incoming landowners drawn from new Romano-British populations in the area. So, we might argue that the slightly more complex settlement features are simply a continuation of changes already becoming visible in the Iron Age, or perhaps the influence of nearby elements of the Roman Empire. Indeed, during the Roman period we may be looking at more significant change towards the end of the 2nd century AD, when the enclosed farmsteads show considerable change. The round-houses at Hemingbrough and the farmstead at Wheldrake go out of use entirely, whilst the enclosure at North Duffield is filled in and the round-houses replaced by a rectangular building.

Romano-British change

During the Roman period there were some important trading centres very near to the Ouse and Derwent landscape, the biggest and most obvious example being the Fortress at *Eboracum* (York) to the north (see Figure 1). There was also a military-related centre on the River Ouse at Barlby (see Figure 1, no 8) to the west and a small ribbon settlement at Sutton Farm (see Figure 1, no 6) on the east bank of the Derwent opposite Wheldrake. Recent commercial excavation near Wheldrake has also identified a Romano-British farmstead that suggested similar results to our excavations (Robinson 2009).

Other university, commercial and community excavations at the northern extremity of the Ouse and Derwent area at Lingcroft Farm, Kexby and Heslington have also revealed sections of the Romano-British

landscape. It is quite surprising that, apart from the more complex field systems, there is only a small amount of material culture filtering through trade down to the rural settlements nearby after the Romans arrived. The evidence from our excavations does however, suggest a significant change in the landscape use towards the end of the 2nd century AD, when the Roman presence at *Eboracum* (York) will have been well established and undoubtedly exerting a strong influence over the region.

Continued lack of high-status settlement

In the Roman period there is still little evidence for high status inhabitants in the Ouse and Derwent landscape. Some farmsteads, such as those at Wheldrake (see Figure 1, no 1) and North Duffield (see Figure 1, no 4) had already become more significant during the Iron Age, showing increasing complexity and appearing more tightly enclosed. This can be argued as a general trajectory that has been in place since their origin and through the Iron Age, with no real shift evident in the Roman period. It is also notable that only one Roman villa has been identified so far in the Ouse and Derwent area (see Figure 1, no 7), evidenced by a scatter of finds and building material between Riccall and Skipwith and reused stone in the church at Skipwith.

The lack of social stratification and wealth visible in the area (until, perhaps, a villa appears) is interesting. To the west, there are several villas on the river Wharfe running to join the Ouse from Roman *Calcaria* (Tadcaster), but only one so far between the Ouse and Derwent. It is possible that the Ouse and Derwent landscape is dominated by the military, perhaps as part of the territorium supplying the legionary fortress. It is also possible that the wealthier peoples living in our landscape were drawn into *Eboracum* itself, or even further north up the Ouse to the civitas at *Isurium Brigantium* (Aldborough). Unusually for this landscape, the population of *Eboracum* seems to have remained present and substantial throughout the period, because the army always had continual presence there.

It is also possible that there were few wealthy clans in the Ouse and Derwent area in the first place, but as it was occupied and productive that it was seen as the obvious place to establish a territorium to feed the fortress. It is even possible that the more complex field systems represent development to meet the needs and demands of the army, with some farmsteads even possibly occupied by retired soldiers in later years.

Thus the occupants of our sites might have been clan based extended families in both the Iron Age and Roman periods, forming small farming communities. During the Roman period they would likely also have included slaves, and perhaps retired soldiers: although the latter might be expected to result in more fragments of 'Roman' material culture as are common on military-related sites. The sites that we looked at contained enough Roman-influenced and imported pottery to show continued occupation and use through the Roman period, but not enough to suggest a significant change in the population or culture in that time. This seems all the more strange given the proximity of the sites to significant more-Romanised settlements. It should be noted that a minor Roman coin hoard was discovered less than two miles from the sites at Wheldrake and Hardmoor Farm, showing that Roman coins were present in the region while being completely absent from our sites.

The four sites excavated as part the current project, and the 2012-2014 North Duffield site, appear to have been producing enough surplus to allow some trade for finer wheel-turned Roman pottery, but not enough to permit wholescale adoption of 'Roman' material culture. There is a possible exception in the enclosed farmstead at North Duffield, which has a larger proportion of later Roman ceramics along with a possible beam-slot foundation rectangular structure appearing late in its chronology. This last phase at North Duffield, with the enclosure boundaries backfilled and a rectangular structure, may represent a change in landscape use towards more larger, centralised estates, perhaps also indicated by the appearance of a villa to the west (see Figure 1, no 7). The farmstead at North Duffield, however, doesn't seem to display any more significant wealth after this change, and the presence of a villa to the west is still unconfirmed, having only been briefly investigated some 20 years ago.

Wheldrake (see Figure 1, no 1) might be expected to have been more heavily influenced by its proximity to Roman track ways and *Eboracum*, but there is no significant difference, and it also doesn't survive beyond the 2nd century AD. Perhaps it was subsumed into a larger estate after this time, again harking back to the possible villa between Riccall and Skipwith (see Figure 1, no 7). This later portion of the Roman period is another area needing further research.

The river network during the Roman period

As we noted previously, the river network must have continued to be very important into the Roman period, both for transport and as a source of resources. Its significance can be seen in the presence of important Roman military sites and settlements sited beside rivers. Although we have not found fish bones to suggest riverine food sources, the rivers washing through glacial sub soils will also have provided cobbles for use as pot-boilers, which appeared in their hundreds on our sites.

What happened to our sites?

The settlement sites at Wheldrake and Hemingbrough appear to have been deliberately abandoned early in the 2nd century AD, with almost no unbroken material culture left behind. Meanwhile, the site at North Duffield changes before going out of use: the enclosure surrounding the farmstead is filled in, and a rectangular structure replaced the round-houses, taking the period of occupation into the 3rd or even 4th century before the site was abandoned completely. But in all cases, eventually, it is as if the population took everything they had and moved away, leaving their houses, round or rectangular, to fall into ruin.

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The Iron Age Ouse and Derwent Project

Geophysical Survey at Hemingbrough, 2017

Site location: Woodhall Lane, Woodhall, Hemingbrough, YO8 6TG

Site grid reference: SE 6915 3175

Date of survey: 22 August and 12 - 14 September, 2017

Undertaken by: North Duffield Conservation and Local History Society

Survey supervisor: Paul Durdin

Summary

Magnetometry and earth resistance survey were undertaken on a site which previously featured crop marks suggestive of Iron Age or Romano-British settlement. The magnetic data corresponded closely to the crop mark analysis, showing a number of ring-ditches and portions of a linear settlement pattern.

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Introduction

The site at Hemingbrough was selected for the project based on crop mark features identified by the Vale of York National Mapping Programme (Kershaw 2001). These crop marks appeared to show a settlement pattern made up of enclosures and field boundaries, with a number of prominent ring-ditches. Geophysical survey was undertaken in order to further characterise the features seen in the crop marks, to obtain a higher level of detail, and to provide accurate location data for excavation.

Figure 1. Crop mark features at Hemingbrough as identified by the Vale of York National Mapping Programme.

The field surveyed is roughly rectangular in shape, and measures approximately 460m long by 205m wide.

Geology

The site at Hemingbrough is situated on Sherwood Sandstone Group bedrock, overlain by the Breighton Sand Formation (BGS 1973). The visible topsoil was a soft, dark brown sandy silt.

Current use

The field surveyed is currently in use as arable land. It is bordered on all sides by hedges except the north, which has a hedge along only half its length, the other half being bordered by a deep drainage ditch. The Selby-to-Hull railway line runs behind the hedge on the southern boundary.

Methodology

A grid baseline was established running parallel with the northern boundary of the field, and a number of grid points at 100m intervals were plotted using a manual Leica total station. The total station was positioned relative to three fixed points, all identified with a reflective survey marker, on a building in the neighbouring property, a utility pole beside the road to the east, and a tree on the western boundary. After these grid corners were established, 100m hand measuring tapes were used to fill in a 20m by 20m square survey grid.

Earth resistance survey was undertaken over a small area prior to the magnetic survey, with the location selected based on the presence of features in the crop marks. Only 6 full grids were surveyed, a total of 0.24 hectares, in very dry weather conditions. The survey was conducted using a Geoscan RM15 earth resistance meter, at 0.5m intervals on 1m traverses, and the data downloaded onto a PC on site for review. A loose contact in the instrument after the first three grids caused issues with data collection in the second half of the survey, and the results for that area are consequently of poor quality. No further earth resistance survey was undertaken after the magnetic survey.

Magnetic survey was undertaken by the supervisor and a number of volunteers using a Bartington Grad-601-2 fluxgate gradiometer system. The system was calibrated by each new surveyor and re-calibrated at intervals during use, usually after every ten completed grids but varying based on the grid layout. Sensor height on the Bartington was also adjusted to be equal from the ground across all surveyors. Data was downloaded and viewed on site, with only rough processing, in order to inform the approach to further survey.

Magnetic readings were taken at 0.125cm intervals, on 1m traverses in a zig-zag layout across the grid, with the initial direction of walking NNE. Apart from a single grid on the western boundary which was one traverse short, and several on the north and southern boundaries which stopped just shy of the grid edge due to vegetation growth, the survey was limited to complete grids. A total of 104 full grids and 1 partial grid were surveyed, around 4.2 hectares in total. Four grids over one of the clearer ring features were also re-surveyed on a traverse direction of ESE-WNW, to obtain an alternate set of data for this area.

Both magnetic and earth resistance data was processed off site using Snuffler 1.3. Filters used on the magnetic data were Destripe followed by selective use of Destagger to correct survey pace inconsistencies. A High Pass filter was selectively applied to six grids in the southeast corner, in order to counteract the ‘bloom’ caused by the nearby railway and enhance the visibility of the features in that area. The data was then clipped to +/- 3.3 nT and interpolated twice perpendicular to the angle of traverse. Earth resistance data was grid-matched first, followed by a Despike filter to remove invalid readings before interpolation. Both types of data were exported as PNG images and georeferenced in QGIS 3.18, which was then used to create the interpretations.

All geophysical data, processed images and interpretations created during this survey are included in the project archive in non-proprietary file formats.

Results

The earth resistance data only shows a pair of NNE-SSW linear low resistance features, probably ditches relating to the settlement patterns, but there is little to merit further discussion. Future earth resistance survey, over a wider area and in better conditions, may give more useful results. However, the magnetic survey was very successful and revealed several ring-ditches and linear features that correspond exactly to elements of the crop marks.

Magnetometry

The magnetic data shows several rings of varying completeness and clarity, along with a number of linear features and a scatter of discrete pit-like responses.

Five definite ring features, and three fainter rings, are visible in the survey. The largest of these, at c.17m diameter, is in the central northwest area, and has a second, fainter ring of c.15m diameter immediately to its south. A more tenuous feature, but probably another ring of c.17m or even slightly larger, can be seen northeast of these two, but only its southeastern quadrant and a portion of its western extent are clear.

In the central southern area are two very clear rings of c.14m and c.15m diameter, while in the far southeast is a third of c.12m diameter. Just east of this latter is a semi-circular feature, probably the western half of another ring of similar size. The last potential ring is in the northwest corner of the field, but it is very indistinct and extends west out of the survey area.

All these rings bar one—the partial ring in the southeast—were previously identified in the crop mark analysis, and are all interpreted as the ring-ditches of Iron Age or Romano-British round-houses, set within an agricultural settlement pattern defined by roughly rectilinear boundaries. In the two instances with very closely adjacent rings, these may well represent re-building rather than contemporary buildings. The crop marks also showed a ring in the eastern part of the survey area which does not appear in the magnetic data.

The settlement pattern is quite clearly defined in the crop mark analysis, but only a small portion of the linear boundaries which comprise it appear in the magnetic data. These are most strongly visible in the central southern area of the survey, corresponding with a N-S trend of enhanced magnetic response. This trend is visible continuing to the north, but appears confined to a central 'strip' in the survey, and its association with the settlement pattern suggests it is caused by human activity in this area.

While the crop marks show ring-ditches set within well-defined enclosures, the boundaries that appear in the magnetic data are not complete enough to provide further substantiation. Nonetheless, where they do appear they correspond closely to boundaries that are visible in the crop mark analysis.

A large number of faint, very straight linear trends can be seen, mostly aligned N-S but with a proportion aligned ESE-WNW parallel with the present-day field boundaries. Most of these elements probably relate to field drains or other modern agricultural activity. However, a pair of sinuous linear features, running E-W and roughly parallel near the northern end of the survey area, may well be of ancient origin. These could form a trackway, or earlier field boundaries, but they do not appear to be associated with the prehistoric/Romano-British settlement features.

Dipole responses are visible scattered across the area. Most of these are likely to derive from modern ferrous material in the topsoil. Two large negative anomalies in the southern area were caused by metal canes accidentally used as traverse markers during the survey. The railway line running behind the southern field boundary caused a large dipolar 'bloom' in the southernmost row of grids, which somewhat masks the archaeological features in that area even with use of a High Pass filter.

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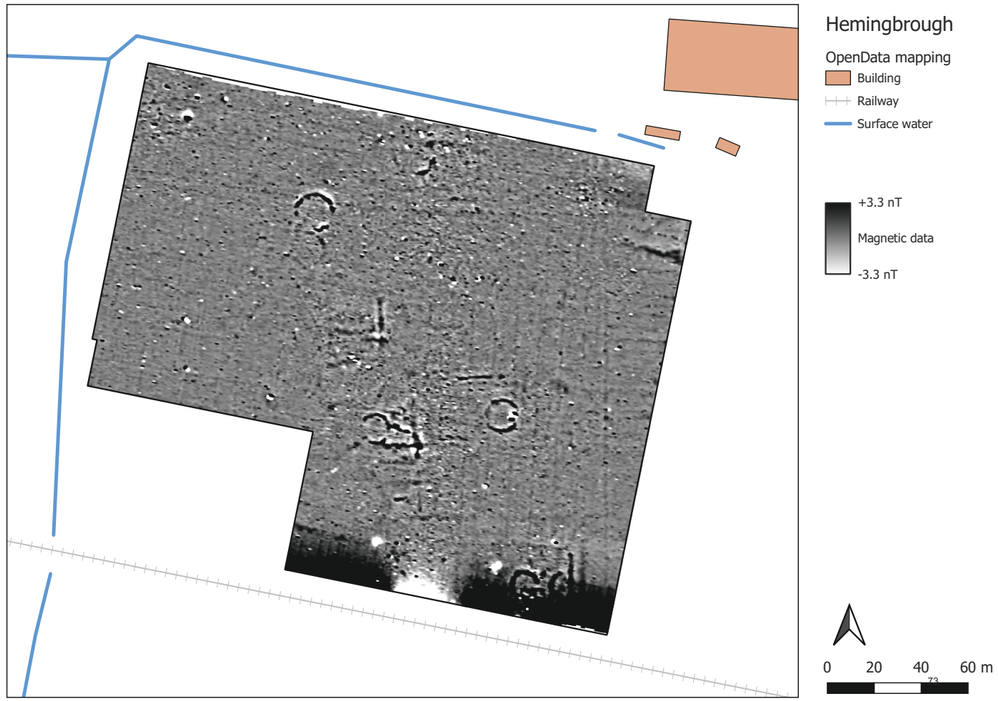
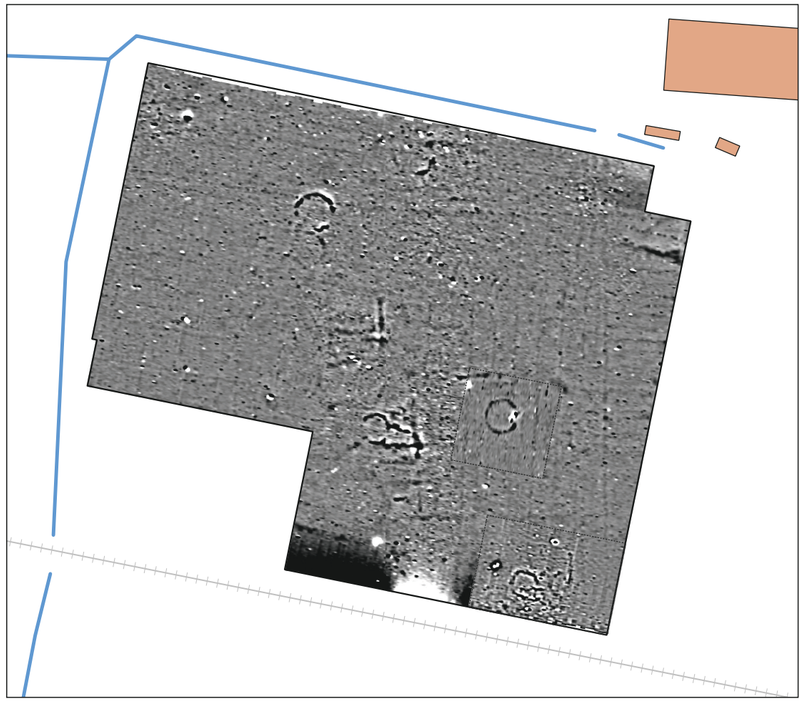




Hemingbrough

OpenData mapping

- Building
- Railway
- Surface water

+3.3 nT

Magnetic data

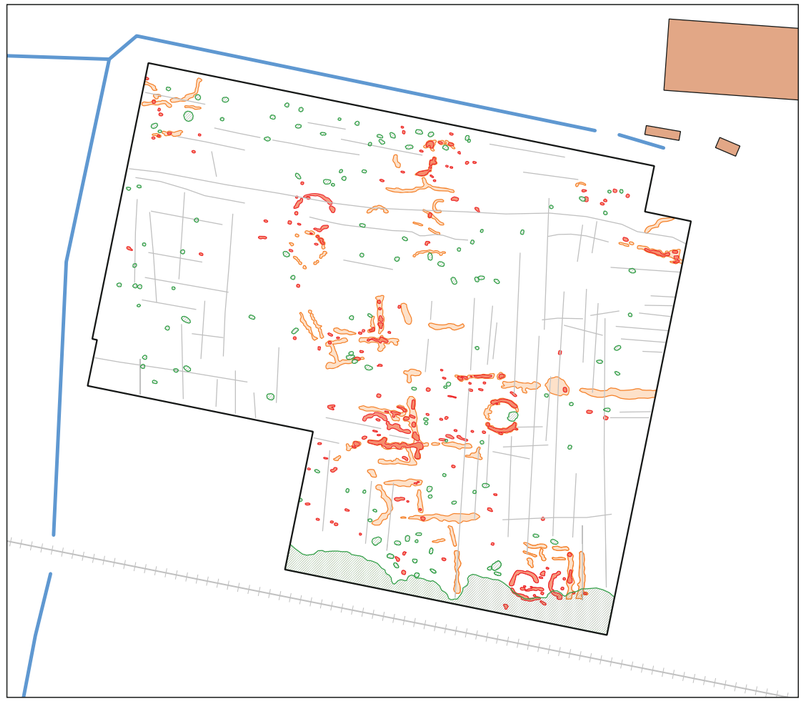
-3.3 nT

Alternate survey data:

Four grids were re-surveyed in ESE-WNW traverse direction over the east central ring-ditch.

Six grids in the southeast are shown after application of a High Pass filter to enhance visibility of the features masked by magnetic 'bloom' from the nearby railway.

0 20 40 60 m



Hemingbrough

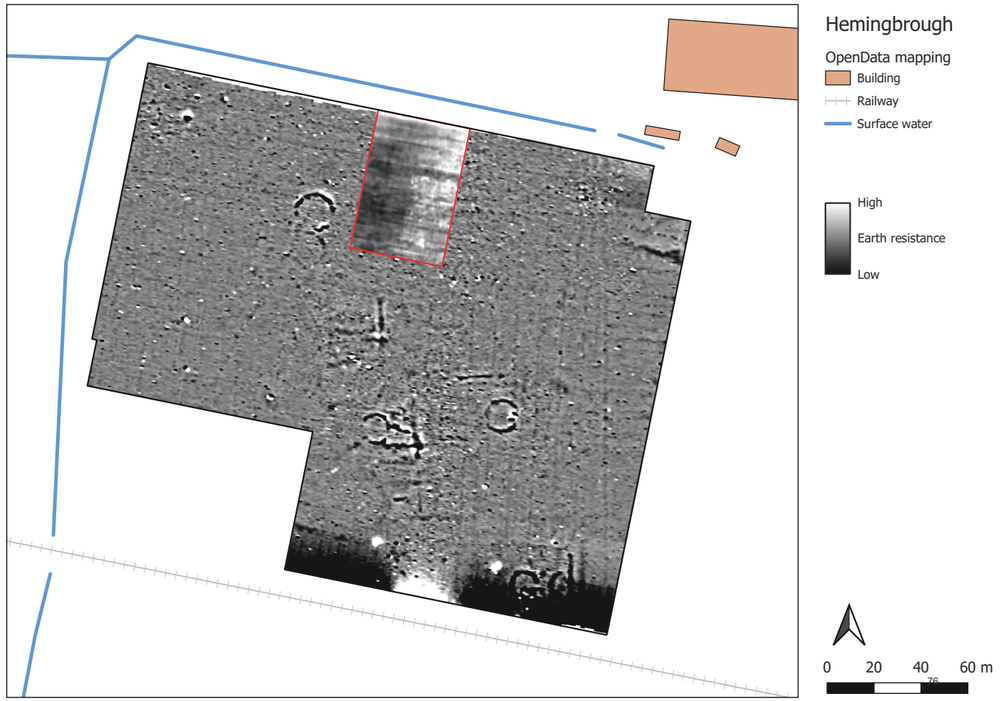
OpenData mapping

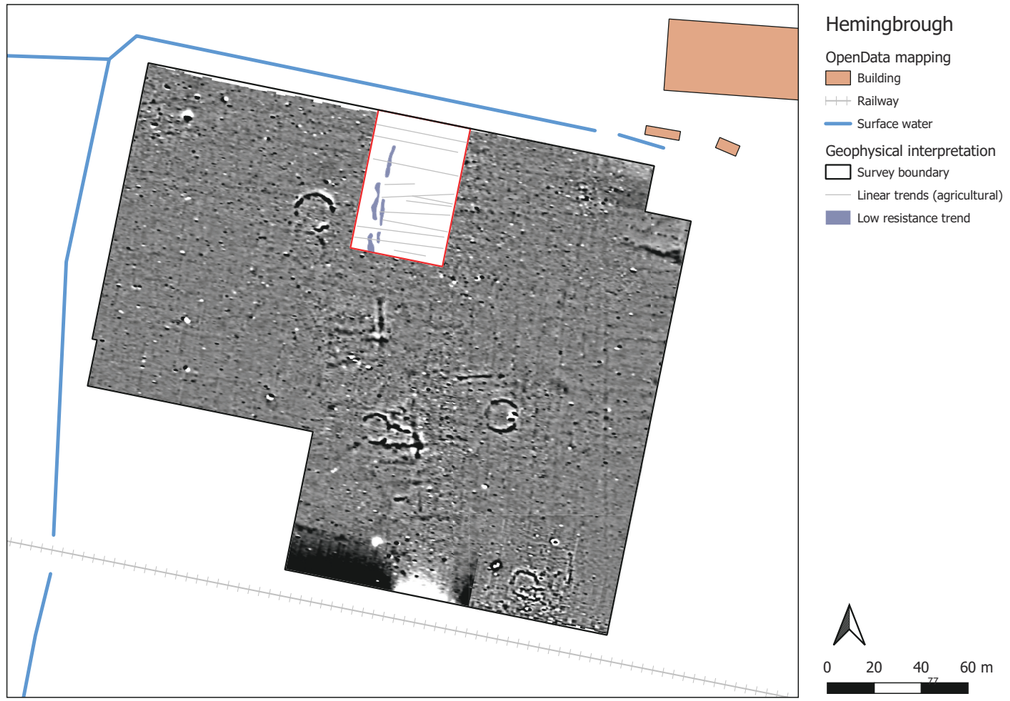
- Building
- Railway
- Surface water

Geophysical interpretation

- Survey boundary
- Ferrous/dipole response
- Linear trend
- Archaeological feature
- Magnetic trend

0 20 40 60 m


Hemingbrough
OpenData mapping
Building
Railway
Surface water
High
Earth resistance
Low
0
20
40
60 m


Hemingbrough
OpenData mapping
Building
Railway
Surface water
Geophysical interpretation
Survey boundary
Linear trends (agricultural)
Low resistance trend
0
20
40
60 m

The Iron Age Ouse and Derwent Project

Excavations at Hemingbrough, 2017

Site location:	Woodhall Lane, Woodhall, Hemingbrough, YO8 6TG
Site grid reference:	SE 6915 3175
Site code:	OADP17
Date of excavation:	30 September - 13 October, 2017
HER:	North Yorkshire HER
Undertaken by:	North Duffield Conservation and Local History Society
Excavation supervisor:	Paul Durdin, Jon Kenny
Report prepared by:	Brian Elsey, Paul Durdin, Jon Kenny
Report produced:	August-September 2021
Archive deposited:	Yorkshire Museum (YORYM : 2021.10)

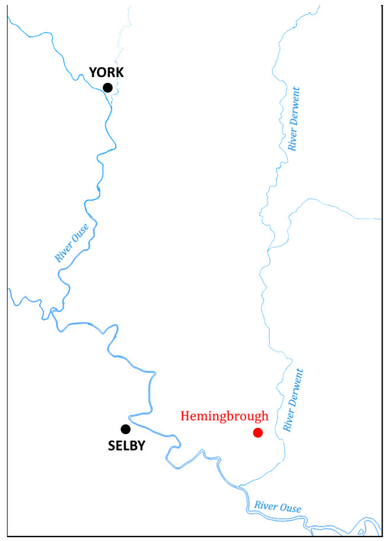
Summary

Six trenches were excavated at Hemingbrough, revealing parts of four round-house ring-ditches and a number of other archaeological features indicating ancient rural settlement. Pottery sherds and radiocarbon sampling from the site date the occupation of the site to the late Iron Age and into the early Roman period.

Table of Contents

Introduction

The excavation site at Hemingbrough is situated to the west of Woodhall Lane, Woodhall, Hemingbrough, immediately north of the Selby-Hull railway line. This site was selected for investigation after aerial photographic evidence revealed crop-marks of ring ditches, linear ditches and field boundaries, suggesting an Iron Age settlement fitting the profile of the project's research questions. The site is 1km from the River Derwent to the east, and 2.6 kilometers from the nearest point of the River Ouse to the southwest, sitting within the southern Vale of York bounded by those two rivers.



Geophysical survey was carried out prior to the excavation in order to identify potential trench locations, with mixed results. While the magnetic data corresponded strongly to the crop-mark evidence, showing a number of clear ring-ditches, the earth resistance survey did not reveal any definite archaeological features (Durdin 2020).

Archaeological Preamble

The project objectives sought to build on our understanding of the archaeological landscape in our part of the Vale of York area. The scattered enclosure, linear features and ring ditches suggested a loosely agglomerated Iron Age or Romano-British settlement extending across the landscape. This is the kind of settlement to be expected in the area, outlined in the desk based assessment produced for the project (Ratcliffe *et al* 2020). It also corresponds to the late Iron Age and Romano-British open or enclosed settlements indicated to the east and west (Chadwick 2009, Halkon 2014 and Allen *et al* 2016). Our objective was to highlight the dating and changes through time at the Woodhall Lane site, securing the site in the chronology of settlement observed elsewhere.

The apparent open settlement may be a family or clan based rural settlement. It was our objective to attempt to understand the status of the site in its appropriate point or points in time. With regard to status we would also seek to understand the activities going on at the site: were they simply an isolated farmstead engaged in subsistence agriculture, or was the settlement part of a widely populated landscape and interacting with links further afield.

Geology

The site at Hemingbrough is situated on Sherwood Sandstone Group bedrock, overlain by the Breighton Sand Formation. The natural geology encountered was sand, varying between white, grey and yellow, to the limit of excavation at 0.7m below the bottom of the topsoil. The topsoil was a soft, dark brown sandy silt, approximately 0.4m in depth.

Current use

The field is in use as arable land for farming a variety of crops, but the topsoil **2100** is considered to be of sufficient depth (0.4m) at the time of excavation to mitigate any damage to the archaeological features.

Methodology

The trenches were laid out on the same site grid as the geophysical survey, using a Leica total station positioned with reference to several previously identified fixed points (cf. Methodology in Durdin 2020). All the agricultural plough soil was removed by machine, after which the trenches were cleaned by hand to identify archaeological features. Excavation of features was undertaken selectively, with the priority placed on identifying stratigraphic relationships (where unclear), clarifying feature form and function, and recovering dating evidence. In most cases, only a percentage of any single feature was excavated, with the majority of the fills preserved *in situ*, both to allow future investigations and to limit post-excavation time and costs. All trenches were backfilled by machine at the end of the excavation period.

Finds were largely cleaned and bagged on site. A very large quantity of heat-affected stones were recovered from some features, and of these only a small number were kept as a representative sample. Due to the fact that most fills were primarily silty sands devoid of biological material, bulk soil samples were only retrieved from archaeological contexts that were either in important stratigraphic positions or had a noticeable charcoal or organic component.

Context, drawing, photo and sample registers were filled out by hand on paper and digitised following the excavation. Individual context records were completed digitally on Android tablets, in a recording system developed using Memento Database. All site records were reviewed on PC following the excavation, and the complete context data was then exported in CSV format for inclusion in the final project archive.

Trench 1

Trench 1 was 7.2m long by 5m wide and was targeted over a very strong magnetic anomaly present in the geophysical survey. There were no other significant geophysical anomalies in

the area of excavation, although cropmark evidence suggests the trench location is within an enclosure, possibly associated with a ring feature c20m to the west.

Removal of the topsoil revealed a number of criss-crossing linear features and one small circular feature, all of which were part-excavated to establish their nature and their stratigraphic relationships with other features. They can all be broadly grouped into two phases: prehistoric or Romano-British activity and relatively modern field drainage systems.

Phase 1 - Prehistoric / Romano-British features

The first phase of archaeological features is evidenced by a range of small gullies and ditches, although it is likely that all have been truncated by agricultural processes and are thus only the remnant of larger features.

Stratigraphically, the earliest of these features is an east-west aligned shallow gully **[2123]** which is truncated by later features **[2124]** and **[2125]**. Fill **2108** in **[2123]**, along with fill **2113** in **[2124]**, contained sherds of calcite tempered pottery dated to the Late Iron Age. A pottery sherd was also recovered from fill **2104** in a separate, very irregular gully **[2106]** aligned NE-SW in the northeast corner of the trench, but this was identified as being from a later, Roman period (note: due to an error in labelling during finds processing, this sherd's provenance is now uncertain). Feature **[2122]** in the southwest corner of the trench contained sandy ware sherds of a similar later period.

Two features of unknown date were also excavated, pit **[2116]** and ditch **[2125]**. The former is isolated stratigraphically, while the latter cuts through prehistoric features and is itself truncated by 19th-21st century field drains, but could date from any time between those events. Fill **2115** in pit **[2116]** did contain a number of burnt cobbles and fragments of burnt bone, which are similar to finds in other, definitely prehistoric, features on the site. Ditch **[2125]** contained no dateable evidence.

The pottery finds in Trench 1 suggest an Iron Age or Roman date for these features, but their exact nature and function remains indeterminate due to the limited extent of the trench.

Phase 2 - Field drains

The second phase relates to the establishment of relatively modern field drains. While precise dating was not determined for these features, none are likely to date from before the 19th century.

Stratigraphically, the earliest of the drains is **2102** in cut **[2105]**, a horseshoe-shaped drain which is roughly moulded, perhaps handmade, placed on a flat tile base (a type also known commonly as 'mug and sole'). This is truncated by later drain cuts **[2109]**, **[2110]** and **[2119]**. Drains **2103** in cut **[2110]** and **2118** in cut **[2119]** are also ceramic, but of cylindrical form and both are machine-extruded rather than moulded. Drain **2103** is deliberately blocked, with a fragment of drain pipe or tile: this may relate to later truncation rather than its original installation. Drain **2118** is much larger diameter than **2103**, and where it is truncated by drain

cut **[2117]** it has been mended by inserting a length of plastic pipe into the gap. The inserted plastic pipe was then roughly covered with ceramic drain fragments, although these would likely have no useful effect. Drains **2101** and **2107** are both corrugated plastic and likely of late 20th/early 21st century date, and as they are installed at a similar depth they are probably both part of the same drainage system.

Features **2111** and **2112** are, in plan, both clearly later than drain **2101**, and both located over intersections of drains, and it was decided not to excavate them since they are obviously very recent deposits. The farmer suggested these might be the result of manual drain clearing or repairs to the drain junctions. After excavation had concluded, metal detector survey of the trench discovered an extremely rusted Castrol oil tank buried within feature **2112**. This find accounts for our strong magnetic response on the geophysical survey.

Trench 2

Trench 2, 5.2m by 3.8m, was targeted over a geophysical anomaly which cropmark evidence suggested was part of a ring-ditch, although only a portion of the overall ring was visible in the geophysics. Removal of the topsoil confirmed this interpretation, and revealed further ancient features as well as relatively modern field drains.

Phase 1 - Prehistoric / Romano-British features

The ring-ditch **[2201]** extended across the trench from the west section, curving northwards in the eastern side of the trench. It was fully excavated in three slots, all of which produced pottery of mid-to-late Iron Age or Romano-British type. This feature has been interpreted as the 'drip gully' around a round-house, although its size and consistent nature suggest it was intentionally dug rather than formed from water flowing off the roof.

A fragment of charcoal from fill **2202** in ring-ditch **[2202]** was radiocarbon dated to 3896 ±26 BP: 2380 ±85 calBC (95.4% probability). This date suggests use of the area during the early Bronze Age, but the material is certainly residual and does not relate to the ring-ditch.

Feature **[2203]** was a shallow, sharply-curving gully inside the curve of the larger ring-ditch **[2201]**, terminating within the trench. The fill of this feature also contained late Iron Age pottery. As no stratigraphic relationship with the ring-ditch could be determined, it's unclear if this is an earlier or later feature.

Two pairs of further features were excavated, **[2207]** and **[2209]**, **[2215]** and **[2216]**, each composed of a post hole overlain by a shallow cut feature of indeterminate shape. No finds were recovered from any of these features, nor do they have any stratigraphic relationship with the other pre-modern features, but they are included in this phase as the fills were very similar to those of the identifiably prehistoric/Romano-British features.

Phase 2 - Field drains

This phase encompasses three features, all interpreted as field drains. Feature **2218** incorporates a roughly-made, probably 19th century ceramic drain which is visible across most of the trench's length, and this drain is clearly cut by two later drains, **2212** and **2213**. The latter two likely hold machine-laid drains due to the extreme regularity of the cuts. None of these features were excavated.

Trench 3

This trench, 11.5m by 2.5m, was intended to investigate a geophysical anomaly, supported by crop-marks in aerial photographs, that suggested an east-west linear feature with a possible gap or entrance at the selected point. Unfortunately, the trench was accidentally positioned approximately five metres further west than intended, making it difficult to correlate the features revealed with those in the geophysics and crop-marks. A number of features were evident in this trench: three gullies or ditches, a single round pit, and five relatively modern field drains.

Phase 1 - Prehistoric / Romano-British features

The only usefully dateable finds from Trench 3 were three small sherds of East Yorkshire Greyware, one recovered from fill **2315** of north-south ditch **[2316]** and the other two from field drains which truncate this ditch. The pottery was dated to the late 2nd/early 3rd century AD, which suggests a feature of Roman date.

Interpretation of the remaining features is difficult due to the narrow limits of the trench and considerable truncation by field drains. Two features may relate to the geophysical and crop-mark evidence: gullies **[2306]** and **[2318]** both run along an east-west alignment that matches the linear feature in the geophysics. However, gully **[2306]** was very shallow, making it less likely to create such a strong response in the magnetometry. Gully **[2318]** was deeper but cut across the southeast corner of the trench at a shallow angle, and was largely disturbed by two intercutting field drains where it was present. It is possible that the two features, running parallel, may form part of a double-ditched boundary as seen elsewhere in the Vale of York, but this is speculative.

A single slot was excavated through a third shallow gully **[2321]**, which was aligned north-south roughly perpendicular to **[2306]** and **[2318]**. This also returned no finds, and the relationship with the other features was not possible to determine due to disturbance by field drains.

Pit **[2312]**, 0.27m deep, is also heavily truncated by a field-drain, and could well be the terminus of a linear feature rather than a pit. It was half-sectioned and the fill **2311** contained no dateable finds, but the presence of heat-affected cobbles and a small amount of bone suggest a prehistoric or Roman date as per other similar evidence on site.

Phase 2 Field drains

A total of five fields drains were identified in Trench 3, of which **2303** was likely to be the eldest, perhaps 19th C, as it was of mug-and-sole type. The remainder were more clearly machine-extruded cylindrical pipes. Where drain **2313** was cut by **2307**, a hand-made joint had been created, suggesting these drains were at least both in use at the same time. Drain **2301** ran parallel to **2313** at a similar depth, and is likely contemporary and part of the same system. The last drain had the extreme regularity of a modern machine-laid drain, and was not excavated. Likewise feature **[2310]** had a similar appearance to modern intrusions **2111** and **2112** in Trench 1, so was also not excavated.

Trench 4

This trench, 11.9 x 6.1m, targeted the eastern side of a ring feature showing in both geophysics and crop-marks. After removal of the plough soil, the existence of the ring-ditch was confirmed, terminating either side of a large gap, together with two probable post settings within the ring-ditch. There were also several straight linear features that were identified as relatively modern field drains, along with a large number of modern plough scars, all clearly truncating the ring-ditch and post settings where they intersected.

Phase 1 - Prehistoric / Romano-British features

The two clearest features in this trench were two arcs of a ring-ditch, each terminating in a rounded end. The northern section arced out to the southeast, approximately 5m from the north west corner of the trench, and the southern arced northwards for approximately 4m from the southern trench edge. This correlates exactly with the geophysical evidence, with the overall ring-ditch having a diameter of just over 14m.

A slot 1.15m wide was excavated across the north arc **[2404]** of the ring-ditch, extending from the trench corner, and from fill **2405** were recovered pieces of bone and four sherds of calcite gritted pottery tentatively dated to the Middle Iron Age. Fill **2403** in the terminal of ditch **[2404]** was also excavated for a distance of 1.48 metres, producing fire-cracked cobbles, fragments of bone and similarly dated calcite gritted pottery. However, a third slot between these two excavation areas was later partially excavated to obtain a bulk soil sample, and this slot **2422** produced a sherd of East Yorkshire Greyware, suggesting that the earlier calcite gritted pottery may be residual.

The southern arc **[2407]** of the ring-ditch was also initially excavated in two slots, one by the southern trench edge and another over the terminal. Both slots produced calcite gritted pottery typologically dated to the Middle Iron Age, along with fragments of bone, but the former was excavated as a secondary fill **2408** and a primary fill **2409**, whereas the latter was excavated as only a single fill **2406**: it is likely that the distinction in fills was simply not identified during excavation of the terminal, and that **2406** comprises both **2408** and **2409**. Also recovered from **2409** were a large coarse chunk of flint and a number of pieces of

broken fired clay object later identified as pieces of a pyramidal loom weight similar to other more complete examples found on site. The flint was identified as a probable waste fragment as it had several clear flaws that would make it largely unworkable, and it was photographed but not retained.

Carbonised residue on a pottery sherd from fill **2409** was successfully radiocarbon dated to 2056 ±24 BP: 68 ±84 calBC (95.4% probability). This Late Iron Age date for the use of the sherd indicates that the typological dating of the calcite gritted wares may not be clearly defined, probably due to use of identical fabric and similar forms over the mid-to-late Iron Age and well into the Roman period.

A bulk soil sample taken from **2406** produced a charred cereal grain (wheat or barley) that was radiocarbon dated to 4327 ±24 BP: 2954 ±58 calBC (95.4% probability). This date does not relate to the feature excavated, but is evidence for residual material in the landscape and suggests nearby agricultural land use during the late Neolithic.

The post settings **[2417]** and **[2419]** were found on excavation to be shallow, dish-shaped depressions. The fills of both features were primarily clay, and they were interpreted as pads to support the weight of a post, rather than post-holes. Fill **2416** in **[2417]**, the northern of the two settings, contained a complete fired clay pyramidal loom weight of common Iron Age type.

Overall, the arcs of the ring-ditch and the position of the post settings confirm the original hypothesis of a round-house, dating to the late prehistoric or Roman period.

Phase 2 Field drains

Five field drains were present in this trench, two of ceramic type and three likely plastic machine-laid insertions. Only drain **2401** was investigated to any degree, as it cut directly through both ring-ditch arcs and both post settings. The others were either visibly drains (**2414**) or only briefly tested (**2410**, **2423** and **2412**) to confirm their modern date.

Trench 5

This trench, 11.7m by 5.2m, was positioned over a clear ring-ditch entrance in the magnetometry results, with some apparent linears extending eastwards from the north and south side of the entrance. On excavation, the southern linear proved to be a very large v-shaped ditch, while the northern was part of an earlier ring-ditch that was truncated by both the later, clearer ring-ditch and the v-shaped ditch.

Phase 1 - First phase prehistoric / Romano-British features

The earliest feature uncovered was a small ditch **[2534]** oriented north-south in the extreme northeast corner of the trench, only partially present within the limit of excavation. This ditch was truncated by a ring-ditch **[2529]=[2539]**, of which approximately two thirds of its

circumference was visible in the trench. This ring-ditch was heavily truncated and disturbed by later features, and no internal features were identified despite the majority of the ring being visible. Calcite tempered pottery sherds of Iron Age or Roman date were recovered from fill **2533** in **[2534]** and fills **2511** and **2521** in this ring-ditch.

A fragment of charcoal from fill **2511** was radiocarbon dated 2065 ±26 BP: 77 ±85 calBC (95.4% probability), and a charred cereal grain (wheat or barley) from fill **2533** was radiocarbon dated 1981 ±24 BP: 14 ±55 calAD (95.4% probability). These provide an earliest possible date of 162 BC for the first ring-ditch, and 41 BC for the later features, but also indicate that the site was in use over a considerable period of time.

Phase 2 - Second phase prehistoric / Romano-British features

A second and later ring-ditch, the clearest feature in the geophysical results for this area, was present in the trench in the form of opposing terminals **[2517]** and **[2528]**, the gap being clearly an original element of the construction. This ring-ditch had a black upper fill **2507** and **2508** which made it simple to differentiate from surrounding contexts, and clearly cut the earlier ring-ditch. It's likely that this ring-ditch represents a reconstruction of the earlier round-house, in approximately the same location. As the earlier ring-ditch was silted up when this occurred, there may have been a period of disuse before the second round-house was built. Both terminuses of this later ring-ditch were excavated, producing large quantities of late prehistoric and Romano-British pottery.

At the southern end of the trench, a very large ditch **[2538]** extended across the excavated area, oriented east-northeast/west-southwest. Two slots were excavated through this ditch, which contained a large number of fills and two possible recuts **[2541]** and **[2542]**. The fills in this ditch produced only a relatively small number of pottery sherds, but all were of 1st-2nd century AD date, including a sherd of decorated Samian ware.

Three isolated homogeneous deposits of clay **2535**, **2536** and **2537,** interpreted as post-pads, were identified and excavated across the trench. They probably belong to this phase due to their position with relation to the second-phase ring-ditch, although this is only an interpretive relationship as no direct stratigraphic relationship between them exists. Likewise, an irregular shallow bowl-shaped cut **[2524]** with a deep black sandy fill **2519** was excavated just inside the northern terminus of the ring-ditch. While there is, again, no stratigraphic relationship, this feature has been assigned to this phase due to its location.

A large sherd of calcite-gritted pottery from ring-ditch primary fill **2514**, under upper fill **2508**, was selected for thermoluminescence dating and successfully returned a date of 170 ±120 BC. This is important when examined alongside the radiocarbon date of 14 ±55 calAD from stratigraphically-earlier fill **2533** (feature **[2534]**), as the possible date ranges do not overlap. This perhaps suggests the pottery was produced a number of years before the silting-up of feature **[2534]** and construction of the first ring-ditch **[2529]=[2539]** and second ring-ditch as seen in terminals **[2517]** and **[2528]**.

A charred cereal grain (wheat or barley) from fill **2514** was radiocarbon dated 2998 ±24 BP: 1227 ±70 calBC (86.4% probability). This Bronze Age date is unrelated to the features being excavated, but does suggest land use during that time.

Phase 3 - Field drains

Three modern features associated with field drainage were identified within Trench 5. The first was drain **[2501]** with a ceramic pipe at the base, likely hand dug as the cut was too irregular for a machine, and possibly dating to the 19th century. This was truncated by drain **[2506]**, a clearly recent drain as the exposed pipe within it was plastic. The cut for this drain was extremely narrow and straight, suggesting it was laid by machine. A further feature **[2503]** stretched east-west across the middle of the trench. While no pipe was uncovered within this feature, the fill **[2504]** was a poorly-sorted mix of topsoil and natural sand, and was clearly of relatively recent date.

Trench 6

This trench, 5.6m by 1.8m, was opened to investigate the western side of the same ring-ditch visible in Trench 4, to confirm its continuity and to examine faint indications in the geophysics of a second entrance or gap in the ditch. Upon removal of the topsoil, the presence of the ring-ditch was confirmed but no evidence of a doorway was found. A faint linear feature towards the southern end of the trench was also identified. No field drains were uncovered in this trench.

Phase 1 - Prehistoric / Romano-British features

The earliest feature in Trench 6 was the east-west linear ditch **[2605]**, which was truncated by the ring-ditch **[2602]**. However, no dateable evidence was recovered from the fill **2605** of the linear.

The ring-ditch **[2602]** was visible for the full length of the trench. It was fully excavated, barring two small baulks to record the section, but only one sherd of calcite gritted pottery was recovered. This sherd, from the primary fill **2603**, was typologically dated to the Late Iron Age, while no dateable evidence was recovered from the secondary fill **2601**. Despite the certainty that this is the same ring-ditch as visible in Trench 4, and the predominance of apparent Middle Iron Age pottery from that trench, the later sherd in this trench suggests that the round-house dates from the Late Iron Age at the earliest. This corresponds to the C14 date obtained from carbonised residue on a pottery sherd from Trench 4.

Discussion

The excavations at Hemingbrough have provided indisputable evidence for the presence of late prehistoric and early Roman settlement at the site. It is difficult to determine the exact form of the settlement due to the lack of clear enclosures and boundary features in the geophysical results, but the occasional presence of such features within the trenches—and

the clear evidence from aerial photographs—suggests that the round-houses discovered were part of a well-organised rural landscape. There were at least two phases of settlement, indicated by the overlapping ring-ditches in Trench 5, showing that the site was not merely a temporary or seasonal habitation but was occupied over a considerable period of time.

The evidence from aerial photographs (Kershaw *et al.* 2020, 130-131) shows a long strip of well-organised rectangular enclosures that runs northwest-southeast, some containing and clearly associated with the round-houses excavated. The earlier ring-ditch in Trench 5 is overlapped by one of these features, while the later ring-ditch sits somewhat centrally within it, suggesting that the rectangular enclosures may belong with the later phase of occupation. This is supported by the fact that the large east-west ditch excavated in Trench 5, which runs parallel to the rectangular enclosure boundaries in the crop-marks, truncates the first phase ring-ditch within the trench. The pottery recovered from this large ditch was 1st-2nd century AD in date, and while no actual connection was uncovered, the alignment and position suggest it formed part of the rectangular enclosures seen in the crop-marks.

It is difficult to be sure if the landscape was enclosed prior to this rectilinear system, but there are several linear features in the crop-marks that do not fit with that pattern and probably form part of a different field system. However, without dating evidence from these features it's impossible to say whether they correspond to the first phase of round-houses discovered, or to a different period entirely.

Despite the limited preservation of even charred organic material, the grains recovered from the environmental samples do indicate that arable farming was taking place in the immediate area. Likewise, the excavated animal bones show the presence of domesticated cattle, sheep and pig, with products from these farmed animals supplemented by hunting as evidenced by a red deer metacarpal. There is also some evidence of materials processing activity in the settlement: several fired clay weights used for weaving on warp-weighted looms, iron smelting represented by hammerscale and smelting waste, and partially germinated barley grains typically associated with brewing. The deliberate deposition of a complete loom weight, within a clay post-pad in Trench 4, suggests that weaving may have held a significant ideological role in society, or as more than just a functional activity.

The dating of the site is reasonably conclusive, although it does not provide an exact chronological sequence. Radiocarbon dating of pottery residue from Trench 4 and carbonised material from Trench 5 (see Figure 1) returned three dates from the Late Iron Age through to the 1st or early 2nd century AD, covering a maximum period of around 270 years. Thermoluminescence dating of a single pottery sherd from Trench 5 returned a date of 170 ±120 BC, suggesting, perhaps, a slightly earlier start for the settlement. The typological dating of the pottery assemblage itself is somewhat less certain, chiefly due to the continual use of the coarse calcite-gritted fabrics from the early Iron Age and well into the late Roman period, but broadly supports this date range. Two charred grains from the excavations were also successfully radiocarbon dated and proved to be of late Neolithic or Bronze Age origin: while they demonstrate that there was earlier agricultural use of the area, they are residual material and unrelated to the features from which they were recovered. There is no evidence of late Roman or Medieval activity on the site, and only a few sherds of

post-Medieval pottery were recovered from the topsoil, suggesting that after the settlement was abandoned the site was used purely for agriculture, if at all.

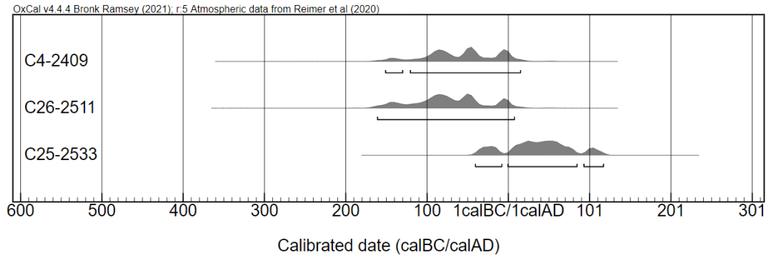


Figure 1. Radiocarbon dates from Hemingbrough.

In conclusion, the overall interpretation of the site is that a round-house settlement was established in the later Iron Age and was occupied for around two hundred years, with the inhabitants chiefly engaged in agricultural subsistence activities. While the pottery was predominantly handmade local wares, the small proportion of imported Roman sherds indicates that the settlement was not entirely insular and had communication with the wider world. On the other hand, the lack of Roman coins and copper alloy artefacts may suggest that, even during the later phase of occupation, there was only minimal interaction with Roman trade networks, where such items were ubiquitous.

There is some potential for future archaeological investigation at Hemingbrough, predominantly with regards to the overall phasing of the settlement. As only three of the many round-house sites were excavated, and only partially, further work could be done to ascertain which houses are contemporary, and whether others exhibit the same multiple phases as that uncovered in Trench 5. Two sets of closely-adjacent rings seen in the magnetic survey results are likely to be similar examples, and recovery of finds or environmental material from these could improve our understanding of the settlement's chronology. Investigation could also be made into the possible earlier enclosure patterns, based on the features seen in the crop-mark evidence. Large scale earth resistance survey, in more favourable conditions, may help clarify the position and extent of some of these elements.

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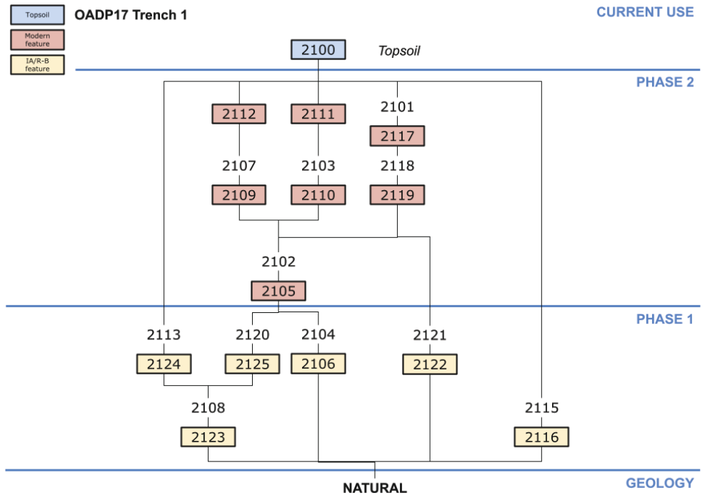
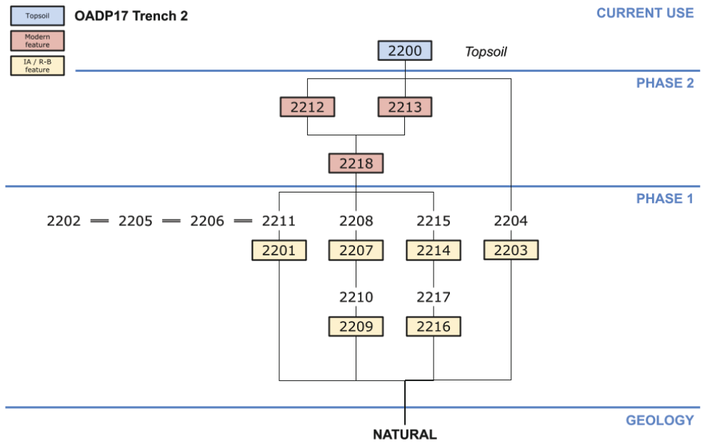
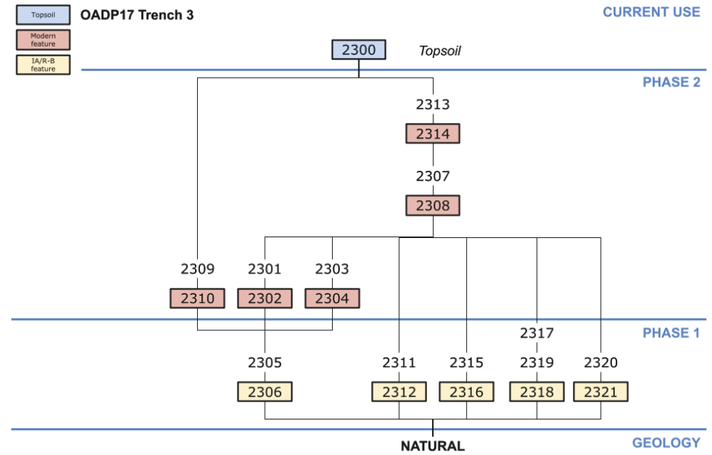
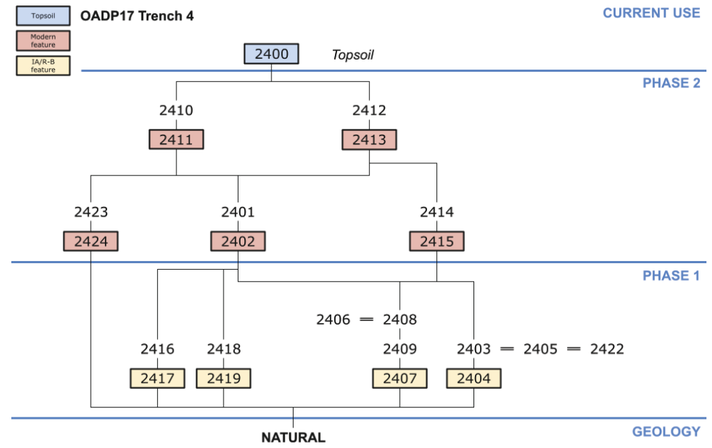
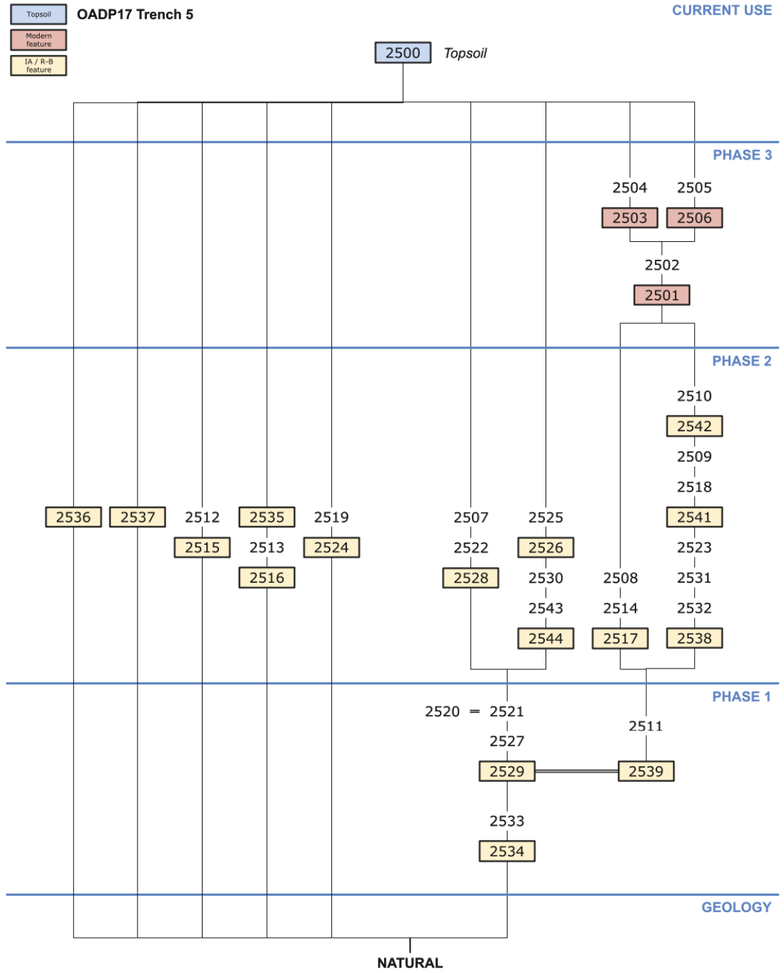
Appendix 1: Trench Matrices







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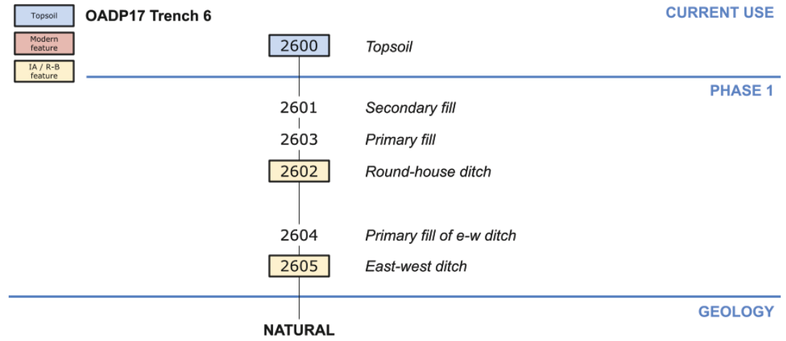
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PHASE 1
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2604 Primary fill of e-w ditch
2605 East-west ditch
GEOLOGY
NATURAL

Hemingbrough 2017 (OADP17): Excavation: ceramics report

Tony Austin (University of York retired) January 2018 (final)

A total of 594 ceramic items recovered during the above excavations. 475 were identified as pottery. A further 119 classed as 'other ceramics'.

Pottery by fabric

A: Samian (sherd count 1 (2523) SF 21)

"*Samian pottery (terra sigillata) describes a type of good quality, mass-produced table ware with a fine red glossy slip and, normally, red fabric which was produced at a number of centres in the Roman Empire between the time of Augustus and the mid 3rd century AD*" (Willis, 2005, 1.1). Samian usage tends to be a military and urban phenomenon. However, isolated sherds are often found on rural sites such as Hemingbrough. As Willis (*ibid*, 7.2.7) notes "*...while present in meagre proportions, it is nonetheless virtually universally present at rural sites*".

Samian varies over time in terms of colour, fabric, form, decoration and place of manufacture. The sherd from Hemingbrough has a reddish fabric containing small (<0.1mm) limestone visible using a magnifying glass and the slip is red-brown suggestive of South Gaulish ware; the earliest centre for Samian manufacture in Gaul (modern France) and is rare in Britain (Johns, 1971, 21-4; Tomber & Dore, 1998, 28-9).

Normally, the investigative process would stop here as Samian sherds on rural sites are generally from plain vessels. However, the Hemingbrough sherd is both highly decorated and substantial enough to provide a partial profile of the vessel and both confirm a South Gaulish date. The profile suggests a Dragendorff (Dr) 29 vessel (Johns, 1971, Fig. 2) confirmed by its "*double frieze of decoration divided by a moulding*" (*ibid*, 21). The lower frieze shows straight 'gadroons' (a decorative motif consisting of convex curves in a series – see Fig. 1& 2) (e.g. Hunter-Mann, 2000, 4.2.6) from the fort at Brough-on-Humber (*Petuaria*)). The lower frieze appears almost identical to a Dr. 29 vessel recovered from the 1st century foundation shafts at Greyhound Yard, Dorchester, Dorset (Seager Smith & Davies, 1993; and image by Wessex Archaeology is available at https://www.flickr.com/photos/wessexarchaeology/58504026). Indeed

the lower friezes could be identical as these were made in moulds. Little remains of the upper frieze on the Hemingbrough example but it may show an animal figure.

Fig. 1 Hemingbrough Samian sherd

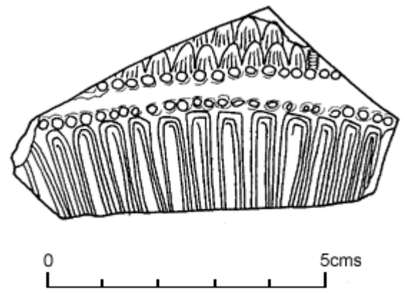

Fig.2 sherd from Brough-on-Humber (Petuaria) (After Hunter-Mann, 2000)

The Hemingbrough sherd parallels other examples of Dr. 29 vessels which are assigned to the later 1st century AD. So the question arises why this sherd from vessels normally found at military and urban sites is present at Hemingbrough. Fine dining is unlikely to have been taking place at low status rural sites. It has been suggested that Samian and other fine wares may have been collected as 'curios' (Alcock, 1987, 23). As such, sherds are out of context and of limited use for dating although so far limited investigations at Hemingbrough do not preclude a major Roman site nearby.

Dating: Whilst this sherd is unlikely to be in its original post-use context it does provide a *terminus post quem* of the later 1st century AD or later for (2523) and similarly for other finds in this context.

B: Calcite Gritted ware (also known Calcite Tempered ware (CTW) (sherd count 147)

The sherds in this fabric are classic early Calcite Gritted ware, soft fired (and hence fragile today) and containing voids where the calcite has leached out. The voids are often angular but these can become sub-rounded as the sherds are abraded over time. As noted previously for excavations at North Duffield, on the South Eastern boundary of the County of North Yorkshire, the sherds are

> "hand thrown sherds here are soft; almost biscuit like, and irregularly fired with surfaces red to brown and cores tending to black representing incomplete oxidation of organic material in the clay matrix; these all products of open or bonfire firing" (Austin, 2015, 131)

At Hemingbrough sherds in this fabric fall into two groups

1: (sherd count 90 (2202) SF 39, (2205) SF 41, (2400) SF 46, (2403) SF 47 SF 48 SF 93, (2405) SF 49 SF 50, (2406) SF 51 SF 52, (2408) SF 53, (2409) SF 54 SF56, (2521) SF 67)

These are in a very poor state of preservation with plentiful voids and little visible calcite. They are largely confined to trench 4. A number of rim sherds (SF 52, 55, 56) rising to a horizontal flat top from 'barrel' shaped vessels were noted. These are generally dated to the Middle Iron Age (Gibson, 2002, 129; Halkon, 2013, 109-11). There are also a small number of often crudely out-turned rims (SF 48, 50) from cooking pots present which can date from the Middle Iron Age through to the earlier Roman period. The shared fabric and state of preservation here suggests these are also Middle Iron Age in date.

Dating: Middle Iron Age

2: (sherd count 57 (2202) SF 60, (2204) SF 40 SF 43, (2205) SF 42, (2206) SF 44, (2300) SF 45, (2508) SF 63 SF 94, (2514) SF 75 SF 85 SF 88 SF 89 SF 97, (2521) SF90 SF 91, (2603) SF 92)

These are much better preserved than group1 and do not feature in trench 4 although one sherd was recovered from trench 6 which is the back of the ring

ditch in trench 4. Group 2 was basically recovered from Trench 5 and to a lesser degree trench 2. In trench 5 it appears largely residual being found with Calcite Gritted (OG) ware which is dated to the Roman period (see below). Here, conversely, out-turned rim sherds (SF 43, 63, 75, 85) outnumber 'barrel rim sherds (SF 88) 4 to 1. In trench 2 they appear to date features.

Dating: The state of preservation suggests that group 2 succeeds group 1 with something of a gap perhaps by now early within the Late Iron Age

C: East Yorks Greyware (sherd count 4 (2307) SF 26, (2313) SF 25, (2315) SF 28, (2422) SF 24)

> "This ware has a hard, slightly abrasive, wheel-thrown fabric that generally has a light to medium grey core and surfaces with the latter sometimes decorated with burnished lines. The clay contains sand which includes quartz (0.1-0.2mm) and grits such as iron ore. It has an expanded production from the mid 3rd century with kiln sites including Norton and Holme-on-Spalding Moor (Corder, 1934; Hayes, 1988: Swan, 1988, 34 & pl xvi: Tomber & Dore, 1998, 158). This ware reaches its peak in the 3rd – 4th century" (Austin, 2012).

The above is a stock description I use for East Yorks Greywares which are generally ubiquitous on sites evidencing later Roman period activity in the North of England. The sherds at Hemingbrough share the sandy fabric (although can be grittier) and general appearance of this ware but some differ largely in terms of firing with a blackness in the sherd core which suggests incomplete combustion of organic content in the clay and erratic reduction to the uniform grey of later production. These sherds (SF 25, 26, 28) may be early within the transition from local industries to the mass production starting in the 3rd century AD. SF 24, although very small, appears to represents fully developed EY Greyware. The only rim (SF 28) which is out-turned suggests a jar/cooking pot.

Dating: The mass production of Roman grey wares is generally accepted as beginning in the mid 3rd century AD and continuing into the late 4th century even very early 5th century in some cases. As noted above some sherds here may pre-date the beginnings of mass production; perhaps from later 2nd century. Thus the sherds here may date from the later 2nd century to the mid 3rd century apart from one sherd which may be from the mass production phase.

D: Calcite Gritted (SL) ware (sherd count 29 (2108) SF 38, (2113) SF 22, (2202) SF 23)

Essentially Calcite Gritted ware, as indicated by angular voids and occasional calcite, with the addition of slag tempering (up to 4mm). Not all the sherds here contain slag but were found together and are visually similar. Although the small to very small size of the sherds prevents comment on form they are generally similar to other coarse wares from the site such as Calcite Gritted ware (OG) and thus likely to represent jars or cooking pots. Peter Halkon notes the use of slag as a temper in pottery recovered from various Iron Age sites including Hasholme (2013, 109-110. It may just be a random addition of slag or its presence may be of significance for future investigation so best to record it. Three abraded body sherds (SF 38) are all heat affected with one sherd showing signs of vitrification. There is the possibility that this relates to metal working processes and might be worth seeking expert opinion.

Dating: Found with Fabric B; both group 1 and group 2 in (2202). The latter group have been argued as early within the Late Iron Age with Fabric D probably of similar date.

E: merged with another fabric.

F: East Yorks Greyware (SL) (sherd count 1(2523) SF 29)

Like East Yorks Greyware (fabric C) and Reduced Sandy ware (fabric I), a sandy ware but with occasional fragments of slag present. Hard fired but is grittier than classic East Yorks Greyware. The presence of slag as a temper is noted under Fabric D.

The only sherd recovered is a substantial part of a flat base (dia c. 10 cms). This coupled with the presence of a probable residue suggest a cooking pot.

Dating: Context (2523) has been given a *Terminus Post Quem* by the presence of a Samian sherd SF21. Thus this slag tempered sherd is similarly dated to the later 1st century AD or later. The lack of later Roman grey wares in (2523), which begin production in the mid 3rd century AD, refines this to later 1st century AD to the mid 3rd century AD and may represent 'proto' East Yorks Greyware before the latter becomes mass produced in the 3rd century AD (see above).

G: Calcite Gritted (OG) ware (sherd count 237 (2107) SF 59, (2507) SF 57 SF 58 SF 86 SF 87 SF95 SF 96, (2508) SF 61 SF 62, (2510) SF 64, (2511) SF 65 SF100, (2514) SF 71 SF 72 SF 73 SF 74 SF 76 SF 77 SF 78 SF 79 SF 80 SF 81 SF 82 SF 83 SF 84, (2518) SF 66, (2521) SF 68, (2522) SF 98 SF 99, (2531) SF 69, (2533) SF 70)

Contains calcite but is heavily gritted with other mineral grits probably of glacial or/and fluvial derivation. It is better fired and much more robust than Fabric B Calcite Gritted ware and clearly postdates it. No Fabric G was recovered from Trench 4 which was dominated by Fabric B which suggests Fabric G post-dates Fabric B. Fabric G dominates the overall excavation assemblage and is largely restricted to trench 5; in particular two contexts 2514 and 2522 which are ring ditch fills. Rim sherds are largely from out-turned rim cooking pots; a tradition that lasts from the Middle Iron Age into the Roman period; especially on native rural sites. One sherd (SF 76) has horizontal finger tip and nail decoration where the rim meets the body. A Fabric H sherd (SF 31) is similarly decorated which hints at contemporaneity. What is certain is that there are five largish rim sherds from Knapton jars/cooking pots (SF 66, 72, 73, 74, 84). These are hard fired and have a very distinctive "rectangular outbent rim". They have been dated from late 1st - early 4th centuries but more recent thinking suggests 2nd century - end of 3rd century; anyway definitely Roman although the presence of out-turned rim sherds (SF 58, 62, 68, 76, 77, 78, 79, 80, 81, 82, 83, 86, 87, 95, 98) suggest that activity could precede this. A fairly unusual object was noted in this fabric

SF 100 (2211) Pot lid

A fairly coarse solid biconical object (diameter: varies between 76-78 mm, weight 179 g) made of fired clay. In profile it bulges from a disc shape around a central, vertical and circular hole (diameter around 8 mm) in the middle (depth 45 mm); looking something like a flying saucer! It has suffered minor damage in antiquity but essentially complete.

Possible functions include a spindle whorl in profile at least. However, at nearly 179 g it appears much too heavy. At Mucking, for example, most whorls averaged between 25 and 45 g (Rogers, 2007, 26).

Fig. 3 Calcite Gritted ware pot lid from Cottam trimmed for reuse as a loom weight (scale mm) after Austin, 2014)

Also, its coarseness would make it aerodynamically unsound introducing wobble which is not a good quality when spinning. A loom weight is another possibility but its shape in profile is unfamiliar.

In the ground before lifting it looked a bit like a cooking pot lid with central steam vent. Conical versions are known but these tend to be hollow (for example, Corder, 1934, 33) like teapot lids. This seems the best fit. The fabric of this object contains sub-rectangular voids suggesting a calcite gritting and other large mineral grits and thus similar to Calcite Gritted ware (OG) which adds weight to it being a pottery related object.

Fig. 4 SF 100 Pot Lid (© Brian Elsey)

(weight 179g)

Dating: The lack of mass produced grey wares, which became available from the mid 3rd century, suggests the Knapton rims are dated 2nd – earlier 3rd centuries AD. The out-turned rims probably represent activity earlier within this range.

H: Sandy Ware (sherd count 33 (2121) SF 33, (2504) SF 32, (2508) SF 30, (2509) SF 37, (2514) SF 31)

As a fine sandy ware it is superficially similar to fabric C East Yorks Greyware but surfaces oxidised red rather than reduced to grey. The core is dark due to imperfect firing. Unlike East Yorks Greyware it has a hackly fracture and is prone to flaking which is similar to fabric I Reduced Sandy ware. Unlike the latter it is fired to a reasonable hardness and wheel thrown or at least finished. Brown inclusions, perhaps iron pan or slag (up to 2mm), are visible on the surface of the sherds.

Two conjoining rims from (SF 31) show slight out-turning to a flat topped rim. Horizontal finger tip and nail decoration is present where the rim meets the body. The estimated rim diameter of 23 cm suggests something like a wide mouthed jar. A fabric G sherd (SF 76) is similarly decorated.

Dating: Sandy ware sherds (2514) were recovered from a large collection of pottery recovered in close proximity. These were given a group ID (A see Calcite Gritted ware (OG)) as it was thought the relationship may be helpful in later analysis. As noted some of the fabric G rim sherds have similar linear finger tip and nail decoration where the rim meets the body which might suggest contemporaneity; thus similar to Fabric G which is dated to the 2nd – earlier 3rd centuries AD.

I: Reduced Sandy ware (sherd count 8) (context 2204; SF 27)

As a fine sandy ware superficially similar to fabric C East Yorks Greyware but very softly fired to the point of fragility especially when damp. Also has a hackly fracture and is hand thrown. The 8 sherds represented here are probably all from the same vessel consisting of 3 body, 3 conjoining rim (dia 15 cms), 2 conjoining flat base.

The rim is suggestive of providing a lid seating and thus represents a cooking pot.

Dating: The soft firing is suggestive of earlier Iron Age and thus early within the history of sand tempered wares in this area.

J: White wares (sherd count 9 (2102) SF 107, (2307) SF 108, (2401) SF109, (2403); SF34)

A small group of tiny sherds of post medieval and modern date were recovered from clearance layers (remnant plough soil following machining) and field drain cuts consisting of mass produced white wares and pattern glazed pottery (eg Crossley 1990, 243-67, Cumberpatch, 2003).

Dating: Early modern; largely 19-20th century

K: Pattern glaze or transfer printed (sherd count 3 (2401) SF 35)

Ditto J

Dating: Early modern; largely 19-20th century

Pottery: summary

ID	Fabric	Count	%	Dating
A	Samian ware	1	0.2	Roman (TPQ late 1st C AD)
B	Calcite Gritted ware			
	Group 1	90	18.9	Middle Iron Age
	Group 2	57	12.0	Late Iron Age (early within)
C	East Yorks Greyware	4	0.8	Roman (later 2nd to mid 3rd C AD)
D	Calcite gritted (SL) ware	29	6.2	Late Iron Age (early within)
E	Not used			
F	East Yorks Greyware (SL)	1	0.2	Roman (late 1st C AD or later TPQ)
G	Calcite Gritted (OG) ware	237	50.0	Roman (2nd – earlier 3rd C AD)
H	Sandy Ware	33	6.9	Roman (2nd – earlier 3rd C AD)
I	Reduced Sandy ware	8	1.7	Iron Age
J	White wares	9	1.9	Early modern; largely 19-20th C AD
K	Pattern glaze or transfer printed wares	3	0.6	Early modern; largely 19-20th C AD
?	Unidentified	3	0.6	
Total		475	100.0	

Leaving modern material aside the assemblage is dominated by coarse wares; cooking pots or storage jars (the names are often used interchangeably). Of the 460 early sherds examined only one can be described as a fine ware; the Samian sherd noted above. Within the coarse wares themselves Calcite Gritted wares totally dominate with 413 (90%) sherds compared to 46 (10%) which are sandy wares. By the middle of the 3rd century AD these two local traditions will come to dominate mass produced pottery for Romanised markets. Earlier than this, Hemingbrough had clearly aligned itself, in terms of pottery at least, with the Yorkshire Wolds (see also Austin, 2015 for the Assemblage at North Duffield, a few miles to the north). Interestingly a similar situation is evident for the Vale of Pickering (e.g. Rigby, 2004, 25). Whether pottery, clay or calcite was on the move is an ongoing debate (e.g. *ibid*, 39).

Other Ceramics

Truncated pyramidal loom weights (total 7 context (2409) SF 102 SF 103, (2416) SF 101 SF 106, (2507) SF104 SF 105, (2514) SF 110, (2523 SF 117)

These are sometimes called 'triangular' loom weights although this encompasses a wider range of material. As their name indicates they are pyramidal but height is approximately twice that of the base measurements; so tall and narrow in profile. They appear to be an Early Iron Age development in Western and Central Europe (probably with influences from the Near East) perhaps spreading as part of the so called Urnfield and following Hallstatt cultures through a migration of ideas or people. Belanová & Grömer (2009, 17) note “A certain amount of weight per thread is necessary to stretch the warp on the loom”. Earlier weights were “very large and cylindrical”. Pyramidal ones of similar weight take up less space on the loom which in turn allows for more of them thus allowing more threads and hence denser fabrics

which provide better weatherproofing. Also heavier weights allow the processing of coarser material such as flax (thanks to Elizabeth Austin for this).

That they are loom weights is confirmed by the occasional finding of *in situ* rows of these weights representing collapsed warp-weighted looms as, for example, noted by Belanová & Grömer (2009, 17) at Hafnerbach in Austria (Fig. 5). The weights from Hemingbrough are clearly not *in situ* but scattered and recovered from ring ditches (but see below) and in one case a ‘pad/ posthole’ and another a linear ditch.

Fig. 5 Hafnerbach, Austria: *in situ* find of 4 m wide loom with over 50 loom-weights, Hallstatt Period (after Preinfalk 2003, Fig. 12, © Bundesdenkmalamt, Austria).

One of the weights (SF 102) is in a context (2409) dated to the Middle Iron Age by pottery. As noted above pyramidal weights are seen as an Early Iron Age phenomenon. Other weights recovered in later contexts should then be considered as in positions of discard or re-use. Loom weight forms change in the later Iron Age.

The corners of the pyramidal weights at Hemingbrough tend to be rounded precluding accurate measurements other than maximums of width, depth and height. The pyramidal shaped does not rise to a point but, as the name suggests, is truncated. There is a horizontal hole towards the top of the pyramid for hanging it from a loom (Fig.6).

Seven weights have been identified at Hemingbrough; two almost complete, two partial and three fragmentary. Fabric is oxidised to a depth of one centimetre or more with a dark core containing un-burnt organic matter.

Fig. 6 SF 101 Truncated Pyramidal Loom Weight from Hemingbrough (© Paul Durdin)

SF 101 (2416) Complete apart some damage near its base probably in antiquity. A horizontal hole runs between the closest sides near to the top of the pyramid. An external groove (approximately 50mm in length and 15mm width) runs over the top parallel to the hole. The hole and groove are clearly related to fixing the weight to a loom.

(weight 1683g, height 175mm, width near base 100mm, depth near base 90mm, width near top 60mm, depth near top 50mm, hole (if present): below top 45mm, diameter 15-20mm near surfaces, 11mm internally)

SF 102 (2409) A partial base fragment with only one side surviving with a width of 91mm and to a maximum height of 95mm. The surviving side is similar to the depth of SF101 which suggests a similar size when complete. Current weight is 659g. If accepted as of a similar weight to SF 101 then SF 102/weight of SF 101 * 100 suggests around 40% of the original loom weight survives.

(weight 659g, depth near base 95mm)

SF 103 (2409) 34 fired clay fragments associated with SF 102. These are visually similar to SF 102. Eight of the fragments exhibit surfaces and two the vestiges of the hole for hanging a weight (as surviving around 12mm in diameter and 47 mm in length. Another may exhibit remains of a groove. These clearly represent loom weight fragments associated with SF 102. Preservation is poor with disintegration ongoing. As such it would be difficult to check for conjoining fragments. The fragments represent a further 38% of SF 102 assuming all the fragments are from the same weight.

(weight 708g)

SF 104 (2507) Almost complete but in three conjoining pieces the smallest of which was located amongst associated fired clay fragments SF 105. It is visually similar to SF 101 but with some variance in metrics. In comparison to SF 101 the top groove is barely discernible.

(weight 1540g , height 185mm, width near base 85mm, depth near base 75mm, width near top 47mm, depth near top 43mm, hole (if present): below top 47mm, diameter internally 10mm)

SF 105 (2507)

12 fired clay fragments associated with SF 104 but clearly representing a separate weight. They include a substantial fragment which shows the tapering profile of a pyramidal weight but in lacking a base or top nothing is really measurable apart from its weight. A second fragment has the partial remains of the hole for hanging the weight; enough to suggest a diameter of around 11mm. If similar in weight to weights SF 101(1683g) and SF 104 (1540g – almost complete) with an average of (1683 + 1540) / 2 = 1611.5 it would suggest SF 105 is around 80% complete (1287 / 1611.5 * 100); assuming that all the fragments represent a single weight.

(weight 1287g)

SF 106 (2416)

Seven fired clay fragments including one that looks like the corner of the base of a truncated pyramidal loom weight. No measurable surfaces.

(weight 418g)

SF 110 (2514)

16 fragments of fired clay which are visually similar fabric to pyramidal loom weight fragments. One fragment is a corner similar to the other weights, another has the remnant of a groove as SF 101.

(weight 483g)

SF 117 (2523)

11 fragments of fired clay. Two show evidence of a possible hole/groove. Could be fragments of a pyramidal loom weight but fabric appears different.

(weight 170g)

Dating: The above weights at around 1.6kg are at the high end of weights for loom weights and are of probable Early Iron Age date. Although one recently found at Kirkby on Bain, Lincolnshire weighed 2.27kg (http://www.allenarchaeology.co.uk/ find-of-the-month-an-iron-age-loom-weight/ downloaded 13.12.2017).

An alternative theory is that these may be 'thatch weights' (for example, Shaffrey 2017a). Alternatively, they may have become redundant as new loom technology appeared and were then reused as thatch weights (several were recovered from ring ditches) but not exclusively.

Burnt Daub? (total 1 (2211) SF 127)

Possible wattle marks

(weight 146g)

Clay tobacco pipes (total 7 (2100) SF 120, (2102) SF 118, (2300) SF 121, (2400) SF 122)

These were recovered from the plough soil overlying trenches except, in one case, from a field drain. They are all pipe stems. They range in date from the mid 16th (perhaps earlier 17th out of population centres) to the early 20th centuries (Ayto, 1987, 4-10). Most dating uses bowl shapes. However, a general trend is that the thicker the stem and the larger the stem bore (the hole in the middle) the earlier the pipe is likely to be (*ibid*, 27). For example, the stems in (2100) and has a narrow bore and is later than the stems in (2300).

Field drain (total 2 (2300) SF 126)

Example of horseshoe and sole drain – collected for reference (TA) - late 18th-mid 19th centuries (Taplow, 2007, 60). Field drain fragments were not otherwise retained.

Unidentified fired clay fragments (total 23)

(2200) SF 114, (2202) SF 113, (2403) SF 111, (2508) SF 112

These include fragments that have a visually similarity to the fabric of the pyramidal loom weights (as described above) but no other supportive evidence to suggest that are from these weights.

(2205) SF 115, (2521) SF 116

Fired clay which no distinguishing characteristics.

(2500) SF 119

Possibly tile? They have one flat surface and are too thick to be pottery.

Glass (total 3 (2100) SF 123, (2300) SF 124, (2401) SF 125)

Two are from plough soil over the trenches and one from a field drain which appears to cut a horseshoe and sole drain. All modern; two bottle and one plate glass. The latter has slight interest as it is too thin to be window glass and might represent picture frame glass.

Other Ceramics: Summary

Period	Object	Count	%
Early Iron Age (probably but in later contexts)	Truncated pyramidal loom weights: seven of which two almost complete, two partial and three fragmentary	83	69.8
Roman (2nd-earlier3rd C) (by association)	Burnt daub	1	0,8
17-early 20th century	Clay tobacco pipes	7	5.9
late 18th-mid 19th centuries	Field drain	2	1.7
Undated	Unidentified fired clay fragments	23	19.3
Modern 20-21st centuries	Glass fragments	3	2.5
		119	100.0

The more recent material confirms activity from the 17th century onwards; presumably resulting from agricultural activity. The identification of the truncated pyramidal loom weights of probable Early Iron Age date is quite exciting. Even if not *in situ* they are fairly rare finds and must hint at EIA activity nearby.

In terms of ceramics Romanitas barely impinges on the site following the conquest (as excavated at least!) apart from a single decorated Samian sherd perhaps collected as a curio.

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Hemingbrough 2017 (OADP17): Environmental: processing of soil samples: ceramics report

Tony Austin (University of York retired) February 2018 (final)

A small group of possible ceramics was recovered from soil samples collected during the Hemingbrough excavation. These were received after the completion of the ceramics report covering the excavation (see Austin 2018). The examination of these objects has been treated as an addendum and it should thus be noted that the material reported on here is not included in any summarising information in the said report.

A total of 36 possible ceramic items were recovered during the above analysis. 27 were identified as pottery. A further nine classed as 'other ceramics'. The objects in the assemblage were generally small and very abraded.

All of the identifiable pottery came from context (2514) and conformed to the fabric groups identified for this context in Austin (2018). This suggests the additional sherds identified here add little to the investigations at Hemingbrough.

ID	Fabric	Count	%	Dating
B	Calcite Gritted ware			
	Group 2	7	25.9	Late Iron Age (early within)
G	Calcite Gritted (OG) ware	20	74.1	Roman (2nd – earlier 3rd C AD)
Total		27	100.0	

Other ceramic

Period	Object	Count	%
Undated	Unidentified fired clay fragments	9	100.00
Total		9	100.0

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Hemingbrough 2017 (OADP17): Finds from unstructured surface collection during magnetometry survey

Tony Austin (University of York retired) March 2018

A total of 104 objects were recovered. Chronologically 84 of these can be attributed to the Post Medieval period and these dominated by pottery (69, SF 135 – 141, 144, 150). Also recovered were field drain fragments (13, SF 151), glass (13, SF 154) and clay tobacco pipes (4, SF 155). The objects are predominantly 17-19th century although a small group of 'light' Stone ware is modern. Such material is generally seen as a product of agricultural activity; field drains as drainage improvements and the other material as the use of midden for manuring.

Five sherds of Medieval pottery were identified within the assemblage

i) Beverley 1 ware (1 sherd, SF 145). Also known in York as Oxidised or Red Splashed ware (Mainman & Jenner, 2013, 1189). Assigned to Beverley where kilns are known unlike York. The ware is wheel-thrown with a fine, hard fabric which is smooth to the touch. The fabric is a characteristic red-orange colour. The glaze is applied by sprinkling a dry powder onto the damp surface of the vessel (thus patchy or splashed) before firing. The lead- based glaze is commonly brown or amber. *(ibid* 1184-9). 11th - early 12th century.

ii) Beverley 2 ware (1, SF 146). Also know in York as Sandy Red ware. Assigned to Beverley where kilns are known unlike York. A thin white slip under the glaze is characteristic of a number of similar red wares. Olive to mid-green glaze. Later 12th - early 14th century (*ibid* 1246-51).

iii) Northern Gritty ware (3, SF 148). Gritty wares have a coarse grained temper of sandstone up to 4mm and occasional muscovite up to 0.3mm. Surfaces are, however, smooth. They have a wide distribution in Yorkshire, Northumberland and even into southern Scotland. For a discussion of Gritty ware see *ibid* 1178-84. Late 11th – early 13th century.

Thus we now have a very small collection of Medieval pottery dating from the 11th to early 14th centuries. This probably represents agricultural activity such as manuring but is suggestive of nearby settlement.

A small but perhaps significant group of Roman material was recovered including Four sherds of Late Roman Grey ware from East Yorkshire kiln sites (SF 142, 147). No late Roman material was recovered during excavations in 2017. Also one sherd of earlier Calcite Gritted (OG) ware was identified (SF143). The latter was a significant component of the pottery recovered at this site during excavation (Austin, 2018).

Finally, what appears to be the partial base of an Early to Middle Iron Age truncated pyramidal loom weight was noted (SF153). The dark, partially fired, core has been lost to weathering processes leaving the better fired outer material. A number of these objects, including all but complete examples, were noted during the 2017 excavations at this site (*ibid)*.

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OADP 17. Animal Bone Report

Louisa Gidney

One small box of animal bones was recovered from the fills of ring ditches associated with an Iron Age round house. The bones are in poor condition, with even some cattle teeth reduced to fragments of enamel. The surface degradation has obscured any former evidence of butchery or gnawing marks, so there is no surviving indirect evidence for the presence of dog. No bones were measurable. Many of the bones recovered have survived because they had been burnt. The degree of burning varies, with partial charring of some fragments while others have been completely burnt black and sheep/goat fragments, in particular, calcined white with distortion and fragmentation along the heat stress cracks. Given the poor condition of the bones, all fragments that could be identified were recorded. The presence of indeterminate fragments is only noted in Table 1 for Trench 3, where no identifiable fragments were recovered. As red deer is represented, fragments mostly of skull, rib and vertebra were assigned to cattle size, which includes the possibility of red deer. The standard term sheep/goat is used, though the identifiable fragments were comparable to sheep. No elements were found which could be confidently attributed to goat. Although Table 1 shows that identifiable fragments were recovered from Trenches 1, 2, 4, 5 and 6, the overall assemblage is so small that the finds will be discussed as one group.

It can be seen from Table 1 that a restricted range of species is represented. Cattle remains predominate. This is a reflection of the better long term survival of such large and robust bones rather than a true representation of the economic importance of this species. Sheep/goat fragments are second in abundance, mostly due to these smaller bones being burnt to the stage of white calcination. Pig remains are present but rare. The only wild mammal represented is red deer, with a proximal metacarpal found in context 2405. There is an absence of horse, which is unusual for sites of this period.

Estimates of age from epiphysial fusion and tooth eruption follow Silver (1969). All the surviving epiphysial ends of all species are fused examples from adult animals. The cattle teeth indicate culling of animals at different ages. Very young animals are

indicated by a fragment of unworn deciduous premolar in context 2408 and two deciduous premolars, probably from the same maxilla, from context 2422, with wear commencing, indicating a calf of a few weeks old. The remaining cattle teeth, including a complete maxillary tooth row from context 2523, were in full attrition, from adult animals. Elderly animals are indicated by single finds of teeth at advanced wear stages, found in contexts 2211 and 2523. Further evidence for an elderly animal is a maxilla fragment from context 2205 with pitting on the lingual border, which is an age-related degeneration in modern Dexter cattle (Gidney 2013). The limited tooth wear evidence indicates the slaughter of young adult sheep/goat, less than or about 2 years old, with three molars 1 or 2 at early stages of wear and one mandible with molar 2 in wear but molar 3 at an early stage of wear. One pig mandible has molar 3 present with wear commencing on the first cusp, indicating an age at death of about 2 years.

Only one pathological condition was observed. A cattle metatarsal, from context 2403, exhibits an exostosis on the proximal medial border, with pitting of the associated articular surface. This indicates a stress on the joint but is not monocausal.

Though this is a very small assemblage, it does demonstrate that the Iron Age occupants farmed the suite of cattle, sheep and pig and also had access to wild red deer. The surviving teeth indicate that cattle were multipurpose animals, with selection for slaughter of both very young and very old animals, possibly indicating a strategy to maximise milk yield producing infant veal calves and elderly milch cows, together with adult, but not aged, animals which might represent culling of stock that failed to be productive either in the pail or the plough. In contrast, the sheep teeth tentatively suggest prime meat from shearling or two shear animals, maximising wool and carcase quality. The one pig tooth is from an animal old enough to have been used for breeding first.

Table 1. Fragment counts for the species present

	Trench1	Trench 2	Trench 3	Trench 4	Trench 5	Trench 6
Cattle		7		17	12	
Cattle size		2			3	1
Sheep/goat	2	12		7	1	2
Pig		2		1		
Red deer				1		
Indeterminate only			X			

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Highs and Lows: examining and comparing the archaeobotanical data from an Iron Age site within the Vale of York to sites in the Yorkshire Wolds, with a focus upon diet.

Cover image: Excavation of the roundhouse at North Duffield in 2014 (Elsey, 2015a).

Freya Greaves BA (Hons)

Undergraduate dissertation

Abstract

Surprisingly little is known about the day to day life of the Iron Age populations of East Yorkshire. Research upon settlement sites and environmental data is limited across the region, while studies upon Iron Age sites within the Vale of York remain especially lacking. This dissertation presents new environmental and archaeobotanical evidence from a small-scale Mid to Late Iron Age settlement near Hemingbrough, from the Vale of York. This data is compared to existing archaeobotanical material from the region, and also the Yorkshire Wolds. Despite disturbance and poor preservation of material, some cereals were recovered, comprising barley (*Hordeum vulgare*) and hulled wheats (*Triticum spp.)*, and also a variety of agricultural weeds. However, evidence of crop processing was especially scarce. Thus, it is likely grains were cultivated around Hemingbrough for a variety of purposes, including consumption, brewing, and as animal fodder, while animal husbandry remained a significant contributor to diets and the economy. In contrast with previously interpreted cultural differences between the Vale of York and the Yorkshire Wolds based upon material culture evidence, diet appears to have been fairly consistent across the Iron Age populations of East Yorkshire. This suggests a base level of cultural homogeneity in the region, and highlights frequent economic interactions between these groups.

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Acknowledgements

I would like to thank Kevin Walsh, for his supervision and amazing support over the course of this project, and Anita Radini for her wonderful tuition in identifying and interpreting archaeobotanical material and being generally lovely throughout; without both of your assistance I would have been totally lost and confused! I am also incredibly grateful to Brian Elsey and the Ouse and Derwent Project for providing me with such an interesting dataset and being so helpful in supplying me with any additional information I needed. I must also thank Paul Durdin and Mark Williams for their assistance in floating and processing the first few samples, and to my family and friends for listening to me whinge endlessly about stress! This especially includes my mother, Ruth, my partner, Sam, and my close friends, Lauren, James, Cormac, Rhys, Jess, Paul, and especially my fluffy friends, Oreo, Harri and Bast! Thank you for all of your encouragement.

Chapter 1: Introduction

1.1 Rationale and background to the study

Combining a visible set of prehistoric monuments with an intense history of agricultural and industrial activity, the Yorkshire Wolds have been the subject of much archaeological research, thus understanding of the Iron Age in this region is relatively well developed (Giles, 2012). However, the adjoining Vale of York has received far less attention. Until recent decades, understanding of the domestic archaeology has been limited, with fewer excavations undertaken than in the surrounding uplands (Neal and Roskams, 2013; Harding, 2017).

Yet this is beginning to change; excavations, such as at Heslington East and North Duffield, aimed to explore Iron Age activity in the lowlands (Elsey, 2012; Neal and Roskams, 2013). With traditional views arguing for contrasting economic and cultural dynamics between lowland and upland sites, these ideas may now be examined due to new influxes of data (Harding, 2017). Plant remains can be an invaluable source of information in exploring the character of sites, alongside elements of lifeways including diet (Jones, 1985). However, little archaeobotanical analysis has been attempted within the Vale of York, with ‘next to nothing’ known regarding the environment and activity of prehistoric peoples in the environs of York (Carrott *et al*, 2004, pp.169). This study aims to expand this dataset, promoting better understanding of the lifeways of Iron Age peoples in this landscape, and explore contrasts between lowland and upland sites. Currently, no comparative study between the Vale of York and the Yorkshire Wolds (see fig 1.1) has taken an archaeobotanical perspective, thus it is hoped this novel approach may offer new insights.

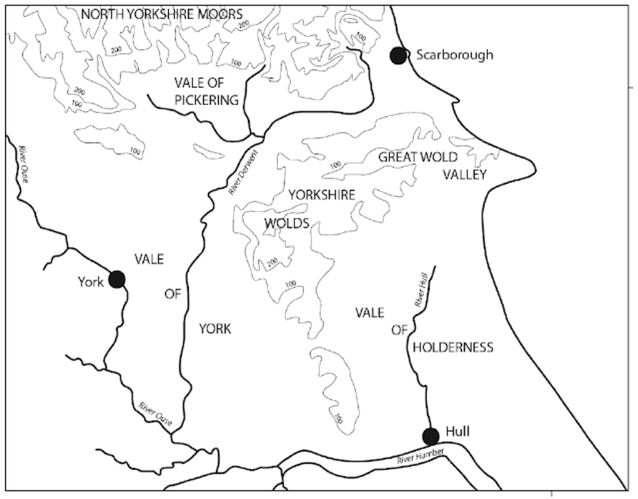


Figure 1.1. Map of North East Yorkshire, including the study area of the Vale of York and the Yorkshire Wolds (Giles, 2012)

Original data from the Vale of York lowlands has been interpreted from a site near the village of Hemingbrough, lying close to the river Ouse and 13 miles south-east of York (Baggs *et al*, 1976). Excavated in 2017 by the Ouse and Derwent Project, a heritage lottery funded community archaeology project, a series of Iron Age ring ditches and associated features were examined, uncovering evidence for at least five roundhouses, believed to represent a fairly low status, rural homestead (Elsey, 2017). Analysis of the ceramic assemblage, containing a sizeable quantity of prehistoric Calcite Gritted wares, suggests a Mid to Late Iron Age occupation, continuing into the Romano-British period (Austin, 2018).

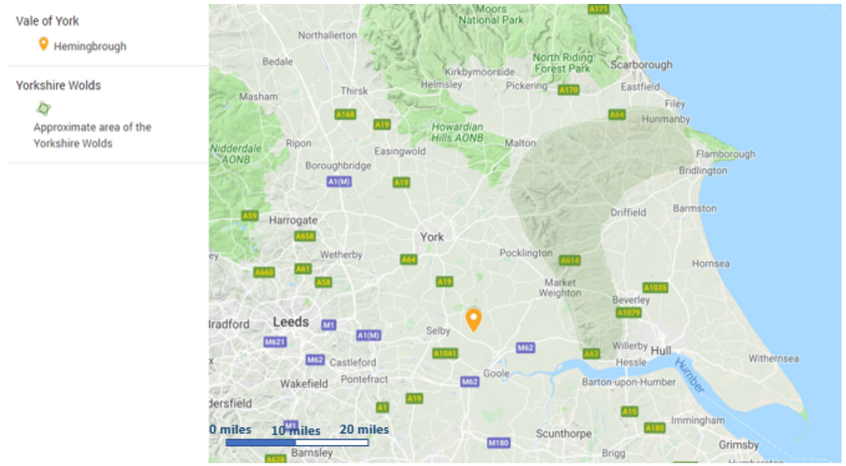


Figure 1.2. The geographical location of the settlement at Hemingbrough in relation to modern day towns and boundaries (Author, 2018).

1.2 Research aim and objectives

Aim

- To examine and interpret archaeobotanical data from Hemingbrough, North Yorkshire, in order to contribute Towards understanding of Iron Age diet within a regional framework and critically compare cultural and economic character between Iron Age sites (c.800 BC - 43 AD) in the Vale of York and the Yorkshire Wolds.

Objectives

- SO1: To investigate the cultural, social and ideological implications of Iron Age diet within East Yorkshire.

- SO2: To analyse environmental and archaeobotanical data from sediment samples taken from Hemingbrough, through the examination of macrofossils and subsequent identification of plant species.

- SO3: To interpret these datasets in order to critically assess Iron Age diet and human-plant interaction in the Vale of York with regards to crop production and processing, consumption and human relationships with landscapes.

- SO4: To critically compare and contrast plant remains from the Vale of York with existing archaeobotanical datasets from Iron Age sites in the Yorkshire Wolds in order to examine diet within a regional context.

- SO5: To reconstruct the Iron Age environment of the Vale of York within the context of East Yorkshire to promote a more holistic understanding of sites.

1.3 Summary of methods

Nine 10 litre sediment samples from different contexts were collected from Hemingbrough. Each sample was disaggregated through bucket flotation, then the flot and residue were collected through a fine mesh, and dried. Material was systematically inspected under microscopes, and all biological macrofossils and archaeological remains were recovered and categorised. Each classified category was weighed or counted by context, and the plant macrofossils identified to at least family level, then quantified. This information was recorded on a spreadsheet and synthesised with existing datasets from East Yorkshire, then subject to analysis aided by the creation of graphs, focusing upon the presence of cereals and weed varieties according to site characteristics.

This data was interpreted with regards to understanding diet, crop production and the environmental context of sites and discussed upon a site-wide and regional level. A review of archaeobotanical data from the Vale of York and the Yorkshire Wolds was collated, and results from Hemingbrough are incorporated into this framework. A

comparative assessment of archaeobotanical data and associated interpretations from the regions was undertaken, and cultural, economic and ideological implications were explored and reviewed within a regional context.

1.4 Dissertation outline

This dissertation attempts to contribute to understanding of Iron Age diet within the Vale of York using archaeobotanical evidence, and explore the subsequent cultural and ideological implications. Chapter 2 consists of a literature review of current knowledge upon Iron Age culture in East Yorkshire, including dietary traditions, and current regional archaeobotanical data. A description of the methodology employed is provided in Chapter 3. The results of archaeobotanical analysis from Hemingbrough is presented in Chapter 4. These are discussed in Chapter 5, alongside comparisons with evidence from the Yorkshire Wolds, and considerations about the implications of findings regarding diet. Conclusions reached through these examinations are presented in Chapter 6.

Chapter 2: Literature Review.

Despite intense historic interest in the Iron Age communities of southern Britain, understanding of the cultures of northern England remains patchy (Cunliffe, 2009). Even so, many studies within the north have focused upon the East Riding of Yorkshire, exhibiting a flurry of activity between 400 BC and the advent of Roman Britain in the 1st century AD (Giles, 2012). This chapter reviews knowledge upon the cultures and dietary practices of East Yorkshire, alongside current archaeobotanical evidence.

2.1 Settlement and Culture in the Iron Age Vale of York and Yorkshire Wolds

Traditionally, it was argued North Yorkshire was split between the Parisi, around the East Riding and Humber Valley, and the Brigantes, spanning much of the remainder of northern England (Harding, 2017). The boundaries between these two cultures are unlikely to have been exact or temporally consistent, although the distinction was possibly drawn from the Ouse, Derwent and Humber rivers, providing natural boundary markers (Sheahan and Whellan, 1855; Halkon, 2013). However, with the city of York (Eboracum) lying upon the Ouse, within Brigante territory, more nuanced demarcation may have surrounded the Vale of York (Harding, 2017). Debated initially during the 19th century (Sheahan and Whellan, 1855), these discussions persist today, yet are hindered by limited research upon the Vale (Higham, 1987; Giles, 2012, Halkon, 2013; Harding, 2017). Moreover, comparisons remain challenging, considering study has focused upon funerary data, suggesting domestic trends have been overlooked (Giles, 2012).

Discovered in the early 19th century, the Arras Farm chariot burials, Market Weighton, became the type-site for Parisi remains of the Arras culture between the Mid to Late Iron Age (Halkon and Stanley, 2011). Stillingfleet (1846) suggested the complex mortuary rites were of British origin, reflecting the ruling elite of the Brigante tribe, thus initiating interpretations of the Parisi as a more powerful group.

However, later works by Mortimer (1905) argued these burials represented invading

Gauls or Phoenicians, appearing too sophisticated to be of native innovation. Following colonial narratives, this suggested the Parisi were superior instigators of social progress, ethnically distinct from the indigenous Brigantes; although physiological evidence contests this, these misinterpretations influenced perceptions that the Parisi and Brigantes were unrelated cultures (Mortimer, 1905; Giles, 2012).

Stead (1965; 1979) later suggested that domestic evidence from Wetwang and Arras Farm is indistinct from settlements across northern England, displaying similar patterning in roundhouses and enclosures (Stead, 1965). Although distinctive funerary rites perhaps arose from contact with continental La Tene communities, this reflects small-scale integration resulting from transfer of ideas rather than people, suggesting Arras populations were a distinct culture, nevertheless sharing roots with the Brigantes (see figure 2.1) (Stead, 1965).

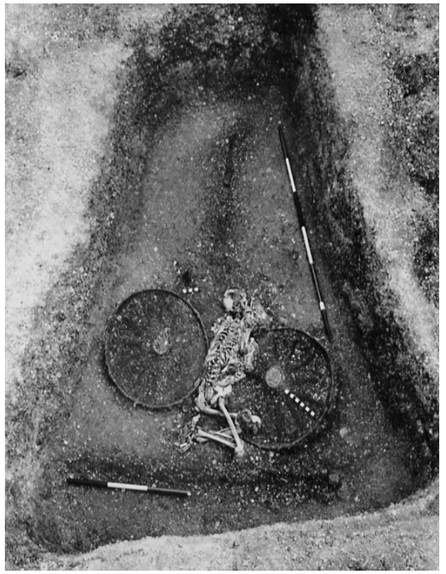


Figure 2.1. Image of a distinctive chariot square burial from Garton-Slack (Brewster, 1971).

Further illustrating this, Higham (1987) characterised the Parisi as a subset of the Brigante tribe, arising as a high-status political and economic class through increased continental trade and emergence of iron production centres. Extravagant burials were used to express wealth, authority and distinction, reflecting conspicuous consumption rather than unique cultural values (Higham, 1987; Halkon and Starley, 2011). However, this focus on economy lacks consideration of the social aspects of identity construction; similar criticisms may affect economic narratives proposed by Cunliffe (2009). Based upon funerary evidence and Roman accounts, Cunliffe (2009) argues burials reflect the emergence of warrior-elite classes, comprising native Britons and small bands of immigrants, overlooking the cultural identity of lower-class individuals.

Even considering syntheses of burials, settlement and earthworks by Giles (2012), in which strong connections between communities and specific locales were inferred, the Arras culture is classified largely regarding funerary rituals. However, whether distinctive cultural values permeate to domestic levels remains debated (Giles, 2012; Harding, 2017).

Material culture remains of the Brigantes is scarce, owing to the widespread aceramicity of many communities and limited reliably dated domestic sites (Cunliffe, 2009; Harding, 2017). Consequently, studies have focused upon the political organisation of the Brigantes, based upon Roman records, and landscape organisation comprising earthworks, fortification and settlement (Cunliffe, 2009).
The term ‘Brigantes’ undertook two definitions in Roman writings. Ptolemy (1991) refers to the communities of northern England, spanning from sea to sea with the exception of a stretch of coastal Parisi territory. Conversely, Tacitus (2018) implied the Brigantes were politically defined, concentrated around core political sites and leaders. Consequently, excavations of political centres were prioritised, for example of Stanwick Fortifications, Richmondshire, identified as a Brigante military stronghold during the early Roman period (Wheeler, 1954). Interpretations of the Brigantes retain Roman perspectives, regarded as a well-established political unit by the first century AD, however knowledge is limited of its development during preceding centuries (Higham, 1987; Cunliffe, 2009). The Brigantes were a broad tribal group,

comprised of sub-tribes, likely with individual cultural identities alongside Brigante affiliations (Higham, 1987). Nevertheless, distinctions are less apparent in the artefactual record, in which coinage, burials and ceramics are rare (Giles, 2012). Vessels and artefacts composed of organic material were certainly prevalent, yet their preservation is unlikely, while alternative disposal practices, such as burning may bias survivability (Cunliffe, 2009).

Bordering the territories of the Parisi and Brigantes, it is unknown whether populations in the Vale felt affiliation towards either culture, however, historical interpretations argued that their lowland location promoted segregation from Wolds communities (Higham, 1987). Fox (1932) suggested prehistoric cultures were distinct between the highlands and lowlands due to the effect of topography upon cultural diffusion and invasion, providing an environmentally-deterministic model, allowing little variability within groups. Although Wolds communities perhaps had a distinct identity it is unlikely they were cut-off from lower-lying areas (Fenton-Thomas, 1999). Research by Giles (2012, pp.5) highlights that the Wolds were ‘a distinct yet internally varied zone, set within a diverse broader landscape, utilised by many communities.’ Despite the rarity of lowland burials, some examples reflect Arras square barrow traditions, suggesting some groups within the Vale felt a cohesive sense of identity with Wolds communities (see figure 2.2) (Parker Pearson, 1999; Halkon and Starley, 2011).

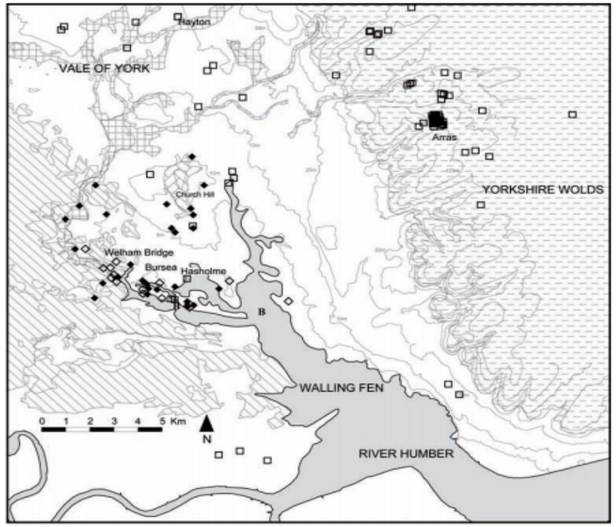


Figure 2.2. Map of the study area, with square barrows marked (Halkon and Starley, 2011).

2.2 Diet in Iron Age East Yorkshire

Following the emergence of post-processualism, diet and food production was recognised as providing significant insight into roles, communication, status, and cultural identities (Mennell *et al*, 1992; Weissner, 1996; Palmer and Van der Veen, 2002; Twiss, 2007). Research into the production, distribution, consumption and

discard of food, aids debates surrounding regional culture, often reflecting expressions of cultural values (Twiss, 2007).

Owing to the diversity in geomorphology and microclimate across England, Iron Age diets varied between regions, with cultures following individual trajectories of change (Cunliffe, 2009). However most communities enjoyed a mixed economy, comprising small-scale pastoralism and agriculture based around individual or small clusters of households; this resulted in diets consisting of terrestrial meat and domesticated crops (Dent, 1982; Van der Veen, 1992; Cunliffe, 2009; Giles, 2012).

2.2.1 Iron Age Meat Consumption

Most studies of diet in East Yorkshire have focused upon the consumption of animal proteins, collated through analyses of animal bone; although no attempts have been made to synthesise this material (Cunliffe, 2009; Giles, 2012). While nationwide evidence suggests sheep and cattle were the dominant livestocks, Morris' (2010) analysis of associated bone group ratios found that pig bones are most frequently recovered in Yorkshire (Harding, 2014). While this may imply a pork-based diet, these data may not reflect everyday subsistence, comprised of evidence from burial contexts upon the Wolds, although similar patterning is displayed at Heslington East in the Vale of York (Antoni *et al*, 2009; Morris, 2010). Similar behaviour is displayed across southern Britain suggesting pigs held national symbolic significance (Parker Pearson, 1999). Parker Pearson (1999) argues that pork was consumed by the elite or during religious events to express the status and liminality of groups who adopted the wild boar as a totem. The disproportionality of elite burial in East Yorkshire has possibly lead to the overrepresentation of pig bones, rather than a preference in everyday diets (Morris, 2010; Peck, 2013).

Furthermore, domestic evidence contrasts with nationwide data, with cattle represented in greater proportions than sheep across Yorkshire, such as at Grimthorpe in which cattle remains appear at a 2:1 ratio over sheep bones (Stead, 1969; Morris, 2010). Ratios are comparable at Heslington East and Wetwang, suggesting cattle played a dominant role in the East Yorkshire diets (Stead, 1991; Antoni *et al*, 2009; Morris, 2010). This use of cattle as a staple food possibly acts as

an expression of differentiation between the tribes of the north and south (Twiss, 2007). Furthermore, the increase in sheep remains upon entering the Romano-British period illustrates a correlation with cultural identity in East Yorkshire, with cattle possibly acting as a totem of a northern identity, altered by the arrival of the Romans (Morris, 2010).

Analysis of carbon and nitrogen isotope values of 62 individuals from Wetwang also suggested meat and dairy foodstuffs comprised a high proportion of diets, with no differentiation detected between sexes, ages or statuses, while marine resources were consumed minimally, despite close proximity to the coast (Jay and Richards, 2006; 2007). It was further suggested that breastfeeding was restricted, with infants weaned by 2.5 years old; this implies children were supplemented with animal milk and plant gruel at an early age (Jay *et al*, 2008). Although no dairy residues have been identified on pottery, this suggests milk and cheese were significant dietary contributors (Giles, 2012). Even so, generalisations about East Yorkshire are impossible to draw from a single site (Jay and Richards, 2006). Furthermore, the invisibility of plant foods in isotopic values means additional methods must be applied to generate a holistic view into prehistoric diets (Jay and Richards, 2007).

2.2.2 Proxy Evidence for Diet

Mid to Late Iron Age quernstones have been recovered from funerary and domestic contexts within the Wolds and the Vale of York (Dent, 1984; Antoni *et al*, 2009). Consisting of saddle and beehive rotary querns, these were used to grind grain into flour for the production of bread, or to crack cereals for porridge-like gruel (Reynolds, 1995). While direct evidence of cereal use is rare, quernstones are indicative of an economy in which plant foods featured in everyday diets (Reynolds, 1995). Moreover, their appearance within burials associates plant foods with ritual practices; while less prevalent than animal bones as grave goods, cereal processing and consumption played a significant role in the lives of some individuals (Giles, 2012).

The extension of enclosures at Crankley Lane, Easingwold, possibly suggests the expansion of pasture during the Late Iron Age, supporting inferences of meat-dominated dietary traditions (Whyman, 1991). However, few field systems have

been reliably dated, thus a Roman origin is possible for many recorded systems (Whyman and Howard, 2005). Indeed, while earthworks enclosing fertile soils around Wetwang may reflect crop production alongside larger-scale pastoralism, much comparative evidence from the Vale has likely been destroyed due to extensive modern ploughing, making wider landscape trends challenging to study (Dent, 1984; Giles, 2012).

2.3. Archaeobotanical Evidence for Diet

Until recently, only Van der Veen (1992) had attempted to synthesise archaeobotanical data from northern England, spanning the Late Bronze Age to the end of the Roman period. Van der Veen (1992) suggested numerous tribes existed with differing agricultural strategies; for example the prevalence of cereal remains may indicate a more agrarian economy sites in which grassland plants dominate. Providing a detailed synthesis, Van der Veen (1992) ensures all archaeobotanical data and their associated contexts have been reliably dated while the issue of intrusive remains is considered.

Although less detailed and spanning all periods, this work was updated by Huntley and Hall (2007). However, not all sites with published archaeobotanical analyses have been included in this work (Huntley and Hall 2007). Additional data can be gathered, such as from the recently published report from Heslington East (Schmidl *et al*, 2009), as well as older publications, for example, from Dalton Parlours (Wrathmell and Nicholson, 1990). Nevertheless, although the dataset is expanding, published archaeobotanical data from East Yorkshire is sparse in comparison to other regions of northern England (see figure 2.3), thus it is difficult to make generalisations (Huntley and Hall, 2007).

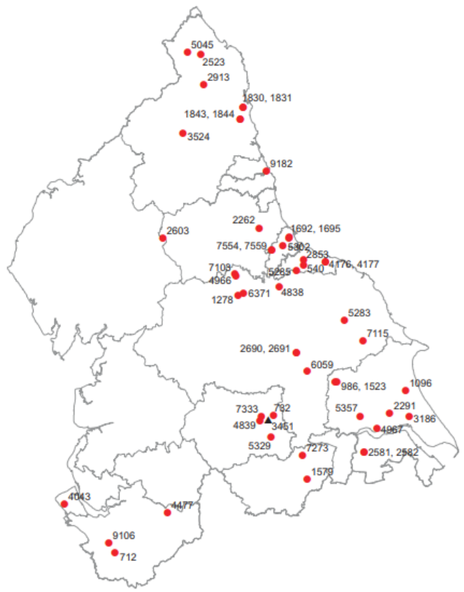


Figure 2.3. Most sites with published archaeobotanical data in northern England. Those labeloled 1523,2690, 2691, 5257, 7103 and 7115 appaear within the study area of this dissertation (Huntley and Hall, 2007).

However, ratios of wheat to barley within sites in East Yorkshire are difficult to determine due to the scarcity and poor preservation of grains recovered (Kenward *et al*, 2004; Antoni *et al*, 2009). Even so, some site-wide analyses of archaeobotanical and palynological evidence have been published. Pollen analysis from Kirkburn suggests the Wolds landscape was open, although interspersed with arable land, while barley and wheat dominated crop assemblages (Grieg, 1991). Brewster's (1980) studies of macrofossils from Wetwang support this, containing barley and wheat grains, alongside trace evidence for the cultivation of rye, oats and field beans. Nevertheless, Huntley (1995) suggests a barley monoculture existed across northern England; while not decisively indicative of a cultural preference towards barley, retaining popularity as an animal feed, this may reflect regional dietary distinctions (Mills, 2006). This contrasts with southern English agricultural practices, compared by Mills (2006), suggesting (see fig 2.4) wheats were strongly preferred

over barley. These differences may reflect regional cultural contrasts, perhaps attributable to southern interactions with the continent, although continental influences upon the Parisi may have similarly affected taste (Cunliffe, 2009).

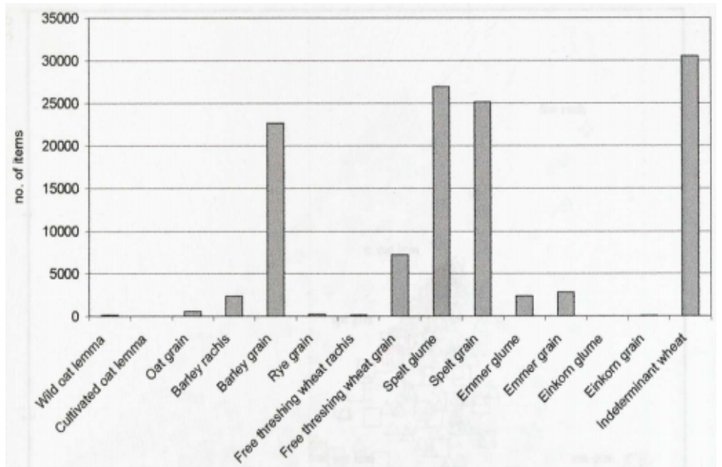


Figure 2.4. The abundance of cereal items from across the British dataset, comprised mainly of sites from southern England (Mills, 2006).

Currently, archaeobotanical evidence may reflect dietary difference between highland and lowland communities during the Iron Age; Jones (1981) observed spelt retained popularity over emmer wheat until much later in highland regions, suggesting limited communications, or cultural resistance. While this is supported by southern British datasets, this hypothesis has not been tested within the north (Mills, 2006). However, Late Iron Age evidence at the lowland Market-Weighton Bypass, containing spelt, appears to support Jones' (1981) interpretation, despite the alignment of the material culture with sites from the Wolds (Huntley, 1995). It would be interesting to examine whether this patterning is repeated at sites deeper within the Vale of York.

Chapter 3: Methodology

The methodology employed throughout this study is presented in full below. Recovery methods and sampling strategy are described, explaining the choice of contexts in relation to generalised aims, followed by an explanation of the flotation, sieving, and laboratory methods. The identification protocols are detailed, in which archaeological material was recovered and categorised following inspection, while the eliminative methods of archaeobotanical, interpretation are also outlined. Following this, the use of relational statistics, following quantification of archaeobotanical remains by specimen count, and environmental material by weight, is presented. Finally, the methods employed in interpreting and comparing this data to existing publications, using graphs and maps is demonstrated.

3.1 Field methods and sampling strategy

Bulk soil samples were collected during excavation from contexts that were identified as likely to contain significant proportions of organic material, through their placement in ditch features and charcoal content observed during excavation, or were in a stratigraphically important position for obtaining radiocarbon dates (see table 3.1). Nine 10 litre samples, and one 20 litre sample from context 2422, were taken from Hemingbrough from various contexts. The sampling focus was on retrieving broader environmental and economic information, rather than comparison of features across sites, thus well-stratified features were chosen, alongside those of particular interest, such as contexts 2409 and 2514 in which pottery was especially abundant. This aimed to generate a general understanding of the environmental characteristics of the sites, enabling study on a regional level consistent with the project aim and objectives (SO3, SO4, SO5). The samples were collected and stored in a dry indoor room in clean, robust, sealed plastic bags.

Sample Number	Trench Number	Context Number	Interpretation	Finds
1	4	2403	Prehistoric ring ditch terminus	Prehistoric pottery, burnt bone, daub, broken cobbles
2	4	2406	Prehistoric ring ditch terminus	Bone fragments, broken cobbles
3	4	2408	Fill of ring ditch (South)	Prehistoric pottery, bone fragments, broken cobbles
4	4	2409	Fill of ring ditch (South)	Prehistoric pottery in abundance at base
5	4	2422	Fill of ring ditch (North)	Bone fragments
6	6	2603	Fill of ring ditch	N/A
7	5	2508	Prehistoric ring ditch terminus (South)	Prehistoric pottery, broken cobbles
8	1	2533	Prehistoric linear ditch terminus	Prehistoric pottery, burnt bone
9	5	2514	Fill of ring ditch (South)	Prehistoric pottery in abundance, broken cobbles

Table 3.1. A summary of the characteristics of the contexts sampled.

3.2 Laboratory Methods

Samples were subject to bucket flotation approximately two weeks after recovery, in which deposits were poured into a bucket with water and disaggregated gently by hand; floating material was poured off into a 100 micron steel sieve, while the remaining heavy residue was collected in a 300 micron mesh. The contents were rinsed clean with cold water, placed on trays, and dried within a heated cupboard for around 24 hours. Once dry, samples were retrieved and stored in large sealed plastic bags.

Flotation was chosen to aid the preservation of archaeobotanical macrofossils (SO2), which may be damaged by dry or water sieving methods of separating material (Jones and Charles, 2009). Even so, bucket flotation is not as efficient and effective as mechanical water-separation tank methods (Watson, 1979). Consequently, a small portion of material may have remained trapped in unagitated sediment that was missed in crevices of the bucket, or in adhesive sediments, such as the clays observed in contexts 2403 and 2406. However, practical complications meant bucket flotation was the only method available during processing.

3.3 Identification Protocol

The dried sediment samples were initially systematically inspected using a GX XTL3T101 low-powered stereomicroscope at 100x magnification (SO2). The limited volume of material meant sub-sampling was not necessary, therefore all flot and heavy residue was sorted. Furthermore, samples were not sieved for sectioning into

size categories as is common practice in bulk samples. Small portions of the samples were poured into a petri dish, then the entirety of material was systematically passed under the microscope for inspection using fine steel tweezers; this was repeated until each sample had been wholly examined. All macrofossils and archaeological remains were recovered and broadly categorised by material, such as pottery, bone, slag, charred wood, cereals and seeds. Categorised material was stored in hard containers to aid preservation, aside from large quantities of charred wood, bone, and pottery, which were stored in sealed bags. General observations of sediments, their quality of preservation and quantity of components was recorded on a paper sample register throughout the sorting process. Plant macroremains, aside from charred wood, were separated for archaeobotanical analysis, while the remaining categorised material was counted or quantified by weight per context upon digital weighing scales and recorded in grams in a spreadsheet (see Appendix 2).

3.4 Archaeobotanical identification protocol

The archaeobotanical material was studied under a Leica MZ75 stereomicroscope at around 100x magnification, however provided a higher-powered zoom than the XTL3T101 (SO2). Cereal grains and seeds were examined, identified, and categorised to family level, then if possible classified according to genus and species, using handbooks by Schoch *et al* (1988), Jones *et al* (2004) and Neef *et al* (2012) for reference, and one-to-one comparison with charred and uncharred specimens from the seed reference collection at the University of York. This was achieved through an eliminative method, rather than by matching, in order to minimise cases of mistaken identity; viable candidates were explored through comparison of morphological characteristics, surface patterning, and to a degree, size, as identification criteria, to establish family identifications then narrowed down in some cases to genus and species level. A similar methodology was employed regarding the identification of chaff, using gross morphology as identification criterion, and texts by Jacomet (2006) and Neef *et al* (2012) for reference. It should be noted that poor preservation of much of the plant material impeded identification beyond family or genus level, thus few specimens were classified according to species. Furthermore, the identifications recorded are generally fairly cautious to

accommodate for the likelihood of misidentification due to the poor condition of the remains.

3.5 Quantification and statistical analysis

The classified plant macrofossils were then quantified using fully-quantitative methods, in which the number of individual specimens per classification in each context was counted and recorded in an Excel spreadsheet to allow the application of relational statistics during analysis (SO3, SO4), categorised into archaeological crops and cultivated flora, arable weeds, wild taxa, and uncharred material. In order to standardise this, a diagnostic feature of each plant species that was archaeologically durable, definable and identifiable was selected in order to calculate a minimum number of individuals; the hilar region of seeds was generally chosen, alongside the embryo tip of grains (Cilingir, 2009). Even so, as seeds were highly fragmentary in some cases, particularly the *Atriplex* and *Silene* genera, it is likely the true number of specimens recovered was higher than that reflected in the quantified data.

Descriptive relational statistical analysis was undertaken using the quantified data (SO4). Each sample, thus each context, represented one unit of analysis (Jones, 1991), comprising a single event that generated archaeobotanical and environmental data, therefore quantifications per context were compared to identify inter-site patterning. Following a review and collation of Iron Age environmental and archaeobotanical data from sites within the Vale of York and Yorkshire Wolds, recorded upon an Excel spreadsheet (see Appendix 3), the original data from Hemingbrough was synthesised within a regional context. Quantity per site or presence of species per site were chosen as analytical units in exploring regional trends and spatial patterning. However, much of the published archaeobotanical data presents only semi-quantified data, recording the presence or absence of species; these sites were used in broader descriptive analysis of foodstuffs and environment in North Yorkshire, though were largely omitted from the dataset in aspects of statistical analysis, such as in exploring the relationship between diet and sites of status. This is certainly a pitfall of a small and understudied dataset. Furthermore, although samples have been sent away for radiocarbon dating, the current lack of

radiocarbon dates from Hemingbrough means that chronological analysis is not possible, and is not discussed at length throughout this analysis.

3.6 Interpretation

Visual aids were created in Excel to assist data-exploration, namely through pie and bar charts to allow comparison of quantities between and within contexts, sites or regions. Data was also mapped to examine spatial patterning, focusing upon the frequency and presence of species of cereals and weeds according to site characteristics. The archaeobotanical information included within produced charts and maps generally focused upon species indicative of diet, such as cereals and arable indicator species, or taxa that reflects the nature of the environment in prehistory. This material aided the interpretation of quantitative data, allowing patterning to be examined in order to study the significance of different foodstuffs by site and throughout the region, understand crop production and processing, site function and status, and to characterise the environment (SO1, SO3, SO4, SO5). Some of these patterns may not be entirely robust due to the limited sample size, however, some generalisations could still be drawn.

The significance of these findings is discussed in relation to their contribution to understanding Iron Age lifeways on a site-wide, in the case of Hemingbrough, and regional level within the existing framework of understanding in East Yorkshire. The data generated is combined with current literature and theory regarding Iron Age diet and interactions with the environment in order to make inferences consistent with the research aims and objectives of this study. A critical comparative assessment of archaeobotanical data and associated interpretations from the two regions has been undertaken and evaluated, and the cultural, economic and ideological implications of the similarities or differences noted were explored and evaluated. As such, the results and interpretations made through following this methodology is presented in this dissertation.

Chapter 4: Results

Plant macroremains retrieved during archaeobotanical investigations of Hemingbrough are presented in this chapter. Nomenclature follows the *New Atlas of the British and Irish Flora* (Preston *et al*, 2002), and is displayed in alphabetical order, with full archaeobotanical data recorded in Appendix 1, and additional environmental data in Appendix 2. Totalling 307 specimens, the material was poorly-preserved, having been subjected to high levels of soil disturbance, with 44.28% of total plant remains of modern origin. Consequently, many macrofossils are not identified beyond family level, with some specimens, particularly from contexts 2403, 2406 and 2422, heavily concreted with clay residue, despite attempts to remove clay by further soaking material in water.

4.1 Cultivated crops

No cultivated crops, such as larger legumes, were recovered from Hemingbrough aside from cereals, comprising wheat (*Triticum spp.*) and barley (*Hordeum vulgare L.)*. While the limited range of economic plants is surprising, wheat and barley are regarded as dominant food plants throughout Iron Age Britain, thus crops cultivated in smaller quantities are unlikely to appear in samples of poor size and preservation (Cunliffe, 2009). The discussed species likely formed the majority of most plant-based elements of diet at Hemingbrough, while fulfilling other uses for example as animal feed.

***Hordeum vulgare* L.**

Twelve grains were confidently identified as barley, while in seventeen other cases, identification is less secure, however likely (see figure 4.1). This totals 9.45% of charred remains, representing the most frequently recovered crop. Grains were 5-8 mm in length and of lengthened-ovoid shape, with tapered ends and a distinctive ventral scar. Preservation was poor, as remains were fragmentary and surface features eroded; furthermore, no barley chaff recovered, thus it was not possible determine whether two-rowed or six-rowed hulled barley was preferred. Although,

six-rowed barley is regarded as most common in Iron Age Europe, therefore likely represents the bulk of this assemblage (Jones, 1981). Barley is a hardy crop, found occasionally in modern fields as a relic crop or as animal fodder, however its uses were widespread in prehistory, including in bread making, porridges, animal feed, and brewing (Mills, 2006). This species is adaptable, requires low labour intensity, and consistently produces a higher yield than most wheats, thus is preferred in regions prone to aridity or with lighter soils (Mills, 2006).

Figure 4.1. An example of *Hordeum Vulgare* recovered from context 2422 (Author, 2019).

Notably, three grains appear to have sprouted, while cereal sprout embryos, totalling thirty-one examples, were recovered. While germination may occur accidentally, due to damp depositional conditions, barley is intentionally germinated during brewing processes; Van der Veen (1989) suggests this is implied when sprouted grains represent over 15% of cereal remains. Although sprouted grains comprise only 10.34% of cereals, a fair proportion of detached sprout embryos were collected, perhaps alluding to high levels of germination. Experimentally, grains become brittle after sprouting, thus elevated germination rates may account for the poor preservation and fragmentation of cereals recovered (Stika, 1996).

Triticum spp.

Eighteen grains, comprising 5.86% of the assemblage, were attributable to species of glume wheat (*Triticum* spp.) (see figure 4.2). Poor preservation prevented identification beyond genus level, however grains displayed characteristics of T. *spelta* and *T. dicoccum* species, consistent with regional cereal assemblages (Hall and Huntley, 2007). Grains were over 5 mm in length, elongated-oval in form with a rounded dorsal face and a deep ventral scar upon a flattened face. Additionally, four glume bases were collected, displaying widely-set spikelet forks, consistent with *T. spelt* and *T. dicoccum*. Although these species are currently rarely grown for human consumption, higher yields and protein content are produced than modern bread wheats (Van der Veen and Palmer, 1997). Both species perform well over various temperatures and soils, including nutritionally-poor soils, and were the dominant wheat varieties grown in throughout the northern Iron Age (Van der Veen, 1992; Mills, 2006). Wheats were cultivated largely for human consumption, although use as animal fodder is also probable (Van der Veen, 1992).

Figure 4.2. An example of *Triticum spp.* From context 2533 (Author, 2019).

4.2 Potential Arable weeds

Weeds associated with tall-growing crops were consistently recovered alongside indicators of pastoral landscapes, supporting interpretations that the landscape of Hemingbrough comprised portions of cultivated land, and hay-meadows for livestock, reflective of a mixed economy. The weeds further indicate the presence of damp, nutritious soils, ideal for cereal cultivation.

Apiaceae

One possible fragmentary example of *Apiaceae* was recovered; the fairly preserved surface patterning displays deep linear ridges and protrusions upon an ovoid form below 1 mm in diameter. Further identification is inconclusive, though bears similarities to members of the genera *Apium* and *Pastinaca*, and close resemblance was noticed to *Aethusa cynapium*. Comprising common, annual or biennial herbs, these genera cover multiple environments, including pasture and cultivated ground, with *Aethusa* and *Pastinaca* occurring alongside cereals (Hanf, 1983); however *Apium* generally appear as wild taxa in wetland environments (Southam, 2002). Members of the *Apiaceae* family generally prefer calcareous, nutrient-rich soils, consistent with soils at Hemingbrough (Hanf, 1983).

Brassicaceae*: *cf. Brassica nigra (L.)

One well-preserved specimen of the *Brassicaceae* family was collected, globular in shape and patterned with raised dimples at around 1 mm diameter, consistent with the *nigra* species. Occurring on wetland or flood zones, this species grows on the periphery of arable land upon damp, nutrient-rich clays or silts alongside spring crops (Pearman, 2002; Hanf, 1983). Historically, Columella (1955) documents its use as a spice foodstuff in AD 1; it is likely its culinary uses were known to prehistoric populations.

Fabaceae

Nine possible examples of small-seeded legumes were found, appearing

lens-shaped and slightly flattened in form with a smooth surface, at around 1 mm in diameter. Inadequate preservation prevented identification beyond family level, however some examples may be tentatively attributed to the *Trifolium* genus. Pea and clover species grow naturally in numerous environments in abundance, however presently, many species are found on grasslands, animal pasture and waste-grounds, while *Trifolium spp.* are also sown as fodder (Hanf, 1983).

Lamiaceae

Six, poorly preserved, charred examples of *Lamiaceae* were recovered. Nutlets are 1-2 mm in length, and of oval or ovoid form with indeterminate surface patterning and distinctive depressions either side of the hilum. Many species are associated with the cultivation of crops and grow upon arable land, while some varieties are cultivated as culinary herbs, such as *Mentha* (mint) (Hanf, 1983).

Papaver cf. rhoeas

Seventeen seeds displayed characteristics of the *Papaveraceae* family, presenting features consistent with the *rhoeas* species. Seeds are reniform with approximately hexagonal reticulated surface patterning, and of generally good, complete levels of preservation. Common in lowland, arable environments, *Papaver* are indicative of disturbed soils, frequently found along fences and banks, and upon arable land, while rarely recovered from wild contexts (Hanf, 1983). This species prefers damp, calcareous loams or clay and thrives alongside winter cereals or spring crops (Hanf, 1983; Wilson, 2002).

***Ranunculus* spp.**

Three examples of at least one species of the *Ranunculus* genus, varying in preservation, were recovered displaying characteristics overlapping the *R. acris, R. repens* and R. *bulbosus* species. Seeds were orbicular with a hooked beak, smooth-surfaced, and between 0.5-1 mm in diameter. *Ranunculus* spp. is a perennial herb, appearing in numerous environments, although commonly in hay-meadow or pasture land and an indicator of heavy loam soils, preferring damp, nutrient-rich ground (Fitzgerald and Preston, 2002).

***cf. Rumex* spp.**

Two fragmented examples of the *Polygonaceae* family, attributed to the *Rumex* genus, were collected; seeds were over 1 mm in width and an angular, multifaceted, ovate shape. Comprising perennial docks and sorrels, these species are indicative of disturbed pastures or meadows, also appearing on waste-ground (Hanf, 1983). *Rumex* are common across the British Isles, often growing alongside *Urticaceae* (nettles), with traditional uses including medicine and occasional consumption (Vasas *et al*, 2015).

Silene spp.

24 complete or near-complete specimens attributable to at least one species of the *Silene* genus were recovered, alongside ten sizable fragments. Surface patterning was well-preserved, appearing closely papillated in irregular rows, while seeds were orbicular to reniform in shape, measuring around 1 mm diameter. These examples were consistent with overlapping characteristics displayed in *S. latifolia* and *S. dioica* species. Both common species prefer disturbed ground, however, *S. latifolia* is indicative of open environments, frequently observed alongside fodder crops such as clover, while *dioica* grows in shaded grounds, often along hedgerows (Hanf, 1983).

cf. Sinapis arvensis

One complete specimen was tentatively identified as *Sinapis arvensis*, appearing globular in shape, with a dull, finely reticulated surface at around 1mm diameter. An annual and abundant weed of cultivation, this species is common alongside spring cereals and prefers calcareous soils (Hanf, 1983). Although young leaves are edible, consumption is historically noted as rare (Pratt, 1855).

***Urticaceae: cf. Urtica* sp.**

One tentative example of *Urticaceae* was recovered, although preservation was insufficient to identify to species level. Around 1 mm in length, the specimen was

smooth-surfaced, flattened and elliptical in shape. Species of *Urtica* spp. (nettles) grow in many environments, including waste-ground and cultivated land, and are indicative of nitrogenous soils (Hanf, 1983).

4.3 Wild Taxa

The environmental implications of the wild taxa identified aligns with most of the aforementioned arable weeds, signifying that prehistoric Hemingbrough was a damp landscape with nutritious, calcareous soils. This is consistent with interpretations that the surrounding environments comprised fertile grasslands and pasture, alongside arable landscapes. Surprisingly, however, no identified specimens were interpreted as foraged wild food plants, such as berry seeds or nutshells.

Cyperaceae

Sixty specimens displaying characteristics consistent with the *Cyperaceae* family were collected, displaying varying levels of preservation. Seeds were pointed-ovate in shape, many with angular edges and multifacets. Examples are grouped into categories of two-sided or three-sided, however, owing to the condition of specimens and the overlapping features of many species, most examples were identified beyond family level. However, many seeds share consistencies with the *carex* genus, and some have been very tentatively suggested at species level. Many British plants from the *carex* genus are best suited to damp, often calcareous soils, for example, in wet meadows, accordant with the landscape at Hemingbrough (Porter and Foley, 2002).

Juncaceae/Cyperaceae

Eleven specimens were recorded as *Juncaceae/Cyperaceae*, appearing smooth, elliptical in shape and below 0.5 mm in length. One tentatively suggests that the hundreds of unidentified small round seeds may also be assigned to this category, however, these were too small to accurately identify. *Juncaceae* and *Cyperaceae* both contain a numerous species with a preference for damp or wetland environments, including varieties of rush.

Poaceae

Seven examples of *Poaceae* were recovered, of generally elongated shape and varying in size, however all specimens were too poorly preserved to allow identification beyond family level. An additional 66 charred rhizome fragments were attributed to the *Poaceae* family; fragments were fairly fine, at around 1-2 mm in diameter, consistent with many common grasses, such as *Elytrigia repens*, found in arable and disturbed grounds. Wild grasses may have been collected for use as hay, or as fuel or tinder for fires.

Unidentifiable thorns

Four examples of thorns, of unidentifiable species, were also recovered. These were perhaps deposited following the collection of wild shrubs as fuel for fire. Although, some thorn-bearing plants from the *Rubiaceae* family, such as brambles, bear fruits that may be foraged and consumed, no seeds associated with this family were identified.

4.4 Note on modern intrusions

301 specimens of plant material were interpreted as modern intrusions (see Appendix 1). Most were uncharred, and likely became mixed with the sample during recovery from site, or were transported into the context through farming, root, insect and animal disturbance (Pelling *et al*, 2015), evidence of such disturbance was retrieved in all samples. An exception to this is the abundance of *Galium aparine*; while examples were mostly charred, their preservation was exceptional when compared with prehistoric material. While these seeds are likely archaeological, they are probably later intrusions, possibly from the medieval period.

Chapter 5: Discussion, Contrasts and Comparisons

5.1 The Iron Age Vale of York - an environmental and archaeobotanical perspective, highlighting Hemingbrough as a case study

Despite increasing excavation around the Vale of York, understanding of human relationships with this landscape during the Iron Age remains limited (Whyman, 1993). The archaeobotanical dataset from Hemingbrough represents one of the largest plant assemblages from the region, providing much-needed insights into the environment of the lowlands south of York. This data has been interpreted with regards to comparative local material, situating environmental interpretations of Hemingbrough within the context of the Vale of York.

5.1.1 The environment of the Vale of York

Reflecting the environmental setting of Hemingbrough, wild and arable weeds recovered from Iron Age contexts prefer damp, loamy soils, consistent with regional geological conditions, in which calcareous alluvial and lacustrine deposits overlay Triassic sandstone, resulting in fertile clays, sands and silts (Natural England, 2014). Situated upon floodplains between the Ouse and Derwent rivers, the prevalence of species indicative of moist ground is unsurprising. Presently, the water table of the southern Vale of York is notably high, while the region is susceptible to flooding; this was exaggerated during the Iron Age in which sea-levels in East Yorkshire were up to 1 m higher (Halkon and Starley, 2011; Wickham, 2018). The abundance of flora characteristic of damp environments, such as *carex* species, totalling 37.37% of charred seeds, certainly represents the natural surroundings of the settlement, comprised of open, damp meadows, interspersed with arable and pastoral land (see figure 5.1).

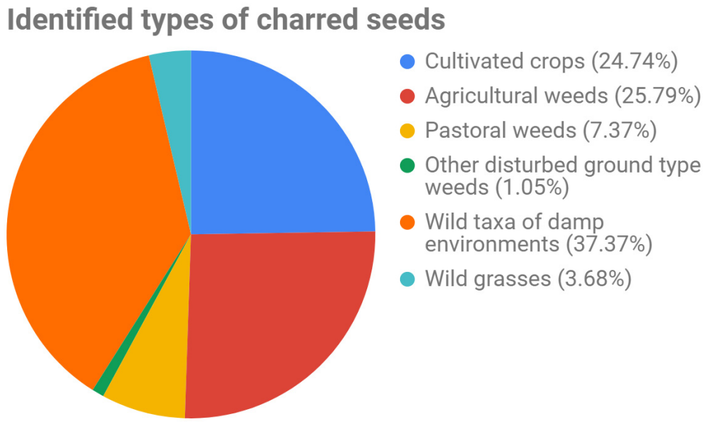


Figure 5.1. Representation of the various charred seed categories identified at Hemingbrough. The interpretations these categories are based upon are presented in Chapter 4 (Author, 2019).

Additionally, the variety of weeds suited to calcareous soils reflects the naturally fertile landscape. While proximate to the confluence of the Ouse and Derwent, enabling communication and transport, the productivity of this environment was perhaps another factor in the settlement of Hemingbrough (Halkon and Starley, 2011). As sea-levels and water tables receded in the Late Iron Age, leaving fertile grounds, populations were perhaps attracted to the area as cultivated crops increased in dietary importance (Stoertz, 1997; Vyner, 2018). This is reflected in the correlating increase in settlements, observed through crop-marks, across the southern Vale (Vyner, 2018). Although social motivations, including territorial expansion, may have encouraged settlement at Hemingbrough, the newly-accessible fertile grounds were also a likely incentive (Giles, 2012).

The natural environment at Hemingbrough appears typical of the landscape in the southern Vale, being flat, open and damp-soiled; this homogeneity was similarly observable during the Iron Age (Whyman and Howard, 2005). Even so, some environmental variety was observable; although lowlands were generally damp, yet

fertile, areas surrounding rivers were often marshlands, unsuitable for agricultural use, while less-fertile pockets of dry heathland are also present; both environments are observed at Skipwith Common, for example (Blythe and Quartermaine, 2009). Notably, despite an absence of supporting palynological data, Halkon and Innes (2005) suggest densely wooded areas were rare, due to widespread deforestation for pasture and agriculture during later prehistory.

Wetland and heathland sites comprise most domestic settlements with archaeobotanical data, often co-occurring with arable or pasture land and reflecting natural environmental variety (see table 5.1 and figure 5.2). Iron Age peoples adapted to many environments within the Vale, including less-fertile landscapes. However, while it initially appears populations settled in marginal environments, modern geological data situates many sites in areas of fertile alluvial soils, such as at Germany Beck, contrasting with archaeobotanical data (Kenward *et al*, 2004). Although heathland was more extensive during prehistory, it is perhaps regionally overrepresented, represented by only within small samples, and biased through depositional practices such as turf burning (Huntley and Hall, 2007; Natural England, 2014). While some marginal areas were settled, populations perhaps gathered resources from the regional landscape, yet were based alongside permanent resources like rivers and fertile grounds.

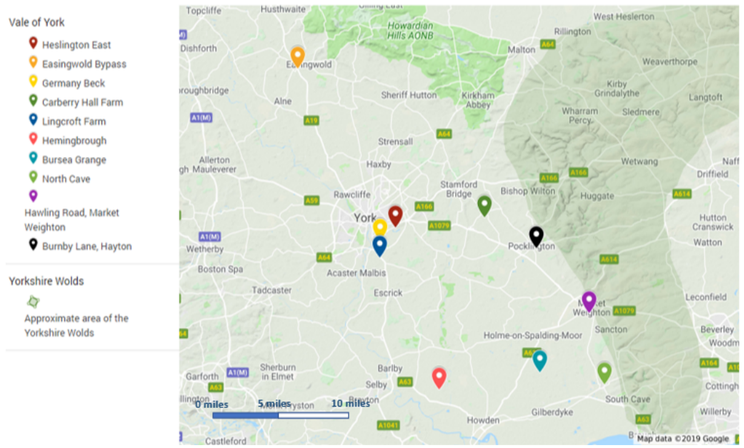


Figure 5.2. Map of Iron Age sites with archaeobotanical data within the Vale of York (Author, 2019).

Site	Iron Age Environment	Data Used	Notes	Reference
Easingwold Bypass	No interpretation	Macrofossil evidence		(Whyman, 1993)
Heslington-East	Wetland, pastureland and arable grounds	Macrofossil evidence		(Schmidl *et al*, 2009)
Germany Beck	Alder carr with some arable ground	Macrofossil evidence		(Kenward *et al*, 2003)
Carberry Hall Farm	Scrub and heathland	Macrofossil evidence	Palaeoentomological evidence suggests pastureland	(Jacques *et al*, 2002)
Lingcroft Farm	No interpretation	Macrofossil evidence		(Huntley and Hall, 2007)
Hemingbrough	Wetland, arable ground and pasture	Macrofossil evidence		Author (2019)
Market Weighton	Highly varied conditions	Macrofossil evidence		Huntley (1999a)
Bursea Grange	Heathland	Macrofossil evidence		Huntley (1999b)
North Cave	Wet tracks and heathland	Macrofossil evidence		(Carrott *et al*, 1996)
Burnby Lane, Hayton	Wetland and heathland	Macrofossil evidence		Huntley (2015)

Table 5.1. Interpretations of the environment at Iron Age sites throughout the Vale of York (Author, 2019).

Although most wild taxa observed at Hemingbrough grew naturally around the settlement, it likely some species were collected and exploited. The burning of turves is perhaps reflected in the archaeobotanical material; Hall (2003) notes that turves were used for roofing, bedding and fuel in prehistory, yet are often overlooked in archaeobotanical records. A high proportion of rhizomes were recovered, totalling 21.5% of charred material, alongside sixty specimens of *Cyperaceae*, representative of natural turf composition and characteristic of burning (Hall, 2003). Thus, turves

were possibly burned intentionally as fuel, supported by the inclusion of hedgerow thorns implying the gathering and burning of wild species with otherwise limited uses. Furthermore, as dense woodlands were uncommon within the Vale of York, turf and wild shrubs would have been an accessible, economical fuel source (Halkon and Innes, 2005). A similar picture is presented at several local sites, in which Huntley and Hall (2007) interpret the inclusion of heathland shrubs, such as heathers, at Carberry Hall, North Cave, and High Catton as resulting from turf burning, accounting for the overrepresentation of heathland plants in archaeobotanical assemblages.

However, wild taxa may not have been used solely as fuel, instead having multiple uses prior to deposition. For example, plants were possibly collected as thatching resources, with ethnographic and archaeological observations suggesting sedges and rushes from the *Cyperaceae* family were used as roofing material (Klotzli, 1988). These may be reused as fuel upon the replacement of thatch, or deposited during the abandonment of structures (Fuller *et al*, 2014). Additionally, sedges are ethnographically used in basketry and coarse textiles (Klotzli, 1988). Nevertheless, these uses are difficult to examine within the archaeological record, and remain speculative.

Notably, wild food remains are rare among assemblages from the Vale, excluding Heslington East were blackberry, sloe, raspberry, and hazel remains were identified, (Carrott *et al*, 2009). Wild fruits were likely not extensively exploited, contributing minimally to the regional diets. Depositional biases may, however, affect representation within assemblages. As only thorns were recovered at Hemingbrough, the corresponding fruits were possibly subjected to alternative depositional processes, following their removal and consumption (Fuller *et al*, 2014). Even so, it is plausible the thorns were from plants that bear non-edible fruits, or that seeds were not archaeologically preserved.

Overall, populations at Hemingbrough and the Vale of York were certainly exploiting wild plants, having been transported from surrounding environments or gathered locally. These plants surely had a range of uses including as fuel, thatch, bedding,

textile, and as food, however this is speculative, and difficult to examine within the archaeological record.

5.1.2. Agriculture and Pastoralism in Hemingbrough and the Vale of York

With agricultural weeds alongside economic plants represented at Hemingbrough, crops were likely cultivated in the surrounding landscape, while livestock was supported on nearby pastures (see figure 5.3). However, although the prevalence of crops and arable weeds over pastoral species may suggest agriculture as the primary economic system, upon closer examination, Hemingbrough may be interpreted as a pastoral consumer site (Vyner, 2018). Nevertheless, crops were likely cultivated nearby as the arable weeds are well-suited to the environment of Hemingbrough. Thus, Iron Age populations engaged with a mixed economy within the Vale of York, in which plant cultivation and livestock husbandry played roles in subsistence (Behre and Jacomet, 1991).

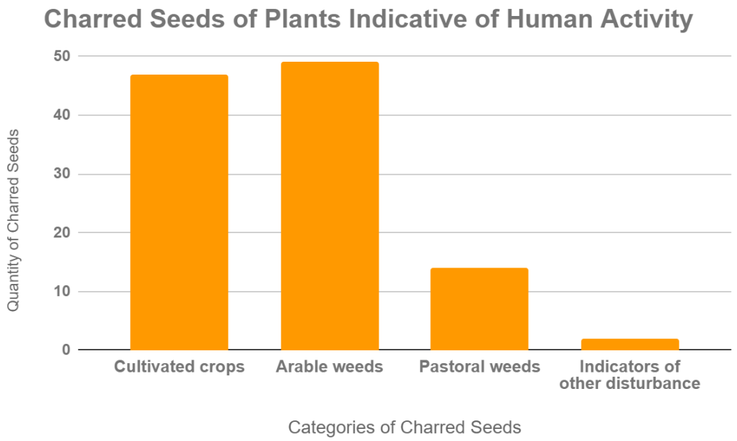


Figure 5.3. Proportion of plants indicative of human activity at Hemingbrough. Categories are based on interpretations presented in Chapter 4 (Author, 2019).

Hemingbrough was perhaps a small, pastoral settlement within regional mixed economies. While crops may have been cultivated locally, evidence for on-site processing is limited. Should threshing and winnowing have been conducted, higher proportions of chaff, including barley rachis internodes and glume bases from wheats, would be observed in relation to grains (Jones and Van der Veen, 2006). Specimens of chaff comprised a limited percentage of crop remains (see figure 5.4), yet, due to the fragility of chaff, these percentages are certainly exaggerated. Even so, glume bases, the only chaff variety recovered at Hemingbrough, are often present at consumer sites, as wheats were traded in spikelet form (Hillman, 1981).

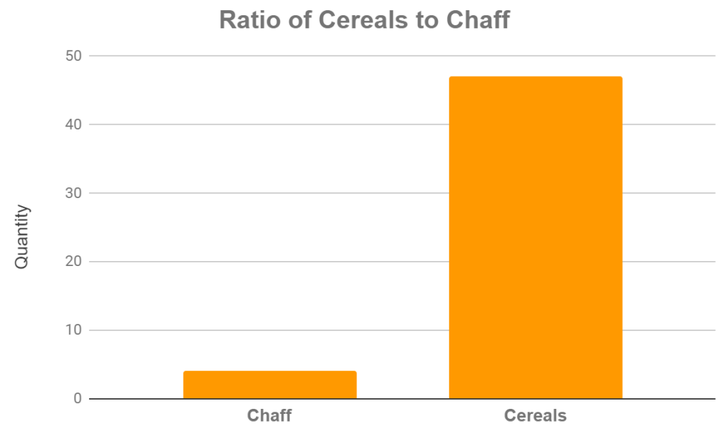


Figure 5.4. Ratio of chaff to cereal grains recovered from Hemingbrough (Author, 2019).

The weed remains further imply that crops were cleaned prior to transportation to Hemingbrough. The arable weed specimens are largely small-sized seeds below 2mm diameter. It is possible larger weeds and plant material were removed at producer sites through coarse sieving, retaining only cereal grains, and subsequently, smaller weed species (Cappers and Neef, 2012). Fine sieving, leaving small seeds as residue, would be undertaken at the consumer site prior to storage or

use of grains (Van der Veen, 1992). However, although arable weeds represent over one third of charred seeds, these are disproportionately from contexts 2422 and 2603; while this may reflect site organisation regarding crop processing, these events may be outliers that bias the site-wide data, however this is difficult to infer from a small sample.

Consistent with most Iron Age crop assemblages across northern England, barley was the dominant cereal at Hemingbrough (see figure 5.5) (Huntley, 1995). Interestingly, however, barley and wheat generally appear in equal proportions throughout the Vale, although it is unclear whether this is accurately reflects preferences due to the limited dataset (see Appendix 3). While this may be linked to the high tolerance of barley to wetter soils, characteristic of the southern Vale, barley was possibly cultivated for a wider range of uses than wheat (Van der Veen, 1992). With consistently high yields, and low-labour requirements, barley is frequently cultivated as fodder, and subsequently interpreted as low-status during the Iron Age, often less thoroughly processed (Van der Veen, 1992; Mills, 2006). Labor-intensive glume wheats, however, were perhaps reserved for human consumption (Van der Veen, 1992). Although this may reflect cultural tastes, or a relatively low-status site, the dominance of barley suggests yield was favoured over quality.

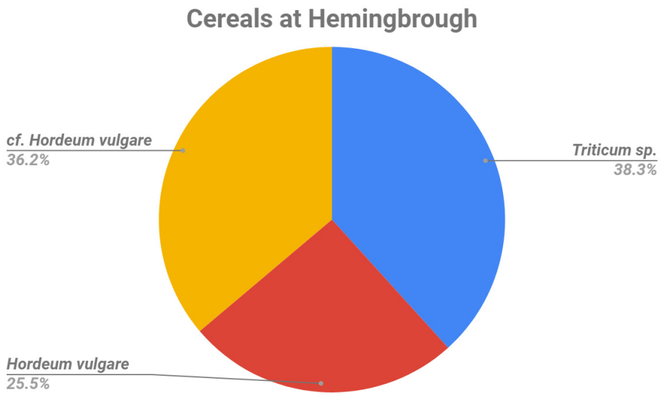


Figure 5.5. Proportions of cereal species present at Hemingbrough (Author, 2019).

This corresponds well with the current dataset from the Vale, in which a probable high proportion of pastoral sites existed (Vyner, 2018). Grains appear in small quantities, often represented by a few specimens or described as rare within samples, while chaff is present, yet rare, at only three sites within the Vale of York (see Appendix 3). Although plants surely formed a proportion of subsistence economies, this is not reflected within archaeobotanical data, likely due to the limited sampling of many some sites, such as Carberry Hall Farm (Jacques *et al*, 2002), or the poor state of local prehistoric remains due to modern agricultural damage (Vyner, 2018). Nevertheless, a mixed economy was implied from more extensive archaeobotanical remains from Heslington East, in which traces of crop processing waste were observed alongside arable weeds, grassland plants, and animal remains (Schmidl *et al*, 2009).

Most interpretations are instead based upon examinations of prehistoric field systems, through excavation and aerial photography (Whyman and Howard, 2005). Although only traces of grains were recovered at Easingwold, the expansion of enclosures during the later Iron Age reflects growing exploitation of land for livestock (Whyman, 1993). Landscape division is perhaps suggested by the presence of hedgerow flora, including thorns at Hemingbrough, *Chaerophyllum* and *Moehringia* at Carberry Hall Farm (Jacques *et al*, 2002), and various shrub species at Heslington East (Schmidl *et al*, 2009). While these examples may be isolated wild specimens, collected for fuel and other resources, the proliferation of hedgerows and crop-marks, indicating the development of field systems, suggests portions of land were permanently assigned roles of pasture or arable ground (Whyman and Howard, 2005; Huntley, 2015).

5.2 The Iron Age Yorkshire Wolds: comparisons to evidence from the Vale of York

5.2.1. The environments of the Wolds

Current understanding upon the Iron Age vegetation of the Wolds, combining archaeobotanical, geological and palynological data suggests these higher lands contrasted with the lowlands of the Vale (Bush, 1993). Elevated between 50-200m, the Wolds comprise of a series of Cretaceous chalk hills and small dry valleys; the soils are well-drained, yet calcareous, holding adequate water without becoming entrenched, providing ideal cereal growing conditions (Stoertz, 1997). This is reflected in plant and pollen assemblages from the region. Inclusions of wetland species are lacking from macrofossil data from the Wolds, aside from at Willow Garth, an isolated area of fenland on the eastern slopes (Bush, 1993). The absence of taxa, such as *Carex* or *Juncaceae*, is striking when compared to their abundance at Hemingbrough. While standing water or heathland was present in areas of the Wolds, the landscape was characterised as open grassland during later prehistory, cleared of forest and subsequently used as pasture, then partially ploughed for cereal cultivation during the Iron Age (Bush, 1993; Stoertz, 1997). This is inferred from the frequency of arable and grassland flora, with evidence of *Avena* and *Cruciferae* observed at multiple sites, alongside occurences of *Trifolium, Polygonum, Atriplex, Gramineae, Plantago,* and *Rumex* species (see Appendix 3) (Brewster, 1980; Grieg, 1991; Bush, 1993; Hall *et al*, 2003). Assemblages suggesting the presence of arable or disturbed ground dominate overall (see table 5.2 and figure 5.6). Furthermore, indications of agriculture are not restricted to larger, domestic and funerary sites, with interpretations of arable landscapes drawn from pollen at Willow Garth and macroremains at Goodmanham (Hall *et al*, 2003; Bush, 1993). Agricultural land formed a sizeable portion of the Wolds environment, representative of a mixed economy and landscapes subject to greater management than the lowlands (Stoertz, 1993).

Site	Iron Age environment	Data used	Reference
Garton-Slack	Arable land	Macrofossil evidence	(Brewster, 1980)
Goodmanham	Heathland	Macrofossil evidence	(Hall *et al*, 2003)
Staple Howe	Not interpreted	Macrofossil evidence	(Brewster, 1963)
Kirkburn	Damp grassland with arable land	Palynological evidence	(Grieg, 1991)
Willow Garth	Sharp increases in arable land	Palynological evidence	(Bush, 1993)

Table 5.2. Interpretations of the environment surrounding Iron Age sites in the Yorkshire Wolds.

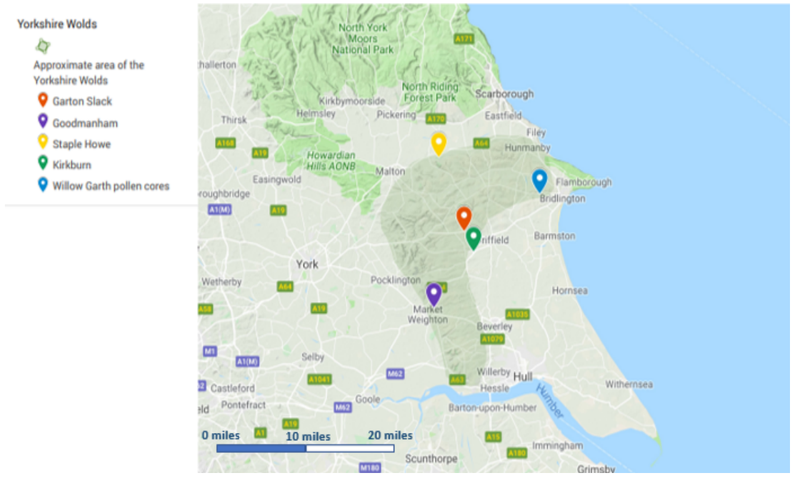


Figure 5.6. Map of Iron Age sites with archaeobotanical data upon the Yorkshire Wolds (Author, 2019).

Similarly, however, wild food plants are minimally represented. Although small traces of hazelnuts were recovered at Garton-Slack, it appears likely wild flora were not extensively collected for consumption throughout the Wolds (Brewster, 1980). Even so, no indication of hedgerow environments was observed at any site across the Wolds, yet it is unlikely that hedgerows were absent considering the extensiveness of trackway and enclosure earthworks (Stoertz, 1993). This absence may be attributable to the selective sampling of sites, with grain deposit samples comprising the majority of material (Brewster, 1963; 1980). Should smaller domestic sites be subject to greater sampling, interpretations may change significantly.

Overall, the Wolds environment is better suited towards a productive agricultural economy than the landscape of the Vale. This is reflected in the large quantities of grains, and likely influenced the emergence of a mixed economy, while the Vale remained more pastoral in character (Brewster, 1963; 1980; Vyner, 2018).

5.2.2. Agriculture and Pastoralism in the Wolds

Both animal husbandry and crop cultivation formed important elements of the economy upon the Yorkshire Wolds (Giles, 2012; Vyner, 2018). Palynological and archaeobotanical data supports this, while stable isotope analysis on populations from Wetwang cemetery confirmed the dietary significance of animal proteins (Jay and Richards, 2006). Variety in rectilinear enclosures across the Wolds, including at Wetwang and Garton-Slack, may also reflect economic landscape organisation, with smaller enclosures close to settlements used in stock rearing, and large enclosures indicative of larger-scale cultivation (Dent, 1984; Stoertz, 1997). While the proliferation of closed enclosures within the Vale may indicate a developing mixed economy, Mid to Late Iron Age crop marks occur on a greater scale upon the Wolds, hinting at more extensive economic landscape organisation (Roberts *et al*, 2010).

The nature of charred crop material from the Wolds is noticeably different to those from the Vale; although data from only three sites was accessible, two assemblages were composed mostly of remains from a single deposit (Brewster, 1963; 1980). While material from Goodmanham is comparable to lowland deposits, comprising minimal quantities of poorly-preserved grain, charred cereals from Garton-Slack and Staple Howe numbered 1896 and 8000 specimens respectively (Brewster, 1963; 1980; Hall *et al*, 2003). Although possibly due to sampling biases, with both sites undergoing extensive excavations, high concentrations of grains may reflect differential treatment of cereals upon the Wolds (Jones, 1981).

Crop monocultures exceeding site-wide needs, generally of low-input, high-yield species such as free-threshing grains, are characteristic of production sites and may indicate the generation of surplus crops for trade (Bakels, 1996; Boggard, 2017). However, this bias must be observed across all contexts, as chance preservation of

single deposits are unrepresentative of economy (Bakels, 1996). Barley was recovered in abundance at Garton-Slack, largely from one deposit, yet also dominated within other contexts, yet samples were limited to few specimens in these cases (Brewster, 1980). Additionally, an Early Iron Age deposit at Staple Howe comprised entirely of bread wheat, contained no traces of barley or associated weeds, suggesting, although from a single layer, only bread wheat was cultivated (Brewster, 1963). While these contexts were not entirely contemporaneous, site-wide crop monocultures may indicate surplus production was practiced upon the Wolds.

Increased storage capacity is also observed at producer sites; this is evidenced upon the Wolds, yet is unparalleled within the Vale (Bakels, 1996). Eight four-poster structures at Grimthorpe hill-fort were interpreted as granaries, while two Iron Age grain silos were identified at Garton-Slack (Stead, 1969; Brewster, 1980). However, this may be a reflection of settlement size, rather than regional economies; Garton-Slack, Grimthorpe and Staple Howe were densely populated, necessitating more resources (Hall *et al*, 2003). While Wolds assemblages often comprise substantial quantities of a singular crop, this may be due to biases in excavation towards larger sites. Supporting this, grains were highly cleaned at Garton-Slack and Staple Howe, with little representation of chaff, implying grains arrived readily processed for consumption; although, due to limited sampling, it is possible crops may have been processed in unsampled areas of the site (Brewster, 1963; 1980; Van der Veen, 1992). Overall, however, evidence for the production of surplus around larger settlements upon the Wolds remains convincing (Bakels 1996).

While societies in the Vale were cultivating cereals on small scales, the lowland economy relied further upon animal husbandry (Vyner, 2018). Giles (2012) agrees that Wolds communities were travelling to lower-lying lands to trade resources and share pasture. It is plausible larger, highland societies, within environments better suited towards cereal growth, engaged with lowland communities through trade of surplus grains to pastoral settlements. Unfortunately, this is difficult to examine in the archaeobotanical record since barley and wheat are not exotic to either region (Preston *et al*, 2002).

5.3 Diet in Iron Age East Yorkshire: cultural, economic, and ideological implications

Although the degree to which the Vale and Wolds were culturally separated remains debated, physical distinctions would certainly have been apparent to Iron Age communities. Even today, the Wolds present like an island, arising out of flat environs with a steep western escarpment, bordering the Vale of York (Harrison, 2000; Moore, 2007). This effect was exaggerated during later prehistory, in which the southern lowlands were essentially formed of damp grounds and a series of creeks (Halkon and Starley, 2011). Environmental and economic differences between the Vale and Wolds certainly had an effect on plant-based elements of diet, thus cultural, economic and ideological discrepancies between populations, may be implicated by dietary evidence.

Communities of the Wolds shared dietary resources with groups within the Vale, incorporating lowland economies into the broader regional economy; resembling an 'open-weave' social structure, landscapes and resources were communally exploited and shared between groups during the Mid Iron Age (Giles, 2012; Vyner, 2018). Crop cultivation and stock tending would have required frequent travel to surrounding lands, including those within the Vale (Giles, 2000). This interaction may have encouraged cultural cohesion, reflected in the similar composition of species in archaeobotanical evidence. However, this did not permeate to all groups; although ceramics from Lingcroft Farm (Evans 1996) and Hemingbrough (Austin, 2018) were aligned with pottery from the Wolds, ceramics from Heslington East (Jenner, 2009) and Easingwold are comparable to areas north of the Vale of York (Vyner, 2018). Furthermore, economic differences would have remained apparent if some groups from the Vale were dependent on resources from the Wolds, or their agricultural productivity was notably smaller. This would be particularly pertinent during the Late Iron Age as economic and political interests became 'close-knit,' controlled by and benefitting select, centralised groups or families (Giles, 2000).

As crops became a necessity and commodity, control over the agricultural economy implicated control over subsistence, thus also the population; cultivable land was therefore particularly valued (Atha, 2007). Suggested by the proliferation of cemeteries and earthworks, ownership of landscape was an important method of status expression (Giles, 2012). Subsistence strategies contributed towards this expression, as owning the means to produce became a symbol of power and status. Reflected in the presence of sizeable grain storage facilities, large-scale cultivation requires persistent control over large swathes of fertile land (Van der Veen, 2007). As social structures shifted from communality to private ownership, lowland populations, producing on smaller scales or reliant upon surplus, were perhaps perceived as a lower-status society (Giles, 2000). Conversely, enclosed pasture expansion is observed throughout the Vale during the later Iron Age, showcasing similar expressions of ownership; to assume pasture rights were less valued is possibly misleading, given the significance of animal proteins in diets (Whyman and Howard, 2005; Jay and Richards, 2007). Even so, the scarcity of easily cultivable land perhaps placed greater value upon arable grounds. Thus, while the expansion of economies may reflect population growth, large-scale cultivation and livestock rearing, may also have expressed status.

Transitions toward greater landscape management is observable throughout the Iron Age, and reflected in regional dietary choices (Stoertz, 1997). The consumption of wild foods appears minimal, contrasting with Bronze Age assemblages from Northern England, in which wild food plants often dominate; for example, solely hazelnut shells were recovered from Mid Bronze Age pits at Auchinleck Close, Driffield (Huntley and Hall, 2007; Walsh *et al*, 2012). By the Iron Age, wild food sources had been phased out as a significant nutritional contributor. This may reflect competition to claim land, reducing reliance on wild resources to increase the necessity of agriculture, therefore heightening the power of land owners (Atha, 2007). Although, forest plants were less accessible due to earlier clearance of woodland, these resources were not wholly uncommon within these regions (Bush, 1993). Thus, wild foods were rejected by choice, paralleled within faunal assemblages where wild animals, such as deer, are rarely butchered (Giles, 2000). These steps toward more managed subsistence may represent ideological shifts away from wilderness and communality, towards ownership and control. Greater

environmental management parallels the idea of further population management, aiding the legitimisation of centralised power. This effect was perhaps pertinent during the ‘close-knit’ Late Iron Age, in which control was asserted by isolated groups (Giles, 2000).

Even so, it is unlikely food consumption was a performance-based expression of status. While crop assemblages appear homogeneous between sites, isotopic analysis of individuals from Wetwang cemetery suggests everyday diets did not differentiate based upon status, gender, or age (Jay and Richards, 2006). Although faunal remains within funerary contexts differ, with pigs represented in elite graves and sheep around lower-status burials, throughout lifetimes there was little differentiation in animal protein intake (Parker Pearson, 1999; Jay and Richards, 2006). Additionally, exotic or restricted food plants are not recovered in the region; while imported foods were reserved for the elite in southern Britain, there is no evidence of equivalent restrictions in the north (Cunliffe, 2009). Although some distinctions may manifest in the preparation of food this is not archaeologically visible in these cases; while quernstones are more commonly recovered upon the Wolds, this is likely reflective of a more arable economy than differential food preparation (Vyner, 2018).

The lack of dietary variety and homogeneity in plant foods is likely because food consumption was a private activity, not intended to express status during daily life (Giles, 2000). This is reflected in the limited variety in ceramic quality, while highly decorative pieces are rare (Vyner, 2018). Pottery was functional, used largely in private settings; most evidence of processing, preparation and consumption, including pottery and quernstones, is recovered from domestic contexts in northern England (Giles, 2000). This suggests food was linked with the domestic, private sphere, while consumption was not an overt performance, with small-scale consumption centered around the roundhouse and evidence of feasting absent (Giles, 2000; Cunliffe, 2009). Even within funerary contexts, large food waste deposits are uncharacteristic of the region, suggesting food did not facilitate social occasion as observed in southern Britain (Giles, 2000). This renders food an unsuitable method of expressing divisions.

Overall, although the dietary composition of populations from the Vale and Wolds did not differ intensely, distinctions in resource production suggests these communities were somewhat distinct. Lowland groups were cultivating crops on a small-scale, thus were regarded as lower-status due to the value of fertile land during this period. However, this was not expressed via food consumption, occurring within private spheres. Even so, high and lowland groups interacted and traded frequently, thus communities may have viewed themselves within a broad, yet cohesive, cultural context, each contributing to a wider, mixed economy.

Chapter 6: Conclusions

In conclusion, the archaeobotanical evidence presented suggests the settlement at Hemingbrough was situated within a wetland environment, typical of the Vale of York during the later Iron Age. Populations cultivated cereals on a small scale, with barley acting as the dominant crop, although it is plausible resources were also traded with larger upland economies from the Wolds. These crops were probably intended for human consumption and as fodder, although may also have been used in brewing at Hemingbrough. It was revealed that populations relied on a limited group of crops, comprising barley and hulled wheats, with little evidence for consumption of alternative crops or wild resources. However, the poor preservation of material, alongside the scarcity of comparable regional datasets, meant more detailed conclusions, regarding cereal variety preferences, or site-wide spatial analyses, could not be drawn.

A similar picture was observed at sites throughout the Vale and the Yorkshire Wolds, suggesting diets were fairly homogenous between these communities, and food was not used to express cultural difference. Thus, populations from both the uplands and lowlands of East Yorkshire formed part of a broader, mixed economy, each contributing resources most suited to their environments. Communities of the Vale may have relied further on pasture exploitation, as suitable pastoral grounds were more abundant in the lowlands, while fertile soils for crop cultivation were accessible in the uplands. However, the rarity of cultivable grounds in East Yorkshire may have contributed to the higher status of Wolds communities, reflected in their control of landscape and larger scale cultivation, and supporting inferences of the economic division of East Yorkshire (Higham, 1987; Giles, 2000; Cunliffe, 2009). Individual diets were likely to have been very similar however, generally consuming high levels of animal protein, as suggested by the presence of fodder crops and weeds of pasture, supported by isotopic analysis from Wetwang (Jay and Richards, 2007). Even so, the high level of interaction between these populations likely led to groups sharing aspects of cultural identity, reflected in comparable crop varieties, and archaeological data including pottery (Vyner, 2018).

Although this study has added to an otherwise limited dataset and provided insights upon the relationship of populations from the Vale of York and the Wolds, more archaeobotanical studies must be conducted upon domestic sites and published in full to generate a detailed understanding of prehistoric everyday lifeways. Research should especially focus on gaining radiocarbon dates of cereals, contributing towards debates surrounding chronology, for example, tracking the adoption of introduced species such as bread and emmer wheats (Jones, 1981; Van der Veen, 1992). DNA analysis could be also undertaken to examine subtle differences between crops from the low and higher lands (Brown *et al*, 1994). Thus it may be possible to track movement of produce between these regions, allowing a deeper understanding of the dynamic between populations in East Yorkshire. Overall, plentiful scope exists for further research into this understudied region, holding potential to contribute towards knowledge upon the histories of agricultural, wetland landscapes, and provide insights into their resilience and adaptability, particularly as reliance shifted to a limited range of crops during the Iron Age, reflective of the contemporary world.

Appendix 1: The Archaeobotanical Material

Within this section, tables displaying the quantified archaeobotanical data from Hemingbrough are presented in full. Both the raw quantities of identified flora and relational percentages per context are included, while totals and percentages per the entire assemblage are also listed regarding each context or taxa. Charred material, interpreted as late prehistoric in origin, is listed in table A.1.1, while specimens interpreted as modern intrusions are detailed in table A.1.2.

Table A.1.1. Quantities of charred archaeobotanical material recovered from Hemingbrough.

										Total	Notes
Sample Number	1	2	3	4	5	6	7	8	9	All	
Context Number	2403	2406	2408	2409	2422	2603	2508	2533	2514	All	
Sample Volume (litres)	10	10	10	10	20	10	10	10	10	100	
Crop plants and cultivated flora											
Hordeum vulgare (L.)	2 (11.76%)	3 (15%)	2 (8.7%)		2 (2.56%)	2 (7.69%)		1 (2.38%)		12 (3.9%)	3 sprouted (2 in 2408, 1 in 2422)
cf. Hordeum vulgare (L.)	2 (11.76%)	1 (5%)	3 (13.04%)	4 (14.81%)		1 (2.85%)	2 (3.51%)	1 (2.38%)	3 (17.65%)	17 (5.54%)	
Triticum spp.	1 (5.88%)	4 (20%)	2 (8.7%)		2 (2.56%)	2 (7.69%)	2 (3.51%)	3 (7.14%)	2 (11.76%)	18 (5.86%)	
Glume base cf. triticum spp.		1 (5%)		2 (7.41%)	1 (1.28%)					4 (1.3%)	
Cereal germ	1 (5.88%)				18 (23.08%)	4 (15.38%)	2 (3.51%)	4 (9.52%)	2 (11.76%)	31 (10.1%)	
Arable weeds											
cf. Apiaceae sp.					1 (1.28%)					1 (0.33%)	
cf. Brassicaceae nigra (L.)		1 (5%)								1 (0.33%)	
Small seeded cf. Fabaceae		1 (5%)	6 (26.09%)		1 (1.28%)			1 (2.38%)		9 (2.93%)	
Lamiaceae sp.	4 (23.53%)				1 (1.28%)		1 (1.75%)			6 (2%)	
Papaver cf. rhoeas					15 (19.23%)	1 (3.85%)	1 (1.75%)			17 (5.54%)	
Ranunculus spp.						3 (11.54%)				3 (1%)	

Rumex spp.						1 (3.85%)		1 (2.38%)		2 (0.65%)	
Silene spp.	1 (5.88%)	2 (10%)	1 (4.35%)	2 (7.41%)	8 (10.26%)	8 (30.77%)		2 (4.76%)		24 (7.82%)	
Fragments of Silene spp. (number ideterminate)					5	3		2			
cf. Sinapis arvensis									1 (5.88%)	1 (0.33%)	
cf. Urticaceae								1 (2.38%)		1 (0.33%)	
Wild taxa											
Cyperaceae (2 sided) sp.	1 (5.88%)	2 (10%)	1 (4.35%)				16 (28.07%)	1 (2.38%)	1 (5.88%)	22 (7.17%)	
Cyperaceae (3 sided) sp.		1 (5%)	3 (13.04%)				13 (22.81%)	12 (28.57%)		29 (9.45%)	
cf. Carex distans									1 (5.88%)	1 (0.33%)	
cf. Carex disticha									1 (5.88%)	1 (0.33%)	
cf. Carex elata					1 (1.28%)					1 (0.33%)	
cf. Carex gracilus					2 (2.56%)		1 (1.75%)		2 (11.76%)	5 (1.63%)	
cf. Carex paniculata					1 (1.28%)					1 (0.33%)	
Juncaceae/Cyperaceae				11 (40.74%)						11 (3.58%)	
Poaceae sp.							3 (5.26%)			3 (1%)	
Small Poaceae sp.	1 (5.88%)				1 (1.28%)		1 (1.75%)	1 (2.38%)		4 (1.3%)	
Unidentifiable small round black seeds	>80	>80	>100	>100	>150	>100	>100	>100	>100		
Seeds indeterminate	1 (5.88%)	4 (20%)			4 (5.13%)	1 (3.85%)		1 (2.38%)		11 (3.58%)	
Other plant material											
Birch bark					1 (1.28%)					1 (0.33%)	
Rhizome cf. Poaceae	3 (17.65%)		5 (21.74%)	7 (25.9%)	19 (24.36%)	3 (11.54%)	15 (26.32%)	11 (26.19%)	3 (17.65%)	66 (21.5%)	
Thorn				1 (3.7%)				2 (4.76%)	1 (5.88%)	4 (1.3%)	

Total charred specimens	17 (100%)	20 (100%)	23 (100%)	27 (100%)	78 (100%)	26 (100%)	57 (100%)	42 (100%)	17 (100%)	307 (100%)	Charred remains 55.72% of total

Table A.1.2. Quantities of uncharred plant material recovered from Hemingbrough.

										Total	Notes
Sample Number	1	2	3	4	5	6	7	8	9	All	
Context Number	2403	2406	2408	2409	2422	2603	2508	2533	2514	All	
Sample Volume (litres)	10	10	10	10	20	10	10	10	10	100	
Uncharred plant material											
Brassicaceae spp.						2 (100%)				2 (0.82%)	
Brassica nigra (L.)					2 (100%)					2 (0.82%)	
Capsella bursa-pastoris (L.)		3 (75%)						1 (25%)		4 (1.64%)	
Carex sp.					2 (100%)					2 (0.82%)	
Silene cf. dioca							2 (100%)			2 (0.82%)	
Chenopodiaceae atriplex sp.	6 (9.23%)	17 (26.15%)	2 (3.08%)	1 (1.54%)	25 (38.46%)	3 (4.62%)	5 (7.69%)	5 (7.69%)	1 (1.54%)	65 (26.64%)	
Fragments of Chenopodia sp. (number indeterminate)	4	7	1	2	35	9	1				
cf. Compositae					2 (100%)					2 (0.82%)	
cf. Galium aperine	2 (1.6%)	7 (5.6%)	2 (1.6%)	13 (10.4%)	8 (6.4%)	44 (35.2%)	13 (10.4%)	35 (28%)	1 (0.8%)	125 (51.23%)	
Lamiaceae cf. mentha		1 (100%)								1 (0.41%)	
Papaver cf. rhoeas	2 (6.9%)	25 (86.21%)	2 (6.9%)							29 (11.88%)	
Poaceae sp.						1 (100%)				1 (0.41%)	
cf. Polygonum sp.									3 (100%)	3 (1.23%)	
Rosaceae					1 (100%)					1 (0.41%)	
Seeds indeterminate		2 (50%)			1 (25%)			1 (25%)		4 (1.64%)	
Bark							1 (100%)			1 (41%)	
Total uncharred specimens	10	55	6	14	41	50	20	42	5	244 (100%)	Uncharred remains 44.28% of total

Appendix 2: Additional Environmental Material

A table displaying quantities of additional archaeological or biological remains recovered from Hemingbrough is presented below (see table A.2.1). This material was categorised and weighed according to category, however, much of the identified material was recovered in too small quantities to generate a weight when placed upon scales. These have instead been recorded by specimen count, and are generally represented by very few or individual fragments of material, with the exception of insect remains. Although insect material was present in higher numbers, the lightweight nature of this material meant they could not be quantified by weight.

Table A.2.1. Quantities of additional archaeological or biological material recovered from Hemingbrough.

	Weight (g)									Total
Sample Number	1	2	3	4	5	6	7	8	9	All
Context Number	2403	2406	2408	2409	2422	2603	2508	2533	2514	All
Sample Volume	10	10	10	10	20	10	10	10	10	100
Environmental Data										
Charred wood/charcoal	17.28 (9.42%)	46.65 (25.43%)	15.5 (8.45%)	8.47 (4.61%)	45.23 (24.66%)	14.02 (7.64%)	6.87 (3.75%)	16.01 (8.73%)	13.4 (7.31%)	183.43 (72.38%)
Slag	3.05 (45.93%)	1.38 (20.78%)	0.06 (0.9%)	0.09 (1.36%)	1.34 (20.18%)	0.21 (3.16%)	0.22 (3.31%)	0.22 (3.31%)	0.07 (1.05%)	6.64 (2.62%)
Burnt bone	1.63 (3.71%)	4.58 (10.43%)	2.29 (5.21%)	0.72 (1.64%)	5.52 (12.57%)	1.67 (3.8%)	5.24 (11.93%)	3.16 (7.19%)	19.12 (43.52%)	43.93 (17.34%)
Pottery	1.4 (7.23%)	1.03 (5.32%)	0.15 (0.77%)	0.39 (2.01%)	0.32 (1.65%)	0.62 (3.2%)	0.15 (0.77%)	11.6 (59.92%)	3.7 (19.11%)	19.36 (7.64%)
Hammerscale								0.05 (100%)		0.05 (0.02%)
Total	23.36 (9.22%)	53.64 (21.17%)	18 (7.1%)	9.67 (3.82%)	52.41 (20.68%)	16.52 (6.52%)	12.48 (4.92%)	31.04 (12.25%)	36.29	253.41 (100%)
	Specimen Count (items/quantities too small to generate accurate weights)									
Insect remains (modern)	27 (14.67%)	23 (12.5%)	41 (22.28%)	3 (1.63%)	24 (13.04%)		30 (16.3%)	11 (5.98%)	25 (13.59%)	184 (100%)
Birch bark								6		6
Insect egg (modern)	1				3	5	3	3		15
Unidentified	1									1
Green coloured bone (Cu?)			1							1
Rodent claw (modern)					1	1				2
Glass					1					1
Hammerscale						1				1
Flint								2		2
Total unweighed specimens	29	23	42	3	29	7	33	22	25	213

Appendix 3: Regional Data

The majority of archaeobotanical data used in this analysis is presented in table A.3.1. This comprises the published archaeobotanical data that was collected in order to compare data between the material recovered from Hemingbrough with the surrounding Vale of York and the adjacent region of the Yorkshire Wolds. Material from the following sites was assessed: Easingwold Bypass (Whyman, 1993), Heslington East (Scmidl *et al*, 2009), Germany Beck (Kenward *et al,* 2003), Carberry Hall Farm (Jacques *et al*, 2002), Lingcroft Farm (Huntley and Hall, 2007), Hemingbrough (Author, 2019), Market Weighton (Huntley, 1999a), Bursea Grange, (Huntley, 1999b), North Cave (Carrott *et al*, 1996), Burnby Lane, Hayton (Huntley, 2015), Garton-Slack (Brewster, 1980), Goodmanham (Hall *et al*, 2003), Staple Howe (Brewster, 1963), Grimthorpe (Stead, 1969), Thwing (Carruthers, 1993), Auchinleck Close, Driffield (Walsh *et al*, 2012), Kirkburn (Grieg, 1991), and Willow Garth (Bush, 1993), alongside regional proxy evidence in the form of quernstones, presented by Brewster (1980) and Vyner (2018).

A.3.1 Synthesised archaeobotanical data from the Vale of York and Yorkshire Wolds.

Site	Location	Site-type	Cereals	Barley presence	Barley quantity	Wheat presence	Wheat quantity	Chaff presence	Chaff quantity	Cereals unidentified quantity	Other cultivated plants	Arable weeds presence	Arable weeds sp.	Wild sp. presence
Easingwold Bypass	Vale of York (North)	M-LIA domestic settlement	Very rare	na	na	na	na	na	na	na	na	na	na	na
Heslington-East	Vale of York (Central)	IA Domestic settlement with some burials	Rare	Rare	na	Rare, dicoccum/spelta	na	Rare	na	na	One specimen onion couch	Present	Atriplex, stellaria, urtica, etc.	Abundant (inc. fruits/nuts)
Germany Beck	Vale of York (Central)	LIA/Romano-British ditch (one context)	Absent	na	na	na	na	na	na	na	na	Present	Chrysanthemum segetum (corn marigold)	Abundant
Carberry Hall Farm	Vale of York (Central)	LIA/Romani-British domestic settlement	Absent	na	na	na	na	na	na	na	na	Present	Urtica, ranunclus	Present
Lingcroft Farm	Vale of York (East)	LIA/Romano-British	Rare	Rare	na	Rare, compactum,	na	Rare	na	na	Oats, though possibly wild	Rare	Brome	Rare
Hemingbrough	Vale of York (South)	M-LIA Small-scale domestic settlement	Present	Present		Present		Rare	4	na		Present		Rare
Market Weighton	Vale of York (Far South-East)	M-LIA-Romano-British enclosures and burial pits	Present	Present	na	Present, cf. Spelta	na	na	na	na	Oat, though perhaps wild	Rare	na	Rare
Bursea Grange	Vale of York (Far South-East)	IA Small-scale domestic settlement	Absent	na	na	na	na	na	na	na	na	One specimen	Sieglingia decumbens	na
North Cave	Vale of York (Far South-East)	LIA/Romano-British pits	Very rare	na	na	One specimen	1	na	na	na	na	Rare	na	Present
Burnby Lane, Hayton	Vale of York (Far East)	M-LIA phases of a Iron Age to Roman site	Rare	Rare	>1	Rare, mainly spelta	>2	Rare	>2	>3	Oat awn	Present	Rumex, small legume,	Present
Garton-Slack	Yorkshire Wolds (Central)	Domestic settlement adjacent to burial site	Present	Common	1896	Present, cf. Spelta	33 (under 2%)	Rare	20	14		Rare	Polgunum convolvulus, Rumex spp., Polygonacae spp., Graminae, Quercus,	Rare
Goodmanham	Yorkshire Wolds (South)	LIA/Romano-British contexts from a domestic settlement	Very rare	Very rare	1	Very rare	1	na	na	1	na	Very rare	Atriplex	Rare
Staple Howe	Yorkshire Wolds (North)	Sample from EIA domestic settlement	Abundant	Absent	na	Abundant cf. compactum	8000	na	na	na	Absent	Absent	na	Absent
Proxy evidence														

Beehive Quern	Yorkshire Wolds (Central)	Beehive quern in child burial at Garton-Slack												
Beehive Querns	Vale of York (Total)	10 quernstones recorded + 1 base												
Grimthorpe	Yorkshire Wolds (East)	8 four post granaries												
For Comparison (preceding periods)														
Thwing	Yorkshire Wolds (East)	MBA ring fort	Present	Present	28	Present - spelta, dicoccum, aestivocompactum	20	Common	114	43	Wild/cultivated oat, possibly cultivated brassicas	Present	Atriplex, brassica, chenopodium, fallopia, galium	Present
Auchinleck Close, Driffield	Yorkshire Wolds (East)	MBA pits	Absent	Absent	na	na	na	na	na	na	na	na	na	Abundant
Pollen evidence														
Kirkburn	Yorkshire Wolds (Central)	Funerary site - pollen from grave goods	Average values - (2-4%)	na	na	na	na	na	na	na	na	na	na	Present
Willow Garth	Yorkshire Wolds (Far East)	Fenland	High values and present in all levels	Implied	na	Implied	na	na	na	na	na	Abundant, present in all levels	na	Abundant

Appendix 4: Plans and Sections

Plans and sections created during the excavation of Hemingbrough, displaying the stratigraphic and spatial contexts of many contexts sampled, are displayed in the following figures. The relevant sampled contexts are circled in red, however, it should be noted that drawings of context 2422 (sample 5) were not available.

Figure A.4.1. Plan of Trench 4. Contexts 2403, 2406, and 2408 appear within the ditch fill of the roundhouse (Author, 2019).

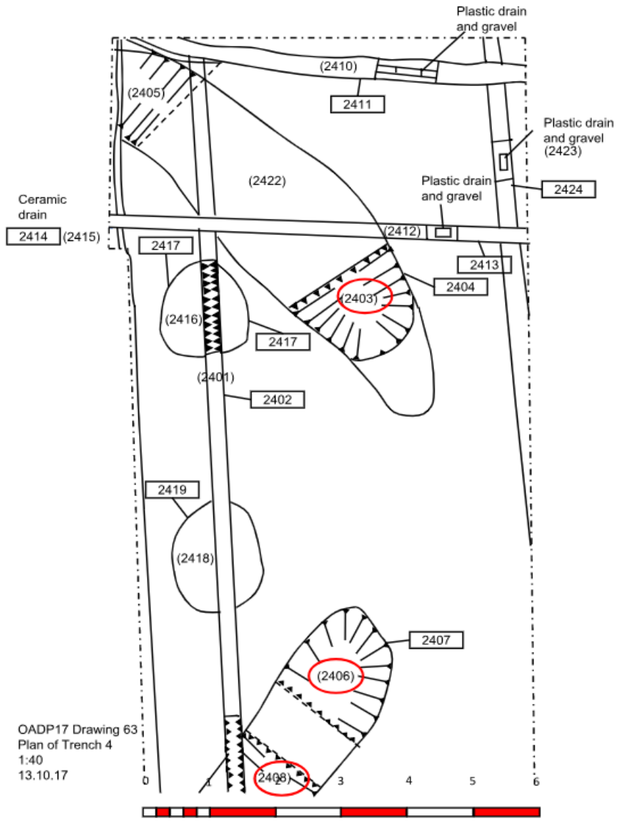


Figure A.4.2. Plan of the northern end of Trench 4, including context 2403, the ring ditch terminus that produced sample number 1 (Author, 2019).

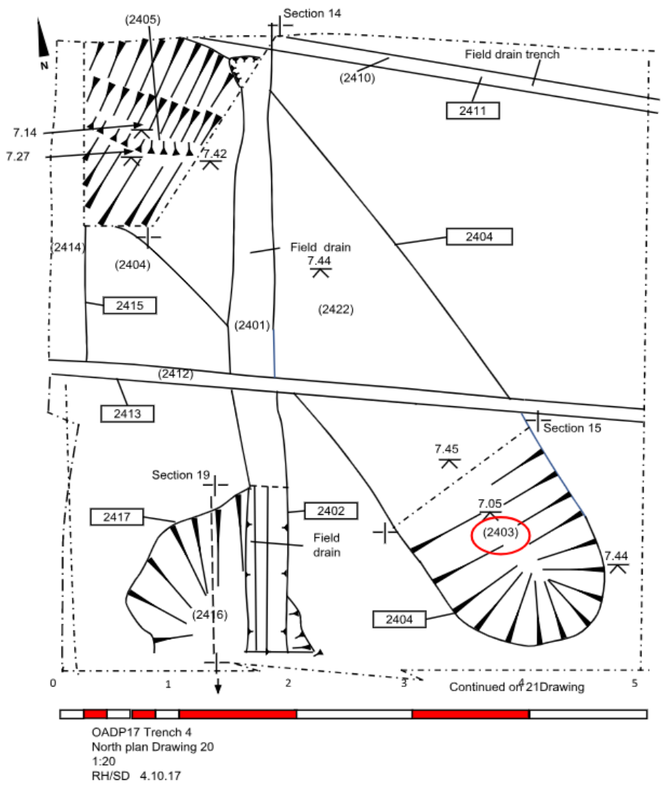


Figure A.4.3 Section plan displaying the ring ditch fills of contexts 2406, 2408 and 2409, from Trench 4 (Author, 2019).

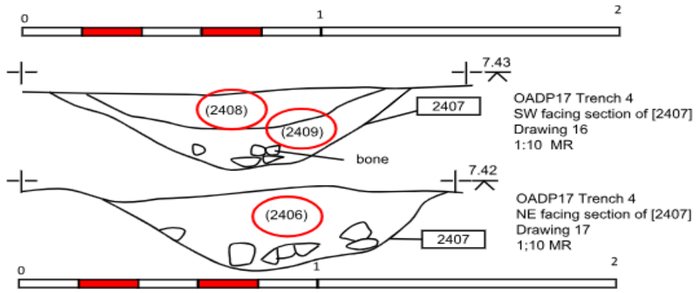


Figure A.4.4. Plan of the southern end of Trench 4, including the ring ditch terminus containing contexts 2406 and 2408, that produced samples number 2 and 3 (Author, 2019).

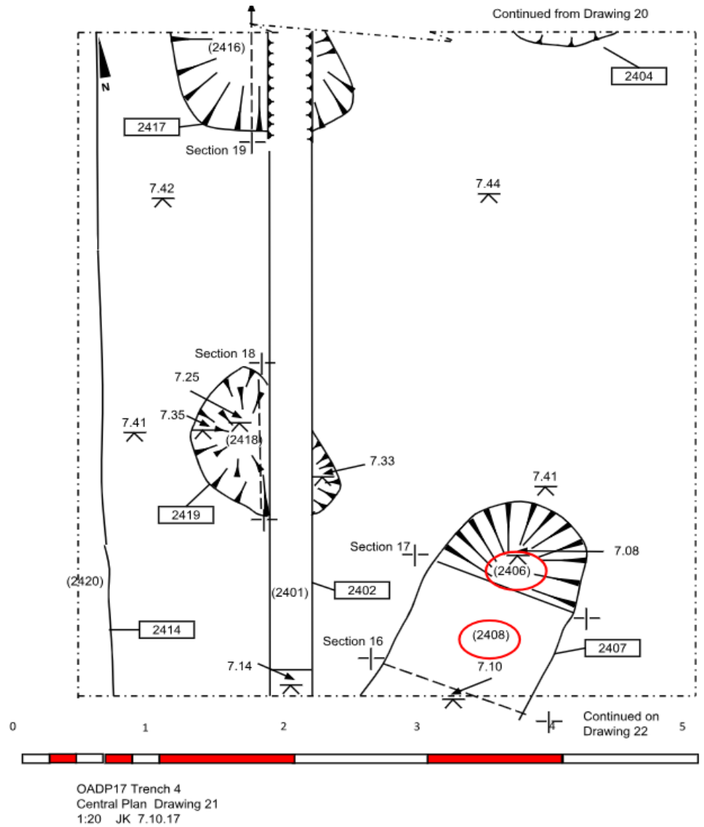


Figure A.4.5. Section plan of the ring ditch fill containing contexts 2508 and 2514. There is a notable abundance of cobbles and pottery in the base of context 2508 (Author, 2019).

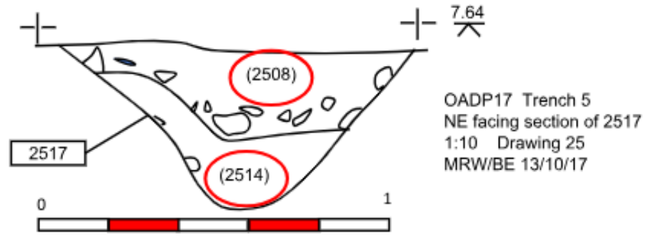


Figure A.4.6. Section plan of the ring ditch fill containing context 2533 (Author, 2019).

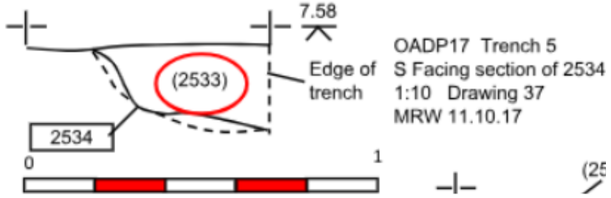
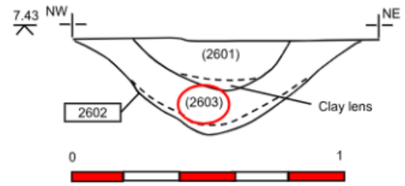
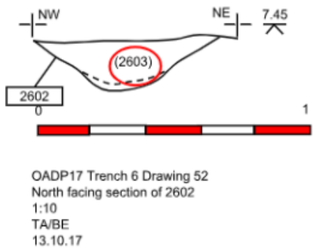


Figure A.4.7. Section plans of the ring ditch containing context 2603 (sample 6) (Author, 2019).





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Site Name: **North Duffield.** Site Code: **OADP-17.**

Grid Reference: **SE 68710 37988** County: **North Yorkshire.**

FLINT ASSESSMENT.

An assessment of the flint from Hemingbrough (OADP-17)

By Peter Makey for North Duffield & Local History Society (Last revision 16/03/18).

All the flint has been fully catalogued in MS excel format (appended) and pieces have each been allocated an individual flint catalogue number. The colour of the flints has been recorded using Munsell (1988) nomenclature.

Introduction.

Of the fourteen flints submitted for analysis, only three pieces have been worked, the remaining eleven pieces are un-worked natural. The struck flint comprises an un-classifiable core and core rejuvenation flake (archive no's 1 & 2) from Hemingbrough (plough soil, context 2000) and a flake (archive record no 12) flake from context 2511. All of the material has been analysed for the presence of both microscopic and macroscopic traces of edge use. No trace of use or micro-wear is present.

State.

The three struck pieces are manufactured on three different coloured pieces of raw material and are in three different states. The core has been heavily rolled whereas the core rejuvenation flake is less worn. The flake from context 2511 is in a surprisingly very fresh state at odds with residuality. The flake may indicate the presence of a prehistoric feature.

The Struck Pieces.

1) The core is a crude utilitarian, unclassifiable piece made on a battered cortical lump or pebble. The piece only just qualifies as a core, possessing five small (13mm average length) flake removals. Cores are the initial working pieces from the manufacture of blades and flake and other flint tools; as such they are reasonably common in un-stratified fieldwalked assemblages. What is interesting is the very poor nature of the piece; this is probably related to the scarcity of local raw material flint sources.

2) The core rejuvenation flake is of Saville's (1972-1973) class B; removal from down the core face. The rejuvenation flake is a removal from a core that is intended to remove an irregularity, hence rejuvenate it. Although not rare, the presence of a rejuvenation flake indicates that there is probably more lithic material near by, since they seldom occur in isolation. The rejuvenation flake is not from the core that was recovered from the same context.

3) The flake (archive no 12) from context 2511 is a trancheform, single crested tertiary flake from the final stages of core reduction and possesses a diffuse bulb and a stepped termination.

Manufactured on a moderate olive brown coloured (Munsell 1991: 5Y 4/4) fine grained flint the piece is in a very fresh state.

Date of the Material.
Despite the fact that there are only three struck pieces, they appear to be from three separate prehistoric periods or phases of activity. The core is consistent with later Neolithic / early Bronze Age pieces. The core rejuvenation flake is from a much finer worked core and is manufactured on a dark yellowish orange (Munsell: 10YR 6/6) raw material. The piece is characteristic of later Mesolithic flint working but also a restricted range of later Neolithic assemblages typically those associated with Grooved Ware of Woodlands sub-style. The flake is characteristic of pieces removed from discoidal cores, a form that is found in mixed Beaker / Grooved ware assemblages of the early Bronze Age. It is therefore possible that the three pieces represent one piece from the later Mesolithic, one piece from the later Neolithic and one piece from the early Bronze Age.

Conclusions.
As with the work conducted in 2015 the possible sources of the flint raw material is the most intriguing aspect of the assemblage. In this phase of work the un-worked natural is also of interest since it resembles the characteristic of till derived material found near the coast but has all been rolled into small gravel like pebbles consistent with the kind of material that might be found in a stream or river bed. It is possible that a source of the raw material may be palaeochannels.

If palaeochannels are a source of raw material then there may be some correlation between the occurrence of palaeochannels and relic streams and the presence of prehistoric flintwork

Recommendations.
Unfortunately the current flint assemblage is of very limited potential in itself but does perhaps indicate the possible presence of further prehistoric flintwork in the area of study.

The assemblage has been fully recorded. No further cataloguing is required.

Drawing Requirements.
None of the material requires illustration.

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ArchaeoMaterials
Analysis, Research and Education

The Industrial Waste from Hemingbrough

Eleanor Blakelock

Introduction

Excavations at the predominantly Iron Age site at Hemingbrough, near Selby discovered a small assemblage (1.13kg) of possible industrial waste. The site was truncated by a modern field drain, however the fills of the ring ditches appear to be secure, and most have been dated to the Iron Age.

There are two main types of process involved in iron working: smelting (extracting metal from the ore), and smithing or forging (shaping the object). Both types of processes create different kinds of waste that can often be distinguished on the basis of their morphology, as described below.

Iron smelting took place in bloomery furnaces, which were typically clay-built, rounded structures. Iron ore was fed into the furnace where it reacted to create a spongy mass of iron metal known as a bloom. The waste from this process formed a liquid slag that was collected in the bottom of the furnace, this most likely collected in the bottom of the small furnace, however by the late Iron Age the slag was potentially being tapped from the furnace (Bayley *et al*. 2001). Iron smelting in the Iron Age was probably carried out on a small scale, using local ores e.g. bog iron ore. On the other hand there is evidence for iron smithing in many Iron Age settlements.

Ironworking waste classification

The ironworking waste from Hemingbrough was classified predominantly using the terms used in the Centre for Archaeology Guidelines, *Archaeometallurgy* (Bayley *et al*. 2001). The categories included *tap slag, runs, smelting slag*, *hearth lining, fuel, smithing hearth bottom*, *undiagnostic slag*, *natural* and *other finds*. There is a summary of the results in table 1 with a description of the debris by context.

Tap slag and runs are by-products of the smelting process, produced by removing slag by tapping when it was hot and fluid. This waste has a characteristic shape, resembling the flow of lava, and the lower surface may be rougher as it comes into contact with the ground. Large numbers of the tap slag and run fragments appeared to be tubular in form.

Smelting slag consists of large blocks of slag waste, often with fuel impressions in the surface. It will appear to have obviously been fluid but will not show the same flowed texture as tap slag. The porosity of this slag varies greatly.

Hearth lining consists of small fragments of clay that has been subjected to heat. The outer surface will often appear orange with a black inner surface. Some fragments may have iron slag adhering to them.

Smithing Hearth Bottoms are usually circular with a concave base, often this is rough or may even contain pieces of vitrified clay lining where it came into contact with the base of the hearth. The top can also have a concave shape. This slag can be magnetic as it forms from the iron that falls off the iron, which combines with slag, charcoal and clay hearth lining to form a distinctive slag. The size is dependent on how often the blacksmith cleans out the forge and the types of activities taking place.

Hammerscale consists of small iron rich fragments which fall of the iron as it is worked by the blacksmith. If the relative density of this waste product is plotted across a site it can be used to determine the anvil and hearth locations.

Undiagnostic slag will not have sufficient characteristics to be categorised; similar materials may be produced by either smelting or smithing operations.

The Assemblage

The assemblage weighs 1.17kg overall. Undiagnostic slag makes up a third of the assemblage, recovered from Hemingbrough. The majority of this undiagnostic slag is small and relatively friable. The classifiable smelting slag present was mostly recovered from field walking, and therefore may not in this case be contemporary with the site. However a small piece of flowed slag and furnace slag was recovered from one of the Iron Age ring ditches in a secure context (2409), therefore it is likely that smelting was being carried out on the site, albeit potentially at a small scale. However the small quantity of slag may indicate the process is occurring in a different part of the settlement.

The evidence for smithing is also present with a small piece of conglomerate hammerscale, and a possible fragment of smithing hearth bottom. This piece (Figure 1) has the typical concave base, which appears to have been in contact with a rough clay surface, and a top which is heavily magnetic, due to the iron scale falling off into the hearth as the iron was repeatedly heated. The samples removed to investigate hammerscale are being analysed separately by the project.

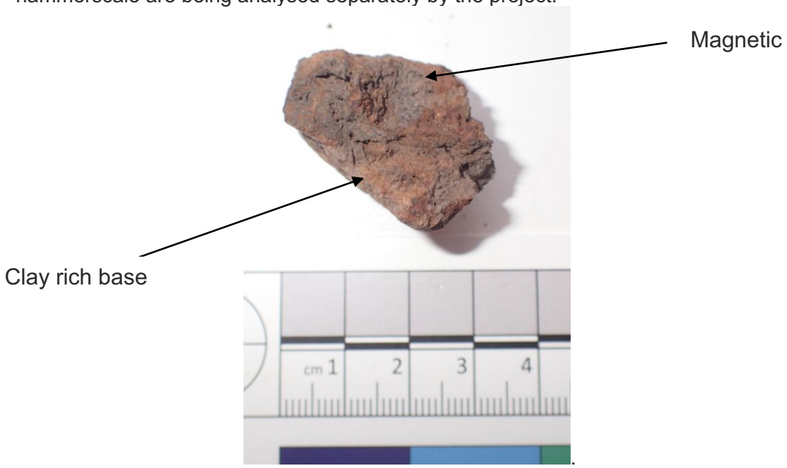

Figure 1. Small fragment of what could be a smithing hearth bottom from context 2206.

A very small quantity of hearth lining was recovered, but none of this was heavily vitrified resulting from the high temperatures required for smelting or smithing, and is unlikely to be related to metalworking. However furnace lining is the least likely component of metalworking to travel long distances, due to its friable nature, so this may be another indication that smelting and smithing was not being carried out in the immediate vicinity.

The pieces of fuel recovered included pieces of coke and charcoal. It is unlikely that they were using the coke for metallurgical purposes.

Finally within the assemblage a few metallic iron lumps and artefacts were identified, as well as some possible prehistoric pottery and a bone or antler, however these need to be confirmed by relevant specialists. Where these were in with other slag they have been re-bagged and labelled.

Conclusion

The small amounts of iron working waste in the overall assemblage suggest that iron working was not taking place in the immediate excavation area. However the presence of some slag from secure contexts does suggest that iron metalworking may have taken place nearby. It is quite common for iron working slag to be re-deposited some distance from where it was produced and it was often re-used e.g. for metalling road surfaces or to improve soil quality (Bayley *et al.* 2001).

Future work

As the assemblage is small and much of the slag is undiagnostic no further work is recommended for this assemblage. However the iron artefacts identified could be x-rayed to determine whether they are iron lumps and therefore small bloom fragments or whether they are artefacts in their own right.

If more diagnostic slag was recovered in the future analysis of the slag may reveal what type of iron ore was being used, indicating more about possible raw material procurement and trade. In addition if iron artefacts are also present on the site these could be examined using metallography to investigate the iron alloys used, manufacturing methods and also blacksmithing techniques applied. Finally by carrying out SEM-EDX analysis of both slag and iron objects from the same site it should be possible to identify whether artefacts from the site were being manufactured using the iron smelted in the area.

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Appendix

Table 1: Quantities (in g) of different types of waste recovered from Hemingbrough, by context. IA indicates where the context is securely dated to the Iron Age through the pottery.

Context	Feature	Smelting			Smithing		Undiagnostic Slag			Other		Notes
		Tap	Furnace	Blast Furnace	Hearth Bottom	Hammerscale	Clay lining	Fuel	Undiagnostic	Artefact	Natural	
2000	Fieldwalking	24	201	34			14		10			
2001		43	44				18					
2102	Modern drain pipe	3										
2108	U shaped ditch					10		2	4			
2113	Ditch terminal								16	4		Possible prehistoric pot?
2115	Pit							under 1g	6			
2202	IA ditch								4			
2205							20	under 1g				
2206					20							
2211											8	
2300	Beneath plough soil									19		
2313	Modern drain pipe									**7**		
2400	Beneath plough soil									145		
2401									94			
2403	IA ditch terminal								7			
2405	IA ditch								64			
2406	IA ditch terminal								under 1g		5	
2409	IA ditch	under 1g	12									
2422	IA ditch								91	7		Antler/bone fragment
2507	IA ditch terminal	6										
2509	Deep ditch (Roman)										8	Possible building material
2511	Ring ditch cut by later IA ditch						3					
2514	IA ditch								1			
2601	IA ditch							26	50		129	Heated stone not heated enough for smelting, could be low cooking hearth heat
2603	IA ditch										7	
Total		**76**	**257**	**34**	**20**	**10**	**55**	**29**	**347**	**182**	**157**	**1167**

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RADIOCARBON DATING CERTIFICATE
25 March 2019

Laboratory Code GU50521

Submitter Brian Elsey
North Duffield Conservation & Local History Society
11 Broadmanor
North Duffield
Selby
North Yorkshire,YO8 5RZ

Site Reference Hemingbrough
Context Reference 2409
Sample Reference <4>OADP17 (2409)

Material Cereal grain

Result Failed due to insufficient carbon.

N.B. Any questions directed to the laboratory should quote the GU coding given above.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Checked and signed off by : P. Naysmith

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RADIOCARBON DATING CERTIFICATE
25 March 2019

Laboratory Code	GU50522
Submitter	Brian Elsey North Duffield Conservation & Local History Society 11 Broadmanor North Duffield Selby North Yorkshire,YO8 5RZ
Site Reference	Hemingbrough
Context Reference	2422
Sample Reference	<5>OADP17 (2422)
Material	Cereal grain
Result	Failed due to insufficient carbon.

N.B. Any questions directed to the laboratory should quote the GU coding given above.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Checked and signed off by : P. Nayont

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RADIOCARBON DATING CERTIFICATE
25 March 2019

Laboratory Code	SUERC-85198 (GU50523)
Submitter	Brian Elsey North Duffield Conservation & Local History Society 11 Broadmanor North Duffield Selby North Yorkshire,YO8 5RZ
Site Reference	Hemingbrough
Context Reference	2406
Sample Reference	<6>OADP17 (2406)
Material	Cereal grain
$\delta^{13}C$ relative to VPDB	-26.7 ‰
Radiocarbon Age BP	4327 ± 24

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith

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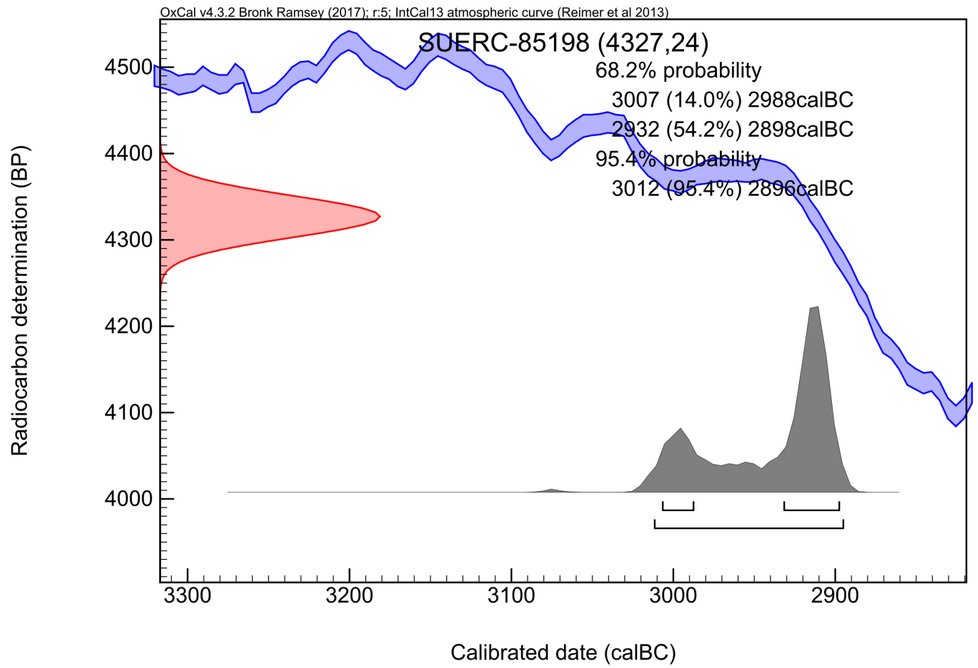

The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

Please contact the laboratory if you wish to discuss this further.

* Bronk Ramsey (2009) *Radiocarbon 51(1) pp.337-60*
† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

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RADIOCARBON DATING CERTIFICATE
25 March 2019

Laboratory Code	SUERC-85199 (GU50524)
Submitter	Brian Elsey North Duffield Conservation & Local History Society 11 Broadmanor North Duffield Selby North Yorkshire,YO8 5RZ
Site Reference	Hemingbrough
Context Reference	2533
Sample Reference	<8>OADP17 (2533)
Material	Cereal grain
$\delta^{13}C$ relative to VPDB	-24.5 ‰
Radiocarbon Age BP	1981 ± 24

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

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Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith

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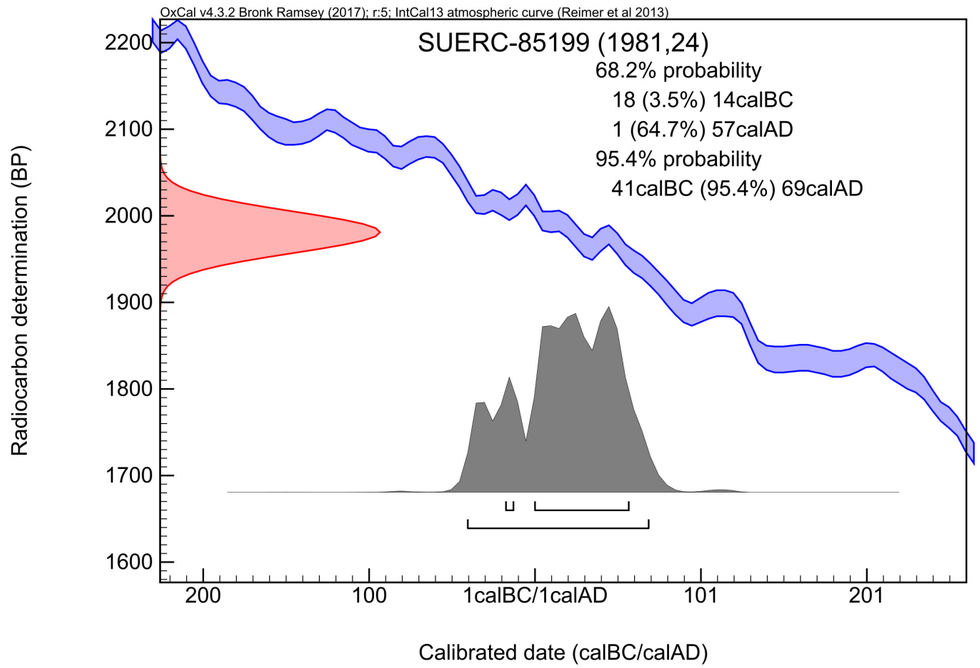

The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

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* Bronk Ramsey (2009) *Radiocarbon 51(1) pp.337-60*
† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

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RADIOCARBON DATING CERTIFICATE
25 March 2019

Laboratory Code	SUERC-85200 (GU50525)
Submitter	Brian Elsey North Duffield Conservation & Local History Society 11 Broadmanor North Duffield Selby North Yorkshire,YO8 5RZ
Site Reference	Hemingbrough
Context Reference	2514
Sample Reference	<9>OADP17 (2514)
Material	Cereal grain
$\delta^{13}C$ relative to VPDB	-25.0 ‰ assumed
Radiocarbon Age BP	2998 ± 24

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith

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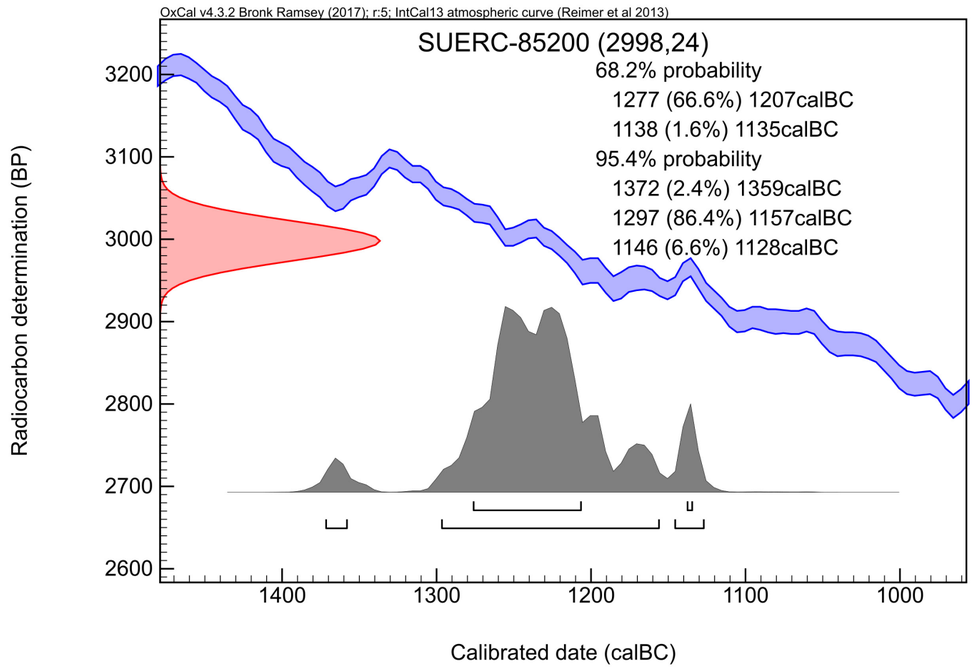

The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

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Scottish Universities Environmental Research Centre

Luminescence Analysis and Dating of Pottery Sherds from Hemmingbrough, North Yorkshire

August 2018

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Summary

Three pottery sherds were collected by North Duffield Conservation and Local History Society from an excavation of a round house ring ditch at Hemmingbrough, North Yorkshire (site code OADP17). These were submitted to SUERC for luminescence analysis to provide absolute dating for this context (context no 2514) to provide a terminus post quem for the construction of this round-house. One of these sherds has been dated to 170 ± 120 BC using a SAR OSL approach on extracted quartz grains. The remaining two sherds are too small to allow determination of dose rate using TSBC and HRGS and have not currently been analysed, but could be processed later with alternative dose rate determinations.

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1. Introduction

Excavations supported by the North Duffield Conservation and Local History Society have been undertaken of a round house ring ditch terminal at Hemmingbrough, North Yorkshire (site code OADP17). The surrounding material is medium grey sandy silt with a moderate amount of burnt stone fragments. The context contained a very large amount of pottery fragments, dated to late iron age or early Roman period. An absolute date range from this context will give us a more accurate terminus post quem, for the construction of this round-house, than the pottery dating provides. Because this ring-ditch cuts an earlier ring-ditch, we may also be able to combine this with C14 dates from stratigraphically earlier contexts to give us an idea of the date of the earlier ring-ditch.

2. Methods

2.1. Sampling and sample preparation

Sampling was conducted during the excavations, and three pottery sherds and associated soil samples (context no 2514) were sent to SUERC for luminescence dating. These were described as calcite gritted ceramics of possible middle iron age. The samples were given a laboratory (SUTL) reference code upon receipt at SUERC, as summarised in Table 2.1.

Table 2.1: Summary of samples and SUERC laboratory reference codes

SUERC code	Description
SUTL2972 bulk	Soil samples
SUTL2972/1	Largest pottery sherd, approximately 65x90x11mm and 80g
SUTL2972/2	Medium pottery sherd, approximately 45x40x9mm and 15g
SUTL2972/3	Smallest pottery sherd, approximately 30x30x11mm and 10g

The soil matrix samples were weighed, dried and reweighed to determine water content. Each sherd was weighed, left to stand in water for a minimum of 30 minutes and the excess water drained and the stone reweighed, then dried and reweighed to determine water content as received and when saturated.

The largest sherd had sufficient material for dose rate measurements and was selected for luminescence analysis at this stage, with the smaller fragments retained for potential future study. The exterior 1-2mm of the sherd was removed using a file, and the shavings retained. A small portion of the sherd was then retained, with the remainder crushed and gently disaggregated using a mortar and pestle, and dry sieved through a 500 µm mesh. 20g of this was separated for dose rate measurements (section 2.4 below), without exposure to light so that it could be used for luminescence measurements if needed.

2.2. Exploratory luminescence measurements

Approximately 12 g of ground material remained after removing 20g for dose rate measurements. This was wet sieved at 90, 150 and 250µm. The 90-150 µm fraction was then subjected to acid treatments of 1M HCl for 10 mins, 15% HF for 15mins and 1M HCl for 10mins. Two small aliquots were removed for exploratory luminescence analysis and examination by optical and electron microscopy (Appendix A). The exploratory analysis aimed to estimate OSL and TL intensities and sensitivities, and purity of quartz extraction. Measurements were conducted under blue LEDs at 125˚C (60% power for 5s) and for TL to 450°C for the natural signal and following a nominal 1Gy test dose, a 5Gy regenerative dose, and a further 1Gy test dose, with artificial doses followed by a preheat at 220˚C for 10 s. Followed by a nominal 5Gy dose with TL to 500°C, with no preheat, and a 30s IRSL measurement (at 60°C, 60% power) following a nominal 1Gy dose.

2.3. Quartz OSL SAR measurements

2.3.1. OSL measurements

All measurements were conducted using a Risø DA-15 automatic reader equipped with a $^{90}Sr/^{90}Y$ β-source for irradiation, blue LEDs emitting around 470 nm and infrared (laser) diodes emitting around 830 nm for optical stimulation, and a U340 detection filter pack to detect in the region 270-380 nm, while cutting out stimulating light (Bøtter-Jensen et al., 2000).

Equivalent dose determinations were made on sets of 8 aliquots from the 90-150µm fraction and 8 aliquots from the 150-250µm fraction, using a single aliquot regeneration (SAR) sequence adapted from Murray and Wintle (2000). Using this procedure, the OSL signal levels from each individual disc were calibrated to provide an absorbed dose estimate (the equivalent dose) using an interpolated dose-response curve, constructed by regenerating OSL signals by beta irradiation in the laboratory. Following the procedure of Sanderson and Bingham (2004), the OSL measurement on each cycle was followed by a TL measurement to 450°C. Sensitivity changes which may occur as a result of readout, irradiation and preheating (to remove unstable radiation-induced signals) were monitored using small test doses after each regenerative dose. Each measurement was standardised to the test dose response determined immediately after its readout, to compensate for observed changes in sensitivity during the laboratory measurement sequence. The regenerative doses were chosen to encompass the likely value of the equivalent (natural) dose. A repeat dose point was included to check the ability of the SAR procedure to correct for laboratory-induced sensitivity changes (the 'recycling test'), a zero dose point is included late in the sequence to check for thermally induced charge transfer during the irradiation and preheating cycle (the 'zero cycle'), and an IR response check included to assess the magnitude of non-quartz signals. Regenerative dose response curves were constructed using nominal doses of 3, 6, 9 and 12 Gy, with test doses of 1.5 Gy. The 16 aliquot sets were sub-divided into four subsets, with a different pre-heat temperature applied to each subset (220°C, 240°C, 260°C and 280°C). The measurement sequence is summarised in Table 2.2.

Table 2.2: Summary of SAR protocol used.

Stage	Description
1	OSL measurement (30s using blue LEDs at 60%, at 125°C)
2	TL to 450°C
3	Test dose (19s. 1.49 Gy)
4	Pre-heat 10s (group 1: 220°C, group 2: 240°C, group 3: 260°C and group 4: 280°C)
5	OSL measurement followed by TL readout (as steps 1-2)
6	Regeneration dose: 39s (3.05Gy); 78s (6.09Gy); 117s (9.14Gy); 156s (12.18Gy); 39s (recycling test); 0s (zero cycle) Repeat steps 4-5 then 3-5 following each dose
7	IRSL measurement 39s (3.05Gy) dose, Pre-heat 10s 160°C, IRSL measurement (30s IR LEDs at 60°C)

2.4. Dose rate determination

2.4.1. HRGS and TSBC Sample Preparation

20 g of the disaggregated material was used in thick source beta counting (TSBC; Sanderson, 1988). This was then sealed in a plastic petri dish using epoxy resin and wrapped in black plastic to make the samples light tight, and left to allow radon daughters to equilibrate prior to HRGS measurement. Approximately 200 g of the dried soil sample was packed into polypropylene containers for HRGS, and also sealed with epoxy resin. In this instance, preliminary HRGS measurements were conducted prior to radon equilibration, and for bulk material before drying.

2.4.2. Dose rate determinations

Dose rates were measured in the laboratory using HRGS and TSBC.

HRGS measurements were performed using a 50% relative efficiency “n” type hyper-pure Ge detector (EG&G Ortec Gamma-X) operated in a low background lead shield with a copper liner. Gamma ray spectra were recorded over the 30 keV to 3 MeV range from each sample, interleaved with background measurements and measurements from SUERC Shap Granite standard in the same geometries. Sample counts were for 80ks for the smaller 20g geometry and 50ks for the larger bulk sample. The spectra were analysed to determine count rates from the major line emissions from ^{40}K (1461 keV), and from selected nuclides in the U decay series (^{234}Th, ^{226}Ra + ^{235}U, ^{214}Pb, ^{214}Bi and ^{210}Pb) and the Th decay series (^{228}Ac, ^{212}Pb, ^{208}Tl) and their statistical counting uncertainties. Net rates and activity concentrations for each of these nuclides were determined relative to Shap Granite by weighted combination of the individual lines for each nuclide. The internal consistency of nuclide specific estimates for U and Th decay series nuclides was assessed relative to measurement precision, and weighted combinations used to estimate mean activity concentrations (Bq kg^{-1}) and elemental concentrations (% K and ppm U, Th) for the parent activity. These data were used to determine infinite matrix dose rates for alpha, beta and gamma radiation.

Beta dose rates were also measured directly using the SUERC TSBC system (Sanderson, 1988). Count rates were determined with six replicate 300 s counts,

bracketed by background measurements and sensitivity determinations using the Shap Granite secondary reference material. Infinite-matrix dose rates were calculated by scaling the net count rates of samples and reference material to the working beta dose rate of the Shap Granite (6.25 ± 0.03 mGy a^{-1}). The estimated errors combine counting statistics, observed variance and the uncertainty on the reference value.

The dose rate measurements were used in combination with the assumed burial water contents, to determine the overall effective dose rates for age estimation. Cosmic dose rates were evaluated by combining latitude and altitude specific dose rates for the site with corrections for estimated depth of overburden using the method of Prescott and Hutton (1994), giving an estimate of 0.185 ± 0.020 mGy a^{-1}.

3. Results

3.1. Sample Description and Water Content Measurements

The sample water contents are list in Table 3.1, along with descriptions of each of the samples used in subsequent analyses.

Table 3.1: Description of samples and measured water content

Sample	Water content (%)			Description
	Received	Saturated	Assumed	
SUTL2972	12		15 ± 5	Soil
SUTL2972/1	16	21	20 ± 5	Sherd #1
SUTL2972/2	17	26	20 ± 5	Sherd #2
SUTL2972/3	18	30	20 ± 5	Sherd #3

3.2. Exploratory measurements

The results of the exploratory measurements on two aliquots are summarised in Table 3.2. The OSL measurements show a high sensitivity of 5-10,000 counts per gray, with a 30-40% increase in sensitivity and 25-30% IRSL signal (consistent with minerals which have not been subjected to a strong HF etching to remove non-quartz components). Whereas, the TL measurements show a much smaller sensitivity of approximately 500 counts per gray (300-450°C), with a 20% loss in sensitivity. Both methods give an approximate stored dose around 5 Gy. The much higher sensitivity of the OSL approach, and consistency with TL measurements, supports the decision to use a quartz OSL approach to date this sample.

Table 3.2: Summary of exploratory measurements

		Aliquot A	Aliquot B
OSL	Sensitivity c Gy^{-1}	8460 ± 120	5580 ± 110
	Sensitivity change %	32.1 ± 0.5	40.1 ± 0.8
	IRSL %	25.0 ± 1.4	31.2 ± 2.0
	Approximate dose (Gy)	5.3 ± 0.1	5.8 ± 0.2
TL	Sensitivity c Gy^{-1}	580 ± 30	420 ± 20
	Sensitivity change %	-20.1 ± 1.4	-21.9 ± 1.8
	Approximate dose (Gy)	4.8 ± 0.3	4.6 ± 0.4

3.3. Dose rates

HRGS results are shown in Table 3-3, both as activity concentrations (i.e. disintegrations per second per kilogram) and as equivalent parent element concentrations (in % and ppm), based in the case of U and Th on combining nuclide specific data assuming decay series equilibrium. For the soil sample (SUTL2972 bulk) an approximately 200 g sample was analysed with higher precision. For the pottery sample (SUTL2972/1), only 20 g was available and the precision of the measurements is significantly lower.

Table 3.3: Activity and equivalent concentrations of K, U and Th determined by HRGS.

SUTL no.	Activity Concentration[a] / Bq kg^{-1}			Equivalent Concentration[b]		
	K	U	Th	K / %	U / ppm	Th / ppm
bulk (wet)	293 ± 12	13.6 ± 1.4	16.6 ± 1.0	0.95 ± 0.04	1.10 ± 0.12	4.10 ± 0.26
bulk (dry)	223 ± 8	15.6 ± 0.9	12.6 ± 0.7	0.72 ± 0.03	1.26 ± 0.07	3.10 ± 0.18
sherd	545 ± 38	34.5 ± 3.8	46.7 ± 3.0	1.78 ± 0.12	2.80 ± 0.30	11.50 ± 0.73

[a]Shap granite reference, working values determined by David Sanderson in 1986, based on HRGS relative to CANMET and NBL standards.
[b]Activity and equivalent concentrations for U, Th and K determined by HRGS (Conversion factors based on NEA (2000) decay constants): 40K: 309.3 Bq kg^{-1} %K^{-1}, 238U: 12.35 Bq kg^{-1} ppmU^{-1}, 232Th: 4.057 Bq kg^{-1} ppm Th^{-1}

Infinite matrix alpha, beta and gamma dose rates from HRGS are listed for the samples in Table 3-4, together with infinite matrix beta dose rates from TSBC for the pottery sample.

The gamma dose rate experienced by mineral inclusions in the sherd will be a combination of gamma rays and beta particles originating within each sherd and an attenuated gamma ray dose rate from the surrounding soil and stones. The approach used here follows that of Mejdahl (1983), who calculated absorbed fractions for different sizes of spherical stones and applying these to external gamma rays (from the surrounding materials, including a soil moisture correction, and cosmic rays) and internal gamma rays.

Table 3.4: Infinite matrix dose rates determined by HRGS and TSBC

SUTL no.	HRGS, dry[a] / mGy a^{-1}			TSBC, dry / mGy a^{-1}
	Alpha	Beta	Gamma	
bulk (wet)	6.1 ± 0.4	1.07 ± 0.04	0.57 ± 0.03	
bulk (dry)	5.8 ± 0.2	0.87 ± 0.03	0.48 ± 0.02	
2972/1	16.3 ± 1.0	2.20 ± 0.11	1.34 ± 0.06	2.30 ± 0.08

[a]based on dose rate conversion factors in Aikten (1983) and Sanderson (1987)

Effective dose rates to the HF-etched 100 µm quartz grains are given in table 3-5. For the beta dose rates these are the mean of the HRGS and TSBC dose rates, corrected for water content, with the gamma dose rates calculated following the method of Mejdahl (1983).

Table 3.5: Effective beta and gamma dose rates following water correction.

SUTL no.	Effective Dose Rate[a] / mGy a^{-1}		
	Beta[b]	Gamma[d]	Total[b,d]
2972/1 90-150µm	1.67 ± 0.13	0.41 ± 0.02	2.27 ± 0.13
2972/1 150-250µm	1.61 ± 0.13	0.41 ± 0.02	2.21 ± 0.13

[a] Effective beta dose rate combining water content corrections with inverse grain size attenuation factors obtained by weighting the 100[b] µm attenuation factors of Mejdahl (1979) for K, U, and Th by the relative beta dose contributions for each source determined by Gamma Spectrometry;
[d] includes a cosmic dose contribution

3.3.1. Quartz single aliquot equivalent dose determinations

For equivalent dose determination, data from single aliquot regenerative dose measurements were analysed using the Risø TL/OSL Viewer programme to export integrated summary files that were analysed in MS Excel and SigmaPlot. The response to the test dose was used to track sensitivity change across the SAR sequence, the IRSL response, zero cycle response and recycling ratio were used for quality control. These quality control indicators are summarised in Table 3.6. Both size fractions produce very similar results, with large initial sensitivities which almost double over the measurement sequence, recycling ratios slightly greater than unity, and no signal following the zero dose nor for the final IRSL readout.

Table 3.6: Quality parameters for the SAR analyses

SUTL no.	Initial sensitivity (c Gy^{-1})	Sensitivity change across 6 cycles (%)	Recycling ratio	Zero cycle	IRSL (%)
2972/1 90-150µm	18500 ± 2500	81 ± 30	1.10 ± 0.02	0.001 ± 0.000	0.02 ± 0.01
2972/1 150-250µm	15600 ± 2000	86 ± 29	1.12 ± 0.02	0.000 ± 0.000	-0.03 ± 0.02

The dose responses for all samples are linear (Fig. 3.1) over the dose range relevant to these materials, and equivalent dose values for each individual disc were determined using fits to the regenerative responses for each individual disc. Mean, weighted mean and robust mean equivalent doses were then calculated from the individual measurements. These are given in Table 3.7. Probability Distribution Functions (PDFs) have been produced for both size fractions, and are shown in Fig 3.2. For the 90-150µm fraction, all the aliquots produce equivalent dose values that are consistent and the three mean values are identical, therefore the arithmetic mean value is used. For the 150-250µm fraction there is a larger dispersion of doses determined, reflecting the reduced number of grains in each aliquot and hence the greater influence of micro dosimetry, with some aliquots giving outlier dose values, and therefore the robust mean is used with an uncertainty that better reflects the measurement uncertainties.

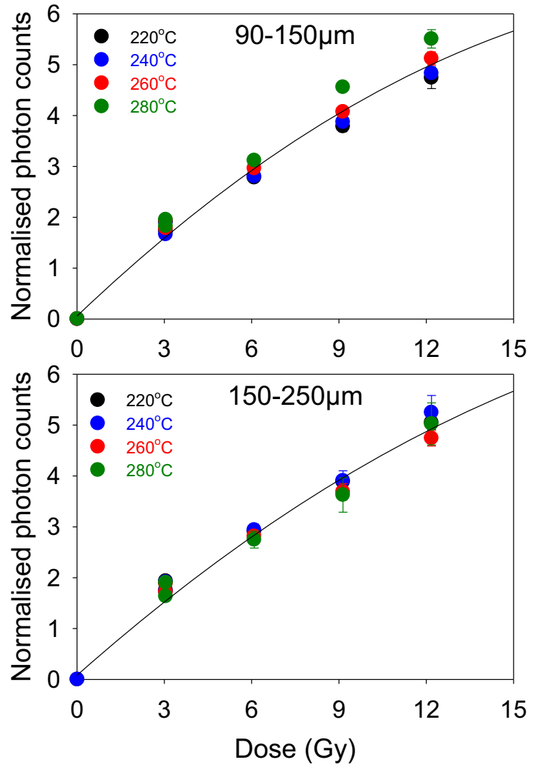

Figure 3.1: Dose response curves for the 90-150µm and 150-250µm aliquots arranged by pre-heating group, with a fit through all data shown.

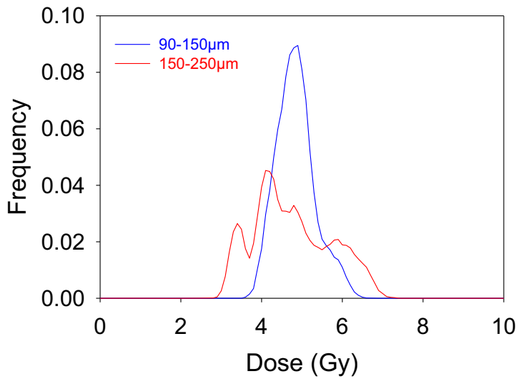

Figure 3.2: Probability distribution plots for the 90-150 and 150-250µm fractions. Note that the 150-250µm fraction also includes an aliquot with a dose of 16.3 ± 0.8 Gy that is not indicated on this plot.

Table 3.7: Mean equivalent dose values. Stated values include the standard error across all aliquots.

SUTL no.	Equivalent dose (Gy)			
	Mean	Weighted mean	Robust mean	Preferred value
2972/1 90-150µm	4.80 ± 0.16	4.73 ± 0.09	4.76 ± 0.02	4.80 ± 0.16
2972/1 150-250µm	6.15 ± 1.49	4.49 ± 0.09	4.97 ± 0.02	4.97 ± 0.15

3.3.2. Age determinations

The calculated stored doses and dose rates for each of the four samples analysed are given in Table 3.8. The corresponding ages obtained from the stored dose divided by the dose rate are also given. Both size fractions give the same age, within uncertainties, and a mean of these is also given.

Table 3.8: Quartz OSL ages

SUTL no.	Stored dose (Gy)	Dose rate (Gy ka^{-1})	Years / ka	Calendar years
2972/1 90-150µm	4.80 ± 0.16	2.27 ± 0.13	2.12 ± 0.16	100 ± 160 BC
2972/1 150-250µm	4.97 ± 0.15	2.21 ± 0.13	2.25 ± 0.16	230 ± 160 BC
mean			2.18 ± 0.12	170 ± 120 BC

4. Discussion and conclusions

Three pottery sherds collected from a round house ring ditch terminal at Hemmingbrough, North Yorkshire, were supplied to SUERC for luminescence dating. Two of these sherds are too small to allow dose rate determination using TSBC and HRGS, and have not been processed at present. These could be investigated in the future, with alternative methods for determining dose rates.

For the larger sherd, dose rates were determined by TSBC and HRGS, with dose rates for the surrounding soil determined by HRGS of bulk material also supplied. Initial investigations with small quantities of material from the sherd showed similar stored dose estimates from both OSL and TL methods, with much larger signal intensities for the OSL measurements. Thus it was decided to extract quartz for SAR OSL measurements, with both 90-150µm and 150-250µm grains used. Both grain sizes yielded dates for the sherd at 0-400 BC, with a mean date of 170 ± 120 BC obtained.

5. References

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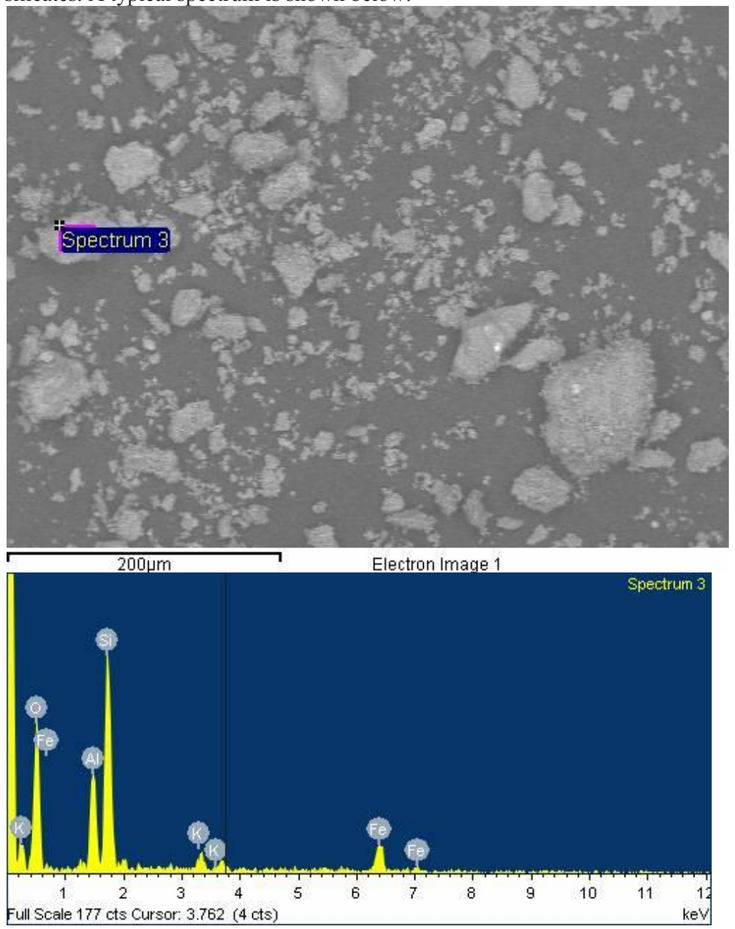
Appendix A: Scanning Electron Microscopy

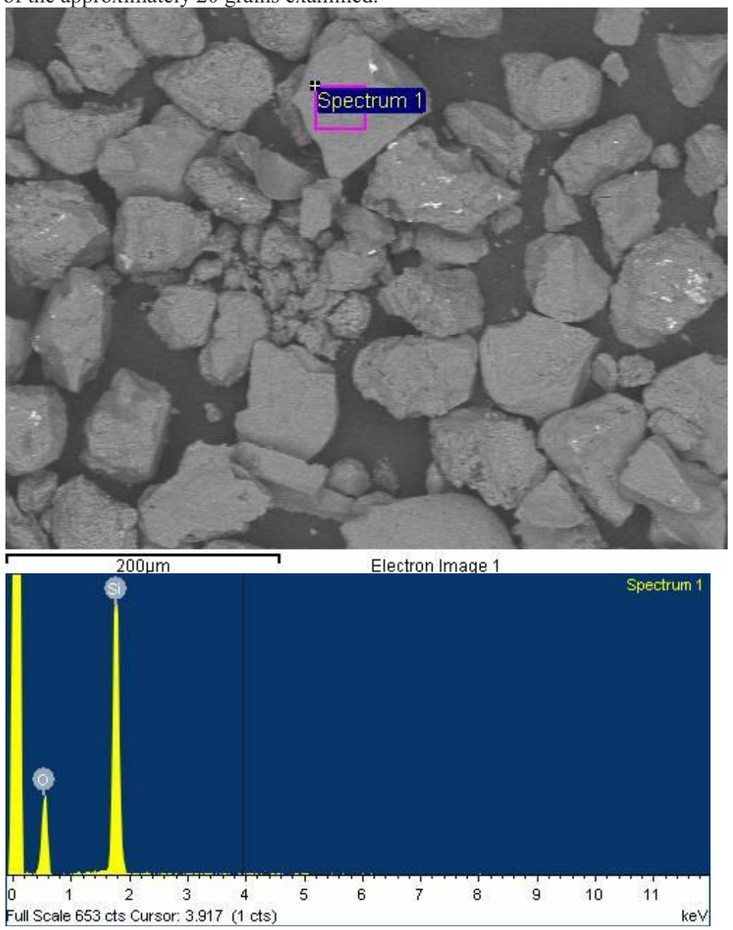
A.1: Unprocessed shavings from exterior of the sherd

A small sample of the material removed from the exterior of the sherd was examined without any further washing or grain size selection. These grains are generally coated with clay particles, with x-ray spectra indicative of iron-containing aluminium silicates. A typical spectrum is shown below:



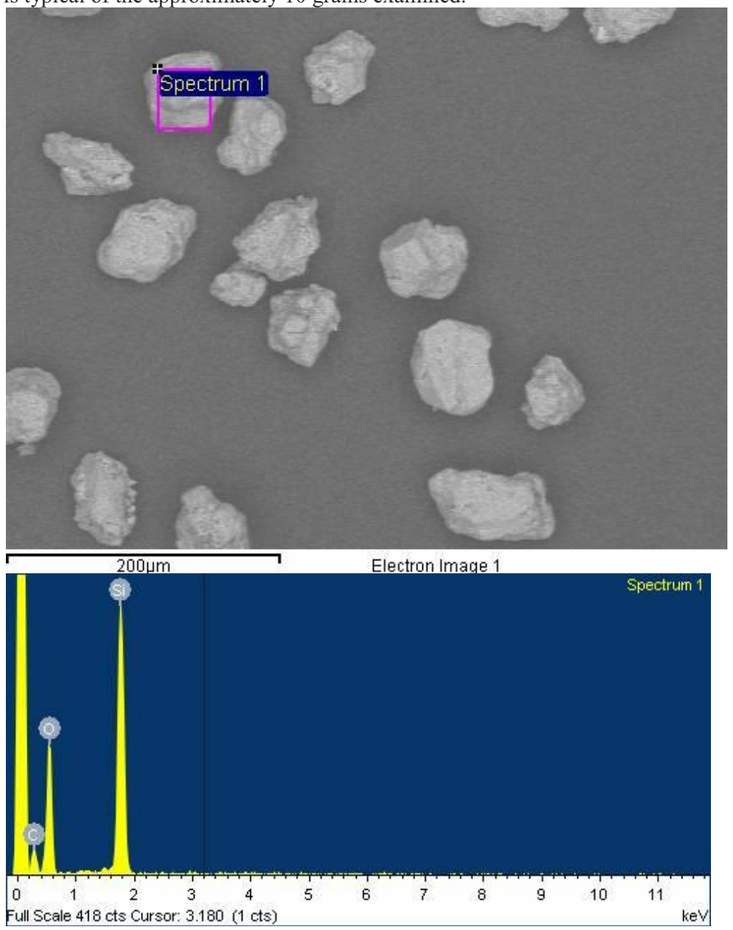
A.2: Lower density fraction

A small sample of a lower density fraction (nominally 2.51-2.58 g cm^{-3}) was extracted after initial acid treatment but prior to final HF treatment to remove inclusions. The grains are quartz, with some Fe-containing inclusions. The spectrum below is typical of the approximately 20 grains examined.



A.3: Higher density fraction

A small sample of a higher density fraction (nominally 2.64-2.74 g cm^{-3}) was extracted after initial acid treatment but prior to final HF treatment to remove inclusions. The grains are quartz, with no significant inclusions. The spectrum below is typical of the approximately 10 grains examined.



The Iron Age Ouse and Derwent Project

Geophysical Survey at Hardmoor Farm, 2018

Site location:	Hardmoor Farm, Broad Highway, Wheldrake YO19 6BE
Site grid reference:	SE 6675 4668
Date of survey:	19 - 23 February, 2018
Undertaken by:	North Duffield Conservation and Local History Society
Survey supervisor:	Paul Durdin

Summary

Magnetometry and earth resistance survey were undertaken on a site which previously featured crop marks of a possible prehistoric ring-ditch and potentially associated linear features. The survey results did not correspond closely to the crop marks, but revealed an area of strong magnetic 'noise' that, when combined with high resistance linear elements, suggest the presence of building remains.

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Introduction

The site at Hardmoor Farm was selected for the project based on crop mark features identified by the Vale of York National Mapping Programme (Kershaw 2001). These crop marks appeared to show a ring-ditch along with several linear features or enclosure boundaries, all suggesting possible Iron Age settlement. Geophysical survey was undertaken in order to characterise the features seen in the crop marks, to obtain a higher level of detail, and to provide accurate location data for excavation.

Figure 1. Crop mark features at Hardmoor Farm as identified by the Vale of York National Mapping Programme.

The field surveyed is somewhat irregular in shape, being made up of two previously separate fields totalling approximately 3.4 hectares. The eastern portion is 208m long north-south and 114m wide, while the smaller western is 112m north-south by 106m

east-west. A hedge sits on the southern half of the boundary between these formerly separate fields, but the northern half is open.

Geology

The site at Hardmoor Farm is situated on Sherwood Sandstone Group bedrock, overlain by a band of the Elvington Glaciolacustrine Formation of silty clays (BGS 1973). However, it is close to a boundary with the Naburn Sand Member of silty and gravelly sands, and there is likely to be some variation in the drift geology as a result. The visible topsoil was a dark grey brown sandy silt, and the topography was largely flat with a slight oval depression, notably wetter in historical aerial imagery, in the western half of the field.

Current use

The field surveyed is currently in use for growing hay. It is bordered on the north by a drainage ditch, behind which is Wheldrake Wood, and on the west and south by intermittent hedges, open fields and a smaller area of trees. To the east are the buildings and adjacent paddocks of Hardmoor Farm.

Methodology

A grid baseline was established running roughly parallel with the eastern boundary of the field, and a number of grid points at 100m intervals were plotted using a manual Leica total station. The total station was positioned relative to three fixed points, all identified with a reflective survey marker, on one of the farm buildings and significant trees along the field boundary. After these grid corners were established, 100m hand measuring tapes were used to fill in a 20m by 20m square survey grid.

Magnetic survey was undertaken by the supervisor and volunteers using a Bartington Grad-601-2 fluxgate gradiometer system. The system was calibrated by each new surveyor and re-calibrated at intervals during use, usually after every ten completed grids but varying based on the grid layout. Sensor height on the Bartington was also adjusted to be equal from the ground across all surveyors. Data was downloaded and viewed on site, with only rough processing, in order to inform the approach to further survey.

Readings were taken at 0.125cm intervals, on 1m traverses in a zig-zag layout across the grid, with the initial direction of walking NNW. The survey was largely limited to complete grids, apart from eight grids where fences or hedges prevented full coverage of the grid. A total of 55 full and 8 partial grids were surveyed, around 2.4 hectares total.

Earth resistance survey was undertaken afterward using the same grid layout, but over three smaller areas, with the location selected based on the concentration of archaeological features in the crop marks and magnetic survey results. Area A comprised 6 full grids over the area in which the crop marks showed a ring-ditch. Area B was located in the north of the field and covered 6 grids which showed some slight magnetic enhancement. A sherd of possible prehistoric pottery was also recovered from the ground surface of this area during the magnetic survey. Area C covered four grids, two each side of the hedge between the two

parts of the field, over an area with strong, although unclear, magnetic responses. A total of 16 grids were surveyed with earth resistance, of which 4 had obstructions preventing complete coverage, giving a total area of around 0.6 hectares. The survey was conducted using a TR Systems Mk 2 earth resistance meter, at 0.5m intervals on 1m traverses, with data collected on a Samsung Galaxy A6 tablet running the ‘trs meter mk2’ app. As with the magnetometry survey, the resistance data was downloaded at intervals onto a PC for viewing on site.

Both magnetic and earth resistance data was processed off site using Snuffler 1.3. Filters used on the magnetic data were Destripe followed by selective use of Destagger to correct survey pace inconsistencies. The data was then clipped to +/- 3.0 nT and interpolated twice perpendicular to the angle of traverse. Earth resistance data was grid-matched first, followed by a Despike filter to remove invalid readings. A high pass filter (“Remove Geology” in Snuffler) was applied but not retained as the results did not facilitate interpretation. Both types of data were exported as PNG images and georeferenced in QGIS 3.18, which was then used to create the interpretations.

All geophysical data, processed images and interpretations created during this survey are included in the project archive in non-proprietary file formats.

Results

The magnetic data shows one clear linear feature, along with several apparent pits and two areas of strong magnetic noise. Both the linear feature and the area of noise are corroborated by the earth resistance surveys in Area A and Area C respectively, but the results from Area B show nothing of definite archaeological origin. An area of strong magnetic ‘noise’ in the central south area, corresponding to high resistance elements, suggests a structure or building foundations in that area.

Magnetometry

Only one feature in the magnetic data corresponds to the crop marks, a faint, slightly curving linear running N-S across the eastern half of the field. However, there are also a number of other features visible. In the western half of the field is a second faint linear feature running E-W, perpendicular to and potentially part of the same boundary system as the first. These boundaries are on a very different alignment to any recorded on maps, and are likely to be medieval or earlier in date.

There are three large pit-like responses, in the north, southeast and southwest, along with a scatter of smaller pit anomalies across the whole field. Midway along the eastern boundary are a pair of medium sized pits, with a slight trend of enhanced magnetism to their south. Also to their south is a strong negative anomaly with a high positive central response, with a weaker ‘tail’ leading out of it to the northeast. This feature is likely to be archaeological, but it’s not impossible that it is of modern origin and relates to the present day farm.

In the central south of the survey area, either side of the hedge that partially divides the field, is an area of strong magnetic ‘noise’. There are numerous discrete features within this area,

including linear elements running ENE-WSW and several pit-like responses. These responses are typical of the enhanced magnetic responses caused by human occupation, and while it is not possible to identify any particular structure, this area is almost certainly identifying such activity.

There is another, smaller area of magnetic noise to the north, at the internal corner of the two fields. This is less convincingly related to occupation, but as it extends beyond the current field boundary a conclusive interpretation is not possible.

There are numerous faint linear trends across the survey area. They do not run in any pattern that would suggest field drains or other modern agricultural activity. Several in the northeast appear to run parallel to the N-S linear boundary, and may well be agricultural activity associated with that feature.

Dipole responses are visible scattered across the area. Most of these are likely to derive from modern ferrous material in the topsoil, but a dense cluster in the central eastern area of the survey may be archaeological in origin.

Earth resistance

Area A shows a low resistance linear feature running NNE-SSW across the northwest portion of the grids. This corresponds with the linear feature seen in this area in the magnetic data and is likely to be a large ditch. There is also a large low resistance anomaly in the south of the area, which may be a large pit or similar archaeological feature. No trace can be seen of the ring-ditch that was identified in the crop marks within this area.

The earth resistance data from **Area B** shows one possible pit feature and some indeterminate high resistance trends, but there is nothing of definite archaeological nature that corresponds to the responses seen in the magnetic data in this area.

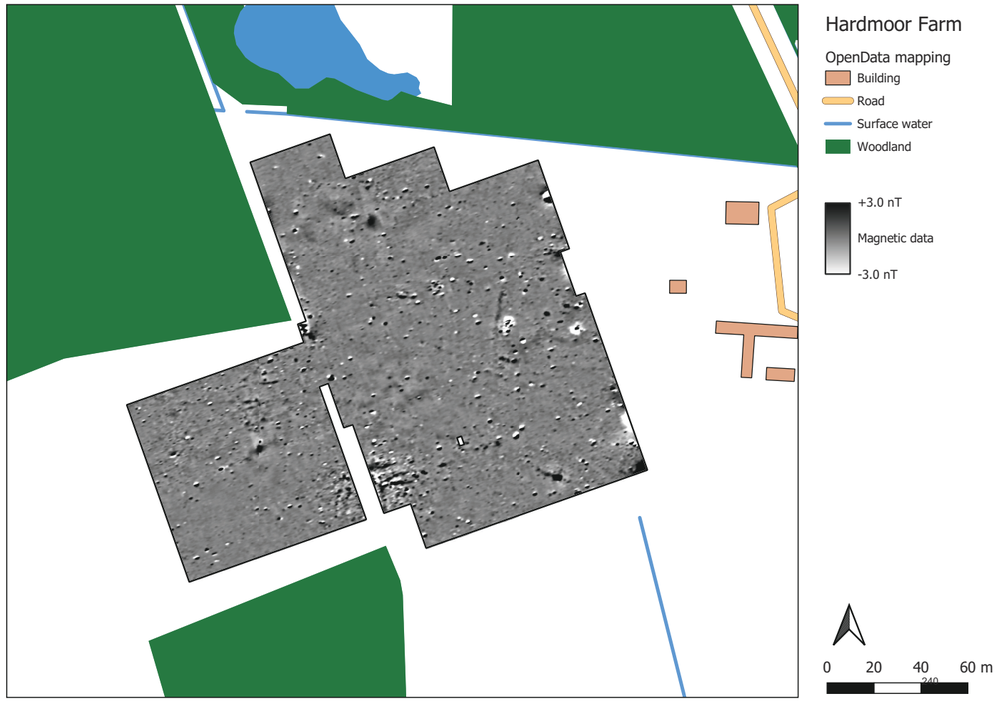
Area C, over the area of strong magnetic ‘noise’ identified previously, reveals a number of features of probable archaeological origin. Most prominent are a number of narrow, high resistance linear features forming a sub-rectangular shape that suggests a structure or extant building foundations around 20m long and 12m wide. These continue either side of the hedge, but are clearest to the west, where they suggest a structure on a WNW-ESE alignment. The high resistance responses east of the hedge are less clear, but correspond closely to the linear features seen in the magnetic data. To the north of these elements is an ovate ring of low resistance, 8-9m in diameter, while to the east is an arc of low resistance that hints at a similar feature. There are several pit-like low resistance anomalies throughout the survey area.

Throughout all three earth resistance survey areas are closely spaced, parallel NNW-SSE trends relating to modern agricultural processes: aerial photography shows that the hay is commonly mown on this alignment. These trends are very clear in Area A and Area B, but only faintly visible in Area C.

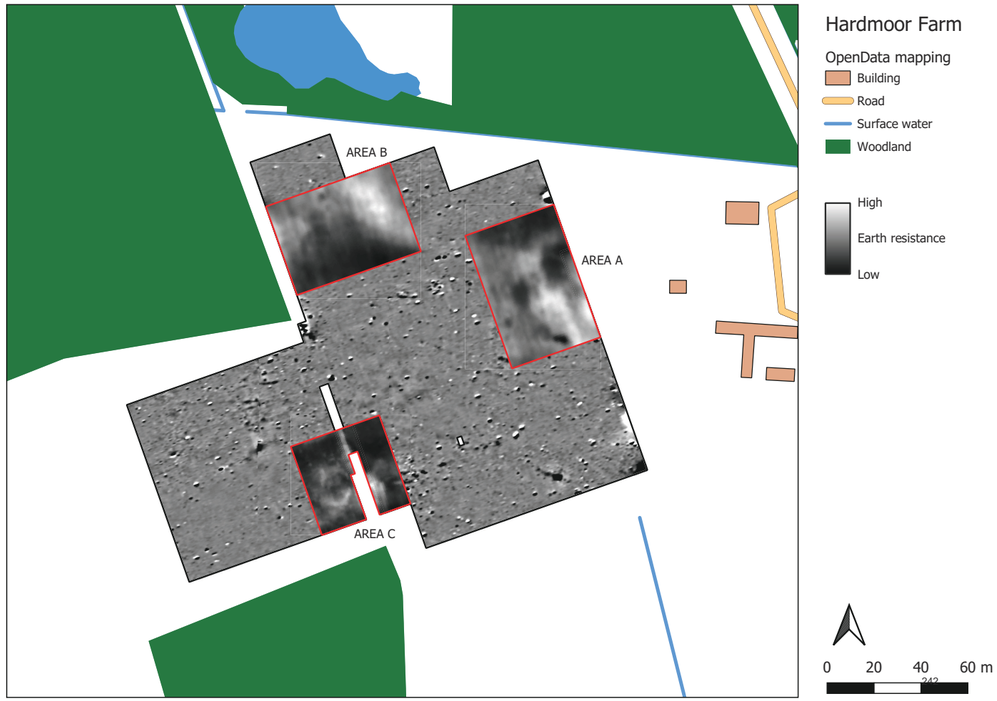
References

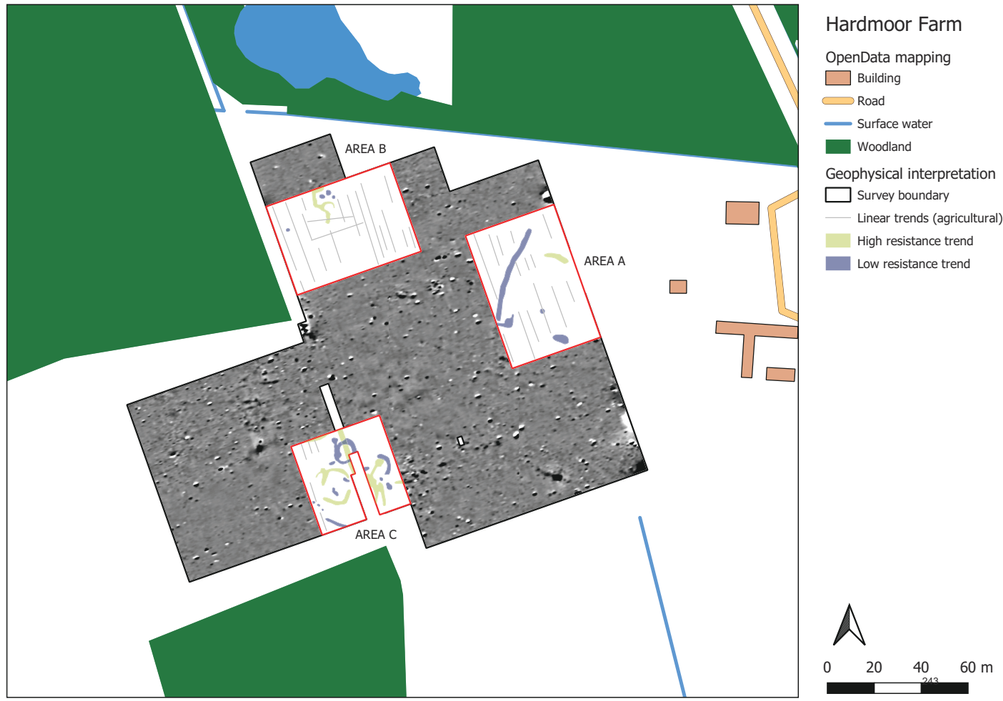
British Geological Survey (BGS) (1973). *1:50k geological map of Selby (Sheet 71)*. British Geological Survey.

Kershaw, A (2001). *Vale of York National Mapping Programme: Project Review.* English Heritage.


Hardmoor Farm
OpenData mapping
Building
Road
Surface water
Woodland
+3.0 nT
Magnetic data
-3.0 nT
0
20
40
60 m
240


Hardmoor Farm
OpenData mapping
Building
Road
Surface water
Woodland
Geophysical interpretation
Survey boundary
Linear trend
Archaeological feature
Magnetic trend
Ferrous/dipole response
0
20
40
60 m
241


AREA B
AREA A
AREA C
Hardmoor Farm
OpenData mapping
Building
Road
Surface water
Woodland
High
Earth resistance
Low
0
20
40
60 m
242


AREA B
AREA A
AREA C
Hardmoor Farm
OpenData mapping
Building
Road
Surface water
Woodland
Geophysical interpretation
Survey boundary
Linear trends (agricultural)
High resistance trend
Low resistance trend
0
20
40
60 m
243

The Iron Age Ouse and Derwent Project

Excavations at Hardmoor Farm, 2018

Site location:	Hardmoor Farm, Broad Highway, Wheldrake, YO19 6BE
Site grid reference:	SE 6675 4668
Site code:	HMF18
Date of excavation:	26-28 May, 2018
HER:	City of York Council HER
HER event number:	EYO6441
Undertaken by:	North Duffield Conservation and Local History Society
Excavation supervisor:	Paul Durdin, Jon Kenny
Report prepared by:	Brian Elsey, Paul Durdin
Report produced:	August-September 2021
Archive deposited:	Yorkshire Museum (YORYM : 2021.11)

Summary

Five test pits were excavated at Hardmoor Farm to evaluate the archaeological features revealed by a prior geophysical survey. Elements of an agricultural landscape or settlement were uncovered in all trenches, with the recovered pottery suggesting an Iron Age or early Roman date. Excavation of Trench 4 ceased when possible occupation layers and clay floors were revealed, while the other trenches were excavated down to natural geology.

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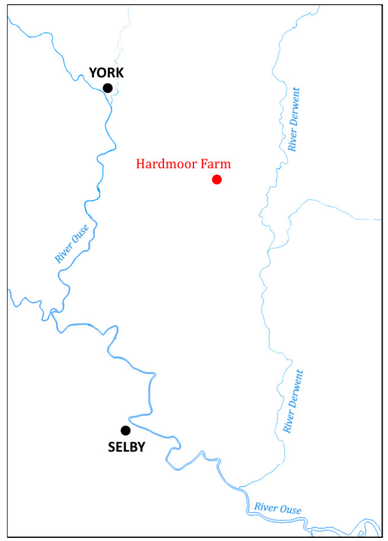
Introduction

The site at Hardmoor Farm consists of a reverse L-shaped field, roughly 220m east-west by 200m north-south, partly divided into two by a hedge and ditch running north-south. The eastern portion of the field is much the same as it appears on the 1st Edition OS map of 1852, but the western part is composed of a subsection of two larger fields on that map. It should be noted that Wheldrake Wood now borders the field to the north, in both the east and west areas, where it did not previously.

This site was chosen due to crop marks of a ring-ditch, and presumably associated linear features, that had been visible on aerial photographs in the eastern half of the field. Geophysical surveys (fluxgate gradiometry and earth resistance) failed to confirm the presence of the ring feature, but did detect some of the linear features.



Perhaps more importantly, a rectilinear high-resistance anomaly was shown in the earth resistance survey, sitting diagonally across the middle dividing hedgeline. This feature was not seen on aerial photos, and it did not respect the field boundary, but was interpreted as a stone-walled structure due to the high resistance 'outline'. During the geophysical survey, a large lump of what was thought to be iron smelting waste was found by the hedge, in the area of the anomaly, and so this area was selected as the primary target of excavation.

Geology

The site at Wheldrake is situated on Sherwood Sandstone Group bedrock, overlain by the Elvington Glaciolacustrine Formation and the Naburn Sand Member. The natural geology encountered was sand in Trench 1 to a depth of 0.7m below the topsoil, and clay in Trenches 2 through 5, to a maximum depth of 0.55m. The topsoil was a soft, dark brown silty sand in Trench 1, 0.3m deep, but in the other trenches was a firm clayey or silty sand up to 0.66m deep.

Current use

The site is in use as pasture for horses and ponies and according to the landowner has not been ploughed for at least thirty years.

Methodology

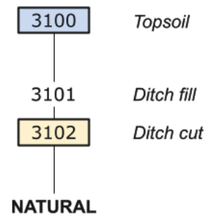
The trenches were laid out on the same site grid as the geophysical survey, using a Leica total station positioned with reference to several previously identified fixed points (cf. Methodology in Durdin 2020). As the trenches were all relatively small, they were excavated entirely by hand, including the removal of turf and topsoil. All archaeological features (except Trench 4, see below) visible within the trenches were excavated to ascertain their depth, form and function where possible, and to recover dating evidence.

Finds were largely cleaned and bagged on site. Due to the fact that most fills were primarily silty sands devoid of biological material, bulk soil samples were only retrieved from archaeological contexts that were either in important stratigraphic positions or had a noticeable charcoal or organic component.

Context, drawing, photo and sample registers were filled out by hand on paper and digitised following the excavation. Individual context records were completed digitally on Android tablets, in a recording system developed using Memento Database. All site records were reviewed on PC following the excavation, and the complete context data was then exported in CSV format for inclusion in the final project archive.

Trench 1

This trench, 4.4m by 1.1m, was situated over a linear anomaly, aligned N-S, that appeared in both the magnetometry and earth resistance surveys.

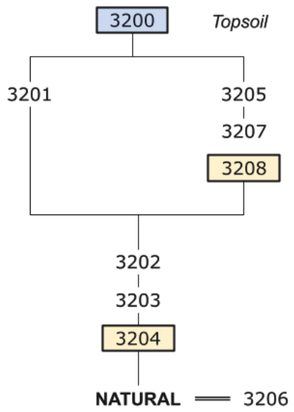


Upon clearing the turf and topsoil from the trench, the ditch seen in geophysics was revealed, with no other features present. This ditch **[3102]** was approximately 2.0m wide and 0.7m deep, but the trench placed obliquely across the feature and an exact profile was not obtained. However, the single fill **3101** produced four sherds of calcite gritted pottery typologically dated to the Late Iron Age.

A single flint burin-like flake was recovered from the topsoil in Trench 1, potentially dated to the late Neolithic or Early Bronze Age. However, the dating is inconclusive given that this isolated find is clearly residual.

Trench 2

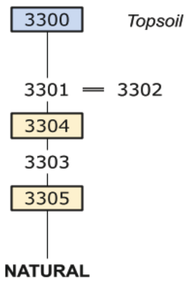
Trench 2, 2.4m by 2.3m, was opened to investigate the area around a very large lump of iron slag or bog iron found on the surface by the hedge and ditch that partially divide the field. After clearance of the overburden, a single slightly curving feature **[3204]** was visible. Insufficient area of the trench was uncovered to be certain of its full shape, but it contained three fills: **3201**, **3202** and **3203**, the latter being the primary fill of the cut. The fills produced calcite gritted pottery of Iron Age or Roman date, along with a fragment of clay furnace lining and a flint core, the latter probably residual.



This feature was truncated by a later cut **[3208]**, likely associated with cutting or re-cutting the ditch by the hedge. It contained two fills, **3207** as primary with a convex profile, almost a bank, and **3205** above which partly overlay **3202**. No finds were retrieved from these deposits.

Trench 3

This trench, 3m by 2.4m, was located over the north side of the high-resistance rectilinear anomaly, west of the hedge that partially divides the present-day field. This anomaly was originally interpreted as a building, not respecting, and thus likely pre-dating, the hedgeline.

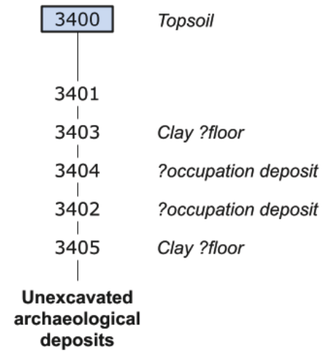


Removal of the topsoil revealed a linear feature that, when excavated, was found to be an earlier ditch **[3305]** partially overlaid by a later ditch **[3304]** along the same alignment. The ditches run northwest-southeast, and the later cut **[3304]** likely represents a re-cut of the earlier ditch as both earlier and later fills contained calcite gritted pottery of Roman date.

The fills of the ditches were a clayey sand, likely better draining than the surrounding clay natural, and this, along with the relatively shallow depth of topsoil (0.27m), may account for the high resistance readings over the ditch compared to the lower-resistance readings over the surrounding clay.

Trench 4

This trench, 2.4m by 2.3m, was located over an area of high resistance to the east of the hedgeline, in order to help understand the geophysical features more generally. No particular features were visible after removal of the topsoil, rather a rich black deposit **3401** that covered most of the trench. This turned out to be the uppermost of a series of deposits tipping gently away towards the south end of the trench. A sondage 0.45m wide, along the eastern side of the trench, was excavated through these deposits in order to establish the stratigraphic sequence.



Deposit **3401** was thought from its colour to be rich in carbon and/or organic material, and while it was difficult to distinguish the boundary with the overburden, it contained more stones and cobble than the topsoil above. Two sherds of Late Iron Age or Roman calcite gritted pottery were recovered from this deposit.

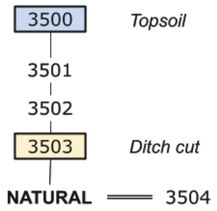
Immediately underneath, and completely covered by **3401**, was deposit **3403**, a firm yellowish grey clay. The northern edge of this deposit curved away to the southwest, and it was interpreted as a possible floor.

Under **3403** was a soft, orange, sandy silt deposit containing a large proportion of ash and frequent carbon and organic inclusions. This had the appearance of an occupation or midden deposit, and overlaid a similarly soft, grey ashy deposit **3402**. This second possible habitation layer was lying directly on a second yellowish grey clay layer **3405**, which was interpreted as an earlier floor but left unexcavated. A single sherd of calcite gritted pottery, probably of Late Iron Age date, was excavated from within deposit **3402**.

An insufficient area of these deposits was uncovered to conclusively interpret their nature, but it was thought that they represented *in situ* prehistoric or Romano-British habitation layers, and, given the presence of clay floors, were likely within a structure. If this interpretation is correct, this is a site of potentially great importance, as well-preserved deposits of this type from this period are rarely encountered in the Vale of York. Appropriate excavation of the deposits was not within the remit of the Ouse and Derwent Project, and so the trench was back-filled, immediately after recording was completed, in order to protect the contents for future investigation.

Trench 5

Trench 5, 2m by 1m, was located over the same rectilinear geophysical anomaly as Trench 3, but on the return of the feature where it runs northeast-southwest. This feature **[3503]** was immediately clear after removal of the topsoil, and on excavation was shown to be a ditch similar in form to ditch **[3304]** in Trench 3. The ditch contained two fills, **3501** and **3502**, which were difficult to distinguish but which both produced Late Iron Age calcite gritted pottery. This feature is confidently interpreted as a continuation of the similar ditch in Trench 3, but as with that trench its exact purpose remains indeterminate. As the trench was placed at an oblique angle over the ditch, the features were photographed but no section was drawn.



Discussion

Although the area excavated at Hardmoor Farm was very small, the trenches did reveal evidence for Iron Age or Romano-British settlement that correlates with the broader picture suggested by crop mark evidence. The sparser crop marks in the field investigated, despite the clear features in the trenches, is likely due to the depth of topsoil and modern day use of the field for pasture. In nearby arable fields, by contrast, there are clear crop marks over features that have since been excavated (see report for site code OADP19: Elsey *et al* 2021) and shown to be broadly similar in nature.

There is considerable potential for future work at Hardmoor Farm, primarily relating to the possible habitation deposits encountered in Trench 4. To excavate these, it would be advisable to expose their full extent in plan, undertake careful single context excavation, and devise a strict sampling strategy to maximise the amount of information retrieved. Note that the proximity of these deposits to the hedge may, in the case of future excavation, necessitate removal of all or part of that hedge.

If evidence for a structure does exist around Trench 4, it would also be important to establish the wider context. A complete earth resistance survey of the field may be of use: the limited areas covered in this project did reveal some features, but were not large enough to develop a proper understanding. Targeted excavation could follow to determine the nature and date of the features.

Bibliography

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Hardmoor Farm, Wheldrake (HMF18): Excavation: ceramics report

Tony Austin (University of York retired) July 2018

A total of 121 ceramic items were recovered during the above excavation. 82 were identified as pottery. A further 39 classed as 'other ceramics'.

Pottery by fabric

A White wares (sherd count 1 (3100) SF 35)

Mass produced wares (e.g. Crossley 1990, 243-67, Cumberpatch, 2003).

Dating: 19th – 20th century.

B Stoneware (sherd count 1 (3100) SF 36)

Appears to be the base of a small bottle or container. Mass produced so later in Stoneware production.

Dating: 19th - earlier 20th century

Calcite Gritted ware (also known as Calcite Tempered ware (CTW))

Calcite Gritted wares have a very long history of production starting in the Bronze Age through the Iron Age and Roman periods and even beyond into early within the Post-Roman period. Fortunately, some differentiation can be observed over time both in quality of manufacture and developing rim forms which become increasing out-turned and curved culminating in the hard fired, wheel thrown, lid seated cooking pots with great hooked rims of Huntcliff ware (e.g. Tomber & Dore, 1998, 201); this the final throw in a period of mass-production of 'grey wares' in eastern Yorkshire that began in the 3rd century AD. Three calcite gritted fabrics were identified at Hardmoor Farm; classic, other grits (OG) and slag (SL). A similar range of calcite gritted wares were recently identified at Hemingbrough and in broadly similar proportions (Austin, 2018).

C Calcite Gritted ware (OG) (sherd count 39 (3100) SF 37, (3101) SF 38 SF 39, (3201) SF 40 SF 41, (3301) SF 47, (3302) SF 51, (3303) SF 42 SF 43, (3401) SF 44, (3402) SF 45, (3501) SF 62 SF 63, (3502) SF 60 SF 61)

Contains calcite but is heavily gritted with other mineral grits (up to 5mm).It is well fired and quite robust. It is clearly within calcite gritted tradition with visible calcite. A similar 'other grits' OG fabric was recently identified at Hemingbrough where it dominated the overall excavation assemblage (*ibid*, 2018). Sherd counts at Wheldrake show equal amounts of OG ware and Calcite Gritted ware but together they completely dominate the assemblage. A further difference is that the 'other grits' at Hemingbrough were largely rounded while at Wheldrake they are much more angular which implies a different source. This may just represent localised availability.

Dating: At Hemingbrough most of the 'other grits' fabric was dated to the earlier Roman period on the basis of the presence of Knapton type rims and the lack of mass-produced 'grey wares' that starts in the earlier 3rd century (*ibib*, 2018). A single, substantial rim sherd at Wheldrake ((3303) SF 42), while not Knapton type ware, has a significant out-turn curving to a beaded or rounded rim top clearly falls into Roman period manufacture. Again this is probably 1st – 2nd century; possibly early 3rd. The lack of later (3rd century on) mass-produced 'grey ware' pottery at the site as excavated tends to confirm this. A small number of slightly out-turned rims ((3101) SF 38, (3402) SF 45, (3501) SF 61 SF 62) from cruder cooking pots were also present in the assemblage which probably precede SF 42 centring on the Late Iron Age.

D Calcite Gritted ware (sherd count 39 (3101) SF 49, (3201) SF 53, (3202) SF 64), (3203) SF 65, (3300) SF52, (3301) SF 48 SF 56 SF 54, (3500) SF 50 SF 55, (3502) SF 58)

Some of the sherds in this fabric here are classic early Calcite Gritted ware, soft fired (and hence fragile today) and containing voids where the calcite has leached out. The voids are often angular but these can become sub-rounded as the sherds are abraded over time. As noted previously for excavations at North Duffield, on the South Eastern boundary of the County of North Yorkshire, the sherds are

> "hand thrown sherds here are soft; almost biscuit like, and irregularly fired with surfaces red to brown and cores tending to black representing incomplete oxidation of organic material in the clay matrix; these all products of open or bonfire firing" (*ibid*, 2015, 131)

Other sherds are clearly much later; better made, hard fired with visible calcite.

Dating: A rim sherd from a bucket style vessel was identified in trench 2 ((3202) SF 64). Bucket and barrel shaped vessels are generally dated to the Middle Iron Age. Stratigraphically, body sherds in (3203) SF 65 are thus Middle Iron Age or earlier. Later rim sherds ((3301) SF 56; a possible bowl, (3301) SF 54; a cooking pot/jar and (3500) SF 55; another cooking pot/jar) are from vessels with Roman period forms These are probably 1st – 2nd century; possibly early 3rd. Again the lack of later (3rd century on) mass-produced 'grey ware' pottery at the site as excavated tends to confirm this.

E Calcite Gritted ware (SL) (sherd count 2 (3500) SF 57, (3502) SF 59)

Essentially Calcite Gritted ware, as indicated by angular voids and occasional calcite, with the addition of occasional slag tempering (up to 2mm). It is generally similar to other coarse wares from the site; namely Calcite Gritted ware (OG) and Calcite Gritted ware and thus likely to represent jars or cooking pots. Peter Halkon notes the use of slag as a temper in pottery recovered from various Iron Age sites including Hasholme (2013, 109-110). It may just be a random addition of slag or its presence may be of significance for future investigation so best to record it. The presence of slag as a temper hints at both metal working and potting taking place in the general area. Both sherds in this fabric were recovered from Trench 5. The only slag recovered from a context other than 'top soil' was also in trench 5; (3502) which may indicate a source for the slag tempering.

Dating: As well as (SL) ware (3502) contained 16 very abraded sherds of 'classic' Calcite Gritted ware which suggests an Iron Age date; Middle to earlier in the Late periods. The presence of (OG) ware suggests Late Iron Age. Similarly tempered ware at Hemingbrough was dated to the 'early within the Late Iron Age' (Austin, 2018).

Pottery summary

ID	Fabric	Count	%	Dating
A	White wares	1	1.22	19th – 20th century
B	Stoneware	1	1.22	19th - earlier 20th century
C	Calcite Gritted ware (OG)	39	47.56	Roman (early) Rim (3303) SF 42 Iron Age (Late) Rims (3101) SF 38, (3402) SF 45, (3501) SF 61 SF 62
D	Calcite Gritted ware	39	47.56	Iron Age (Middle) Rim (3202) SF 64 Roman (early) Rims (3301) SF 56, (3301) SF 54; (3500) SF 55
E	Calcite G ritted ware (SL)	2	2.44	Iron Age (Late, early within)
Total		82	100.0	

Apart from two 19th – 20th sherds in a top soil context the rest of the assemblage is entirely made up of Calcite Gritted wares. These represent coarse ware cooking pots or jars. Rims suggest activity in the Middle and Late iron Age and earlier within the

Roman period. The latter describes a convenient label for dating. As excavated, there is little to suggest any Roman influence at the site. Rather it seems to be a native British site that continues through the 2nd century unaffected by Romanitas.

Other Ceramics

Clay Tobacco Pipe (count 2 (3400) SF25, (3500) SF24)

SF24 Stem fragment. Fairly narrow stem and bore suggests latish date: later 18 - 19th century (Ayto, 1987 ed, 27)

SF 25 Partial bowl. Highly decorated with a scallop design which suggests a 19 century date (Ayto,1987, 6). A very similar bowl is shown in Higgins, 1999, fig. 100 (25) which is dated to the mid 19th century; not suggesting, of course, that this is anything other than a local product.

Dating 18th – 19th century

Hand-made brick (Count 8 (3300) SF29, 30)

SF29 Fragment with 3 surfaces suggestive of a hand-made brick. A depth of 55mm make it unlikely to be Medieval as such bricks in York are normally between 45-50mm (McComish, 2015, 25). Thus Post Medieval (17-19th century). Mass-production develops in first half of the 19th C.

SF30 Several fragments of fired clay, including one with a flat surface, some of which are likely to relate to SF29 suggested as a Post Medieval (17-19th century)

Dating: 17th – 19th century

Other CBM (Ceramic building material) (Count 21 (3200) SF 26, (3301) SF 32, (3400) SF 31, (3500) SF 33)

The CBM consists of small fragments of mostly brick and tile which are largely in 'top soil' contexts and thus of Post medieval date. The lack of this material in earlier contexts supports this with a possible exception of (3301) which contains early pottery and CBM; however the latter contains a tile fragment of Post Medieval form; a bevelled edge which has remains of a brown glaze on it.

Dating: Post Medieval

Field drain (count 4 (3200) SF 27, (3500) SF 34)

Small fragments which have a curving profile. Sarah Taplow notes that horseshoe and sole drains were in use from the late 18th century and that cylindrical clay pipes were introduced in the 1830s or 1840s (2007, 60). The latter come to dominate as they were more suited to mass production and also more efficient (*ibid* 60-61).

Dating 18th -19th century

Furnace lining? (Count 1 (3201) SF 28)

Largish fragment of coarse fired clay. Thick walled. Furnace lining possibly? This is speculative. Needs opinion of a metalworking expert.

Dating: Roman or Iron Age

Glass (Count 2 (3100) SF 23, (3401) SF 22)

Two sherds.

Dating: One is clearly modern, the other, at best, Post Medieval.

Other ceramics summary

Objects	Period	Count	%
Clay tobacco pipe fragments	18th – 19th century	2	5.13
Hand-made brick fragments	17th – 19th century	8	20.51
Other CBM	Post Medieval	21	53.85
Field drain fragments	18th -19th century	4	10.26
Furnace lining?	Roman/Iron Age	1	2.56
Glass sherds	Post Medieval/Modern	2	5.13
Unidentified fired clay	?	1	2.56
		39	100.0

This assemblage is centred on the 18th – 19th century apart from a speculative fragment of furnace lining.

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Wheldrake (HMF18). Animal Bone Report

Louisa Gidney

Faunal remains were recovered from four contexts.

3101, fill of large ditch, produced one calcined fragment, probably from a sheep-size long bone.

3200, plough soil over trench 2, produced tiny, unidentifiable scraps of calcined bone.

3203, a primary ditch fill, produced an unburnt shaft from a cattle metacarpal. The bone is poorly preserved, with small fragments disintegrating from the ends.

3401, a dark fill, contained part of a calcined sheep/goat astragalus and two long bone fragments of sheep-size.

This site is not conducive to the preservation of bone. The few calcined scraps suggest some food refuse thrown into the fire and subsequently disposed of among the ashes. The single cattle bone can only hint at the possibilities of structured deposition.

HMF18	Wheldrake		
Context	Species	Element	Comments
3101	sar	lbon	calcined
3200	indet	frags	small, calcined
3203	cow	mc	shaft frag, not burnt, poor pres
3401	s/g	ast	calcined
3401	sar	lbon	calcined shaft frags x 2

Palaeoecology Research Services **PRS 2019/22**

Assessment of biological remains from a single sediment sample collected during an archaeological excavation at Hardmoor Farm, Broad Highway, Wheldrake, York (site code: HMF18)

by

John Carrott and Jane Sheppard

Summary

A single sediment sample from the secondary fill of a feature presumed to be a linear ditch, possibly and enclosure ditch, encountered during an archaeological excavation at Hardmoor Farm, Broad Highway, Wheldrake, York, was submitted for an assessment of its bioarchaeological potential.

Biological remains of probable 'ancient' origin were largely restricted to a modest charcoal assemblage, presumably fuel waste, accompanied by occasional fully calcined (to white), small fragments of indeterminate bone. Preservation of the charcoal was generally poor with individual larger fragments often crumbling when examined for species identification and others exhibiting a vitrified appearance and distorted cell structures. A small number of fragments could be partially identified as of a diffuse-porous species, and three of these were probably alder, birch or hazel, and one fragment was probably ring-porous, but the only definitive species level identification was of a single fragment of oak.

Other organic remains present were clearly or almost certainly modern intrusions – root/rootlet, earthworm egg capsules and soil-dwelling nematode cysts, and a live bee – and artefactual remains consisted of just a single pot sherd and two pieces of possible ?slag.

Although easily sufficient for radiocarbon dating the charcoal recovered was unsuitable for this purpose and no further study of the limited biological remains recovered is warranted.

Keywords: Hardmoor Farm; Broad Highway; Wheldrake; York; assessment; Iron Age; plant remains; charred plant remains; charcoal; invertebrate remains (trace; modern); vertebrate remains (trace; calcined)

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Assessment of biological remains from a single sediment sample collected during an archaeological excavation at Hardmoor Farm, Broad Highway, Wheldrake, York (site code: HMF18)

Introduction

An archaeological excavation was undertaken by North Duffield Conservation and Local History Society (NDCLHS) at Hardmoor Farm, Broad Highway, Wheldrake, York (centred on NGR SE 667 467), between the 26th and the 28th of May 2018. The excavation was undertaken as part of NDCLHS's current project investigating Iron Age settlement in the southern Vale of York bounded by the rivers Ouse and Derwent.

The site was selected as aerial photographs showed crop marks indicating a large ring ditch with, perhaps, a burial mound or some other feature within it and some linear ditches. Geophysics failed to confirm these features but did reveal what was initially believed to be the footprint of a building which did not respect either the orientation or existence of a ditch shown on the 1852 OS maps.

Although this did not appear to fit the remit of the research project, it was decided to conduct a limited intervention whilst attempting to identify a new site in the same area and five trial trenches were excavated.

A linear ditch was confirmed (showing as a crop mark) in the area of the supposed ring ditch (of which, no trace was found). The ditch produced Iron Age pottery and possible Mesolithic flints. The supposed 'building' appeared to be an enclosure through which a boundary ditch had been dug at some time prior to 1852. The enclosure included at least one ring ditch (from which Iron Age pottery was recovered) and there was evidence of iron working.

A subsample of a single 'bulk' sediment sample ('GBA'/'BS' *sensu* Dobney *et al*. 1992), from the secondary fill (Context 3501) of a feature presumed to be a linear ditch [3503], possibly an enclosure ditch, was submitted to Palaeoecology Research Services Limited, Kingston upon Hull, for an assessment of its bioarchaeological potential.

Methods

The lithology of the submitted sediment subsample was recorded using a standard *pro forma*. A very small further subsample was extracted for examination for microfossils (see below) prior to processing of all of the remainder for the recovery of plant, invertebrate and vertebrate remains (macrofossils), broadly following the techniques of Kenward *et al*. (1980), producing a residue and a washover.

The deposit did not appear to contain ancient uncharred organic remains preserved by anoxic waterlogging and the washover was dried for examination for macrofossils using a low-power microscope (x7 to x45 magnification).

The residue was primarily mineral in nature and was also dried prior to the recording of its components; the weight and description of the residue was recorded after sorting. The residue

was separated into fractions (using 1, 4 and 10 mm sieves) to facilitate recording. Data acquired refer to the larger items which have been extracted; smaller fragments remain in the residue and details of these are not included. All biological and artefactual remains were sorted to 1 mm; the residue fraction less than 1 mm was scanned for additional identifiable remains and its composition recorded semi-quantitatively (see below). All of the residue fractions (including that less than 1 mm) were scanned for magnetic material.

The processed sample fractions (washover and residue) were scanned until no new remains were observed and a sense of the abundance of each taxon or component was achieved and these were recorded either as counts or using a five-point semi-quantitative scale as: 1 – few/rare, up to 3 individuals/items or a trace level component of the whole; 2 – some/present, 4 to 20 items or a minor component; 3 – many/common, 21 to 50 or a significant component; 4 – very many/abundant, 51 to 200 or a major component; and 5 – super-abundant, over 200 items/individuals or a dominant component of the whole. The abundance of recovered organic and other remains within the sediment as a whole may be judged by comparing the washover weight/volume and the quantities of remains recovered from the residue with the size of the processed sediment sample.

For plant remains identifications were attempted to the lowest taxon necessary to achieve the aims of the project by comparison with modern reference material (where possible) and the use of published works (e.g. Cappers *et al*. 2006). In the event, there were no plant remains present other than charcoal which were likely to be contemporary with deposit formation, however.

Species identifications were attempted for the small number of charcoal fragments (of over 4 mm) recovered from the sediment samples. Pieces were broken to give clean cross-sectional surfaces and the anatomical structures were examined using a low-power binocular microscope (x7 to x45) and higher magnification where necessary (x100 and x150). Identifications were attempted by comparison with modern reference material where possible, and with reference to published works (principally Hather 2000 and Schoch *et al*. 2004).

The few invertebrate remains noted were all almost certainly modern intrusions and were recorded in brief.
Vertebrate remains were examined and identifications to species or species group attempted using the PRS modern comparative reference collection and published works (e.g. Schmid 1972); in the event only small, wholly indeterminate, calcined bone fragments were recovered, however.

During recording, consideration was given to the identification of suitable remains (if present) for possible submission for radiocarbon dating by standard radiometric technique or accelerator mass spectrometry (AMS).

A small subsample (of approximately 5 ml) of sediment was extracted from the sample for examination for microfossils. This was investigated using the 'squash' technique of Dainton (1992), originally designed specifically to assess the content of eggs of intestinal parasitic nematodes; however, this method routinely reveals other microfossils, such as pollen and diatoms, which were also recorded if present. The assessment slide was scanned at x150 magnification and at x600 where necessary.

Results

The results of the investigations of the sediment sample are presented below. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample number.

Context 3501 [Secondary fill of presumed linear ditch [3503] , possibly an enclosure ditch, mentioned above
Sample 1/T (9.75 kg/8.5 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Just moist, mostly mid grey (mottled with mid brown at a mm-scale), largely unconsolidated with occasional crumbly lumps, ashy, silty fine sand (with slight clay content in places). Stones (2 to 60 mm), charcoal and modern rootlets were present; there was also a single live ?solitary bee.

The quite large washover (dry weight 91.9 g/~200 ml) was mostly composed of charcoal (to 25 mm; abundance score 5), together with abundant modern rootlet (score 4; and including fragments of root epidermis from more substantial rootlets/roots (score 3)) and sediment 'dust' (both score 4). Minor components were occasional tiny and indeterminate fragments of calcined bone (to 2 mm; score 2) and small numbers of earthworm egg capsules and soil-dwelling nematode (cf. *Heterodera* sp.) cysts; the two last both score 2 and probably intrusive. All of the charcoal was rectilinear fragments and fragments were mostly less than 4 mm and indeterminate. Of 13 larger fragments for which species identification was attempted, five crumbled and remained wholly indeterminate, seven were of a diffuse-porous species but could not be identified more closely and the thirteenth was oak (*Quercus*).

The rather small residue (dry weight 802.9 g: >10 mm- 136.2; 4-10 mm – 281.8 g; 1-4 mm – 184.5 g; <1 mm – 200.4 g) was mostly stones (to 60 mm; score 5) and sand (score 3). There was also a little indeterminate calcined bone (to 12 mm; 1.3 g; 11x fragments), some charcoal (to 20 mm; 20.6 g; ~60x pieces), two pieces of ?slag (to 20 mm; 2.9 g) and a single pot sherd (to 40 mm; 14.9 g). Thirteen charcoal fragments were examined more closely but none could be positively identified to species – two crumbled and another three were strongly vitrified with distorted cell structures (all of these fragments remained wholly indeterminate), four other fragments were somewhat vitrified but could be partially identified as diffuse-porous, three were diffuse-porous and probably alder, birch or hazel (*Alnus*/*Betula*/*Corylus*) and the last was, again, vitrified but probably ?ring-porous. The trace level magnetic component (to 5 mm; <0.1 g) was all ?heat-affected sand grains and small stones.

The 'squash' subsample was almost entirely inorganic, with just a trace of organic detritus (~1 %). No microfossils were present.

Discussion and statement of potential

Biological remains of probable 'ancient' origin recovered from the sediment sample from the secondary fill (Context 3501) of a feature presumed to be a linear ditch [3503], possibly an enckosure ditch, were largely restricted to a modest charcoal assemblage, presumably fuel waste, accompanied by occasional fully calcined (to white), small fragments of indeterminate bone. Preservation of the charcoal was generally poor with individual larger fragments often crumbling when examined for species identification and others exhibiting a vitrified appearance and distorted cell structures; both of which rendered identification impossible. A small number of fragments could be partially identified as of a diffuse-porous species, and three of these were probably alder, birch or hazel, and one fragment was probably ring-porous, but the only definitive species level identification was of a single fragment of oak. In the past vitrification of charcoal, as noted to varying degrees on several fragments here, has been taken to indicate high temperature burning but relatively recent experimental work (McParland *et al*. 2010) suggests a more moderate formation temperature of 310-530 degrees Centigrade.

Other organic remains present were clearly or almost certainly modern intrusions – root/rootlet, earthworm egg capsules and soil-dwelling nematode cysts, and the live bee (removed from the sample prior to processing).

Artefactual remains were similarly few consisting of just a single pot sherd and two pieces of possible ?slag.

The charcoal recovered would easily be sufficient for radiocarbon dating (via AMS) to be attempted. This material cannot be recommended for the purpose, however, as all of the fragments were of an indeterminate number of years of wood growth and the only identified fragment was of oak (a particularly long-lived species). Consequently, the associated 'old wood problems' could result in a radiocarbon date significantly earlier (but by an unknown amount) than the charring event being returned; as the carbon content of the wood is fixed at the time of its growth.

Recommendations

No further study of the limited biological remains recovered from this deposit is warranted.

Retention and disposal

Artefactual (and possible artefactual) materials recovered from the sediment sample will be returned to the excavator to be considered by the appropriate specialist(s) and included within the physical archive for the site if warranted.

The recovered organic remains and sorted residue fraction are of no further interpretative value and may be discarded.

Unless required for purposes other than the study of biological remains (possible artefact retrieval, for example), any retained unprocessed sediment may also be discarded.

Archive

All of the extant material from the submitted subsample is currently stored by Palaeoecology Research Services (Unit 4, National Industrial Estate, Bontoft Avenue, Kingston upon Hull), pending return to the archaeological contractor (or permission to discard), along with paper and electronic records pertaining to the work described here.

Acknowledgements

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Site Name: **Wheldrake.** Site Code: **HMF-18.**

County: **North Yorkshire.**

FLINT ASSESSMENT.

An assessment of the flint & stone from North Wheldrake (HMF-18)

By Peter Makey for North Duffield & Local History Society (Last revision 03/06/19).

All the flint has been fully catalogued in MS excel format (appended) and pieces have each been allocated an individual flint catalogue number (ARN Archive record number).
The colour of the flints has been recorded using Munsell (1988) nomenclature.

Only three pieces of flint were submitted for examination, all of which are struck and prehistoric. All of the material has been analysed for the presence of both microscopic and macroscopic traces of edge use. No use wear is present on the material. The core fragment (small find 10) from ring ditch 3204 (trench 2) is in a fresh state that might be consistent with the date of the feature, while the flake (small find 12: trench 1, plough soil context 3100) and notched flake (small find 11: trench 3, plough soil context 3300) are less fresh. The flake and notched flake are intact; the core breakage is an ancient knapping related fracture. The pieces have been manufactured on a medium grained till derived flint of light olive grey (Munsell 5Y 5/2) to olive black (5Y 2/1)c 2 colour. None of the pieces possess patina. Knapping has been conducted by the application of hard hammer stones.

Flint ID	**Context**	
Flake (burin like)	3100	Plough soil over trench 1
Core Fragment - Unclassifiable	3201	Upper fill ring ditch 3204, trench 2
Notched Flake – Single (ventral) notch	3300	Plough soil over trench 3

The Flints.

1) The flake (small find 12) is a slightly cortical (secondary) single crested example with a linear platform, diffuse bulb and a hinged termination. The distal (non-striking end) end has a small flake facet that slightly resembles a burin (a graving tool). However there are no signs of use wear and the facet is probably a coincidental by product of, knapping rather than intentional flaking.

2) The core fragment (small find 10) is from a small irregular core and shows traces of six flakes and one bladelet removal (average length 10mm). The platform edge shows traces of fine trimming that resembles retouch (note it is not retouch). Two of the flake removals occurred after the piece was broken. This might be indicative of a shortage of raw material.

3) The notched flake (small find 11) possesses a single notch on the ventral (lower) surface. The notch has been made on an old flake.

Date of the Material.

The overall dimensions of the pieces and the nature of the core fragment is indicative of a later Neolithic to early Bronze Age date. The core fragment and the notched flake look as though they have been reworked although the time interval between the two phases of working could range from weeks to many years.

Conclusions.

Unfortunately the flint assemblage is too small to draw any firm conclusions.

Recommendations.

The assemblage has been fully recorded. No further cataloguing is required.

Drawing Requirements.
None of the material requires illustration.

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Industrial Waste from 2018 Season at Hardmoor Farm, Wheldrake (HMF18)

Eleanor Blakelock

Introduction

In 2018 excavations on a small scale were conducted at Hardmoor Farm, Wheldrake(HMF18). In total an assemblage (11.6kg) of possible industrial waste was recovered. This appears to comprise of a possible ring ditch, a possible enclosure ditch and several ditches which have been dated to the Iron Age.

There are two main types of processes involved in iron working: smelting (extracting metal from the ore), and smithing or forging (shaping the object). Both create different kinds of waste that can often be distinguished on the basis of their morphology, as described below.

Iron smelting took place in bloomery furnaces, which were typically clay-built, rounded structures. Iron ore was fed into the furnace where it reacted to create a spongy mass of iron metal known as a bloom. The waste from this process formed a liquid slag that was collected in the bottom of the furnace, however by the late Iron Age the slag was potentially being tapped from the furnace (Bayley *et al*. 2001). Iron smelting in the Iron Age was probably carried out on a small scale, using local ores e.g. bog iron ore. On the other hand there is evidence for iron smithing in many Iron Age settlements.

Ironworking waste classification

The ironworking waste from Hardmoor Farm was classified predominantly using the terms used in the Centre for Archaeology Guidelines, *Archaeometallurgy* (Bayley *et al*. 2001). The categories included *tap slag, runs, smelting slag*, *hearth lining, fuel ash, smithing hearth bottom*, *undiagnostic slag*, *natural* and *other finds*. There is a summary of the results in table 1 with a description of the debris by context.

Tap slag and runs are by-products of the smelting process, produced by removing slag by tapping when it was hot and fluid. This waste has a characteristic shape, resembling the flow of lava, and the lower surface may be rougher as it comes into contact with the ground. Large numbers of the tap slag and run fragments appeared to be tubular in form. In addition to these types of slag it is possible to get *flow slag* which exhibit signs of fluid flow, but did not flow out of the furnace.

Smelting slag consists of large blocks of slag waste, often with fuel impressions in the surface. It will appear to have obviously been fluid but will not show the same flowed texture as tap slag, instead it will have impressions from obstructions of wood or charcoal from within the furnace. The porosity of this slag varies greatly. In addition to smaller lumps of smelting slag, occasionally large masses of slag that form the *furnace bottom* are found, where the tapping arch is above the base of the furnace (Paynter 2007; Pleiner 2000). This slag generally forms below the iron bloom, and they are generally oval in plan, often with some preserved surface from the furnace. Like smelting slag they contain impressions from organic matter, such as charcoal or wood.

Iron rich slag is a dense slag like material that can also be magnetic, the outer surface appears ‘rusty’ which suggests that this slag contained a higher proportion of iron. This slag is potentially related to the iron rich bloom crown material that forms close to the bloom during the smelt, and removed during primary smithing.

Hearth lining consists of small fragments of clay that has been subjected to heat. The outer surface will often appear orange with a black inner surface. Some fragments may have iron slag adhering to them.

Smithing Hearth Bottoms are usually circular with a concave base, often this is rough or may even contain pieces of vitrified clay lining where it came into contact with the base of the hearth. The top can also have a concave shape. This slag can be magnetic as it forms from the iron that falls off the iron, which combines with slag, charcoal and clay hearth lining to form a distinctive slag. The size is dependent on how often the blacksmith cleans out the forge and the types of activities taking place.

Hammerscale consists of small iron rich fragments which fall of the iron as it is worked by the blacksmith. If the relative density of this waste product is plotted across a site it can be used to determine the anvil and hearth locations.

Fuel Ash and clinker is usually less dense than other types of slag, and form from the reaction with fuel ash and occasionally clay linings.

Undiagnostic slag will not have sufficient characteristics to be categorised; similar materials may be produced by either smelting or smithing operations.

The Assemblage

In total, 4.6kg of iron waste material was recovered from HMF18, not including a large slag block (6.9kg) found although this was from the plough soil [3200]. The vast majority of the slag from the site is a dense and heavy material, with occasional charcoal impressions. 84% of the total recovered material was a result of the smelting process and 13% was kiln lining and only 2% of the assemblage at HMF18 was undiagnostic slag. 86.1% was recovered from the plough soil

No evidence of smithing in the form of hammerscale was found in the HMF18 trenches. Furnace lining is the least likely component of metalworking to travel long distances due to its friable nature. However the presence of some relatively large pieces of furnace lining may be an indication that smelting was being carried out near to the site.

Conclusion

The vast majority of the slag from the site is smelting slag, being dense with charcoal impressions, or attached furnace lining. There is no tap, present on the site, so it is highly likely that the furnaces were non-tapping furnaces, which would support the suspected period of the site.

Most of the industrial waste from HMF18 came from the plough soil; this along with the relatively smaller amounts from the fills of ditches suggests that iron smelting is not necessarily happening in the immediate vicinity of these trenches. However the presence of some slag from secure contexts does suggest that iron metalworking was taking place somewhere nearby.

References

Bayley, J, Dungworth, D and Paynter, S 2001 *Archaeometallurgy*. Centre for Archaeology Guidelines 2001-01. London: English Heritage.

Appendix

Table 2: Quantities (in g) of different types of waste recovered from Hardmoor Farm, Wheldrake (HMF18), by context.

	Feature type	Tap and flown Slag		Smelting		Furnace lining		Smithing hearth bottom	
		no	weight	no	weight	no	weight	no	weight
3300	Plough soil			2	415	1	385		
3200	Plough soil			1	6900				
3201	Fill of ditch					1	90		
3401	Fill in south of trench			2	479				
3400	Plough soil			5	1159				
3502	Fill of ditch			1	842	13	107		
3500	Plough soil					2	912		
Total count/weight of assemblage				**11**	**9795**	**17**	**1494**		
					84%		**13%**		

Table 2 cont: Quantities (in g) of different types of waste recovered from Hardmoor Farm, Wheldrake (HMF18), by context.

	Feature type	Undiagnostic slag			Clinker/ fuel		Ore	Iron objects	
		no	weight	no	weight	no	weigh t	no	weight
3300	Plough soil	2	23						
3200	Plough soil	1	65						
3201	Fill of ditch							1	90
3401	Fill in south of trench	2	95						
3400	Plough soil	3	59						
3502	Fill of ditch								
3500	Plough soil	1	17					1	56
Total count/weight of assemblage		**9**	**259**					**1**	**56**
			2%						**0%**

The Iron Age Ouse and Derwent Project

Geophysical Survey at North Duffield, 2018

Site location: Hugh Field Lane, North Duffield YO8 5RH

Site grid reference: SE 6826 3778

Date of survey: 19 - 23 February, 2018

Undertaken by: North Duffield Conservation and Local History Society

Survey supervisor: Paul Durdin

Summary

Magnetometry and earth resistance survey were undertaken on a site which previously featured crop marks suggestive of Iron Age or Romano-British settlement, particularly a large double-bounded enclosure containing a ring-ditch. The results largely corresponded to the crop marks, while adding a great deal of complexity to the enclosure interior.

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Introduction

The site at North Duffield was selected for the project based on crop mark features identified by the Vale of York National Mapping Programme (Kershaw 2001). These crop marks appeared to show an Iron Age or Romano-British agricultural landscape around a large double-bounded enclosure containing a round-house.

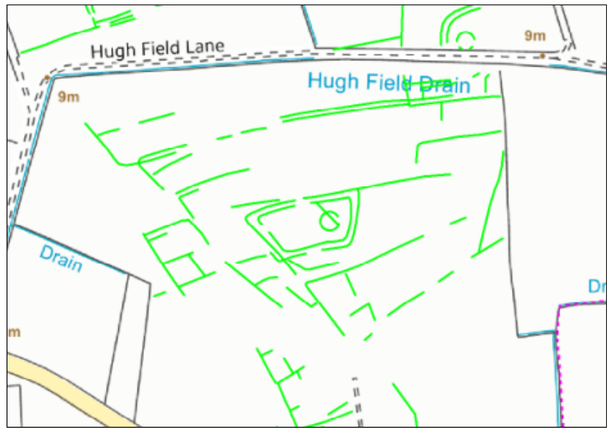


Figure 1. Crop mark features at North Duffield as identified by the Vale of York National Mapping Programme.

The field surveyed is irregular in shape, measuring 400m E-W across its northern boundary and around 550m N-S at its longest point. Geophysical survey was confined to the northwestern third of the field, but the crop marks continue across the whole field.

Geology

The site at North Duffield is situated on Sherwood Sandstone Group bedrock, overlain by the Skipwith Sand Member (BGS 1973). The visible topsoil was a greyish brown silty sand.

Current use

The field surveyed is currently in use as arable land, but is divided into two or sometimes three parts which may also be used as pasture. It is bordered on the north and west by hedges, with open fields to the south and east.

Methodology

A grid baseline was established running parallel with the eastern boundary of the field, and a number of grid points at 100m intervals were plotted using a manual Leica total station. The total station was positioned relative to three fixed points, all identified with a reflective survey marker, on significant trees or fence posts along the field boundaries as no permanent structures were within range. After these grid corners were established, 100m hand measuring tapes were used to fill in a 20m by 20m square survey grid.

Magnetic survey was undertaken by the supervisor and a number of volunteers using a Bartington Grad-601-2 fluxgate gradiometer system. The system was calibrated by each new surveyor and re-calibrated at intervals during use, usually after every ten completed grids but varying based on the grid layout. Sensor height on the Bartington was also adjusted to be equal from the ground across all surveyors. Data was downloaded and viewed on site, with only rough processing, in order to inform the approach to further survey.

Magnetic readings were taken at 0.125cm intervals, on 1m traverses in a zig-zag layout across the grid, with the initial direction of walking north. A total of 113 grids were surveyed, 4.52 hectares in total. Twelve grids over the large double-bounded enclosure were also re-surveyed with a traverse direction of E-W, to obtain an alternate set of data for this area, but the user unwittingly had magnetic material in their clothing and the results were badly affected.

Earth resistance survey was undertaken using the same grid layout, but limited to the area of the double-bounded enclosure. A total of 12 full grids were surveyed, in very dry conditions. The survey was conducted using a TR Systems Mk 2 earth resistance meter, at 0.5m intervals on 1m traverses, with data collected on a Samsung Galaxy A6 tablet running the ‘trs meter mk2’ app. As with the magnetometry survey, the resistance data was downloaded at intervals onto a PC for viewing on site.

Both magnetic and earth resistance data was processed off site using Snuffler 1.3. Filters used on the magnetic data were Destripe followed by selective use of Destagger to correct survey pace inconsistencies. The data was then clipped to +/- 3.1 nT and interpolated twice perpendicular to the angle of traverse. Earth resistance data was grid-matched first, followed by a Despike filter to remove invalid readings before interpolation. Both types of data were

exported as PNG images and georeferenced in QGIS 3.18, which was then used to create the interpretations.

All geophysical data, processed images and interpretations created during this survey are included in the project archive in non-proprietary file formats.

Results

While the earth resistance did not produce entirely favourable results, the magnetometry was highly successful. These results correspond well to the crop marks previously described, although they show far more complexity within the double-bounded enclosure than had been identified from the aerial photographs. Overall, the survey data show a rural settlement pattern of prehistoric or perhaps Romano-British date, oriented along a NW-SE alignment as defined by a trackway.

Magnetometry

The most striking feature visible in the magnetic data is a large double-bounded trapezoidal enclosure, oriented ENE-WSW and measuring approximately 100m in length by 50m in width. Within the enclosure are a number of partial ring features ranging from 6m to 18m in diameter, likely to be the ring-ditches of round-houses, along with rectangular or rectilinear features that appear to overlie them. Several of the ring features overlap each other, suggesting multiple phases of round-house construction, but the complexity of the interior elements is such that determining the sequence is impossible. The rectangular features, measuring c.30m E-W by c.20m N-S, are likely to be a later, non round-house structure, but they are also difficult to define.

There is a broad spread of activity continuing to the south of the main enclosure, marked by a NW-SE trend of linear features that extend from the enclosure's western side to the southern boundary of the survey area. These are likely to be ditches defining a trackway or droveway, and other boundaries can be seen extending to the east and west off this path. A second trapezoidal enclosure, also apparently double-bounded, is visible south of the main enclosure on the east side of the trackway. It measures some 40m by 40m at its widest points, but does not have the internal complexity of the main enclosure. A much fainter, almost square enclosure can also be seen further south still, with its ENW-WSW southern boundary extending beyond the eastern extent of the survey.

A very strong magnetic response, of uncertain shape, appears near the southern edge of the survey area. This may well result from industrial activity requiring high temperatures, such as pottery firing or iron smelting.

The features to the west side of the trackway are less distinct, but there are two linear features west-southwest from it opposite the southern border of the main enclosure, forming an apparent enclosure at this point. Other elements on this side of the trackway are fragmentary, but mostly suggest similar linear features. This difference in clarity may be due to human activity being largely confined to the enclosures east of the trackway, and thus only limited magnetically-enhanced material being deposited to the west.

There are numerous pit-like responses scattered across the magnetometry survey area, with no remarkable patterns or concentration.

A relatively small number of dipole responses are visible scattered across the area. Most of these are likely to derive from modern ferrous material in the topsoil. There are also numerous narrow linear trends, most clearly running N-S in the northwest area but in other places on different alignments, that likely relate to agricultural activity.

Differences in the natural geology are visible across the survey area as a change between the relatively clear northeast and the 'dappled' southwest.

Earth resistance

The electrical resistance results were not very favourable, largely due to the very dry soil conditions at the time of survey. While some archaeological features are visible in the data, the most prominent elements are all related to present day agricultural activity.

A wide band of low resistance can be seen running N-S towards the east end of the survey area. This was caused by a farm machinery routeway as this point formed the boundary between two different uses of the field, with pasture growing to the west and carrots to the east. There are numerous narrow E-W parallel linear trends to the west of this, also relating to modern crops. A narrow N-S high resistance linear trend towards the western end of the survey is probably also modern.

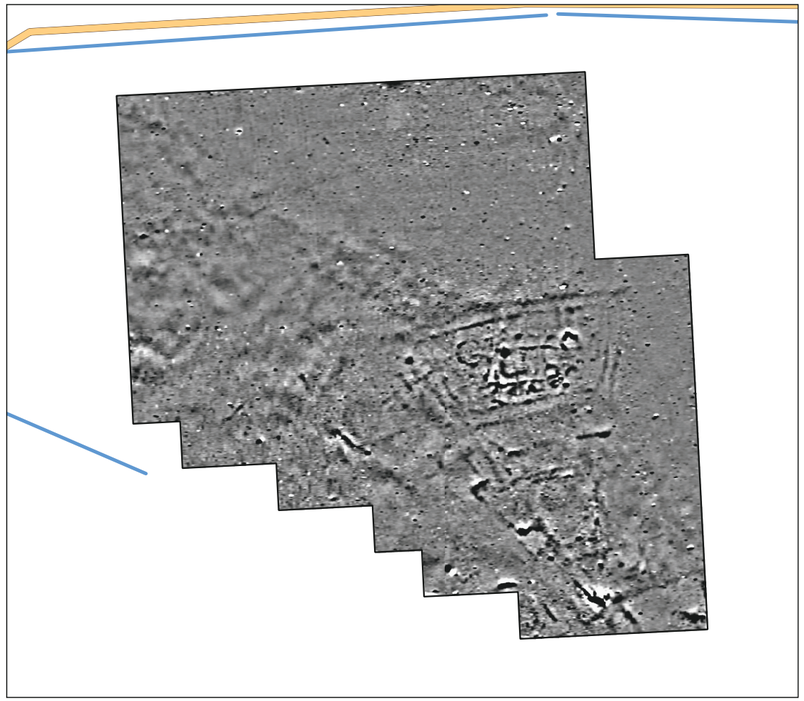
The double-bounded enclosure that is clearly visible in the magnetic data is only partially visible in the resistance survey. In the northwest area, it can be seen as two high resistance linear trends, offset on the inside of the strong magnetic responses and likely to be remnant banks. The inner of the two high resistance trends continues intermittently down the west side of the enclosure and can be seen to bend to the east at the southwest corner. The southern inner boundary is partly visible as a low resistance E-W linear, indicating a ditch. Another large low resistance trend, to the southwest of the enclosure, corresponds somewhat to the linear magnetic responses in this area.

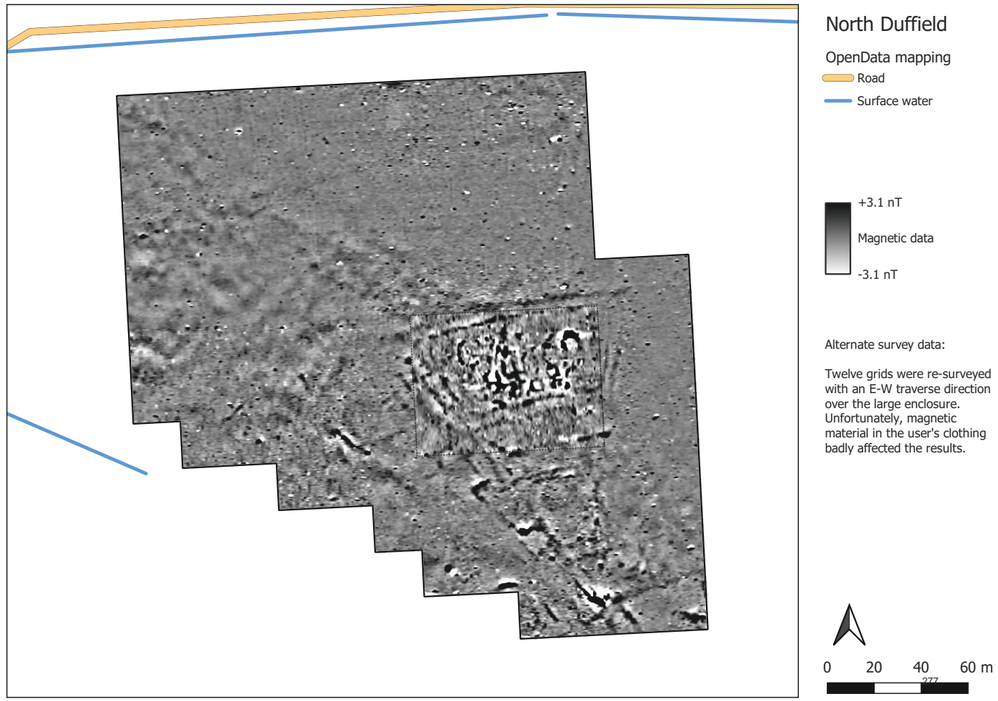
Further resistance survey in better conditions is likely to produce much more positive results.

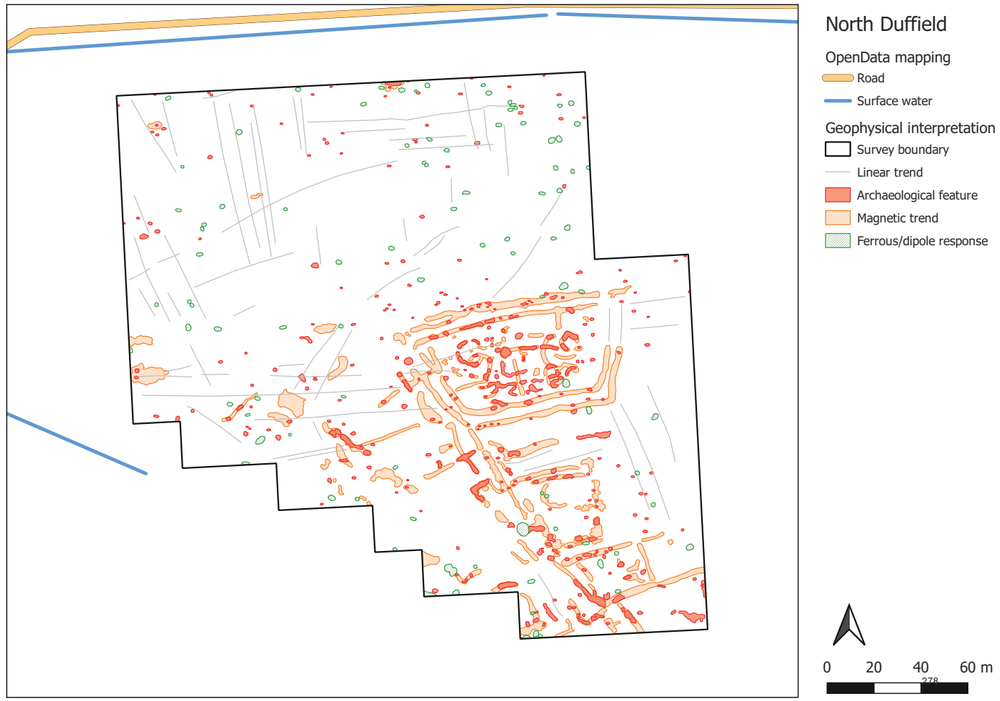
References

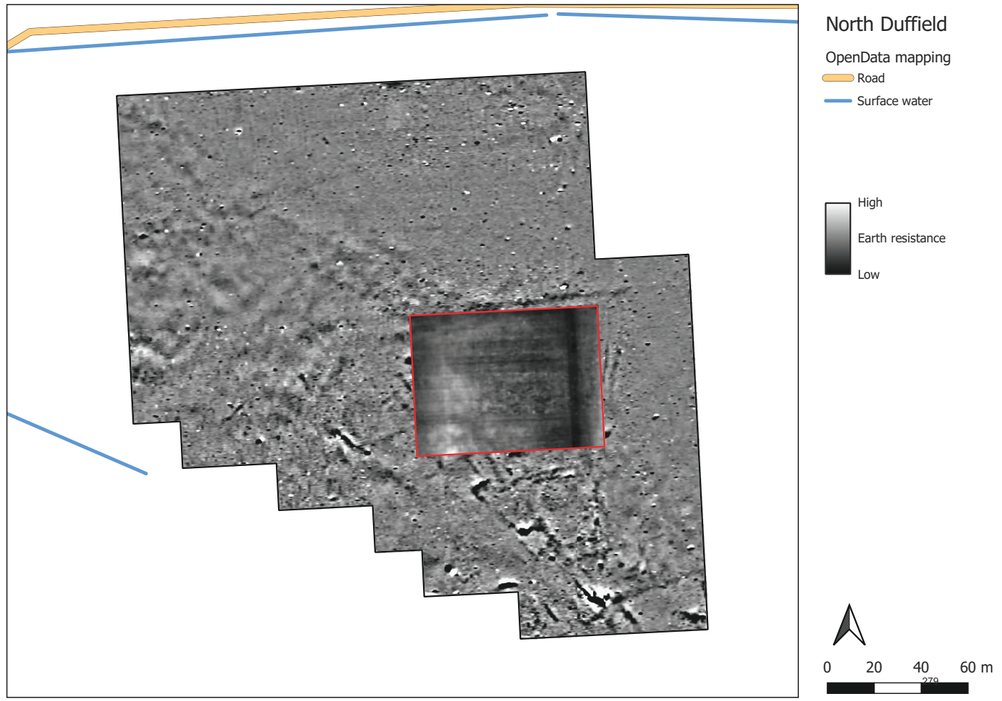
British Geological Survey (BGS) (1973). *1:50k geological map of Selby (Sheet 71)*. British Geological Survey.

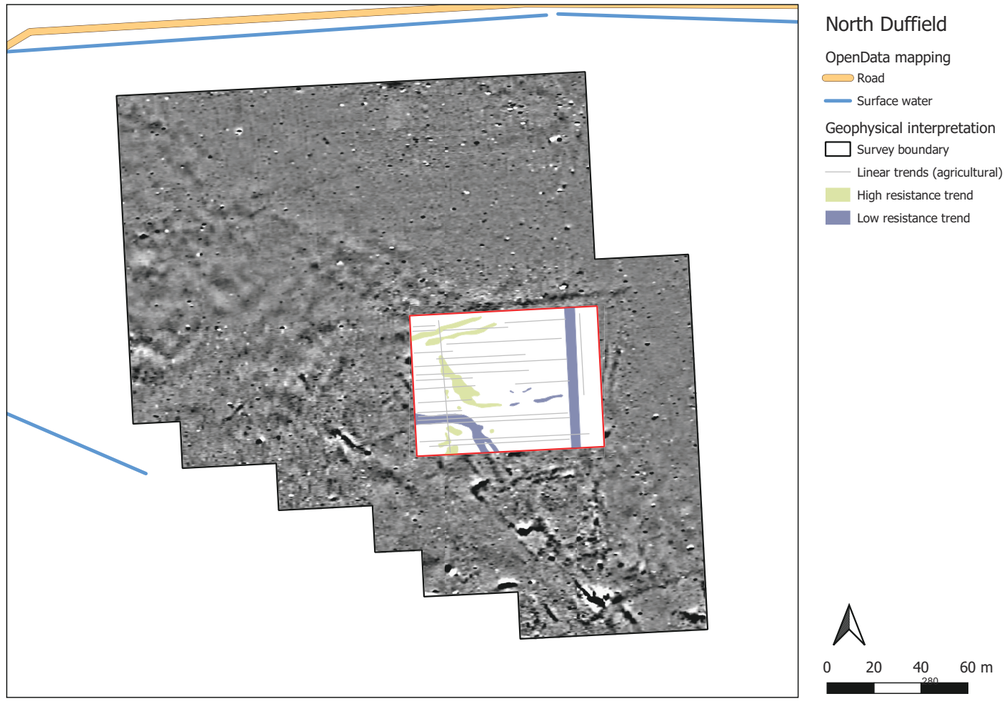
Kershaw, A (2001). *Vale of York National Mapping Programme: Project Review.* English Heritage.


North Duffield
OpenData mapping
Road
Surface water
+3.1 nT
Magnetic data
-3.1 nT
0
20
40
60 m


North Duffield
OpenData mapping
Road
Surface water
+3.1 nT
Magnetic data
-3.1 nT
Alternate survey data:
Twelve grids were re-surveyed with an E-W traverse direction over the large enclosure. Unfortunately, magnetic material in the user's clothing badly affected the results.
0
20
40
60 m


North Duffield
OpenData mapping
Road
Surface water
Geophysical interpretation
Survey boundary
Linear trend
Archaeological feature
Magnetic trend
Ferrous/dipole response
0
20
40
60 m
278


North Duffield
OpenData mapping
Road
Surface water
High
Earth resistance
Low
0
20
40
60 m
279



The Iron Age Ouse and Derwent Project

Excavations at North Duffield, 2018

Site location:	Hugh Field Lane, North Duffield YO8 5RH
Site grid reference:	SE 6826 3778
Site code:	OADP18
Date of excavation:	22 September - 6 October, 2018
HER:	North Yorkshire HER
Undertaken by:	North Duffield Conservation and Local History Society
Excavation supervisor:	Paul Durdin, Jon Kenny
Report prepared by:	Brian Elsey, Paul Durdin, Jon Kenny
Report produced:	Oct-Nov 2019
Archive deposited:	Yorkshire Museum (YORYM : 2018.160)

Summary

Six trenches were excavated at North Duffield, revealing a large number of archaeological features of late Iron Age to early Roman date. Trench 2 uncovered a portion of the interior of a large double-bounded enclosure, containing several intercutting ring-ditches that were overlaid by a series of beam slots that suggested a large rectangular building replaced the earlier prehistoric round-houses. The other trenches examined the boundary ditches and other features within the complicated landscape surrounding the main enclosure, including a separate round-house ring-ditch within Trench 1.

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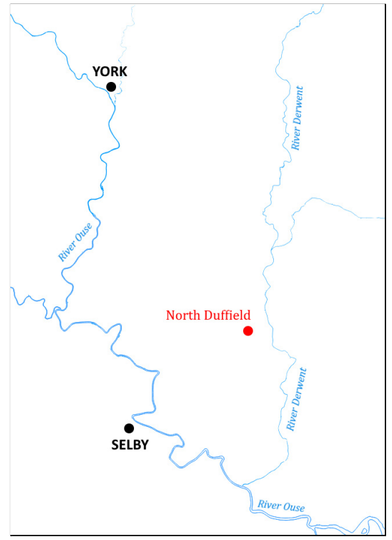
Introduction

The excavation site at North Duffield is situated off Hugh Field Lane, North Duffield, which runs along the western and northern boundaries. The field is irregular in shape and covers slightly in excess of 6 hectares, and was selected for investigation as a result of aerial photographic evidence revealing crop-marks that suggested a very large double-bounded enclosure containing a large ring-ditch. Previous excavations by the North Duffield Conservation and Local History Society, between 2012 and 2014, had revealed a similarly large ring ditch in a field some 200 metres north east of this site. The excavation site is 1.5 kilometres from the River Derwent to the east, and 5.7 kilometres to the nearest point of the River Ouse to the southwest, located within the southern Vale of York bounded by these two rivers.



Geophysical surveys were conducted prior to the excavation, using both fluxgate gradiometry and earth resistance, revealing a far more complex set of features than suggested by the crop-marks alone (Durdin 2020). Besides the main enclosure, which showed a complicated interior with multiple ring-ditches and other features, further enclosures were visible to the south alongside a large droveway running northwest-southeast. A single clear ring-ditch was visible outside the main enclosure, towards the western boundary of the present-day field.

Archaeological Preamble

The project objectives sought to build on our understanding of the archaeological landscape in our part of the Vale of York area. The large enclosure, linear features and ring ditches suggested a complex Iron Age or Romano-British settlement of the kind to be expected in the area, outlined in the desk based assessment produced for the project (Ratcliffe *et al* 2020). It also corresponds to the late Iron Age and Romano-British enclosed and complex settlements indicated to the east and west (Chadwick 2009, Halkon 2014 and Allen *et al* 2016). Our objective was to highlight the dating and changes through time at the Wheldrake site, securing the site in the chronology of settlement observed elsewhere.

The apparent enclosed settlement may be a family or clan based rural settlement, with its size and complexity suggesting residents of higher social status, in either the Iron Age or Romano-British period. It was our objective to attempt to understand the status of the site in

its appropriate point or points in time. With regard to status we would also seek to understand the activities going on at the site: were they simply an isolated farmstead engaged in subsistence agriculture, or was the settlement part of a widely populated landscape and interacting with links further afield.

Geology

The site at North Duffield is situated on Sherwood Sandstone Group bedrock, overlain by the Skipwith Sand Member. The natural geology encountered was sand, varying between white, grey and yellow, visible to a maximum excavation depth of 1.17m in cut **[1208]**. In Trench 3, a shovel pit was dug in the base of the inner enclosure ditch **[1305]**, through the natural sand, revealing a layer of peat approximately 1.5m below the current day ground surface. The topsoil was a greyish brown silty sand, varying from 0.3m to 0.4m in depth across the site.

Current use

The field in which the excavation took place is currently in use as arable land, although at the time of excavation it was pasture for grazing sheep, as the farmer delayed the return to arable use in order to allow the archaeological investigation to take place unhindered.

Methodology

The trenches were laid out on the same site grid as the geophysical survey, using a Leica total station positioned with reference to several previously identified fixed points (cf. Methodology in Durdin 2020). All the agricultural plough soil was removed by machine, after which the trenches were cleaned by hand to identify archaeological features. Excavation of features was undertaken selectively, with the priority placed on identifying stratigraphic relationships (where unclear), clarifying feature form and function, and recovering dating evidence. In most cases, only a percentage of any single feature was excavated, with the majority of the fills preserved *in situ*, both to allow future investigations and to limit post-excavation time and costs.

Finds were largely cleaned and bagged on site. A very large quantity of heat-affected stones were recovered from some features, and of these only a small number were kept as a representative sample. Due to the fact that most fills were primarily silty sands devoid of biological material, bulk soil samples were only retrieved from archaeological contexts that were either in important stratigraphic positions or had a noticeable charcoal or organic component.

Context, drawing, photo and sample registers were filled out by hand on paper and digitised following the excavation. Individual context records were completed digitally on Android tablets, in a recording system developed using Memento Database. All site records were reviewed on PC following the excavation, and the complete context data was then exported in CSV format for inclusion in the final project archive.

Trench 1

Trench 1 at North Duffield, 13.4m by 3.3m, was located over the double ditched enclosure boundary, at a point in the western side where the geophysical results suggested a possible entrance. After removal of the topsoil, faint traces of the boundary ditches were visible in the underlying material. However, this deposit turned out to be an earlier plough soil, likely post-Medieval in date, and only after this was removed were the earlier archaeological features exposed.

Phase 1 - Prehistoric / Romano-British features

Evidence of prehistoric or Romano-British activity was present in the form of two very large ditches running northwest-southeast across the trench. These features were not excavated, only recorded as exposed in plan, due in part to lack of time. However, it was also considered that in the absence of an entrance to the enclosure, there would be limited benefit gained from excavating the boundary ditches further when they had already been investigated in Trench 3.

Phase 2 - Post-Medieval agriculture

The later plough soil **1101** (equated to **1201**, **1301**, **1501** and **1601**) was found to be present, in all trenches except Trench 4. This layer had a maximum depth of 0.25m, although in places it appeared to have subsided into or filled the top of earlier features and could in such places be deeper. The deposit took the form of an orangish brown silty sand, clearly distinct from both the topsoil and the underlying earlier features and natural sands. It was presumed to be a pre-modern agricultural layer due to the absence of any 20th-21st century material that was present in the current topsoil. However, it may date from as late as the 19th century, despite the predominance of 11th-17th century pottery in the finds recovered, as a few sherds of later date were found in the deposit.

In many instances, earlier features were visible ‘through’ this layer, due to earlier material being lifted and mixed by the plough. This provides strong evidence that truncation of the prehistoric or Romano-British features started at least as early as the 19th century, and the survival of this plough soil suggests that the older features are likely not being directly affected, in this field, by current agricultural practices.

Phase 3 - 19th-20th century drains

A single 19th-20th century ceramic field drain running east-west was exposed in the eastern half of Trench 1, clearly cutting through plough soil **1101**.

Trench 2

This trench was located over the eastern centre of the larger, main enclosure, stretching south to include the southern double boundary. At 26m x 12.4m, with a small 5.9m x 1.9m extension at its southeastern corner, it was by far the largest and most complex of the trenches.

Removal of the topsoil was initiated at the northern end of the trench, where the post-Medieval plough soil that covered most of the trench was not extant. This resulted in the rest of the trench being machined to a 'false level' above this largely unremarkable layer, and only after it was removed by hand were the underlying prehistoric and Romano-British features revealed.

The earlier features were a complicated palimpsest of cut features in the form of overlapping ring-ditches, pits, and beam slots. Only limited excavation of these features was undertaken, in the form of small slots, with the priority placed on establishing the nature of the features and their stratigraphic sequence. It would perhaps be possible to divide these features into multiple phases or sub-phases, given the clear sequences of building and re-building, but the dating evidence does not provide clear and consistent enough chronology for this purpose.

Phase 1 - Prehistoric / Romano-British features

The features in this phase constitute the majority of archaeological evidence in the trench, and the pottery recovered from them was all dated from the Iron Age through to the mid-Roman period of 2nd-3rd century AD. This phase is separated into three sub-phases, categorised by the changes in the nature of the features through the stratigraphic sequence, but this phasing is necessarily somewhat arbitrary and may not truly reflect phases of occupation and use of the site.

Phase 1a - Earliest ring-ditches

Appearing most prominently in this trench was an intercutting sequence of ring-ditches. The earliest of these, representing the first sub-phase, were two very circular ring-ditches at the northern end of the trench **[1212=1290]** and **[1233=1264]**, but though there is no direct relationship between them they are unlikely to be contemporary as the smaller **[1233=1264]**, with a diameter of only 4.5m, is located entirely within the larger **[1212]**. The latter is only partially within the trench, extending out the north and east boundaries, but has an estimated external diameter of 19m based on the arc revealed. It was the largest of the ring-ditches and was the only one to appear in the original crop-mark analysis, situated centrally in the east end of the main enclosure. Corresponding with a faint but definite arcing anomaly in the magnetometry survey, the location of this ring-ditch suggested that it was an original part of the settlement, originally constructed at the same time as the enclosure ditches. Ring-ditch **[1212]** was originally narrow, with only one primary fill **1236=1291** before being recut **[1237]** wider and then silting up over time with fills **1238**, **1239** and **1211**. This suggested it was

extant and in use for a considerable period of time, and if it was the ring-ditch for a round-house implies that a certain amount of effort was taken to re-establish the ring-ditch during the lifetime of the house.

Phase 1b - Small intercutting ring-ditches

The second sub-phase is characterised by a number of small, intercutting ring-ditches, multiple of which exhibit a very ovate shape. Both the earliest ring-ditches are cut by ring-ditch **[1266=1292]**, a very indistinct ovate cut oriented northwest-southeast. The uppermost fill **1265** of this feature was a pale grey sand very close in appearance to the nearby natural sand, and the true extent of the feature was not identified until after the excavation had concluded. As such, excavation of this ring-ditch was limited to its presence in three relationship slots, and its true profile was not determined, despite being entirely contained within the trench limits.

Ring-ditch **[1266=1292]** was itself cut by a 6.3m diameter ring-ditch **[1220]**, also entirely within the trench. This ring-ditch was circular, with a v-shape profile, and truncated a linear feature **[1229]** that entered from the western side of the trench but did not extend past the ring-ditch. The form and nature of this linear **[1229]** could not be fully examined, but it's not impossible that it was part of an earlier ring-ditch, as there was an isolated terminus visible to the east that could have been the continuation. This would have been of a similar scale to ring-ditch **[1212]**, and as it must have overlapped with that ring-ditch it would have likely represented a different phase of building. However, this is speculative, and the feature may not have been a ring-ditch at all.

During post-excavation, an apparent pit **[1296]** with a pale grey fill was identified amongst the ring-ditches, cutting ring-ditches **[1220]** and **[1266]** and ditch **[1252]**, and itself truncated by ring-ditches **[1235=1254]** and **[1246=1268]**. This apparent pit, approximately 2.9m long and 1.6m wide and oriented roughly north-south, was not investigated during the course of the excavation, although its southeast corner was slightly affected during the excavation of ring-ditch **[1246=1268]**.

Likewise during post-excavation, a portion of a possible ring-ditch was identified comprising features **[1276]** and **[1277]**. This was most clear on the orthographic trench photos, but was not ascertained through excavation and it's form and stratigraphic position remain uncertain. A part of this feature, possibly a terminal end, was excavated along with one portion of ring-ditch **[1246=1268]**, which clearly truncates it. A small post or stake setting **[1287]** was seen in the base of this feature.

The clearest ring-ditch in the trench was **[1235=1254]**, an ovate feature oriented east-west and filled with a firm brownish orange silty sand **1234=1253**. It was slightly narrower at the eastern end than at the western, and there were no breaks visible in the feature; it was only truncated in two small areas by a later ditch **[1246=1268]**. Large quantities of calcite gritted pottery were recovered from fill **1253** in the western end of this ring-ditch, representing at least part of multiple vessels. By contrast, no pottery was found in the fill **1234** as excavated towards the eastern end of the feature.

Carbonised residue on a pottery sherd from fill **1253** was successfully radiocarbon dated to 2008 ±24 BP: 13 ±63 calAD (95.4% probability). This provides a definite Late Iron Age date for this fill, although the stratigraphy of the phase is obviously too complex to simplify down to a single date.

A last possible ring-ditch **[1246=1268]** was present as a semi-circular ditch just south of, and very similar in size to, ring-ditch **[1235=1254]**. The ditch terminates in the region of its truncation by beam slots **[1244=1260]** and **[1248=1250=1262]**, but if it was a full circle rather than the ovate shape of ring-ditch **[1235=1254]**, the remaining portion could be projected to lie under post-Medieval plough soil **1201** and within the area of enclosure ditch **[1222]**. No clear evidence of the ring-ditch continuing was visible in the sections of ditch **[1222]**, but if it was truncated by the enclosure ditch then that would be understandable. Calcite gritted pot was also found in fill **1245** of this ring-ditch.

No interior features were identified that could be definitely associated with any of the ring-ditches, but there were a number of possible post holes, in the northern end of the trench, which may have related to the earliest ring-ditches **[1212]** or **[1233=1264]**. Only one of these post holes **[1286]** was excavated, due to time constraints. An isolated feature **[1225]** within the arc of ring-ditch **[1212]** was also investigated, but it contained no finds, was only 0.07m deep and had irregular, very indistinct edges, making interpretation practically impossible.

The lack of interior features makes it difficult to understand the function and purpose of these ring-ditches, but the most likely explanation is that they are ring-ditches or drip gullies for small round-houses or similar structures. If this is the case, it signifies a considerable amount of building and re-building after the huge central round-house has gone out of use. However, the ovate shape that some of them have does raise questions about the construction of such a building, particularly with regard to the roof. Likewise, at least two have no sign of the gaps for doorways that might be expected. An alternative interpretation is that they are the remains of barrows, but the absence of any evidence for burials, along with the intercutting and overlapping nature of the features, makes this unlikely.

The two large enclosures ditches were present towards the southern end of the trench, oriented east-northeast to west-southwest and likely extant through at least the first and second sub-phase. The inner ditch **[1222]** was 2.27m wide and was excavated to a depth of 0.77m, with two post or stake settings **[1272]** and **[1274]** in the base. The outer ditch **[1208]** was considerably larger at 3.4m wide and 1.17m depth, and it was not excavated to its full depth. Both ditches showed a clear sequence of slumping sides and gradual filling up, with wetter, carbon-rich fills towards the base. Likewise, both contained pottery of Iron Age and Romano-British type.

Carbonised residue on a pottery sherd from fill **1258** in the inner enclosure ditch was successfully radiocarbon dated to 2096 ±29 BP: 160 ±119 calAD (95.4% probability). This provides a reliable Middle-to-Late Iron Age date, although the presence of Roman greyware sherds within the same fill suggests the earlier pottery may be residual.

Phase 1c - Beam slots

The last sub-phase is defined by a change to very regular, parallel, straight cuts running east-west across the southern half of the trench. Their consistent straight sides and flat base suggested they were beam slots, although the profile of ditch **[1244=1260]** was less convincing. The northernmost of these, ditch **[1252]**, was stratigraphically earlier than ring-ditch **[1235=1254]** and thus cannot be contemporary with those that are stratigraphically later. It also extended only 3.6 metres into the trench, not the full width of the trench. However, as it was of very similar form and runs parallel with the other three, some association with them could not be entirely discounted.

Ditches **[1244=1260]** and **[1248=1250=1262]** lie very close together, between ring-ditch **[1235=1254]** to the north and the inner enclosure ditch **[1222]** to the south. The former is slightly shallower, and had a less consistent profile than the latter, and may not have been a beam slot. Beam slot **[1248=1250=1262]** was the clearest, with a width of 0.25-0.48m and a depth of 0.28-0.37m and an extremely regular profile and flat base. Likewise, beam slot **[1205]**, lying in between the inner and outer enclosure ditches, had a very flat base and regular profile, although it was slightly larger. It was thought most likely that beam slots **[1248=1250=1262]** and **[1205]** formed two sides of a large rectangular structure, with shallower ditch **[1244=1260]** representing a drip gully or drain along the north side. This correlated well with the geophysical results that suggested a large rectilinear building over the enclosure, the beam slots here providing evidence of the southern part of the structure. However, a larger area would need to be uncovered to be able to understand this structure properly, and no dating evidence was recovered from any of the beam slots. There was similarly no remnant of wall or roofing material.

Phase 2 - Post-Medieval agriculture

The trench was mostly covered with a layer of post-Medieval plough soil **1201** to a maximum depth of 0.2m, although this material was absent in the northernmost end of the trench, corresponding to a slight rise in the underlying natural geology. For a full discussion of this material, refer to the Phase 2 description in Trench 1. In order to save time, this earlier plough soil was not entirely removed across the trench, particularly towards the south where it was felt the large enclosure ditches only needed to be exposed enough to excavate a single slot across them.

Three shallow linear scrapes **1203, 1241** and **1256**, running roughly northeast-southwest, were visible after removal of the post-Medieval plough soil. These clearly post-dated the prehistoric and Romano-British features underneath, and their parallel nature and spacing suggest they may be the remnants of Medieval furrows.

Phase 3 - 19th-20th century drains

Two ceramic field drain systems **1283** were exposed within Trench 2, both cutting through the post-Medieval plough soil and likely to date from the 19th or 20th century. Neither was

investigated beyond recording its presence, but both were partially machined away during the initial opening of the trench.

The most prominent field drains were a set of four drains running east-west at even intervals across the trench, with a single north-south drain, connecting the three more southern east-west drains, near the eastern boundary of the trench.

A second system of drains, running roughly north-northeast to south-southwest, was seen in two places. This was at a higher level than the first, not penetrating below the post-Medieval plough soil **1201** and was largely excavated with that material. Where remaining, it showed evidence of considerable disturbance and damage, likely from ploughing.

Trench 3

This trench, 9.1m by 1.5m, was positioned over the eastern side of the main enclosure to investigate the boundary. Removal of the topsoil, and following that the post-Medieval plough soil **1301**, revealed two large cut features, the double ditch that forms the boundary around the settlement.

Phase 1 - Prehistoric / Romano-British features

The inner, western ditch **[1305]** was 2.5m wide and 0.73m deep as excavated, with a number of clear distinctions in the fill suggesting multiple types of deposit. In the base of the ditch is a dark band of silty sand suggesting vegetation growth in the original ditch cut, followed by brownish white natural sand **1313** slumping down the east side. This is covered by a second band of dark grey silty sand **1312**, which covers both sides of the ditch and is also interpreted as relating to vegetation growth. These lowest fills produced no finds. However, a light grey silty sand **1311** above this produced 12 sherds of pottery, mostly calcite gritted and dated to the Roman period. Over this was dark brown silty sand **1302**, possibly sitting within a recut of the ditch, and this also produced Roman pottery, including a sherd of Samian ware. The presence of a recut was not ascertained during excavation.

The outer ditch **[1306]** was significantly larger than the inner at 3.4m wide and 0.84m deep, and the true dimensions will be larger still (see note below on under-excavation). It contained a somewhat simpler sequence of fills, with no suggestion of a recut. Darker layers **1316** and **1315** at the base again suggest vegetation growth, with a consistent mid greyish brown silty sand **1314** evidencing silting up over some length of time. The uppermost layer **1304** is a mid brownish grey silty sand with frequent orange speckling where bog iron is forming, suggesting this fill has remained very wet over time. This last is the only fill in the ditch to produce any finds, in the form of three sherds of Iron Age or Roman pottery.

These two ditches form the eastern side of the main enclosure's double boundary, and the low number of finds from the outer ditch perhaps suggests a lack of activity immediately outside the eastern side of the enclosure. Future investigation could perhaps compare this

with the ditches on the western boundary, where they adjoin a putative trackway and where more complex fills and quantity of anthropogenic material might be expected.

On later inspection of the 3D model and site photographs, it appears that both ditches were somewhat under-excavated and their true profile not ascertained. The inner ditch **[1305]** was excavated to the base but likely had some deposits still extant along the sides, whereas the outer ditch **[1306]** still had material in both base and along the sides. Slumping of the natural sand into which the ditches are cut, likely soon after their initial creation in the past, creates a misleading 'false edge' which was not identified on site. Note that the sections selected for illustration were not perpendicular to the feature: the sections along the trench baulk were selected instead as the stratigraphic details were clearer. This does not affect the interpretation of the features, but any future excavation will have to take it into account.

Phase 2 - Post-Medieval agriculture

The earlier archaeological features were covered with a layer of post-Medieval plough soil **1301=1303** of 0.25m depth. For a full discussion of this material, refer to the Phase 2 description in Trench 1.

Phase 3 - Field drains

Two probable field drains **[1307]** and **[1308]** running north-south were identified cutting through, and therefore post-dating, the post-Medieval layer **1301**. They did not intersect with either ditch, and thus were not excavated and only recorded in plan.

Trench 4

This trench, 6.3m by 3.7m, was positioned to investigate one of a series of northwest-southeast linear features visible as crop marks and in the geophysical survey results. These features were apparent for around 150m, and were interpreted as ditches bordering a trackway or droveway that adjoined the western edge of the large enclosure. Removal of the topsoil revealed the expected linear feature.

This was the only trench which did not have a layer of post-Medieval plough soil obscuring the underlying features. Why it was not present in this location is uncertain, although as seen in Trench 2 it was not always consistent across the other areas excavated.

Phase 1 - Prehistoric / Romano-British features

A single ditch **1405** was uncovered running northwest-southeast across Trench 4, correlating exactly with the linear feature seen in the geophysical survey. This ditch had a single fill **1402=1403=1406** that was largely excavated within the trench, producing several sherds of calcite gritted pottery and a single sherd of Roman colour-coated ware.

Due to this trench's use as a training area and opportunity to take part for visitors, the priority was given to obtaining dating evidence and recording the true profile of the ditch; the feature was only very roughly excavated in other places.

A second feature **1407** was partially visible in the northeast corner of the trench, but it was left unexcavated as its extent and shape in plan were not possible to ascertain.

Phase 2 - 19th-20th century drains

A single cylindrical ceramic field drain **1404**, running east-west across the trench, was exposed but left unexcavated. It clearly truncates ditch **1405** and as it appears machine-made most likely dates from the 19th or early 20th century.

Trench 5

Trench 5, 7.3m by 1.6m, was located over the northern boundary of what appeared to be a double-ditched enclosure just to the south of the larger main enclosure investigated in Trenches 1, 2 and 3. This second, smaller enclosure was visible in the geophysical survey and appeared to abut, to its west, the same trackway as the larger enclosure. It measured around 33m north-south and 27m east-west in the geophysics, although the boundary is not clearly defined for its entire length.

Removal of the topsoil revealed the expected ditches as broad parallel bands of darker fills, although as with other trenches they were obscured by a layer of post-Medieval plough soil.

Phase 1 - Prehistoric / Romano-British features

Two large ditches **[1527]** and **[1533]** extended across the trench, running roughly northeast-southwest, with a much smaller third ditch **[1524]** running parallel between them. The larger features correspond to the double-ditch boundary of the southern enclosure seen on the geophysical survey.

The northern, outer ditch **[1527]** was considerably larger at 2.1m wide than the inner, with evidence for a recut **[1522]** after partially silting up during its use. It was interpreted as truncating a smaller feature **[1505]**, possibly a ditch, in the northern end of the trench, but the relationship was not completely clear due to later disturbance by a field drain. Feature **[1505]** extended out of the trench and its form or purpose was never fully determined, and as there were no finds within it can not be firmly dated. The inner enclosure ditch **[1533]** was only 1.66m wide, and may also have been recut, but the latter point is unclear due to the poor clarity of horizon between fills. There were many lenses of natural sand within the fills of both ditches, along with evidence of vegetation growth, slumping of ditches sides and bioturbation by both roots and animals. While there were no finds from the northern, outer ditch, the inner ditch produced two small sherds of calcite gritted pottery that were typologically dated to the Late Iron Age.

These two ditches clearly form part of the boundary of the southern enclosure, and likely correspond to the parallel ditches seen in Trench 6 despite the difference in size. Unfortunately, the purpose of this enclosure remains unknown, but future investigation of the interior may provide an answer to that question.

Ditch **[1524]**, in between the two enclosure ditches, was only identified after partial excavation, as the fill **1525** merged in plan with the uppermost fill of ditch **[1527]**. However, three sherds of calcite gritted pottery were also recovered from this feature. Due to the small area excavated, it is not clear if this feature represents a third enclosure ditch or an entirely separate feature, as no direct stratigraphic relationship with the ditches was seen and it does not appear on the geophysical survey.

As with the enclosure ditches in Trench 3, it was later concluded that ditches **[1527]** and **[1533]** had not been fully excavated, with some fill remaining on the sides and in the base. This is due to the appearance of natural sands within the ditch fills, caused by slumping of the sides while the ditch was in use, concealing the true boundary of the features. However, this issue does not affect the broader interpretation of the features.

Phase 2 - Post-Medieval agriculture

The earlier archaeological features were covered with a layer of post-Medieval plough soil **1501** of 0.2m depth, which had partially filled, or subsided into, the top of the ditches. For a full discussion of this material, refer to the Phase 2 description in Trench 1. This material was removed by hand to expose the underlying features.

Phase 3 - 19th-20th century drains

A single 19th-20th century ceramic field drain **1507**, running east-west across the northern half of the trench, partially obscured the relationship between ditch **[1527]** and feature **[1505]**. The drain pipe was exposed but left in place.

Trench 6

This trench, 12.6m by 3.1m, was positioned across what appeared, in the geophysical survey, to be two large pit features towards the southern end of the south enclosure. It was hoped that excavating these might help elucidate the purpose of this enclosure. However, after removal of both the topsoil and the requisite post-Medieval plough soil, two clear roughly northeast-southwest linear features were revealed, rather than any pits: the southern boundary ditches of the enclosure, running parallel to those in Trench 5. Two other features were also identified by the southern edge of the trench, meeting the southern of the two ditches.

Phase 1 - Prehistoric / Romano-British features

The earliest features in Trench 6 were the two apparent linear features **[1609]** and **[1613]** entering from the southern baulk and both truncated by the southern, outer enclosure ditch. Neither of these features produced any finds, and as their visible extent was minimal no firm interpretation was possible. Their stratigraphic position is, however, good evidence of activity on site prior to the enclosure being created.

The inner and outer enclosure ditches were very similar in size and shape, and this, along with the exactly parallel course, is good evidence for their contemporaneity. Only four body sherds of calcite gritted pottery were recovered from the two features, all from within a small area of the outer ditch. These were dated to the Iron Age, but in the absence of any characteristic rim sherds, this leaves a very wide date range which may well extend into the Roman period. The geophysical evidence does, however, suggest that this enclosure was at least contemporary with the larger enclosure to the north, and this may provide a more useful chronological context.

A bulk soil sample from the inner enclosure ditch was sent for flotation but produced only a small number of minute charcoal fragments, largely unidentifiable.

Phase 2 - Post-Medieval agriculture

The earlier archaeological features were covered with a layer of post-Medieval plough soil **1601** of 0.25m depth. For a full discussion of this material, refer to the Phase 2 description in Trench 1.

Phase 3 - Field drain

A narrow, straight linear feature running north-south across the western half of the trench was identified as a probable field drain due to its regularity and mixed fill. It cut through and definitely post-dated the post-Medieval plough soil **1601**, and was thus not excavated and only recorded in plan.

Discussion

The excavations at North Duffield revealed a well-organised settlement of late prehistoric to early Roman date. Crop-mark evidence and geophysical survey results had already presented a very clear picture of the settlement layout, which was formed of large enclosures adjoining the east side of a northwest-southeast trackway or droveway. The huge double-bounded enclosure on the site, investigated in Trenches 1 to 3, contained a sequence of buildings and features whose stratigraphic depth and complexity represents a long duration of occupation. Likewise, the great size of the enclosure may indicate that the inhabitants were relatively wealthy or held a position of some status in the locality.

The second double-bounded enclosure to the south, of much smaller size, received limited attention with the sole aim of obtaining dating evidence. Trenches 5 and 6 were located over the boundary ditches of this enclosure, and the pottery recovered suggests it was roughly contemporary with the larger enclosure investigated to the north. Geophysical survey suggests there may be a ring-ditch within this southern enclosure, but further investigation will be necessary to properly ascertain its purpose.

Both enclosures adjoin a trackway or droveway that runs northwest-southeast, bounded by linear ditches. One such ditch was excavated in Trench 4, and the few pottery finds recovered dated from later in the Iron Age or into the Roman period. However, this ditch may well have represented a re-establishment of the trackway boundary, as the geophysical survey shows multiple ditches along the alignment of the trackway, suggesting there may be more than one phase to the feature.

A noticeable number of sherds of Medieval pottery were recovered from the buried plough soil layer and the present topsoil, but there were no extant features to suggest anything other than agricultural use of the site after the Roman period. It therefore seems likely that the pottery originated in night soil or similar waste from the nearby Medieval village of North Duffield. It's worth noting that the prehistoric and Roman features were all subject to truncation at the level of the buried plough soil, and were largely undisturbed by modern cultivation, implying that Medieval or post-Medieval agricultural processes on the site were significantly destructive.

While there were no coins found during the excavation, the significant number of later Roman wheel-turned vessels amongst the pottery assemblage indicates that there was at least regular interaction with Roman trade networks. There is also strong indication for iron smelting taking place on site, evidenced by large quantities of smelting slag and similar waste recovered, chiefly, from the enclosure ditches. A concentration of this material appears in Trench 6, which may suggest a function for the southern enclosure, but smelting waste was recovered from all trenches.

The extremely poor preservation conditions make analysis of the animal bone assemblage limited to ascertaining the presence of cattle, sheep or goats, and pigs at the site, with no deeper interpretation possible. Similarly, the biological evidence recovered from the environmental samples was minimal, providing no information on agriculture.

Dating of the settlement at North Duffield is fairly convincing, although further samples from across the site would provide a more definite chronology. The radiocarbon dates obtained from pottery residues in the main enclosure (see Figure 1) suggest that the settlement was first established in the Late Iron Age, or perhaps very late in the Middle Iron Age, and was occupied at least into the early Roman period. This corresponds well to much of the pottery dating, although the latter is less definite due to the continual use of calcite gritted wares from the early Iron Age right through to the late Roman period. However, some of the pottery indicates that use of the main enclosure continued well into the 3rd or 4th century AD, and such a long period of occupation is consistent with the many overlapping ring-ditches encountered in Trench 2. The rectangular beam slot structure encountered very high in the

pre-Medieval sequence is perhaps also suggestive of a more Romanised population than the earlier round-houses.

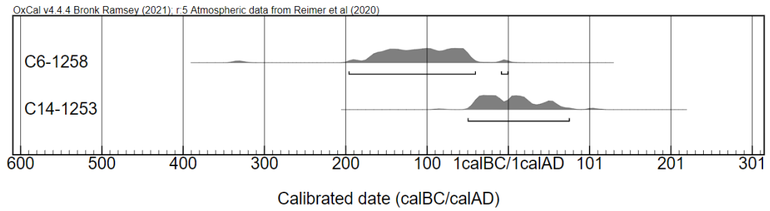


Figure 1. Radiocarbon dates from North Duffield.

No absolute dates were obtained for the southern enclosure or the trackway, but the morphology of the features, the spatial relationships, and the pottery recovered suggest that they were at least partially contemporary with the main enclosure. Further work would be necessary to determine if there is any closer relationship between these elements of the settlement.

In conclusion, the settlement at North Duffield appears to have been originally established late in the Middle Iron Age, with occupation continuing through until quite late in the Roman period. The main enclosure first contained at least one very large central round-house, but over time saw many smaller buildings constructed and reconstructed, leaving the palimpsest of ring-ditches uncovered in Trench 2. Towards the end of its occupation a sizeable rectangular building with beam slot foundations replaced the earlier round-houses, potentially indicating a more 'Romanised' population. There is little direct material evidence of agriculture, but this may be due to the extremely poor preservation conditions; the field boundaries and trackways visible in crop-mark evidence suggest the settlement was closely integrated with a well-organised agricultural system that covered much of the surrounding area.

There is considerable potential for future investigation of this settlement at North Duffield. More extensive earth resistance survey, in better conditions, might help to clarify the complex linear features that run northwest-southeast through the field. Less than 10% of the main enclosure was uncovered, and within that area only a small portion of any feature was excavated, so there is enormous potential for further understanding to be gained from excavation. Uncovering other parts of the enclosure may help to clarify the chronology of the settlement, particularly the earliest origins and the last period of occupation. Likewise, further excavations of the boundaries, ring-ditches and other features external to the main double-bounded enclosure would provide a more complete understanding of the broader settlement patterns across the field. In such a case, an emphasis should be placed on the interior of the southern enclosure, along with comprehensive dating in order to establish the chronology of the features and thus the development of the settlement over time. There is also an extensive spread of crop-mark evidence over the surrounding fields, including other ring-ditches and enclosures, and more work is still needed to fully understand how this

landscape fits within the context of the transition to 'Roman' Britain. Similarly, there is no doubt that the nearby River Derwent would have been of great importance to the inhabitants of this site, but how they interacted with and made use of it remains largely unknown.

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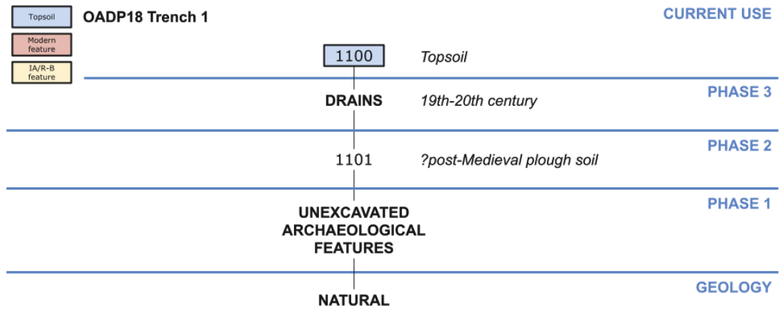
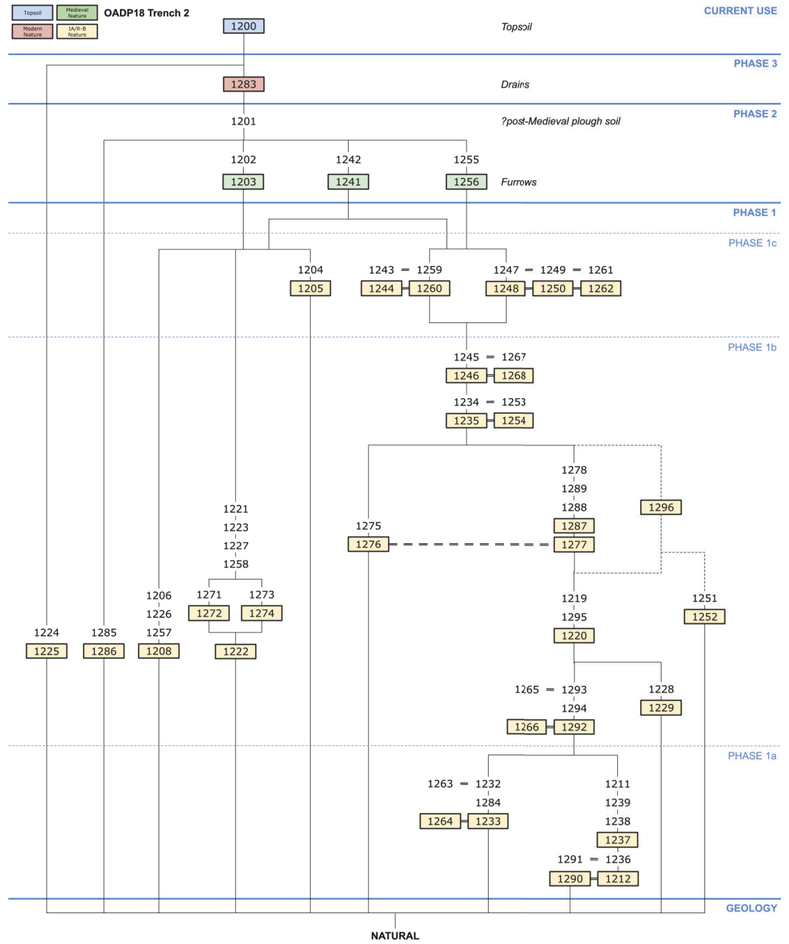
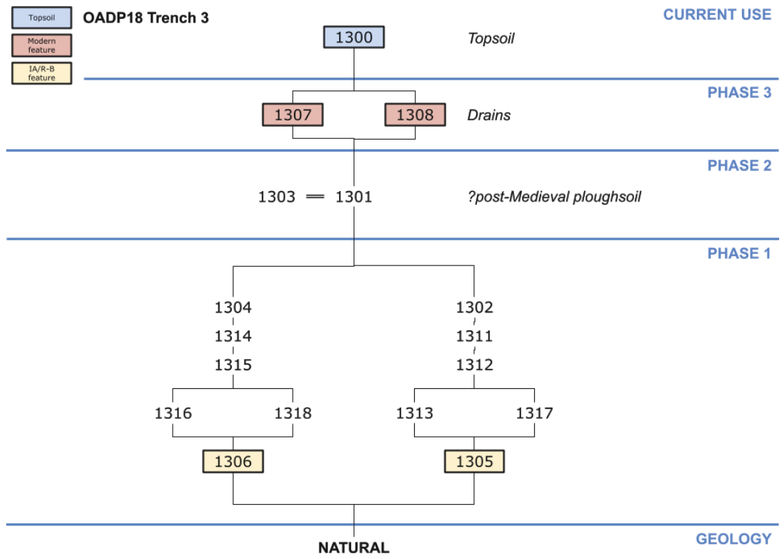
Appendix 1: Trench Matrices



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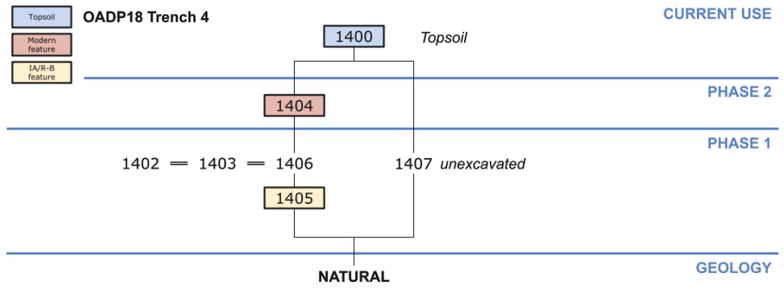
Modern feature
IA/R-B feature
OADP18 Trench 3
CURRENT USE
1300
Topsoil
PHASE 3
1307
1308
Drains
PHASE 2
1303 = 1301
?post-Medieval ploughsoil
PHASE 1
1304
1314
1315
1316
1318
1302
1311
1312
1313
1317
1306
1305
NATURAL
GEOLOGY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Modern feature
IA/R-B feature
OADP18 Trench 4
CURRENT USE
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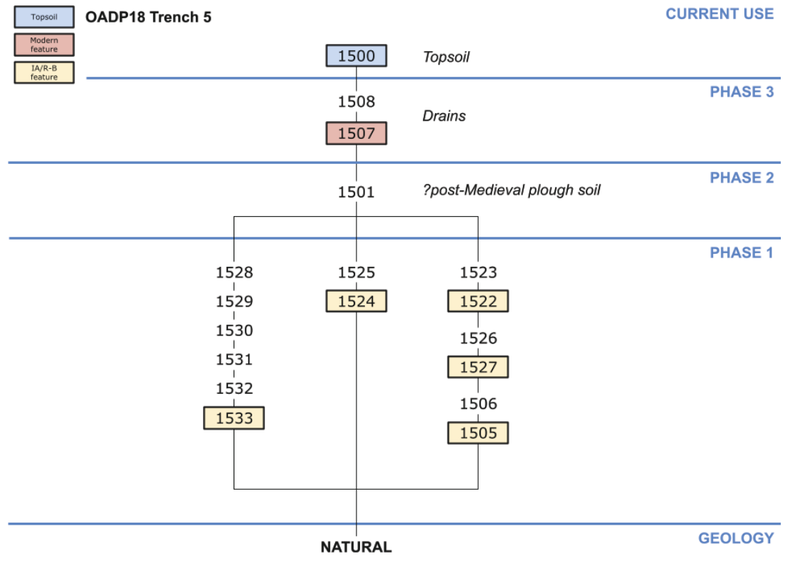
Topsoil
PHASE 2
1404
PHASE 1
1402 = 1403 = 1406
1407 unexcavated
1405
NATURAL
GEOLOGY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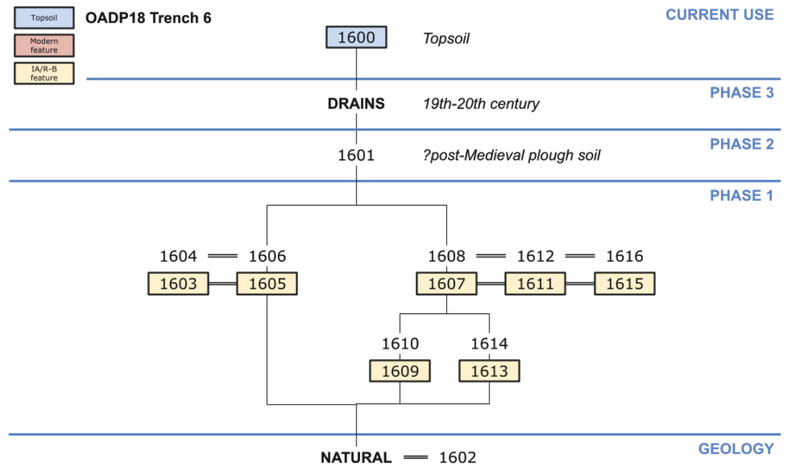
Modern feature
IA/R-B feature
OADP18 Trench 5
CURRENT USE
1500
Topsoil
PHASE 3
1508
1507
Drains
PHASE 2
1501
?post-Medieval plough soil
PHASE 1
1528
1529
1530
1531
1532
1533
1525
1524
1523
1522
1526
1527
1506
1505
NATURAL
GEOLOGY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Modern feature
IA/R-B feature
OADP18 Trench 6
CURRENT USE
1600
Topsoil
PHASE 3
DRAINS
19th-20th century
PHASE 2
1601
?post-Medieval plough soil
PHASE 1
1604 = 1606
1603
1605
1608 = 1612 = 1616
1607
1611
1615
1610
1614
1609
1613
NATURAL = 1602
GEOLOGY

North Duffield 2018 (OADP18): Excavation: ceramics report

Tony Austin (University of York retired) & Elizabeth Austin (formerly Jelley) February 2019 (final)

A total of 688 ceramic items recovered during the above excavations. 665 were identified as pottery. A further 23 classed as 'other ceramics'. Items were examined visually including a magnifier where necessary. SF or Small Finds numbers reference an associated database; OADP18_exc_ceramics_final.accdb.

Pottery by fabric

A: Calcite Gritted ware (also known Calcite Tempered ware (CTW))

(**sherd count 406 (1000)** SF 34, **(1100)** SF 35, **(1101)** SF 1 SF 2 SF 36, **(1200)** SF 37, **(1201.)** SF 3 SF 4 SF 5 SF 6 SF 7 SF 8 SF 38, **(1206)** SF 9 SF 39, **(1207)** SF 40, **(1211)** SF 32 SF 41 SF 42, **(1219)** SF 43 SF 44, **(1221)** SF 10 SF 11 SF 45, **(1223)** SF 12 SF 13 SF 14 SF15 SF 16 SF 46, **(1226)** SF 17 SF 71 SF 72, **(1227)** SF 18 SF 47, **(1232)** SF 48, **(1240)** SF 49, **(1243)** SF 50, **(1245)** SF 51, **(1249)** SF 52, **(1253)** SF 19 SF 20 SF 21 SF 22 SF 23 SF 24 SF 25 SF 53, **(1257)** SF 26 SF 54, **(1258)** SF 27 SF 28 SF 29 SF 30 SF 31 SF 55, **(1265)** SF 56), **(1300)** SF 57, **(1301)** SF 58, **(1302)** SF 59, **(1304)** SF 60, **(1311)** SF 61,**(1402)** SF 33 SF 62, **(1403)** SF 63, **(1406)** SF 64, **(1503)** SF 65, **(1525)** SF 66, **(1528)** SF 67, **(1600)** SF 68, (**1601)** SF 69, **(1616)** SF 70)

The Calcite Gritted ware industry had a long history from the Late Bronze Age (LBA) through to the ending of Roman Britain and probably beyond. Fortunately it changes through time in terms of fabric, form and firing which allows it to be visually dated to some degree. The material grouped here is 'classic' Calcite Gritted ware largely being tempered with calcite grit. There are variants which include the addition of slag, other grits and pea gravel (at Burdale on the Wolds – Austin & Jelley, 2012) as a significant component of the fabric.

> Slag: A few sherds at Hemingbrough (OADP17) were noted as containing slag and treated as a separate fabric (Austin, 2018). Similarly a few sherds are present in the assemblage under consideration here. On reflection these are probably not significant (possibly accidental) and have not been treated as a separate grouping.

> Other Grits: This variant was first noted at Hemingbrough (OADP17) where it dominated the assemblage. Calcite Gritted ware (OG) contains calcite but is heavily gritted with other mineral grits probably of glacial or/and fluvial derivation. Whilst it does not dominate the assemblage here it is present in small amounts and appears below as fabric C

Early sherds of Calcite Gritted ware were soft fired (and hence fragile today) and containing voids where the calcite has leached out. The voids are often angular but these can become sub-rounded as the sherds are abraded over time. As noted previously for excavations at North Duffield (ND12-14) , on the South Eastern boundary of the County of North Yorkshire. The sherds are

> "hand thrown sherds here are soft; almost biscuit like, and irregularly fired with surfaces red to brown and cores tending to black representing incomplete oxidation of organic material in the clay matrix; these all products of open or bonfire firing" (*ibid*, 2015, 131).

Dating: chronologically;

Rims from bucket or barrel shaped vessels Middle Iron Age (MIA)

These are generally dated to the MIA (Gibson, 2002, 129; Halkon, 2013, 109-11). A large, 20 m diameter, roundhouse excavated at North Duffield by AND between 2012-4 (ND12-14) was dated as MIA (Austin 2015). This was subsequently confirmed by radiocarbon dating of charcoal recovered from ring ditch fill which gave a date of 2188 ± 29 BP (Before Present; a reference point of 1950) which equates to 238 BC ± 29 (Elsey, 2015, 97-8). At OADP18 a rim (1223) SF 14 appears barrel shaped in being in-turned. 4 very abraded and fragile body sherds (1211) SF 42 may date to this period also. It should be noted that this material is residual in later contexts.

Slightly out-turned rims (transitional activity spanning late MIA to early LIA?)

Approaching the Late Iron Age (LIA) and probably into it rims became slightly out-turned. At Hemingbrough (OADP17) these were suggested as "early within the Late Iron Age". The subsequent luminescence dating of pottery sherds from the fill (2514) of a ring ditch terminal in trench 5 yielded a date of "170 ± 120 BC" (Cresswell & Sanderson, 2018). This centres on late within the MIA but its margin of probability ± 120 suggest slightly out-turned rims could represent transitional activity spanning late MIA to early LIA. It should be noted that the sherds tested are residual with (2514) the context being dated by the presence of Knapton rims of 2nd – 3rd century AD. Thus the ring ditch is Roman and not as Cresswell & Sanderson suggest. Two slightly out-turned rims are present in the OADP18 assemblage (1211) SF 32, (1258) SF 29 but both are residual in later contexts.

Increasingly out-turned rims (LIA/ earlier Roman)

During the LIA and earlier Roman period (on rural sites effectively native or Romano-British activity continuing) rims become increasingly out-turned. Vessels become increasingly robust through better manufacturing techniques. This variation is visible in a number of rims found at OADP18. Earlier examples are (1201) SF 6 SF 3, (1221) SF 11, (1223) SF 12 SF 15 SF 16, (1257) SF 26, (1258) SF 27 SF 28, (1311) SF 110, (1402) SF 33. Unfortunately all the sherds are residual and can't help with dating. The process of increasingly out-turned curving rims continues until the ending of Roman Britain. If present later examples will be considered below.

Knapton rims (middle Roman)

A useful horizon is the appearance of Knapton jars/cooking pots. These are hard fired and have a very distinctive "rectangular outbent rim". They have been dated from late 1st - early 4th centuries but more recent thinking suggests 2nd century - end of 3rd century (Swan, 1988, 36 & figure XVI.230); anyway definitely Roman. Knapton rims noted in the OADP18 assemblage are (1201) SF 7, (1253) SF 20 SF 21 SF 22 SF 23 SF 24 SF 25 SF 111. Three of these have partial profiles but are almost certainly Knapton. Two others have characteristics of Knapton rims but are not classic in form (1201) SF 8, (1258) SF31. A large amount of body and base sherds are associated with these. A similar horizon was present at OADP17 (Hemingbrough) but this was in Calcite Gritted ware (OG). This may suggest the Knapton material dates differently between these sites as it was produced over quite a long period.

Mass production (Late Roman)

By the mid 3rd century Calcite Gritted wares along with East Yorkshire Greyware and Crambeck wares are being mass produced to supply Roman markets in the North and beyond. Native or Romano British pottery production traditions have fully transformed into producing quality mostly wheel-thrown and hard fired vessels. A single sherd (1201) SF 4 has a later Roman beaded rim.

Huntcliffe ware (towards the end of Roman Britain)

The series culminates with the lid seating and hooked rims of Huntcliffe ware (*ibid* 36 & figure XVI.231) although none of was identified at OADP18

B: East Yorks Greyware

(sherd count 41 (1000) SF 73 SF 74, **(1101)** SF 75 SF 83, **(1200)** SF 84, **(1201)** SF 76 SF 85, **(1206)** SF 77, **(1207)** SF 86, **(1221)** SF 87, **(1223)** SF 78 SF 88, **(1257)** SF 79 SF 80 SF 81, **(1258)** SF 82 SF 89)

"This ware has a hard, slightly abrasive, wheel-thrown fabric that generally has a light to medium grey core and surfaces with the latter sometimes decorated with burnished lines. The clay contains sand which includes quartz (0.1-0.2mm) and grits such as iron ore. It has an expanded production from the mid 3rd century with kiln sites including Norton and Holme-on-Spalding Moor (Corder, 1934; Hayes, 1988: Swan, 1988, 34 & pl xvi: Tomber & Dore, 1998, 158). This ware reaches its peak in the 3rd – 4th century" (Austin, 2012).

At OADP18 (North Duffield) the sherds belonging to the mass-produced phase of this ware (although see Fabric G below) notably include

SF 79 "Loop handle" or lug from a storage jar (Corder, 1934, 28 & Fig. 14 no.72). Corder notes that handles from Throlam are applied (i.e. our example) whereas at Crambeck they are "counter sunk"

SF 81. 4 body sherds decorated with burnished lines forming a lattice work. An example from the fortress at York is recorded by Monaghan (1993, 799 catalogue no. 3062 and Fig. 300) which has a suggested date of the early 3rd century. This is imitating Black Burnished wares (e.g. Swan, 1988, Fig. VIII)

Fig. 1 burnished sherd

At OADP17 (Hemingbrough) sherds, whilst recognisably in the Greyware tradition, largely pre-dated this mass-production phase (Austin, 2017).

The significant assemblage at OADP18 (North Duffield) of East Yorks Greyware confirms continuing Roman activity.

Dating: The mass production of Roman grey wares is generally accepted as fully active from the mid 3rd century and continuing into the late 4th century even very early 5th century in some cases. The presence of small amounts of Crambeck wares (see Fabric F below) confirm very late Roman activity.

C: Calcite Gritted ware (OG)

(sherd count 40 (1000) SF 98, **(1100)** SF 99, **(1101)** SF 90 SF 100, **(1200)** SF 101, **(1201)** SF 91 SF 102, **(1223)** SF 103, **(1245)** SF 104, **(1253)** SF 92 SF 93 SF 94 SF 105 SF 106 SF 107, **(1278)** SF 95, **(1311)** SF 96 SF 97 SF 108, (1400) SF 109)

Contains calcite but is heavily gritted with other mineral grits (up to 5mm).It is well fired and quite robust. It is clearly within the calcite gritted tradition with visible calcite. A similar 'other grits' OG fabric was recently identified at OADP17 (Hemingbrough) where it dominated the overall excavation assemblage (*ibid*).

From an admittedly small assemblage sherd counts at HMF18 (Wheldrake) show equal amounts of OG ware and Calcite Gritted ware but together they completely dominate the assemblage. A further difference is that the 'other grits' at OADP17 (Hemingbrough) were largely rounded while at Wheldrake they are much more angular which implies a different source. This may just represent localised availability.

The sherds from OADP18 (North Duffield) contained mostly rounded grits similar to Hemingbrough. Classic Calcite Gritted ware (Fabric A above) totally dominates the OADP18 assemblage with OG ware a relatively minor component. Unlike Hemingbrough Knapton rims are in the classic Calcite Gritted ware fabric (A above). The OG rims from OADP18 are confusing. Three (SF 92 SF 93 SF 95) represent vessels with near vertical or very slightly in-turned rims seem unlikely to to be MIA as despite being crude are well fired like all the OG sherds here. They may be in a 'retro' style or they may indicate a different form such as bowls. Bowls are a Roman form (i.e. Samian). Two (SF 92 SF 93) are in a securely Roman context (1253) which contains Knapton rims in Fabric A (above). Two other rims (SF 91 SFSF 97) exhibit Roman forms.

Dating: At Hemingbrough most of the 'other grits' fabric was dated to the earlier Roman period on the basis of the presence of Knapton type rims and the lack of mass-produced 'grey wares' that starts in the earlier 3rd century (*ibid*, 2018). A single, substantial rim sherd at Wheldrake ((3303) SF 42), while not Knapton type ware, has a significant out-turn curving to a beaded or rounded rim top clearly falls into Roman period manufacture. Again this is probably 2nd - earlier 3rd century.. The material from OADP18 seems to largely align with the above dating so 2nd century - end of 3rd century.

D: Samian ware

(sherd count 7 (1000) SF 112, **(1101)** SF 113, **(1201)** SF 114, **(1206)** SF 115, **(1259)** SF 116, **(1302)** SF 117)

"*Samian pottery (terra sigillata) describes a type of good quality, mass-produced table ware with a fine red glossy slip and, normally, red fabric which was produced at a number of centres in the Roman Empire between the time of Augustus and the mid 3rd century AD*" (Willis, 2005, 1.1). Samian usage tends to be a military and urban phenomenon. However, isolated sherds are often found on rural sites such as OADP18. As Willis (ibid, 7.2.7) notes "*...while present in meagre proportions, it is nonetheless virtually universally present at rural sites*". However, the presence of other Roman wares at OADP18 suggests the sherds here have more significance.

Samian varies over time in terms of colour, fabric, form, decoration and place of manufacture. Undecorated Samian was widespread (Bédoyère, 2000, 20-1) (although plain panels on decorated vessels can mislead).None of the Samian sherds from OAPD18 are decorated as richly as, for example, a single late 1st century sherd from OADP17 (Austin, 2017) but three have some form of decoration. In terms of fabric and colour a number of the sherds appear to have been manufactured in the Central Gaulish region. Looking by context

(1000) Rim sherd (SF 112); surface find by metal detectorists (in Grid B1). The rim's profile suggests a Dragendorff Dr. 27 plain drinking cup Rim diameter approx 10cms.

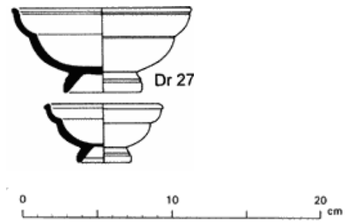

Fig. 2 Dr. 27 drinking cup (copyright http://potsherd.net/atlas/potsherd)

A suggested date range for this form is AD50-150.This sherd is in pristine condition despite being a surface find. It can only suggest undisturbed early Roman activity nearby.

(1101) A body sherd (SF 113) looks like the flange from a Dr. 38 bowl. A suggested date range for this form is AD 140-230. The sherd is burnt and heavily abraded masking further examination of the fabric but likely to be Central Gaulish

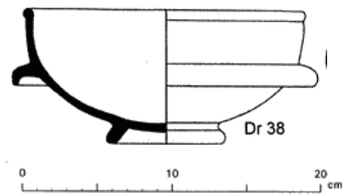

Fig. 3 Dr. 38 bowl (copyright http://potsherd.net/atlas/potsherd)

(1201) A rim sherd everted immediately to a rounded top. Diameter of c. 200mm suggests a dish or a bowl. It could represent one of several forms including Dr. 38 (above). It shares a sub-fabric with (1206), (1259) and (1302). Probably Central Gaulish.

(1206) An abraded rim sherd beaded on outer surface. Diameter of c. 200mm suggests a dish or a bowl. It has two delicately inscribed, parallel lines just below the top of the rim (may be an accident of manufacture?). It shares a sub-fabric with (1201), (1259) and (1302). Probably Central Gaulish.

(1259) Small abrabed body sherd. It shares a sub-fabric with (1201), (1206) and (1302). Probably Central Gaulish.

(1302) Two small, very abraded body sherds have moulded decoration; possibly figures but hard to be certain. They share a sub-fabric with (1201), (1206) and (1359). Probably Central Gaulish.

Dating: Central Gaulish wares are generally dated to 2nd century. The recognisable vessel forms fit with this. It should be noted that the sherds above are residual in later contexts.

E: Eboracum (or Ebor) ware

(sherd count 6 (1101) SF 118, **(1201)** SF 119, **(1223)** SF 121 SF 123, **(1226)** SF 120, **(1249)** SF 122)

This fabric is amply described by Tomber & Dore (1998, 199-200 & plate 166) . Characteristics include “orange”, “Irregular fracture and a rough feel”, “well fired and hard”. Inclusions to *c* 1.0mm include “Rounded quartz - sometimes polycrystalline” and “black and red-brown iron-rich fragments”. A number of forms were produced including flagons, beakers, jars, bowls, dishes, platters, tazze and mortaria. All were produced in the same fabric but with different surface finishes; plain, burnished, slipped and white slipped.

This fabric was formerly known by the generic term of Legionary ware until renamed by Perrin in 1981. Legionary ware is found at Legionary fortresses (and increasingly recognised at smaller sites) throughout much of the Roman Empire. It was produced at legionary kiln sites; one of the best known being Holt near Wrexham which produced pottery and tile for the fortress of Deva at Chester (Grimes, 1930). In York kilns existed beside the fortress and at Apple Tree Farm in Heworth (Swan, V. 2004, 267). For a discussion of the development of Legionary ware (ibid 259-84).The sherds from OADP18 are largely small, abraded body sherds without obvious surface treatment. However, one is substantial..

Fig. 4 Eboracum (Ebor) ware mortarium

SF 123 A mortarium or mixing bowl including the spout and worn trituration grits in the interior of the vessel. The rim profile is early perhaps late 1st to earlier 2nd

century. Later rims tend towards a ‘hammer head’ profile (see, for example, Laing, 2014, 63-5). Rim diameter c 250mm

Dating: late 1st – early 3rd centuries. For the mortarium late 1st to earlier 2nd century as noted above

F: Crambeck Reduced ware

(sherd count 3 (1101) SF 125, **(1207)** SF 124, **(1400)** SF 126)

Described by Tomber & Dore (1998, 196-7 & plate 165) as having a distinctive contrast between its surfaces and the sherd core. The latter is very pale “sometimes slightly green-grey to more or less white” while surfaces are bordering on “dark grey”. The fabric is “hard with a smooth fracture and a rough/powdery feel”. The surfaces show wiping marks and are sometimes burnished externally”. Inclusions include abundant fine quartz set in a “sparsely micaceous (silver) matrix. Other inclusions can include “red or black iron rich grains, up to 0.5mm”, “clay pellets up to 1.0mm” and “fine limestone fragments”. Forms include bowls and dishes, jugs and flagons but not mortaria.

Fig. 5 Crambeck Reduced ware jug

SF 124 A substantial sherd in this fabric was recovered with rim and upper profile and the stub of an attached handle. Approximately 35% of the rim (dia c. 10cm) survives and the handle is a characteristically triple groove along its length, With its rim profile it suggests Corder’s type 185 a ‘single handled jug’ although in this case the area where a spout would have been does not survive (Corder,1928, 22 & Plate VII see also ibid 1937, Plate LXXXVII, type 2)

Dating: Rachel Wood in her recent thesis discusses the dating of Crambeck wares historically with production of reduced wares variously starting at the end of the 3rd to the first half of the 4th century. Thus this suggests a largely 4th century industry. There is consensus that production ceases in the early 5th with the collapse of Roman Britain. Parchment wares have a more restricted lifespan in the 2nd half of the 4th century (2016, 114-128). As part of this recent thesis radiocarbon dates were obtained for skeletal material from cist burials, one of which cut into the furnace of a Crambeck kiln at Jamie’s Craggs.with the remains from Cist II dated to between 330 and 420 AD (ibid 225-9) which suggests production, at this kiln at least, had ceased in he later 4th century.

G: ‘Proto’ greywares

(sherd count 40 (1100) SF 127, **(1101)** SF 128 , **(1201)** SF 129 SF 130 SF 131, **(1223)** SF 132, **(1226)** SF 133, **(1243)** SF 134, **(1258)** SF 135, **(1304)** SF 136, **(1311)** SF 137, **(1502)** SF 138, **(1600)** SF 139)

These are within the East Yorkshire Greyware tradition of sandy wares but differ in some way from the later mass-produced wares of the mid third century onwards (see Fabric B above). Differences include misfiring, poor firing, other inclusions and form.

Dating: Most of the sherds are close enough to Fabric B East Yorks Greywares to suggest they represent the transitional phase to mass-production and therefore date to the earlier 3rd century but some may be earlier still.

H: **Northern Gritty ware** (or Gritty wares in York)

(sherd count 20 (1101) SF 140 SF 141, **(1200)** SF 142 SF 143, **(1201)** SF 144 SF 145 SF 146, **(1400)** SF 147 SF 148)

This wheel-thrown coarse ware is quite distinctive coloured off-white to pale pink and containing large sand grits which are visible on the surface of sherds. Forms are dominated by jars, bowls and very occasional pitcher. The ”squat, wide-bodied” jars would have been used for both storage and cooking. Decoration is described as very rare “limited to the occasional band of rouletting, incised lines or pronounced ribbing on the shoulder”. Occasional spots of glaze are thought to be accidental.

Known as Gritty ware in York; as a wider phenomenon, covering Yorkshire, Northumberland and southern Scotland, it is called Northern Gritty ware (Jennings,1992, 14, Mainman & Jenner, 2013, 1178-84).

The small group of 20 sherds from OADP18 may seem of little consequence but they were recovered from the topsoil of three different trenches; 1, 2 & 4, which hints at a more significant presence in the area of excavation. The only rim of measurable size (SF 148) has a diameter of 110 mm which is within the range of 'small vessel' from a significant sample of rim diameters obtained for this ware in York (*ibid* 1179-80).

Dating: late 11th – early 13th centuries in York (*ibid* 1178)

I: Colour Coated wares

(sherd count 3 (1101) SF 149, **(1406)** SF 150)

Colour Coated ware is essentially a slip ware with both inner and outer surfaces thus coated. The slip is generally darker than the fabric core. It was used to produce fine table wares. Vessels varied throughout the Roman period in terms of fabric, shape, colour and decoration, depending on their date and place of manufacture. The earliest are imports but local industries develop; notably Nene Valley ware (for example, Laing, 2014, 56).

The sherds from OADP18 are undecorated and too small and abraded to say more than that they are Colour Coated wares and Roman.

Dating: Roman

J: Other Coarse wares

(sherd count 8 (1201) SF 151, **(1223)** SF 152 SF 153, **(1253)** SF 154, **(1257)** SF 155, **(1258)** SF 156, **(1525)** SF 157)

This consists of a very small group of sherds representing coarse ware cooking pots/jars other than Calcite Gritted wares. They have been grouped here for convenience

i) Has a laminated fracture. A rim is slightly out-turned to a rounded top

ii) Large grits. Not a calcite gritted ware. Hard fired. Rim slightly out-turned to a rounded top.

iii) Sandy and slightly gritty. Hard fired. Possibly a precursor to later sandy grey wares

Dating: Appear to be LIA

K: Brown wares

(sherd count 8 (1000) SF 158, **(1101)** SF 159, **(1200)** SF 160, **(1500)** SF 161, **(1501)** SF 162, **(1600)** SF163)

Coarse earthernware with brown glaze found on most sites evidencing Post Medieval activity. As noted below a utilitarian ware used for "storage jars, cisterns and large jugs" amongst other forms.

"...it seems that there was a general tendency for the medieval types to be replaced by the Purple wares, which themselves later gave way to Brown Glazed Coarsewares, (sometimes known as redware), the ubiquitous utilitarian ware of the later 16th, 17th, 18th and 19th centuries. The vessel forms show considerable continuity from the earlier period with storage jars, cisterns and large jugs all common. The descendants of the later Brown Glazed Coarseware types, like open bowls, cooking vessels and large pancheons, may still be recognised amongst mass-produced kitchen wares today, where they are designed to evoke an idealised domestic past." (Cumberpatch, 2003)

Dating: Post Medieval. 16th - 19th centuries.

L: White wares (Post-Medieval)

(sherd count 7 (1000) SF 164, **(1200)** SF 165, **(1201)** SF 166)

A small group of tiny sherds of post medieval and modern date consisting of mass produced white wares. These may include White, Cream and Porcelain (eg Crossley 1990, 243-67, Cumberpatch, 2003)

Dating: Early modern. 19th – 20th century

M: York Glazed ware

(sherd count 2 (1201) SF 167)

Made from a pale or white firing clay which is not known in and around York with sources perhaps 30 miles to the north of York in the Hambleton Hills. Kilns are known; for example, at Brandsby which produced Brandsby (-Type in York) ware (see Fab S) which replaces York Glazed wares in York. The fabric contains distinctive rounded quartz inclusions. Products of this ware appear suddenly as “a fully developed fashion with good suspension glazes and sophisticated decoration”. The main products were jugs (Jennings, 1992, 18-21), Mainman & Jenner, 2013, 1203-25).

Two small body sherds with the above characteristics were identified in the OADP18 assemblage; both glazed but otherwise undecorated.

Dating: late 12th – mid 13th centuries AD (Jennings, 1992, 18-9), mid/late 12th – mid/late 13th centuries (based on Coppergate sequences (Mainman & Jenner, 2013, 1224).

N: Modern/Post Medieval Glazed wares

(sherd count 7 (1000) SF 168, **(1200)** SF 169, **(1201)** SF 170, **(1300)** SF 171)

This consists of a small group of sherds that are clearly Modern or Post Medieval but have not been assigned to specific wares.

Dating: largely 19th – 20th centuries

O: Pattern Glazed or Transfer Printed wares

(sherd count 9 (1100) SF 172, **(1101)** SF 173, **(1301)** SF 174, **(1400)** SF 175, **(1600)** SF 176)

A small group of tiny sherds of post medieval and modern date consisting of mass produced pattern glazed or transfer printed wares (eg Crossley 1990, 243-67, Cumberpatch, 2003)

Dating: Early modern. 19th – 20th century

P: Staffordshire Slipware

(sherd count 2 (1101) SF 177, **(1200)** SF 178)

Earthernware with applied slip which was decorated with varying slips in contrasting colours. Decorative uses of slip include sgraffito and carving, painting, trailing, marbling, and inlay. Generally called Staffordshire Slipware but was produced at other centres; locally at Wrenthorpe near Wakefield for example (Barker, 1993)

Sherds have been trailed or combed with a dark brown slip and is a common archaeological find.

Dating: mid 17th – earlier 18th centuries (although slipware more generally still being produced in small amounts)

Q: Stonewares

(sherd count 6 (1000) SF179 SF 180, **(1200)** SF 181 SF 182, **(1600)** SF 183)

Salt glazed Stonewares were initially imported from Germany from the 15th century. Local production started in London during the 17th century and spread (Crossley, 1994, 266-7). These early wares are very distinctive. It increasingly became a vessel of choice for the commercial distribution of liquids and dry goods. The industry was also producing table and kitchen wares and other utilitarian items. The former use started to decline in the 19th century with the increasing use of glass containers but the latter production is still thriving today (https://www.britannica.com/art/stoneware).There is also a thriving market in the sale of Stoneware containers recovered from Victorian and earlier rubbish pits or early landfill sites where they are often found complete.

The small number of sherds from OADP18 includes a partial base (diameter 8.5mm) which has vertical sides. This is probably a container.

Dating: 15th century to current. Here; however, a 19th, possibly 18th, century date is likely.

R: Humber ware

(sherd count 11 (1000) SF 184, **(1100)** SF 185, **(1101)** SF 186 SF 187, **(1200)** SF 188, **(1201)** SF 189 SF 190, **(1501)** SF 191, **(1600)** SF 192, **(1601)** SF 193)

Of York “The 15th century is dominated by Humber wares (Le Patourel, 1966) which make their appearance in the later 13th century but capture the market almost entirely in the late medieval period. Though kilns have been located at Kelk, Holme-on-Spalding Moor and Cowick (Mayes, 1964) in Yorkshire, the development of shapes and the differences in fabric from various centres has not yet been established. Generally speaking, the fabric is fine or sandy, light to dark reddish brown when oxidized and varying shades of grey when reduced (cf. reduced greenware). The glaze is usually olive or brownish green, sometimes forming a brown margin at the edges of the glaze.” (Holdsworth, 1978,14).

Most of the sherds at OAD18 have significantly reduced (grey) cores some with oxidised surfaces (reddish brown). They are hard fired. Sherds include a base and handle indicative of jugs though it should be noted that the material here comes from several contexts and thus several vessels. Some bear an olive green or mottled glaze (lower body sherds would be unglazed). Overall these characteristics suggest these sherds are later in a productive life spanning lasting over 250 years; perhaps 15th – earlier 16th century.

Dating: late 13th – early 16th centuries when Humber greenwares are replaced by Humber Purple wares *(ibid*; Jennings, 1982, 27-9; Mainman & Jenner, 2013, 1275-8; Mcarthy & Brooks, 1988, 395-6). As noted above the sherds here are likely to be 15th – earlier16th century

S: Brandsby-type ware

(sherd count 2 (1000) SF 194 SF 195)

Produced from a white firing clay. Early production seems to be largely identical to York Glazed ware (see above). However, it does diverge from the latter over time and ultimately replaces it with different decorative styles developing. Also the fabric becomes less gritty in Brandsby-type ware compared to York Glazed ware with its ‘rounded quartz sand’... ‘Brandsby-type wares are generally finer and sandier, and usually more hard-fired’ (Mainman &Jenner, 2013, 1230).

Dating: early/mid 13th – mid 14th century (Jennings,1982, 24-5, Mainman & Jenner, 2013, 1230)

T: Red Sandy ware (called Sandy Red ware by Mainman &Jenner)

(sherd count 4 (1501) SF 196 SF 197)

Jennings defines this ware as compared to contemporary jugs and notes “as the name implies the fabric is orangey-red colour in contrast to the pale clays of both York Glazed and Brandsby wares. The lack of copper in the glaze results in a paler green than the rich emerald copper green, and the unusual feature of this pottery is the use of a thin slip under the apple or olive green glaze” (1992, 22-4). Mainman & Jenner cover the same ground but in more detail (2013, 1246-8).

The sherds from OADP18 include a complete jug handle although in two parts and and a conjoining sherd where the handle would have been attached to the body of the jug. These are three of the four sherds; the other being a base.

Dating: mid 13th century and uncommon by the 14th century AD (Jennings, 1992, 22-4). Based on the evidence from Coppergate Mainman & Jenner suggest a more extended date range of mid 13th – late 14th/mid 15th centuries (2013, 1248).

U: Medieval Glazed wares (unidentified fabrics)

(sherd count 2 (1200) SF 198, **(1601)** SF 199)

Two very abraded body sherds but showing evidence of having been glazed. Possibly Humber ware.

Dating: Medieval

V: Roman ‘White’ wares

(sherd count 1 (1200) SF 200)

Made from a white firing clay the only (small abraded body) sherd present in the assemblage is decorated with two parallel, well executed grooves which shout Roman. Guy Bédoyère notes that incised lines can be a feature of Crambeck Parchment ware (2000, 53). The fabric is gritty with large visible inclusions including iron rich and slag fragments. It has not been related to a specific White ware of which there are numerous (Tomber & Dore, 1998).It has something of the characteristics of Crambeck Parchment or White wares (*ibid* 196-8)

Possibly from a mortaria (i.e. gritty).

Dating: Roman

W: Late Green Glazed wares

(sherd count 1 (1201) SF 201)

Production of these continued beyond the Medieval period. Sherds seem "...to be local to the York region. 'Many are Humber ware of a late type (Le Patourel, 1965, 115-16), but others are of unknown but probably local sources. The fabric and form ranges cannot be defined from the present series." (ibid 16) and "Similarly the fine orange-brown fabric with amber or green glaze 234-5 has affinities with Humber wares and reduced greenwares (see Sections VII and VIII) which continued in York until the 1840s (Brears, 1971, 17-18,61)." (Holdsworth, 1978, 17)

The sherd from OADP18, a largish rim, shares characteristics with Humber ware; sandy, hard fired, oxidised core and surfaces, olive green glaze. The vessel form appears to be from an everted bowl or dish and is probably Post Medieval (see *ibid* 38, Fig. 234); whether a late Humber ware or one of the other late Green glazed wares noted above by Holdsworth.

Dating: Post Medieval. Later 16th – 17th century.

X: Cistercian ware

(sherd count 18 (1000) SF 202 SF 203 SF 204, **(1101)** SF 205 **(1200)** SF 206 SF 207 SF 208, **(1201)** SF 209, **(1300)** SF 210, **(1500)** SF 211, **(1600)** SF 212 SF 213)

Various commentators describe the glaze of Cistercian ware as "black", "dark brown" and even "treacle brown" on both interior and exterior vessel surfaces. The fabric is consistently described as "reddish" (i.e. a Post Medieval purple ware). Vessels are clearly wheel thrown as demonstrated by ribbing. The vessels are described as having elaborate decoration using "white clay slip" and "incised lines". The decoration often includes "roundels of white clay" which appear yellow under the applied glaze (e.g. see https://www.flickr.com/photos/birminghammag/7982506797/in/photostream/). One of the main kiln sites was relatively local at Wrenthorpe (Potovens in the past) near Wakefield. in the West Riding of Yorkshire.(Cumberpatch, 2003; Jennings, 1992, 33; Laing, 2014, 107-9; McCarthy & Brooks, 1988, 402)

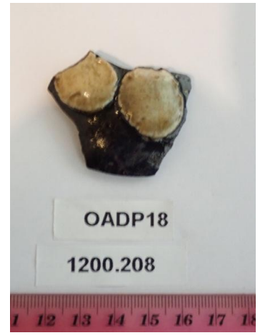

Fig. 6 Cistercian ware

Fig. 7 Cistercian ware in Rievaulx Abbey Museum

The identification of the material from OADP18 conforms to the above characteristics with two decorated sherds including bearing "roundels of white clay", on one the roundels were c. 20mm across and the other c. 2mm but otherwise identical. A small delicate handle was also recovered. It was also observed that the glaze on sherds from North Duffield was consistently pitted which aided with identification.

Dating: generally given as late 15th – 17th centuries although production finished at Wrenthorpe in the late 16th but continued in other parts of the country. This ware is generally considered 16th century in York.

Y: Yellow wares

(sherd count 2 (1100) SF 214, **(1500)** SF 215)

"In a development which runs parallel to that of the Cistercian and Blackwares, a range of vessels were manufactured in off-white and buff fabrics with clear glaze giving the vessels a bright lemon yellow colour". Often representing bowls and other food preparation equipment (Cumberpatch, 2003)

Dating: As Cistercian ware; late 15th – 17th centuries

?: Not identified

(sherd count 9 (1100) SF 216, **(1101)** SF 217, **(1200)** SF 218, **(1201)** SF 219, **(1251)** SF 220)

Pottery that could not be assigned to a specific fabric or group; Sherds are generally very abraded and/or burnt.

Summary

ID	Fabric	Count	%	Dating
A	Calcite Gritted ware	406	61.1	mostly LIA/Roman. Residual MIA
B	East Yorks Greyware	41	6.2	mid 3rd – end of 4th century
C	Calcite Gritted ware (OG)	40	6.0	here late 1st – 2nd century?
D	Samian ware	7	1.1	2nd century
E	Eboracum (or Ebor) ware	6	0.9	late 1st – early 3rd century
F	Crambeck Reduced ware	3	0.5	4th century
G	'Proto' Greywares	40	6.0	first half 3rd century?
H	Northern Gritty ware	20	3.0	late 11th – early 13th century
I	Colour Coated wares	3	0.5	Roman
J	Other Coarse wares	8	1.2	LIA?
K	Brown wares	8	1.2	16th - 19th century
L	White wares (Post-Medieval)	7	1.1	19th – 20th century
M	York Glazed ware	2	0.3	mid/late 12th – mid/late 13th c
N	Modern/Post Medieval Glazed wares	7	1.1	19 – 20th century
O	Pattern Glazed or Transfer Printed wares	9	1.4	19th – 20th century
P	Staffordshire Slipware	2	0.3	mid 17th – earlier 18th century
Q	Stonewares	6	0.9	here 19th, possibly 18th, century
R	Humber ware	11	1.7	here 15th – earlier16th century
S	Brandsby-type ware	2	0.3	early/mid 13th – mid 14th century
T	Red Sandy ware	4	0.6	mid 13th – late 14th/mid 15th c
U	Medieval Glazed wares (unidentified fabrics)	2	0.3	mid 12th – 16th century
V	Roman 'White' wares	1	0.2	Roman
W	Late Green Glazed wares	1	0.2	later 16th – 17th century
X	Cistercian ware	18	2.7	late 15th – late 16th century
Y	Yellow wares	2	0.3	late 15th – 17th century
?	Not identified	9	1.4	?
Total		665	100.0	

Comments

MIA sherds are residual as is most of the LIA pottery (Calcite Gritted ware). Exceptions include contexts (1211), (1232) and (1265) which may be primary (i.e. dating the context).

All of the early Roman pottery (Samian, Eboracum) appears residual although the discovery of a Samian sherd (SF 112) in pristine condition despite being a surface find. can only suggest undisturbed early Roman activity nearby. Middle Roman pottery (Knapton ware and Calcite Gritted ware (OG) represents primary contexts in some cases as do late Roman wares (East York Greyware and Crambeck).

The presence of Roman material (Eboracum ware, Samian, Colour Coated wares, Roman White wares, Crambeck ware) normally restricted to military and/or administrative sites suggest a function here beyond a Romano-British or native farmstead.

There is also a significant Medieval and early Post Medieval assemblage; more than might be expected from the spreading of midden.

Other ceramics

Fired clay fragments

(Count 19 (1100) SF 221, **(1101)** SF 222 SF 223, **(1201)** SF 224, **(1219)** SF 225, **(1243)** SF 226, **(1304)** SF 227, **(1311)** SF 228, **(1403)** SF 229)

None of these could be assigned to a specific object class such as daub, kiln furniture, brick, tile, field drain, etc.

Clay tobacco pipes

(Count 4 (1000) SF 230 SF 231 SF 233, **(1201)** SF 232)

These were largely recovered from surface collection except in one case from the plough soil overlying trenches. There are three pipe stems and one partial bowl. Pipes range in date from the mid 16th (perhaps earlier 17th out of population centres) to the early 20th centuries (Ayto, 1987, 4-10). Most dating use s bowl shapes. However, a general trend is that the thicker the stem and the larger the stem bore (the hole in the middle) the earlier the pipe is likely to be (ibid, 27 see also the National Pipe Archive website at http://www.pipearchive.co.uk/).

Dating: 17-19th century

Other Ceramics: Summary

Period	Object	Count	%
17-early 20th century	Clay tobacco pipes	4	17.4
?	Unidentified fired clay fragments	19	82.6
		23	100.0

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OADP 18. Animal Bone Report

Louisa Gidney

This season of excavation recovered a further small box of animal bones, mostly recovered from the fills of ditches associated with Iron Age occupation. Preservation of bone in these features is poor, with most finds being either small burnt or calcined fragments, as described for the OADP17 finds. Unburnt fragments showed surface degradation and teeth were reduced to fragments of enamel.

Trench 1

The only finds of bone in this trench were in context 1101, medieval ploughsoil. These comprise a fragment of pig tooth enamel, a calcined fragment of sheep size long bone and a sheep size fragment of flat bone, possibly scapula or pelvis.

Trench 2

The majority of the faunal remains were recovered from Trench 2. Tables 1 and 2 demonstrate how few identifiable fragments were found. Cattle, sheep/goat and pig are represented. Most bone fragments had been calcined white, a few had been less thoroughly burnt and were charred black. Unburnt fragments were confined to cattle tooth enamel fragments in contexts 1211 and 1278 and sheep/goat tooth enamel fragments in 1258. The pig tooth from 1201 was unerupted and some of the unidentifiable fragments may derive from the surrounding jaw bone. The pig bone from context 1245 is a metacarpal, part of the trotter.

The distribution of small fragments of calcined bone in this trench is probably an indication of the dumping of household hearth ashes, in which table scraps had been previously disposed of.

Table 1. Contexts with identifiable fragments

	1201	1211	1234	1245	1249	1258	1259	1278
Cattle		1			1			1
Cattle size		1					1	
Sheep/goat	2		1			2		
Pig	1			1				

Table 2. Contexts with unidentifiable fragments

	1200	1201	1211	1219	1221	1223	1234	1243
Cattle size Long bone							1	
Sheep size Long bone	1	2	1	1				1
Indeterminate	3	16	1	12	1	1	2	5

Table 2 cont Contexts with unidentifiable fragments

	1245	1249	1251	1253	1257	1258	1265
Cattle size frags						2	
Sheep size Long bone	2					2	1
Sheep size rib			3				
Indeterminate	26	2		2	4	20	

Trench 3

In this trench, only context 1314 produced fragments that could be positively identified to species. These are part of a cattle mandible and fragments of cattle tooth enamel, probably from a maxillary tooth. Neither of these finds had been burnt. The bird bone from 1314 is a long bone shaft fragment from a small species, which is not burnt and is in surprisingly good condition compared to the cattle fragments. This may possibly be intrusive. The remaining fragments are all calcined and it is not clear whether some of the “sheep size” fragments may derive from pig.

Table 3. Contexts with identifiable fragments

	1302	1311	1314
Cattle			2
Sheep size	1	1	1
Bird			1
Indeterminate	4		

Trench 4

Only context 1402 produced bone fragments. These were all calcined and include only one identifiable fragment, part of a sheep/goat mandible.

The find from 1406 appears to be cinder rather than bone.

Trench 5

The majority of the finds from Trench 5 were from context 1523/25, of uncertain stratigraphy. Both cattle and sheep/goat were identified in this context and 1529. A cattle intermediate carpal from 1523/25 was not burnt but in poor condition. All other finds were calcined, including part of a probably female cattle pubic bone from 1529.

Table 3. Contexts with identifiable fragments

	1503	1523	1525	1523/25	1529
Cattle				2	1
Sheep/goat				1	1
Indeterminate	4	1	2	22	21

Trench 6

Indeterminate calcined fragments were found in contexts 1601, 1606, 1612 and 1614. One fragment from 1601 might possibly be part of a cattle size scapula. There is also a struck flint flake in 1601.

Recovery of small fragments of calcined bone has been excellent, including a small, calcined, sheep premolar in context 1523/25. The vast majority are not identifiable. It is only possible to say that bones of cattle, sheep/goat and pig are present on the site and most appear to have been first disposed of in fires and then thrown out with the ashes. How many unburnt bones were originally deposited is unclear. Preservation of unburnt fragments is poor with only cattle bones surviving and teeth reduced to splinters of enamel. The spatial distribution indicates that calcined bone fragments are concentrated in the ditches of Trench 2.

OADP 18

Context	Species	Element	Comments
Trench 1			
1101	sar	lbon	shaft frag, calcined
1101	pig	tooth	frag enamel
1101	sar	frag	calcined, poss scap or pelvis
Trench 2			
1200	sar	lbon	calcined frag
1200	indet	frag	x 3, calcined
1200			2 frags cinder
1201	s/g	tib	z45, df, calcined
1201	s/g	mp	z 3 or 4, calcined
1201	pig	tooth	unerupted, calcined, poss with frag jaw
1201	sar	lbon	shaft frag, calcined, poss rad
1201	indet	frags	x 13, calcined, one prob lar
1201	sar	lbon	shaft frag, calcined
1201	indet	frags	x 3, calcined
1211	cow	tooth	enamel frags NOT burnt
1211	lar	vl	calcined, prob chopped sagit
1211	sar	lbon	shaft frag, burnt black
1211	indet	frag	calcined, prob chopped sagit
1219	indet	frags	x 3 calcined
1219	sar	lbon	shaft frag, calcined
1219	indet	frags	x 3, calcined
1219	indet	frags	x 4, calcined lar size
1219	indet	frags	x 2 calcined, from articular surface
1221	indet	frag	calcined
1223	indet	frag	calcined prob lar
1234	s/g	tib	z67, df, calcined, in frags
1234	lar	lbon	calcined shaft frag
1234	indet	frags	x 2, calcined
1243	sar	lbon	shaft frag, calcined
1243	indet	frags	x 5, calcined, sar size
1245	indet	frags	x 11, burnt & calcined, 1 prob lar

1245	pig	mc3	z1, calcined
1245	indet	frags	x 15, calcined
1245	sar	lbon	x 2, burnt black
1249	cow	jaw	z2 frag calcined
1249	indet	frags	x 2 calcined
1251	sar	rib	x 3 shaft frags, calcined
1251	indet	frags	x 2 calcined
1257	indet	frags	x 4, calcined
1253	indet	sfrag	burnt petrous, prob sar
1253	indet	frag	calcined
1258	s/g	tooth	enamel frags, NOT burnt
1258	indet	frags	x 3 lar, calcined
1258	indet	frags	x 3, calcined
1258	lar	frag	calcined, poss jaw z2
1258	lar	frag	calcined
1258	indet	frags	x 3, calcined
1258	s/g	tib	z4, burnt
1258	sar	lbon	x 2, calcined, prob tib
1258	indet	frags	x 9, calcined/burnt, prob lar
1258	indet	frags	x 2, calcined
1259	lar	uln	shaft frag, calcined
1265	sar	lbon	shaft frag, calcined
1278	cow	tooth	enamel frags NOT burnt

Trench 3

1302	sar	jaw	calcined frag s/g or pig
1302	indet	frag	calcined frag lar
1302	indet	frag	calcined, poss scap or pelvis
1302	indet	frags	x 2 calcined
1314	cow	jaw	not burnt, frag with socket
1314	cow	tooth	enamel frags, not burnt, prob max
1314	sar	tib	z1 or 3, calcined, s/g or pig, pn
1314	bird	lbon	shaft frag, small sp, intrusive??
1311	sar	lbon	shaft frag

Trench 4

1402	s/g	jaw	z5, calcined
1402	indet	frags	x 7, calcined & burnt
1406	indet	frag	prob cinder not bone

Trench 5

1503	indet	frags	x 4 calcined
1523	lar	frag	calcined
1525	indet	frags	x2, calcined, prob sar
1523/25	cow	cari	not burnt, poor pres
1523/25	cow	uln	z2 burnt
1523/25	s/g	LPM	calcined
1523/25	indet	frags	x 22, calcined/burnt, sar/lar
1529	cow	aph	z1, pf, calcined
1529	cow	pub	z5, prob female, calcined
1529	sar	lbon	x 8 shaft frags, calcined
1529	indet	frags	x 13, calcined

Trench 6

1601	struck	flint	flake
1601	lar	frag	calcined, poss scap
1601	indet	frag	calcined
1606	indet	frag	calcined
1612	indet	frags	x 5, calcined
1614	indet	frags	x 3, calcined

Palaeoecology Research Services

Assessment of biological remains from sediment samples collected during an archaeological excavation at Hugh Field Lane, North Duffield, North Yorkshire (site code: OADP18)

***PRS* 2019/23**

Assessment of biological remains from sediment samples collected during an archaeological excavation at Hugh Field Lane, North Duffield, North Yorkshire (site code: OADP18)

by

John Carrott and Jane Barker

Summary

Seven sediment samples (selected by the excavator from 17 collected) from deposits encountered during an archaeological excavation at Hugh Field Lane, North Duffield, North Yorkshire, were submitted for an assessment of their bioarchaeological potential. The site showed extensive crop marks from aerial photographs but also a large trapezoidal double-ditched enclosure containing what appeared to be a ring ditch of equivalent size (20m diameter) to one excavated during previous works at the adjacent site of Park House Farm. Geophysics was conducted and revealed a much more complicated picture with upwards of ten ring ditches and, superimposed upon some of them, what appeared to be the footprint of a building. Some of the linear ditches showing in aerial photographs now appeared to form a second, slightly smaller, double-ditched trapezoidal enclosure to the south of the one already recognised and possibly a drove-way running through the site. The pot assemblage recovered included sherds of late Iron Age to early Roman date and the site appears to span this transition; later medieval wares were also recovered, however. There was also evidence of iron working at the site and a very small assemblage of flint tools may reflect a little earlier prehistoric activity.

Biological remains of 'ancient' origin were largely restricted to a little rectilinear charcoal from all seven contexts, together with a little indeterminate bone (predominantly calcined) from all bar one, two poorly preserved charred grains (one perhaps wheat – cf. Triticum*) and a small piece of charred ?culm node from another and two small fragments provisionally identified as bird ?eggshell from a third. No interpretatively valuable microfossils were present. Artefactual remains were also rather few but did include a little pot (and ?pot or ?pot/daub) from four of the fills.*

Overall, the small quantities of biological and artefactual remains recovered reflect no more than 'background' levels of fuel and probable food waste suggesting accidental inclusions of domestic waste (or at most the occasional casual disposal of same). There were certainly no concentrations of remains to suggest any large-scale waste disposal or deliberate dumping to infill the features.

There were no remains suitable for radiocarbon dating of the deposits to be attempted and no further study of the limited biological remains recovered is warranted.

Keywords: Hugh Field Lane; North Duffield; North Yorkshire; assessment; late Iron Age to early Roman; plant remains; charred plant remains; charcoal; charred grain (trace); invertebrate remains (trace; modern); vertebrate remains (trace; mostly calcined)

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Assessment of biological remains from sediment samples collected during an archaeological excavation at Hugh Field Lane, North Duffield, North Yorkshire (site code: OADP18)

Introduction

An archaeological excavation was undertaken by North Duffield Conservation and Local History Society (NDCLHS) at Hugh Field Lane, North Duffield, North Yorkshire (centred on NGR SE 686 376), between the 22nd of September and the 5th of October 2018. The excavation was undertaken as part of NDCLHS's current project investigating Iron Age settlement in the southern Vale of York bounded by the rivers Ouse and Derwent.

The site showed extensive crop marks from aerial photographs but also a large trapezoidal double-ditched enclosure (some 100m x 50m) containing what appeared to be a ring ditch of equivalent size (20m diameter) to one excavated during previous works at the adjacent site of Park House Farm, North Duffield (only 200m or so away).

Geophysics (magnetometry and resistivity) was conducted and revealed a much more complicated picture. There were upwards of ten ring ditches of varying sizes and superimposed upon some of them was what appeared to be the footprint of a building. Some of the linear ditches showing in aerial photographs were revealed in more detail and now appeared to form a second, slightly smaller, double-ditched trapezoidal enclosure to the south of the one already recognised and possibly a drove-way running through the site.

Excavation confirmed the existence of both ditches of both double-ditched enclosures, which turned out to be significant features almost 2m deep. Beam slots from the building were recorded and this appears to have been constructed over several of the ring ditches and of Roman date, perhaps a wooden 'villa'. The pot assemblage recovered included sherds of late Iron Age to early Roman date and the site appears to span this transition; later medieval wares were also recovered, however. There was also evidence of iron working at the site and a very small assemblage of flint tools may reflect a little earlier prehistoric activity.

Subsamples of seven 'bulk' sediment samples ('GBA'/'BS' *sensu* Dobney *et al*. 1992), from fills of ring, enclosure and linear ditches, were submitted to Palaeoecology Research Services Limited, Kingston upon Hull, for an assessment of their bioarchaeological potential.

Methods

The lithologies of the submitted sediment subsamples were recorded using a standard *pro forma*. A very small further subsample was extracted from each for examination for microfossils (see below) prior to processing of all of the remainder for the recovery of plant, invertebrate and vertebrate remains (macrofossils), broadly following the techniques of Kenward *et al*. (1980), producing a residue and a washover in each case.

The deposits did not appear to contain ancient uncharred organic remains preserved by anoxic waterlogging and the washovers were dried for examination for macrofossils using a low-power microscope (x7 to x45 magnification).

The residues were primarily mineral in nature and were also dried prior to the recording of their components; the weights and descriptions of the residues were recorded after sorting. The residues were separated into fractions (using 1 and 4 mm sieves) to facilitate recording. Data acquired refer to the larger items which have been

extracted; smaller fragments remain in the residues and details of these are not included. All biological and artefactual remains were sorted to 1 mm; the residue fractions less than 1 mm were scanned for additional identifiable remains and their composition recorded semi-quantitatively (see below). All of the residue fractions (including those less than 1 mm) were scanned for magnetic material.

The processed sample fractions (washovers and residues) were scanned until no new remains were observed and a sense of the abundance of each taxon or component was achieved and these were recorded either as counts or using a five-point semi-quantitative scale as: 1 – few/rare, up to 3 individuals/items or a trace level component of the whole; 2 – some/present, 4 to 20 items or a minor component; 3 – many/common, 21 to 50 or a significant component; 4 – very many/abundant, 51 to 200 or a major component; and 5 – super-abundant, over 200 items/individuals or a dominant component of the whole. The abundance of recovered organic and other remains within the sediments as a whole may be judged by comparing the washover weights/volumes and the quantities of remains recovered from the residues with the sizes of the processed sediment samples.

Plant macrofossil remains were identified by comparison with modern reference material (where possible), and the use of published works (e.g. Cappers *et al*. 2006 and, for cereal remains, Jacomet 2006). Remains were identified to the lowest taxon possible or necessary to achieve the aims of the project. Nomenclature for wild plant taxa follows Stace (1997), with cereal identifications following Jacomet (2006) where nomenclature follows van Zeist (1984).

Species identifications were attempted for the small number of charcoal fragments (of over 4 mm) recovered from the sediment samples. Pieces were broken to give clean cross-sectional surfaces and the anatomical structures were examined using a low-power binocular microscope (x7 to x45) and higher magnification where necessary (x100 and x150). Identifications were attempted by comparison with modern reference material where possible, and with reference to published works (principally Hather 2000 and Schoch *et al*. 2004).

The few invertebrate remains noted were all almost certainly modern intrusions and were recorded in brief.

Vertebrate remains were examined and identifications to species or species group attempted using the PRS modern comparative reference collection and published works (e.g. Schmid 1972); in the event, no identifications were possible, however.

During recording, consideration was given to the identification of suitable remains (if present) for possible submission for radiocarbon dating by standard radiometric technique or accelerator mass spectrometry (AMS).

A small subsample (of approximately 5 ml) of sediment was extracted from each of the samples for examination for microfossils. These were investigated using the 'squash' technique of Dainton (1992), originally designed specifically to assess the content of eggs of intestinal parasitic nematodes; however, this method routinely reveals other microfossils, such as pollen and diatoms, which were also recorded if present. The assessment slides were scanned at x150 magnification and at x600 where necessary.

Results

The results of the investigations of the sediment samples are presented below in context number order. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of

the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers.

Context 1211 [Upper fill of ring ditch [1237], re-cut of ring ditch [1212]; one of the earliest ring ditches – re-cut [1237] deeper than the original ring ditch [1212]]
Sample 8/T (12 kg/9.5 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Moist, mostly dark grey (mottled with mid/dark brown at a mm-scale), unconsolidated with occasional crumbly lumps, very ashy, slightly silty fine sand, with a few modern rootlets present.

The small washover (dry weight 74.8 g/100 ml) was mostly sand (abundance score 5), with abundant charcoal (to 14 mm but predominantly less than 4 mm), occasional small stones (to 6 mm; score 2), traces of modern rootlet (score 1) and indeterminate bone fragments (to 8 mm; score 1; not burnt) and a single uncharred ?common nettle (cf. *Urtica dioica* L.) achene (probably a modern contaminant). All of the charcoal was rectilinear fragments – of three examined more closely, one was of a diffuse-porous species (but not identifiable to species), one was vitrified and exhibited distorted cell structures which prevented any identification and the third crumbled and also remained wholly indeterminate.

The small residue (dry weight 1945.5 g: >4 mm – 17.1 g; 1-4 mm – 42.1 g; <1 mm – 1886.3 g) was mostly sand (score 5; almost all of the <1 mm fraction – although this also included occasional flecks of unsorted charcoal and bone). Minor components were four ?pot sherds (to 13 mm; 0.3 g), bone (to 16 mm; 1.4 g; 41 indeterminate fragments of which 31 were calcined and the remainder part-burnt), two tiny fragments of ?eggshell (to 4 mm; <0.1 g) and a little charcoal (to 11 mm; 2.6 g; score 2). The last was all rectilinear fragments one of which was partially and tentatively identified as ?diffuse-porous; three other charcoal fragments examined all crumbled and remained wholly indeterminate. There was a minute magnetic component (to 2 mm; <0.1 g; score 1) which consisted exclusively of ?heat-affected sand grains.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Context 1243 [Fill of shallow east-west aligned ditch [1244]; corresponds to rectilinear anomalies in geophysical results]
Sample 10/T (13 kg/10 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Moist, mostly mid/dark grey-brown (mottled with mid/dark grey and mid brown at a mm-scale), mostly unconsolidated with very occasional crumbly lumps, silty fine sand, with stones (20 to 60 mm) and modern rootlets present, and a minor component of light grey sand (in small patches to 20 mm).

The relatively small washover (dry weight 194.8 g/250 ml) was mostly small 'crumbs' of undisaggregated sediment (to 4 mm; score 5), with abundant sand (score 4), frequent charcoal (to 13 mm but almost all less than 4 mm; score 3), occasional small stones (to 11 mm; score 2) and modern rootlets (score 2), and a few indeterminate calcined bone fragments (to 2 mm; score 1). All of the charcoal was rectilinear fragments (occasional round cross-sectioned fragments noted all appeared to be charred root/rootlet/rhizome; to 12 mm; diameter to 5 mm, score 2) which were very fragile and quite heavily sediment encrusted – six fragments were examined for species identification but all crumbled and remained wholly indeterminate.

The small residue (dry weight 2455.1 g: >4 mm – 223.6 g; 1-4 mm – 120.7 g; <1 mm – 2110.8 g) was mostly sand (score 5; almost all of the <1 mm fraction – although there were occasional flecks of unsorted charcoal and bone). Minor components were pot and ?pot (to 27 mm; 20.3 g; seven larger 'sherds' of over 10 mm and some smaller 'crumbs' (score 2)), a little bone (to 10 mm; 0.2 g; approximately 50 small indeterminate and mostly calcined fragments, only three fragments were not burnt), a trace of modern rootlet (score 1) and a little charcoal (to 16 mm; 6.0 g). All of the charcoal was rectilinear and very fragile – the six fragments examined more closely were all also somewhat vitrified, five crumbled and were wholly indeterminate and the sixth could only be partially and tentatively identified as ?ring-porous). The minute magnetic component (to 1 mm; <0.1 g; score 1) was exclusively of ?heat-affected sand grains.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Context 1247 [Fill of east-west aligned ditch [1248]; beam slot – near vertical sides, consistent and very straight]
Sample 11/T (13 kg/10 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Moist, mottled (mm-scale) shades of grey-brown and grey from light/mid to mid/dark (and occasionally light and light/mid browns), unconsolidated with occasional crumbly lumps, ?very slightly ashy, silty fine sand (lumps more silty, i.e. fine sandy silt). No obvious inclusions.

The small washover (dry weight 38.8 g/50 ml) was mostly small 'crumbs' of undisaggregated sediment (to 4 mm; score 5 – with one larger piece to 12 mm), with abundant sand (score 4), frequent charcoal (to 12 mm but almost all less than 4 mm; score 3), occasional modern rootlets (score 2), a few tiny indeterminate calcined bone fragments (to 1 mm; score 1), and a few uncharred 'seeds' (two indeterminate fragments and one more or less whole orache/goosefoot (*Atriplex*/*Chenopodium*) seed – all probably modern contaminants).

The small residue (dry weight 2771.5 g: >4 mm – 39.9 g; 1-4 mm – 74.1 g; <1 mm – 2657.5 g) was mostly sand (score 5; almost all of the <1 mm fraction – although there were occasional flecks of unsorted charcoal and bone). Minor components were indeterminate bone fragments (to 11 mm; 0.7 g; ~50 fragments all bar four of which were calcined), a trace of modern rootlet (score 1) and a little charcoal (to 12 mm but almost all less than 4 mm; 6.3 g; score 2). Most of the charcoal fragments were coated with sediment and all were very fragile – of six examined, five crumbled and only the sixth could be partially identified as diffuse-porous. The minute magnetic component (to 1 mm; <0.1 g; score 1) was exclusively of ?heat-affected sand grains.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Context 1253 [Fill of ring ditch [1254]; the latest ring ditch encountered – not truncated by any later features, occasional inclusions of bog iron]
Sample 6/T (12.75 kg/9.5 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Just moist, mottled (mm-scale) shades of brown, grey-brown and grey from light to mid/dark, unconsolidated/ ?slighty ashy, slightly silty fine sand. Stones (2 to 20 mm) and modern rootlets were present.

The relatively small washover (dry weight 120.7 g/200 ml) was mostly sand (score 5), with abundant small 'crumbs' of undisaggregated sediment (to 3 mm; score 5 – with occasional larger pieces to 11 mm; score 2), frequent modern rootlet (score 3), a trace of coal (to 2 mm; score 1) and a little indeterminate bone (to 5 mm; score 2; mostly calcined with three unburnt fragments to 2 mm) and charcoal (to 16 mm but almost all less than 4 mm: score 2). All of the last was sediment encrusted, fragile, rectilinear fragments – the largest was partially identified as diffuse-porous and two others more tentatively as ?diffuse-porous but three other fragments examined all crumbled and remained wholly indeterminate.

The small residue (dry weight 1133.4 g: >4 mm – 83.8 g; 1-4 mm – 76.9 g; <1 mm – 972.7 g) was mostly sand (score 5; almost all of the <1 mm fraction – although there were occasional flecks of unsorted charcoal, ?pot/daub and bone). Minor components were some ?pot/daub (approximately 50 larger (>10 mm) pieces (to 46 mm; 58.5 g) and 50 smaller 'crumbs' (to 10 mm; 3.7 g), some indeterminate bone (to 18 mm; 2.2 g; ~75 fragments all bar seven of which were calcined, and a little charcoal (to 15 mm; 6.0 g; score 2). The charcoal was all rectilinear, sediment encrusted and very fragile – six fragments examined all crumbled and remained wholly indeterminate and all were also somewhat vitrified in appearance. There was a tiny magnetic component (to 2 mm; 0.4 g; score 1) which was exclusively of ?heat-affected sand grains.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Context 1315 [Primary fill of outer enclosure ditch [1306]; sample from near base of ditch – fill ~1% fine charcoal]
Sample 16/T (11.25 kg/8.5 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Moist, mostly mid/dark grey (mottled with mid grey and mid grey-brown at a mm-scale), unconsolidated with occasional crumbly lumps, ?slightly ashy, silty fine sand (more silt content within lumps, i.e. fine sandy silt). Stones (2 to 60 mm) were present.

The tiny washover (dry weight 15.6 g/30 ml) was mostly charcoal (to 11 mm but predominantly less than 4 mm; score 5), with abundant sand (score 4) and

traces (all score 1) of indeterminate bone fragments (to 6 mm; none were burnt), modern rootlet and modern invertebrate fragments (including fragments of ?soil-dwelling nematode (cf. *Heterodera* sp.) cysts. All of the charcoal was rectilinear and fragile and most fragments were somewhat sediment encrusted – six fragments were examined more closely and two were partially and tentatively identified, one as ?diffuse-porous and one as ?ring-porous, but the four others crumbled and remained wholly indeterminate. Occasional round cross-sectioned (approximately) fragments noted all appeared to be charred root/rootlet/rhizome (to 3 mm; diameter to 1 mm, score 2).

The rather small residue (dry weight 2962.6 g: >4 mm – 30.5 g; 1-4 mm – 22.0 g; <1 mm – 2910.1 g) was mostly sand (score 5; almost all of the <1 mm fraction – although there were occasional flecks of unsorted charcoal and bone). Minor components were bone (to 13 mm; 1.5 g; ~40 fragments, 11 of which were unburnt and the remainder calcined or part-burnt) and charcoal (to 9 mm; 1.7 g; score 2). All of the charcoal was rectilinear, slightly sediment encrusted and fragile – four of the five fragments examined more closely crumbled and remained indeterminate and the fifth was only partially identifiable as a diffuse-porous species. There was no magnetic component to the residue.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Context 1523 [Fill of possible re-cut [1522] of southern enclosure ditch [1527]; sample from 'early in the silting up of the southern enclosure' – some leaching of bog iron from above evident in upper portion of fill]
Sample 13/T (11.5 kg/8 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Moist, mostly mid/dark grey (mottled with light/mid grey-brown and mid brown at a mm-scale), crumbly or unconsolidated, silty fine sand, with occasional fragments of burnt bone present.

The tiny washover (dry weight 18.5 g/30 ml) was mostly sand (score 5), with abundant charcoal (to 7 mm but almost all less than 4 mm; score 4), frequent 'crumbs' of undisaggregated sediment (to 4 mm but mostly less than 2 mm; score 3) and a few indeterminate calcined bone fragments (to 10 mm; score 1). There were also a few modern rootlets (score 1) and other uncharred plant remains which were almost certainly modern contaminants were recorded in the form of abundant elder (*Sambucus nigra* L.) fruits and fruit fragments (score 5). All of the charcoal was rectilinear fragments (a few round cross-sectioned fragments noted all appeared to be charred root/rootlet/rhizome; to 6 mm; diameter to 2 mm; score 1) which were fragile but with rather less adhering sediment than seen from the other assessment samples – all four of the fragments examined more closely crumbled and remained indeterminate, however. A few other charred plant remains were also recorded from this sample and comprised two poorly preserved charred grains (one perhaps wheat, cf. *Triticum*, but the other no more than an indeterminate fragment) and a small piece of charred ?culm node (to 2 mm).

The rather small residue (dry weight 2938.5 g: >4 mm – 9.8 g; 1-4 mm – 19.5 g; <1 mm – 2909.2 g) was almost entirely sand (score 5; almost all of the <1 mm fraction – although there were occasional flecks of unsorted charcoal). Minor components were charcoal (to 10 mm; 0.7 g; score 2), indeterminate bone fragments (to 11 mm; 0.5 g; ~50 fragments in total all bar one of which were calcined or part-burnt) and a little pot and ?pot (to 28 mm; 5.5 g; three larger 'sherds' (over 10 mm) and some (score 2) additional 'crumbs'). There were also frequent further records of elder fruits and fruit fragments. No magnetic component was present in the residue.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Context 1606 [Fill of inner enclosure ditch [1605]; this ditch runs parallel with the outer ditch [1607], [1611] and [1615] – geophysical evidence suggests it forms part of a southern trapezoidal enclosure]
Sample 2/T (11 kg/8 litres sieved to 300 microns with washover and microfossil 'squash'; none of the submitted sample remains)

Just moist, mostly very dark grey (with a little mm-scale mid brown mottling), unconsolidated, very ashy, sandy silt, with fragments of charcoal present.

The relatively small washover (dry weight 140.3 g/200 ml) was largely composed of roughly equal parts sand and 'crumbs' of undisaggregated sediment (to 9 mm but mostly less than 4 mm and predominantly less than 2 mm) – both score 5. There was also frequent charcoal (to 20 mm but mostly less than 4 mm; score 3), however, and there were a few modern rootlets (score 1) and pieces of cinder (to 20 mm; score 1). All of the charcoal was rectilinear fragments (a few round cross-sectioned fragments noted all appeared to be charred root/rootlet/rhizome; to 4 mm; diameter to 2 mm; score 1) which were somewhat fragile and often sediment encrusted. Six of the charcoal fragments were examined more closely – all crumbled to some degree but two were diffuse-porous and a third ?diffuse-porous; the three others were wholly indeterminate.

The small residue (dry weight 791.5 g: >4 mm – 33.7 g; 1-4 mm – 20.7 g; <1 mm – 737.1 g) was mostly sand (score 5; almost all of the <1 mm fraction – although there were occasional flecks of unsorted charcoal). Minor components were a little charcoal (to 9 mm; 0.7 g; score 2) and two ?ash concretions (to 8 mm; <0.1 g). All of the charcoal was rectilinear and fragile and most was sediment encrusted – four fragments were examined but none could be identified; two crumbled and two were somewhat vitrified with distorted cell structures. The minute magnetic component (to 1 mm; <0.1 g; score 1) was all ?heat-affected sand grains.

The 'squash' subsample was almost entirely inorganic with the barest trace of organic detritus (<1%). A few fragments of fungal hyphae were noted but there were no parasite eggs or other interpretatively valuable microfossils present.

Discussion and statement of potential

Biological remains of 'ancient' origin (i.e. likely to be contemporary with deposit formation) were largely restricted to a little rectilinear charcoal (presumably fuel waste) from all seven contexts, together with a little indeterminate bone (mostly burnt and predominantly fully calcined to white) from all bar Context 1606 (fill of inner enclosure ditch [1605]). The only other charred plant macrofossils recorded were two poorly preserved charred grains (one perhaps wheat – cf. *Triticum* – the other an indeterminate fragment) and a small piece of charred ?culm node from Context 1523 (fill of possible re-cut [1522] of southern enclosure ditch [1527]). Context 1211 (upper fill of ring ditch [1237]) gave two small fragments provisionally identified as bird ?eggshell.

Charcoal preservation was consistently poor (fragments were fragile and often sediment encrusted) with many of the fragments examined for attempted species identification crumbling and remaining wholly indeterminate; those fragments for which cross-section could be examined were only partially identifiable as diffuse-porous or ring-porous and even this level of identification was often tentative. A few of the pieces of charcoal examined from four of the deposits (Contexts 1211, 1243 (fill of shallow east-west aligned ditch [1244]), 1253 (fill of ring ditch [1254]) and 1606) exhibited a vitrified appearance which, in the past, has been interpreted as indicative of high temperature burning (in excess of 1000 degrees Centigrade) but which experimental work by McParland *et al*. (2010) suggests is likely to reflect a more moderate charring temperature of 310-530 degrees Centigrade.

No interpretatively valuable microfossils were recorded from any of the deposits – all of the 'squash' subsamples were effectively inorganic with just traces of organic detritus and occasional fragments of fungal hyphae.

Other organic remains present were clearly or almost certainly modern intrusions or contaminants – modern rootlets from all seven deposits, occasional uncharred 'seeds' from Contexts 1211 and 1247 (fill of east-west aligned ditch [1248]) and an abundance of uncharred elder (*Sambucus nigra* L.) fruits from Context 1523, and invertebrate fragments (including ?soil-dwelling nematode – cf. *Heterodera* sp. – cyst fragments) from Context 1315 (primary fill of enclosure ditch [1306]).

Artefactual remains were also rather few but did include a little pot (and ?pot or ?pot/daub) from Contexts 1211, 1243, 1253 and 1523. The trace levels of magnetic material noted from five of the deposits (all bar Contexts 1315 and 1523) were entirely composed of ?heat-affected sand – i.e. there were no indications of metalworking from hammerscale or slag.

Overall, the small quantities of biological and artefactual remains recovered reflect no more than 'background' levels of fuel and probable food waste suggesting accidental

inclusions of domestic waste (or at most the occasional casual disposal of same). There were certainly no concentrations of remains to suggest any large-scale waste disposal or deliberate dumping to infill the features.

The charcoal recovered from each of the deposits would be sufficient for radiocarbon dating (via AMS) to be attempted. This material cannot be recommended for the purpose, however, as all of the fragments were of an indeterminate number of years of wood growth and none could be identified to species). Consequently, the associated 'old wood problems' could result in a radiocarbon date significantly earlier (but by an unknown amount) than the charring event being returned; as the carbon content of the wood is fixed at the time of its growth. The charred grain and grain fragment from Context 1523 could perhaps provide sufficient more suitable material for AMS dating but there would be considerable doubt regarding the extension of any date returned to the deposit as a whole – given the tiny quantities of charred plant material recovered, the presence of rootlet with the resultant possibility of bioturbation and displacement of individual small remains and the abundance of probable contaminant remains in the form of elder fruits; similar uncertainties would also apply if the more recently developed technique of radiocarbon dating burnt bone were employed.

Recommendations

No further study of the limited biological remains recovered from these deposits is warranted.

Retention and disposal

Artefactual (and possible artefactual) materials recovered from the sediment samples will be returned to the excavator to be considered by the appropriate specialists and included within the physical archive for the site if warranted.

The recovered remains and sorted residue fractions are of no further interpretative value and may be discarded.

Unless required for purposes other than the study of biological remains (possible artefact retrieval, for example), any retained unprocessed sediment may also be discarded.

Archive

All of the extant material from the submitted subsample is currently stored by Palaeoecology Research Services (Unit 4, National Industrial Estate, Bontoft Avenue, Kingston upon Hull), pending return to the archaeological contractor (or permission to discard), along with paper and electronic records pertaining to the work described here.

Acknowledgements

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Site Name: **North Duffield.** Site Code: **OADP-18.**

County: **North Yorkshire.**

FLINT ASSESSMENT.

An assessment of the flint & stone from North Duffield (OADP-18)

By Peter Makey for North Duffield & Local History Society (Last revision 02/06/19).

All the flint has been fully catalogued in MS excel format (appended) and pieces have each been allocated an individual flint catalogue number (ARN Archive record number). The colour of the flints has been recorded using Munsell (1988) nomenclature.

The Flint.

Introduction.

Eleven pieces of flint and twelve pieces of stone were submitted for examination. Of the eleven pieces of flint, eight are worked and three pieces (ARN 2, T1 context 1101: ARN 7, T2 context 1201 & ARN 9, T2 context 1223) are un-worked natural. All of the material has been analysed for the presence of both microscopic and macroscopic traces of edge use. No trace of micro-wear is present and use wear is present on the chunk (ARN 1) from trench 1, plough soil (context 1100) and the edge utilised flake (ARN 6) from trench 2, plough soil (context 1200). In the case of the chunk the piece has been heavily battered, whereas the edge utilised piece has a light nondescript (unidentifiable pattern) use wear.

Flint Typology	**Number ( ) = Broken**	**Trenches**	**Context ( ) = Broken**
Core Rejuvenation Flake	1	T1	1101
Chunk	1	T1	1100
Flakes	4 (3)	T2 & T4	1200, (1211), 1224, 1400
Bifacial Flake	1	T1	1101
Edge Utilised Flake	1	T2	1200
Total	**8**		

State.

Three of the flakes have been broken and two possess an old patination. Five of the struck flints are manufactured on a medium grained light brownish grey (Munsell 5YR 6/1) to light brown (Munsell: 6 YR 5/6) coloured raw material that appears to be derived from a fluviatile gravel. The remaining pieces appear to be consistent with local till deposits which are however some distance from the site. The only fresh looking piece is the edge utilised flake (ARN 6) from trench2, plough soil context 1200. Only two struck pieces (ARN 8, T2 context 1211 & 10, T2 context 1224) of flint come from non plough soil contexts. The broken flake (ARN 10) from the fill (T2 context 1224) of a possible feature (context 1225) is the sole piece that is possibly non residual. All the pieces appear to have been struck via the application of hard hammer stones and with the exception of the chunk (ARN 1) traces of cortex are either very limited or totally absent consistent with the pieces being from the final stages of flint knapping.

The Struck Pieces.

1) The core rejuvenation flake (ARN 3, T1 context 1101) is an unclassifiable form that bears traces of eight small (less than 16mm in length) irregular flake removals. A core rejuvenation flake is a removal from a core that is intended to remove a surface irregularity, that and allow for continued knapping. Although not rare, the presence of a rejuvenation flake indicates that there is probably more lithic material near by, since they seldom occur in isolation. This example possesses a dense white surface patination. The form and size of this example is not reliably datable but regionally they occur most frequently in middle to later Neolithic flint assemblages.

2) The chunk (ARN 1, T2 context 1100) is a nondescript piece with a nodular cortical chunk with traces of knapping related battering, heavy plough damage and a dense old white patina. Such pieces are un-datable (although prehistoric) except with regard to their overall state,

3) The flakes include a fine trimming flake (ARN 8) from the fill (context 1211) of ring ditch 1222. This derives from the final stages of tool manufacture. The flakes could be of any date although their general dimensions are consistent with regional later Neolithic / early Bronze Age assemblages.

4) The bifacial flake (ARN 4) from trench 1, context 1101 is a flake with flake facets on both its dorsal (upper) and ventral surface (lower). Although not rare this trait is found on only a low proportion of un-stratified flint flakes and the trait is found slightly more in early Bronze Age assemblages.

5) The edge utilised flake (ARN 6) from the plough soil (context 1200) of trench 2 is a small non-descript example with two small areas of usage. However the piece does possess a finely trimmed platform.

Date of the Material.

With the possible exception of the core rejuvenation flake, there are no clear chronologically diagnostic pieces. This piece hints at a Neolithic date and the overall metrical characteristics

of the remaining pieces, is indicative of a later Neolithic to early Bronze Age date. Differences in the state of the pieces, is suggestive of at least three separate phases of flint working.

Conclusions.

The assemblage is too small to draw any great conclusions. As with the previous phases of archaeological field work the possible sources of the flint raw material is the most intriguing aspect of the assemblage. At present little is known of the flint in the immediate vicinity of the site and when present flint assemblages are far smaller than those for the rest of East and North Yorkshire. The present assemblage is however not consistent with a background scatter, since the reduction stage of the pieces is more consistent with a settlement than a background scatter.

Recommendations.

Unfortunately the current flint assemblage is of very limited potential in itself but does once again indicate the possible presence of further prehistoric flintwork in the area of study.

The assemblage has been fully recorded. No further cataloguing is required.

Drawing Requirements.
None of the material requires illustration.

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Site Name: **North Duffield.** Site Code: **OADP-18.**

County: **North Yorkshire.**

NON-FLINT.

An assessment of the stone from North Duffield (OADP-18)

By Peter Makey for North Duffield & Local History Society (Last revision 04/06/19).

All the stone has been measured, weighed and catalogued in MS excel format (appended) and pieces have each been allocated an individual flint catalogue number (ARN Archive record number). The colour of the stone has been recorded using Munsell (1988) nomenclature.

Twelve pieces of stone were submitted for analysis; the pieces were distributed over seven separate contexts. One piece (ARN 23) from fill context 1525/23? is an un-modified fragment of coarse grained natural chert.

Stone	**Number ( ) = Broken**	**Context ( ) = Broken**	**Burning**
Hearth Stone ?	3 (2)	1232x2, 1302	3 fire cracked, moderate
Pot boiler? / Hearth Stone ?	3	1201,1219, 1245	2 light, 1 mod cracked
Pot boiler	1	1201	1 light
Pot boiler ?	1 (1)	1403	1 light fire cracked
Quern flake?	1 (1)	1403	
Stone burnt	1	1525/23?	1 fire crazed, moderate
Stone brought in	1	1403	
Natural (Chert)	1	1525/23?	

Total	**12**

The stones are predominately fine grained sandstones of greyish orange pink (Munsell: 5YR 7/2) to light brown (5YR 6/2) colour with cortexts (outer skins) of pale yellowish brown (10YR 6/2) colour. Nine of the stones exhibit traces of burning to varying degrees. Context 1403 (slot/ linear track way) contained a large angular sandstone fragment with micaceous inclusions (length 145mm, weight 846g). The piece is similar to the intentionally burnt examples and would appear to have been brought in. This context also contained a flake of light brownish grey (5YR 6/1) very fine grained and very hard micaceous sandstone. The piece is atypical of the stone assemblage but is a perfect match with some of the quern stones from the Yorkshire Wolds. It is possible that this is a flake from a quern stone.

The source of the stones needs further consideration. Similar pieces often occur on regional archaeological sites primarily from the Iron Age onwards to the Medieval period.

The Industrial Waste from 2018 Season at North Duffield (OADP18)

Eleanor Blakelock

Introduction

In 2018, excavations at North Duffield (OADP18) were conducted by North Duffield Conservation and Local History Society. A relatively large assemblage (23.6kg) of possible industrial waste was recovered. The site mostly comprises of ring ditches and two enclosure ditches, and which have been dated to the Iron Age.

There are two main types of processes involved in iron working: smelting (extracting metal from the ore), and smithing or forging (shaping the object). Both create different kinds of waste that can often be distinguished on the basis of their morphology, as described below.

Iron smelting took place in bloomery furnaces, which were typically clay-built, rounded structures. Iron ore was fed into the furnace where it reacted to create a spongy mass of iron metal known as a bloom. The waste from this process formed a liquid slag that was collected in the bottom of the furnace, however by the late Iron Age the slag was potentially being tapped from the furnace (Bayley *et al*. 2001). Iron smelting in the Iron Age was probably carried out on a small scale, using local ores e.g. bog iron ore. On the other hand there is evidence for iron smithing in many Iron Age settlements.

Ironworking waste classification

The ironworking waste from North Duffield was classified predominantly using the terms used in the Centre for Archaeology Guidelines, *Archaeometallurgy* (Bayley *et al*. 2001). The categories included *tap slag, runs, smelting slag*, *hearth lining, fuel ash, smithing hearth bottom*, *undiagnostic slag*, *natural* and *other finds*. There is a summary of the results in table 1 with a description of the debris by context.

Tap slag and runs are by-products of the smelting process, produced by removing slag by tapping when it was hot and fluid. This waste has a characteristic shape, resembling the flow of lava, and the lower surface may be rougher as it comes into contact with the ground. Large numbers of the tap slag and run fragments appeared to be tubular in form. In addition to these types of slag it is possible to get *flow slag* which exhibit signs of fluid flow, but did not flow out of the furnace.

Smelting slag consists of large blocks of slag waste, often with fuel impressions in the surface. It will appear to have obviously been fluid but will not show the same flowed texture as tap slag, instead it will have impressions from obstructions of wood or

charcoal from within the furnace. The porosity of this slag varies greatly. In addition to smaller lumps of smelting slag, occasionally large masses of slag that form the *furnace bottom* are found, where the tapping arch is above the base of the furnace (Paynter 2007; Pleiner 2000). This slag generally forms below the iron bloom, and they are generally oval in plan, often with some preserved surface from the furnace. Like smelting slag they contain impressions from organic matter, such as charcoal or wood.

Iron rich slag is a dense slag like material that can also be magnetic, the outer surface appears 'rusty' which suggests that this slag contained a higher proportion of iron. This slag is potentially related to the iron rich bloom crown material that forms close to the bloom during the smelt, and removed during primary smithing.

Hearth lining consists of small fragments of clay that has been subjected to heat. The outer surface will often appear orange with a black inner surface. Some fragments may have iron slag adhering to them.

Smithing Hearth Bottoms are usually circular with a concave base, often this is rough or may even contain pieces of vitrified clay lining where it came into contact with the base of the hearth. The top can also have a concave shape. This slag can be magnetic as it forms from the iron that falls off the iron, which combines with slag, charcoal and clay hearth lining to form a distinctive slag. The size is dependent on how often the blacksmith cleans out the forge and the types of activities taking place.

Hammerscale consists of small iron rich fragments which fall of the iron as it is worked by the blacksmith. If the relative density of this waste product is plotted across a site it can be used to determine the anvil and hearth locations.

Fuel Ash and clinker is usually less dense than other types of slag, and form from the reaction with fuel ash and occasionally clay linings.

Undiagnostic slag will not have sufficient characteristics to be categorised; similar materials may be produced by either smelting or smithing operations.

The Assemblage

In total 18kg of material was recovered from OADP18, this does not include the smelting slag block from context [1608], which weighed approximately 5kg. The vast majority of the slag from the site is a dense and heavy material, with occasional charcoal impressions. There were only a few pieces of slag with flown textures, although no tap slag was identified. Undiagnostic slag only comprised of 16% of the assemblage at OAP18 '

There is also some evidence for smithing with six possible fragments of smithing hearth bottom recovered from the site at OADP18. These pieces had the typical concave base, which appears to have been in contact with a rough clay surface, and a top which is magnetic, due to the iron scale falling off into the hearth as the iron was repeatedly heated. However it is also possible some of these are also smelting slag, perhaps forming in the base of the furnace.

A small quantity of hearth lining was recovered, some of which was heavily vitrified resulting from the high temperatures required for smelting or smithing. Furnace lining

is the least likely component of metalworking to travel long distances due to its friable nature. However the presence of some relatively large pieces of furnace lining may be an indication that smelting and/or smithing was being carried out near to the enclosure ditches.

Finally within the assemblage a few metallic iron lumps and artefacts were identified, within the secure contexts provided there appeared to be a possible arrowhead [1406], knife or spearhead [1525], end of a bar or object [1608] and metal rod [1614].

Conclusion

The vast majority of the slag from the site is smelting slag, being dense with charcoal impressions, or attached furnace lining. There is no tap, present on the site, so it is highly likely that the furnaces were non-tapping furnaces, which would support the suspected period of the site. Majority of slag and furnace lining found on OADP18 came from the fills of the enclosure ditches, with a small amount coming from the fill of ring ditches [1222]. It is therefore possible that iron smelting was being carried out on the site, perhaps near to the enclosure ditches, where the majority of the industrial waste was recovered.

Future work

There is much more diagnostic slag present in this assemblage, which would allow for further work to be carried out. Chemical analysis of a small proportion slag may reveal what type of iron ore was being used, indicating more about possible raw material procurement and trade.

The iron artefacts identified could be x-rayed to help identify their function, and condition. A selection of iron artefacts from the site could be examined using metallography to investigate the iron alloys used, manufacturing methods and also blacksmithing techniques applied.

Finally by carrying out SEM-EDX analysis of both slag and iron objects from the same site it should be possible to identify whether artefacts from the site were being manufactured using the iron smelted in the area.

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Appendix

Table 1: Quantities (in g) of different types of waste recovered from North Duffield (OADP18), by context.

	Feature type	Tap and flown Slag		Smelting		Furnace lining		Smithing hearth bottom	
		no	weight	no	weight	no	weight	no	weight
1000	Surface collection			1	56				
1100	Plough soil			3	273				
1101	Medieval plough soil			5	956	8	107	3	962
1200	Plough soil								
1201	Medieval plough soil	1	116	3	429			1	213
1207				1	1062				
1211	Fill of ring ditch	2	61						
1219	Fill of ring ditch			2	318				
1221	Fill of ring ditch			1	221				
1223	Fill of ring ditch	1	1223			1	87		
1232	Fill of ring ditch								
1243	Shallow ditch	1	48						
1251						1	128		
1257	Fill of enclosure ditch								
1258	Fill of ring ditch								
1265	Fill of ring ditch								
1300	Plough soil								
1400	Plough soil					1	103		
1402	Linear ditch					7	129		
1403	Plough soil	1	278	1	147				
1406	Linear ditch	1	97	2	436	1	33		
1501	Subsoil			1	567				
1503									
1523	Recut fill of enclosure ditch			1	152				
1523/ 1525	Recut fill of enclosure ditch			1	238	1	118		
1525	Uncertain			2	463			1	168
1528	Fill of enclosure ditch			3	539				
1600	Plough soil								
1601	Medieval plough soil			10	1697				
1604	Fill of enclosure ditch			3	507				
1606	Fill of enclosure ditch			3	1076	2	114		
1608	Fill of enclosure ditch			2	5209			1	139
1612	Fill of enclosure ditch			1	158	1	124		
1614	Fill of ditch			1	639				
1616	Fill of enclosure ditch								
Total count/weight of assemblage		**7**	**1823**	**47**	**15143**	**23**	**943**	**6**	**1482**
			8%		**64%**		**4%**		**6%**

Table 1 cont: Quantities (in g) of different types of waste recovered from North Duffield (OADP18), by context.

	Feature type	Iron Rich Slag		Undiagnostic slag		Clinker/ fuel		Ore		Iron objects	
		no	weight	no	weight	no	weight	no	weight	no	weight
1000	Surface collection										
1100	Plough soil			4	42						
1101	Medieval plough soil			24	560	2	81				
1200	Plough soil			8	46						
1201	Medieval plough soil			5	367					2	19
1207				1	13						
1211	Fill of ring ditch			4	42						
1219	Fill of ring ditch			1	22						
1221	Fill of ring ditch										
1223	Fill of ring ditch			1	87						
1232	Fill of ring ditch			1	56						
1243	Shallow ditch										
1251											
1257	Fill of enclosure ditch			1	17						
1258	Fill of ring ditch			1	24						
1265	Fill of ring ditch			1	16						
1300	Plough soil			2	35						
1400	Plough soil			1	100						
1402	Linear ditch			1	23			1	153		
1403	Plough soil										
1406	Linear ditch			6	106					1	14
1501	Subsoil										
1503				2	17						
1523	Recut fill of enclosure ditch										
1523/ 1525	Recut fill of enclosure ditch			3	114	1	6				
1525	Uncertain			1	41					1	35
1528	Fill of enclosure ditch			12	292						
1600	Plough soil			3	184						
1601	Medieval plough soil			6	417						
1604	Fill of enclosure ditch			2	44						
1606	Fill of enclosure ditch			5	638						
1608	Fill of enclosure ditch									2	54
1612	Fill of enclosure ditch			3	192						
1614	Fill of ditch			3	54					1	14
1616	Fill of enclosure ditch	1	105	4	130						
Total count/weight of assemblage		**1**	**105**	**106**	**3679**	**3**	**87**	**1**	**153**	**7**	**136**
			0%		**16%**		**0%**		**0%**		**0%**

North Duffield, Selby, North Yorkshire

Iron Artefacts

AOC 25016

30th January 2020

AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

North Duffield, Selby, North Yorkshire

Iron Artefacts

On Behalf of:	**North Duffield Conservation and Local History Society**
National Grid Reference (NGR):	**SE 68394 37745**
AOC Project No:	**25016**
Prepared by:	**Andrew Morrison**
Date of Report:	**January 2020**

This document has been prepared in accordance with AOC standard operating procedures.

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Abstract

A small assemblage of five iron artefacts from North Duffield, Selby, North Yorkshire were submitted to AOC Archaeology Group for analysis following 2018 excavations by the North Duffield Conservation and Local History Society in lands bound to the north and west by Hugh Field Lane. This investigation was undertaken as part of the Heritage Lottery Funded Ouse and Derwent Project. The excavations focused on settlement evidence including enclosure ditches and trackways of possible Iron Age or later date. The finds comprise: a knife blade fragment, a possible nail, a T-shaped object- possibly a spike or nail, a likely ring fitting, and a shank or wire fragment. The finds are all subject to heavy corrosion and are all long-lived types that are not closely dateable.

Introduction

A small assemblage of five iron artefacts from North Duffield, Selby, North Yorkshire were submitted to AOC Archaeology Group for analysis following 2018 excavations by the North Duffield Conservation and Local History Society in lands bound to the north and west by Hugh Field Lane, as part of the Heritage Lottery Funded Ouse and Derwent Project. The excavations focused on settlement evidence including enclosure ditches and trackways of possible Iron Age or later date.

The assemblage comprises a knife blade fragment, a possible nail, a T-shaped object- possibly a spike or nail head, a likely ring fitting, and a shank or wire fragment that were all hand-excavated from four separate secure contexts.

Overall, the assemblage is difficult to classify chronologically, partially due to the fragmentary condition of the finds, but also owing to the fact that objects types such as nails, knife blades, and ring-fittings like the ones recovered, all enjoyed a long currency of use, seeing little modification in design or production style over several centuries. This report presents a catalogue of the individual items and a summary of the classifications of objects present for archive purposes.

Methodology

The metal artefacts recovered are fragmented and either partially or completely obscured by heavy corrosion, making their accurate identification and dating difficult. For the most part, the identification of the finds was only possible through x-radiography which was able to reveal the objects' form and certain diagnostic features.

The finds were examined macroscopically, further aided by x-radiographs of all five artefacts. A binocular microscope was also used in order to clarify surface details, and all finds were measured using a 0-150mm Carbon Dial Calliper with 0.1mm accuracy and were weighed using a Sartorius Universal digital scale accurate to 0.01g.

A complete catalogue of the of the metal artefacts is presented below.

Condition

The finds are all incomplete and subject to heavy corrosion, either partially or completely obscured by corrosion product, and are identifiable only with the aid of x-radiography. The finds are also heavily degraded displaying both considerable surface loss and damage caused by the fragmentation and detachment of their original surfaces.

Classifications

A total of five ferrous metal artefacts were recovered from four separate contexts, and comprise: a knife blade retrieved from the fill (*1406*) of a ditch associated with a possible trackway, a possible oval-sectioned nail, rod or shank retrieved from the fill (*1525*) of a U-shaped ditch situated between two parallel enclosure ditches, a T-shaped object and a ring fitting from the fill (*1608*) of the trapezoidal enclosure ditch, and a possible fine bar or nail shank fragment retrieved from the fill (*1614*) of a ditch cut by a later enclosure ditch.

The most significant artefact within the assemblage is that of the knife blade fragment from ditch fill (*1406*). Identified in the field as a possible iron arrowhead due to its broadly elongated triangular shape, macroscopic and x-ray analysis revealed the artefact to be a heavily degraded, fragmentary and poorly preserved section of knife blade.

The blade fragment (*1406*) displays the typical V-shaped cross-section of a single-edged knife which can be observed on a clear break edge where the blade has broken forward of the shoulder and the tang. The cutting edge is largely lost, the junction between the blade and tang where the knife would have been hafted onto a handle has broken off and is missing, as is the tip of the blade. As the tang of the blade has been lost, it is not possible to determine whether this was a knife of whittle-tanged or scale-tanged variety.

Knife blades can be difficult to classify both stylistically and chronologically as these are long-lived tool types which saw little variation in form and use from the Iron Age into modern times. Remarkably few knives can be given even a reasonably precise date (Manning 1985, 108) as those found in archaeological contexts are typically individually handmade and no two will be identical (Blakelock and McDonnell 2007, 41). Yet some distinctive forms, such as blades with acutely angled backs, are considered typologically diagnostic (of early medieval date, c. 5th to 11th centuries AD) when found in a substantially intact condition (Blakelock and McDonnell 2007; Ottaway 2009, 203). It can also be difficult to classify form as the original blade shape has often been deformed through damage and corrosion or has be altered through wear from use and sharpening (Ottaway 1992, 559).

Existing typological schemes of knives from archaeological contexts rely on close examination of specific features of the blade, including: the angle of the back in relation to the cutting edge, how the back of the blade transitions towards the tip, the form of the junction between the tang and the blade back and the form of the tang (e.g. Anglo-Scandinavian: Ottaway 1992, 559; medieval: Cowgill et al 1987, 78). As one of the more robust sections of the knife blade, the form of the blade back is commonly used in typological classifications, as it tends to have a greater rate of survival and is less likely to suffer the effects of wear.

Though the overall form of the blade (*1406*) recovered from North Duffield is largely obscured by corrosion, x-ray analysis shows the surviving section of the blade back to be pitched at a slight angle and may also drop from the angled back through to a concave curve to the tip, though it is not clear if this is an intentionally manufactured feature or the by-product of corrosion. Based on the condition of the surviving fragment, the latter is more likely. As the full dimensions of the blade are unknown and the cutting edge has been largely lost, the pitch of this angled back cannot be determined with certainty and it is unclear how this angled portion of the blade back sits in proportion to the original length of the blade.

A number of different blade typologies were consulted in assessing the blade fragment from (*1406*), including Roman (Manning 1985), Anglo-Scandinavian (Ottaway 1992), Anglian (Rogers 1993), Saxon (Cowgill *et al* 1987), and medieval (*ibid*; Goodall 2011), all of which produced examples of angle back blades similar to (*1406*). With no other features of the blade surviving, such as the tang or shoulder of the blade, closer classification is not feasible.

Although no overarching classification scheme currently exists for Iron Age knife blades in northern England, early knife blades have been found on Iron Age and Romano-British sites in the region including damaged examples from High Wold, Bridlington (Cool 2009, 109-110) and pre-Roman contexts at Stanwick (Haselgrove *et al* 1990) and Scarborough (Smith 1928), to name a few. The recovery of the knife blade fragment from the infill material of ditch (1406) in association with diagnostic Iron Age pottery and daub suggests the iron object is contemporary and the surviving features of its form does not contradict this assertion.

The other iron items recovered from North Duffield include a possible oval-sectioned rod or nail fragment, broken at the tip (*1525*), a T-shaped object which may be a robust nail head (*1608*), a ring fitting (*1608*), and a shank or wire fragment (*1614*). None of these other iron items are independently datable and could well be Iron Age or Romano-British in date.

Like the incomplete knife blade fragment, these other iron objects are all broken and incomplete. This implies that the iron finds from North Duffield were either discarded when they were no longer functional or represent casual losses though breakage during use. The recovery of these items from various ditch fills alongside pottery, ironworking waste and animal bone suggests that day-to-day detritus of the settlement and the associated craft activities undertaken there routinely infiltrated the open ditches, either as deliberate dumps of waste material or as incidental inclusions within backfilled soils.

Catalogue

Knife blade. Likely an angled back form with a possible concave curve to the tip. Blade fragment is heavily corroded and largely visible only through x-ray. Has a V-shaped section, with a portion of the blade back intact. Blade back appears to change angle and may drop to a concave curve before the tip, though this may be the product of a corrosion blister. Broken at the tip and before the shoulder and tang. The cutting edge does not survive. L: 44.1mm, H: 19.7mm, W: 4.1mm, Mass: 11.06g. Context (*1406*): section of ditch associated with possible trackway.

Possible nail or rod. Long, straight shank with broken tip and possible head, though both ends appear broken. Completely obscured by heavy corrosion and only visible through x-ray, though an ovoid section is exposed at the head end. L: 91.6mm, Diam: 6.5mm x 8.2mm, Mass: 32.43g. Context (*1525*): U-shaped ditch between two parallel enclosure ditches.

T-shaped head of possible nail head. Heavily corroded surviving as an exposed core with six fragments of flaked-off surface spall and corrosion product. Fairly robust with a broken square to rectangular sectioned shank tapering on two sides. Remnants of short T-shaped arms. H: 22.8mm, W: 18.2mm, Th: 12.0mm, Shank: 9.7mm x 10.7mm, Mass: 39.10g. Context (*1608*): fill of a trapezoid enclosure ditch.

Ring fitting. Approximately half of a circular loop or a portion of a figure-of-eight loop. Section form not clear. Completely obscured by corrosion and visible only through x-ray. Small area of core visible where three fragments of spall and corrosion has detached. Possibly part of a chain or fitting. H: 14.0mm, Th: c.6.8mm, Diam: Ext: 18.8mm, Int: 11.1mm, Mass: 6.66g. Context (*1608*): fill of a trapezoid enclosure ditch.

Unidentifiable. Possible shank or wire fragment. Completely corroded and fractured into six fragments. Small and linear in shape, with a thin, possibly square-shaped section. No original form or surface surviving. L: c.28.4mm, W: c.4.2mm, Mass: 2.50g. Context (*1614*): ditch fill cut by a later enclosure ditch.

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The Iron Age Ouse and Derwent Project

Geophysical Survey at Wheldrake, 2019

Site location:	Broad Highway, Wheldrake YO19 6BE
Site grid reference:	SE 6708 4664
Date of survey:	9 - 14 February, 2019
Undertaken by:	North Duffield Conservation and Local History Society
Survey supervisor:	Paul Durdin

Summary

Magnetometry and earth resistance survey were undertaken on a site which previously featured crop marks suggestive of Iron Age settlement enclosures. The survey results confirmed the presence of a large double-bounded enclosure containing round-house ring-ditches, along with associated linear boundaries and another round-house ring-ditch in the immediately surrounding landscape. A second enclosure was also detected, but its date and characteristics were not readily determined.

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Introduction

The site at Wheldrake was selected for the project based on crop mark features identified by the Vale of York National Mapping Programme (Kershaw 2001). These crop marks appeared to show a settlement pattern made up of enclosures and field boundaries, with two prominent ring-ditches. One of these ring-ditches was of particular interest as it was located, apparently on its own, within a clear enclosure. Geophysical survey was undertaken in order to characterise the features seen in the crop marks, to obtain a higher level of detail, and to provide accurate location data for excavation.

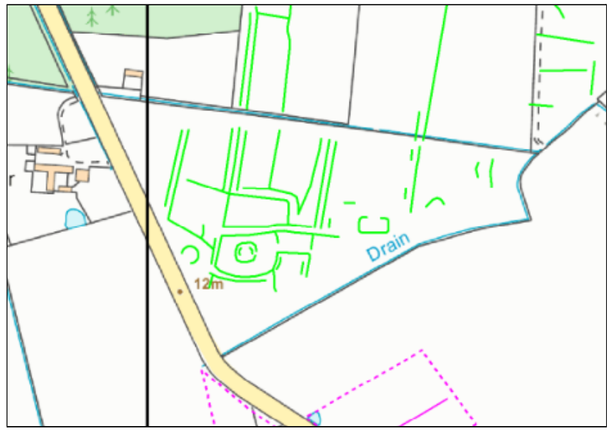


Figure 1. Crop mark features at Wheldrake as identified by the Vale of York National Mapping Programme.

The field surveyed is roughly triangular in shape, and measures approximately 260m along its western boundary, 400m along its northern boundary and 330m along the southern boundary.

Geology

The site at Wheldrake is situated on Sherwood Sandstone Group bedrock, overlain by a band of the Elvington Glaciolacustrine Formation of silty clays (BGS 1973). However, it is close to a boundary with the Naburn Sand Member of silty and gravelly sands, and there is likely to be some variation in the drift geology as a result. The visible topsoil was a dark brown silty sand, and there was no significant gradient.

Current use

The field surveyed is currently in use as arable land, with a portion of the field set aside as a game reserve. It is bordered on the north and west by hedges, with intermittent trees, and by a deep drainage ditch along the southern side. The geophysical survey included only a portion of the game reserve, as ground conditions and the remnant crop were prohibitive.

Methodology

A grid baseline was established running roughly parallel with the southern boundary of the field, and a number of grid points at 100m intervals were plotted using a manual Leica total station. The total station was positioned relative to three fixed points, all identified with a reflective survey marker, on significant trees along the field boundary, as no permanent structures were in range for use. After these grid corners were established, 100m hand measuring tapes were used to fill in a 20m by 20m square survey grid.

Magnetic survey was undertaken by the supervisor and volunteers using a Bartington Grad-601-2 fluxgate gradiometer system. The system was calibrated by each new surveyor and re-calibrated regularly during their use, usually after every ten completed grids. Sensor height on the Bartington was also adjusted to be equal from the ground across all surveyors. Data was downloaded at intervals and viewed on site, with only rough processing, in order to inform the approach to further survey.

Readings were taken at 0.125cm intervals, on 1m traverses in a zig-zag layout across the grid, with the initial direction of walking NNW. A number of partial grids were completed along the western side of the field, where crop marks indicated archaeological features, and a single partial grid was completed on the north boundary to expand the coverage over features identified in the first set of results. Slightly more than two grids in the central north of the survey area were not covered due to the presence of standing water. A total of 73 full and 9 partial grids were surveyed, around 3.3 hectares total.

Earth resistance survey was undertaken using the same grid layout, but over a smaller area, with the location selected based on the concentration of archaeological features in the crop marks and magnetic survey results. A total of 25 full grids and three partial grids (around 1.1 hectares) were surveyed in the southern half of the field (Area A), and 2 full grids towards

the north (Area B) where features were identified in the magnetic results. The survey was conducted using a TR Systems Mk 2 earth resistance meter, with data collected on a Samsung Galaxy A6 tablet running the 'trs meter mk2' app. As with the magnetometry survey, the resistance data was downloaded at intervals onto a PC for viewing on site.

Both magnetic and earth resistance data was processed off site using Snuffler 1.3. Filters used on the magnetic data were Destripe followed by selective use of Destagger to correct survey pace inconsistencies. The data was then clipped to +/- 3.0 nT and interpolated twice perpendicular to the angle of traverse. Earth resistance data was grid-matched first, followed by a Despike filter to remove invalid readings. A high pass filter ("Remove Geology" in Snuffler) was attempted but proved unsuitable due to the strong banding caused by modern agriculture. Both types of data were exported as PNG images and georeferenced in QGIS 3.18, which was then used to create the interpretations.

All geophysical data, processed images and interpretations created during this survey are included in the project archive in non-proprietary file formats.

Results

Both the magnetic and the earth resistance data show a large sub-rectangular enclosure, along with two or more ring-ditches, in the middle south area of the field. Various fainter, discrete features are also visible in each set of data.

Magnetometry

The most immediately visible feature in the magnetic data is a large, sub-rectangular, double-bounded enclosure in the central southern part of the field. This enclosure measures approximately 70m east-west by 50m north-south, with a clear entrance on its eastern side. A strong pit-like response near the centre of the southern boundary suggests a second entrance on that side. Within the interior, there is a large central ring-ditch, roughly 18m in diameter, with an east-facing entrance, although its western side is not clearly visible. In the southeast portion of the interior is a mass of 'noise', with discrete pit-like responses as well as more linear trends, along with an apparent 8m diameter ring-ditch. A faint ring-ditch of similar size is visible in the northeastern corner of the enclosure. All these ring-ditches are interpreted to be round-house structures of various sizes.

The magnetic responses over the western half of the enclosure were much weaker, and this corresponds precisely to a band of low earth resistance running across that side of the feature. These are both suspected to result from higher ground moisture content, perhaps due to variations in the underlying geology. However, this meant that no archaeological features were discernible within the western half of the enclosure, and the western boundaries were only faintly visible.

The inner boundary of the enclosure in general returned a much stronger magnetic response than the outer, suggesting a larger concentration of anthropogenic material within the inner ditch fill. Likewise, the linear features outside the enclosure, which are clearly visible in the crop marks, only appear faintly if at all in the magnetic data. While geological influences

can't be discounted for these differences, it seems likely that human occupation was largely concentrated on the main enclosure and ring-ditches, with perhaps only agricultural activities taking place in the surrounding area.

To the west of the main enclosure is a single clear ring-ditch, approximately 15m in diameter, along with a number of linear features of varying clarity. This is also likely to be a round-house, although whether it is associated with the main enclosure remains unknown. The fainter linear features around it may suggest a separate enclosure, but no real shape can be determined from these elements.

The double-bounded enclosure and ring-ditches are probably of prehistoric or Romano-British date, and are likely set in an agricultural landscape.

In the central north area of the survey is a sub-rectangular positive anomaly, approximately 5m by 4m in size. This is probably a large pit, with a smaller but otherwise similar response some 20m to its west.

A faint semi-circular linear feature can be seen in the northwest area of the magnetic data, curving south, around to the east, and then back north. It is around 70m in width east-west, and around 110m in total length. Within this enclosure is a series of pit-like features set in and amongst a rectangular trend of enhanced magnetic responses. These are certainly of archaeological origin, but are not distinct enough to allow a confident interpretation.

Dipole responses are visible scattered across the area. Most of these are likely to derive from modern ferrous material in the topsoil, although a large concentration in the central north area may be of archaeological origin.

Earth resistance

In earth resistance **Area A**, the large enclosure is made up of two, and in places three, concentric boundary ditches visible as strong low resistance linear responses. At the southeastern corner of the enclosure, where the features are clearest, a band of noticeably higher resistance runs between the ditches, suggesting a remnant bank feature. In this area a third, narrower low resistance linear can be seen running parallel with the two main enclosure boundary ditches, and may indicate a third ditch on the interior. A number of low resistance linears can be seen outside the main enclosure, either attached or separate, and probably represent field boundaries.

The large central ring-ditch is partially visible in the earth resistance as a low resistance ring with a clear gap on its eastern side, corresponding exactly to the magnetic data. There are also two ring features northeast and north of the central ring, both very faint but apparently comprising high and low resistance rings, which are not visible in the magnetometry. The more northern of these two overlies the northern boundary of the enclosure. A number of small, discrete low resistance anomalies, probably pits or similar, are visible in the southeastern quadrant of the enclosure.

A fourth faint ring is visible to the west of the main enclosure, made up of two low resistance arcs with one high resistance arc between them, with an apparent entrance on its eastern side. This correlates with the magnetic data for this area.

A very large double arc, with low resistance on the inside of the curve and high resistance on the outside, is visible in the eastern end of the surveyed area. If the arc is projected into a full circle, it gives a diameter of around 50m. However, as the feature extends beyond the survey boundary, interpretation is difficult: it may be merely geological.

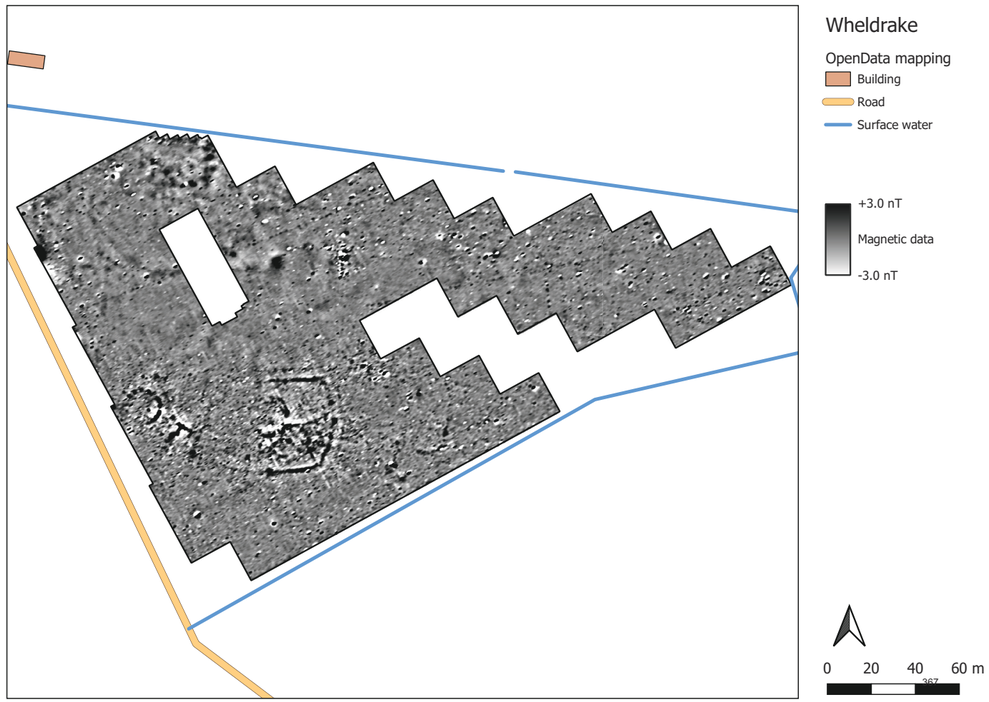
Some modern features are visible in the earth resistance: a number of straight linears running ENE-WSW, parallel with the southern field boundary, that likely represent field drains, and a very close and consistent pair of parallel, linear low resistance features curving E-W across the enclosure that were interpreted as resulting from tractor movement. “Stripes” caused by present-day ploughing are visible running NNW-SSE across the entirety of the survey area.

Area B of the earth resistance survey shows two or three faint, parallel high resistance linear features running E-W, terminating at a high resistance square anomaly roughly 7m by 7m in size. These features correspond to the faint rectangular trends in this area of the magnetic data, and may represent structural elements, but a wider area would need to be surveyed with earth resistance to understand them better. As this area was not the focus of the project, only the two grids were covered in this survey.

References

British Geological Survey (BGS) (1973). *1:50k geological map of Selby (Sheet 71)*. British Geological Survey.

Kershaw, A (2001). *Vale of York National Mapping Programme: Project Review.* English Heritage.




Wheldrake
OpenData mapping
Building
Road
Surface water
Geophysical interpretation
Survey boundary
Linear trend
Archaeological feature
Magnetic trend
Ferrous/dipole response
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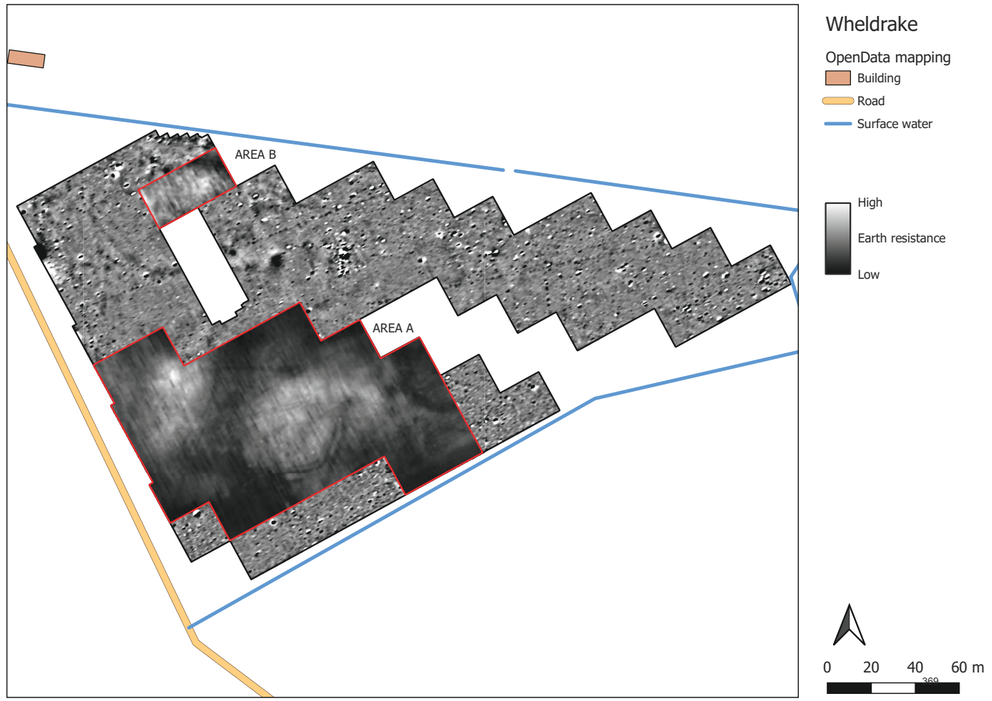
368


AREA B
AREA A
Wheldrake
OpenData mapping
Building
Road
Surface water
High
Earth resistance
Low
0 20 40 60 m
369

The Iron Age Ouse and Derwent Project

Excavations at Wheldrake, 2019

Site location:	Broad Highway, Wheldrake YO19 6BE
Site grid reference:	SE 6708 4664
Site code:	OADP19
Date of excavation:	21 September - 6 October, 2019
HER:	North Yorkshire HER
HER event number:	-
Undertaken by:	North Duffield Conservation and Local History Society
Excavation supervisor:	Paul Durdin, Jon Kenny
Report prepared by:	Brian Elsey, Paul Durdin, Jon Kenny
Report produced:	August-September 2021
Archive deposited:	Yorkshire Museum (YORYM : 2019.67)

Summary

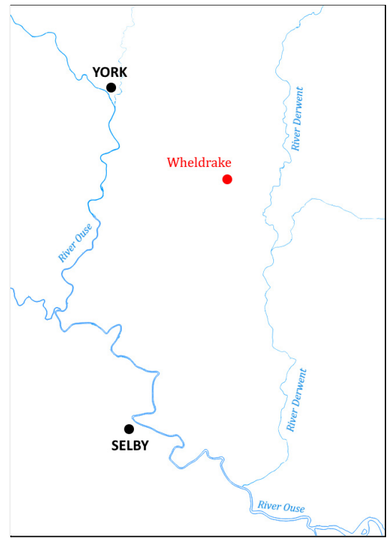
Four trenches were excavated at Wheldrake, revealing a large number of features associated with multiple phases of a late Iron Age to early Roman settlement. Trenches 1 and 3 both contained the ring-ditches of round-houses, while Trenches 2 and 4 were located over the boundary ditches of a large double-bounded enclosure surrounding the buildings in Trench 3.

Table of Contents

Introduction

The excavation site at Wheldrake is situated to the east of Broad Highway, Wheldrake, directly opposite Hard Moor Farm which was investigated separately in 2018 under site code HMF18. This site was chosen as a suitable replacement for Hard Moor Farm when that site was deemed not to meet the research criteria of the Project.

The site was selected for investigation as a result of aerial photographic evidence revealing apparent Iron Age or Romano-British crop marks indicating a roughly square double-ditched enclosure with an entrance facing east, one ring-ditch in the interior and another outside it to the west, and numerous linear features and boundaries. A drone survey, conducted prior to the excavation by Tony Hunt from Yorkshire Archaeological Aerial Mapping, both confirmed the presence of these crop-mark features and increased the level of detail visible, while also revealing a number of other features that had not previously been identified.



Geophysical survey of the site—using both fluxgate gradiometry and earth resistance—also correlated strongly with this much more complex picture, and confirmed that the crop mark evidence was due to the presence of buried archaeological features (Durdin 2020).

Archaeological Preamble

The project objectives sought to build on our understanding of the archaeological landscape in our part of the Vale of York area. The complex enclosure, linear features and ring ditches suggested an Iron Age or Romano-British settlement of the kind to be expected in the area, outlined in the desk based assessment produced for the project (Ratcliffe *et al* 2020). It also corresponds to the late Iron Age and Romano-British enclosed and complex settlements indicated to the east and west (Chadwick 2009, Halkon 2014 and Allen *et al* 2016). Our objective was to highlight the dating and changes through time at the Wheldrake site, securing the site in the chronology of settlement observed elsewhere.

The apparent enclosed settlement may be a family or clan based rural settlement or of a slightly higher status in either the Iron Age or Romano-British period. It was our objective to attempt to understand the status of the site in its appropriate point or points in time. With

regard to status we would also seek to understand the activities going on at the site: were they simply an isolated farmstead engaged in subsistence agriculture, or was the settlement part of a widely populated landscape and interacting with links further afield.

Geology

The site at Wheldrake is situated on Sherwood Sandstone Group bedrock, officially overlain by a band of the Elvington Glaciolacustrine Formation of silty clays (BGS ref). However, the natural drift geology encountered was sand, varying between white, brown, grey and yellow, visible to a maximum excavation depth of 1.03m in cut **[3412]**. The topsoil was a dark greyish brown silty sand, varying from 0.30m to 0.37m in depth across the site.

Current use

The field in which the excavation was located is triangular in shape, and measures approximately 260m along its western boundary, 400m along its northern boundary and 330m along the southern boundary. It is currently in use as arable land, with a portion of the field set aside as a game reserve. The geophysical survey included some of the latter, where ground conditions permitted, but the excavation only took place in the ploughed area.

Methodology

The trenches were laid out on the same site grid as the geophysical survey, using a Leica total station positioned with reference to several previously identified fixed points (cf. Methodology in Durdin 2020). All the agricultural plough soil was removed by machine, after which the trenches were cleaned by hand to identify archaeological features. Excavation of features was undertaken selectively, with the priority placed on identifying stratigraphic relationships (where unclear), clarifying feature form and function, and recovering dating evidence. In most cases, only a percentage of any single feature was excavated, with the majority of the fills preserved *in situ*, both to allow future investigations and to limit post-excavation time and costs.

Finds were largely cleaned and bagged on site. A very large quantity of heat-affected stones were recovered from some features, and of these only a small number were kept as a representative sample. Due to the fact that most fills were primarily silty sands devoid of biological material, bulk soil samples were only retrieved from archaeological contexts that were either in important stratigraphic positions or had a noticeable charcoal or organic component.

Context, drawing, photo and sample registers were filled out by hand on paper and digitised following the excavation. Individual context records were completed digitally on Android tablets, in a recording system developed using Memento Database. All site records were reviewed on PC following the excavation, and the complete context data was then exported in CSV format for inclusion in the final project archive.

Trench 1

Trench 1 at Wheldrake was 8m by 6m and oriented NNW-SSE, located over the southeastern side of a circular geophysical anomaly suspected to be a round-house ring-ditch. This feature was located 15m west of, and external to the central enclosure that was the primary target of investigation.

Removal of the topsoil revealed a black arcing linear in the southern half of the trench, contrasting strongly with the surrounding mottled yellow natural sand and exactly matching the circular anomaly seen on the geophysical results. Two other linear features were also identified in the trench, along with a modern field drain.

Phase 1 - Prehistoric / Romano-British features

The earliest stratigraphic feature in Trench 1 was a northwest-southeast oriented linear gully **[3105]**, 0.95m wide and 0.14m deep, filled with a dark brown silty sand **3103** from which 31 sherds of Iron Age or Romano-British pottery were recovered. The gully is cut by ring-ditch **[3106]**, which arced across the trench from the northeast to the southwest and represents approximately 12% of the ring-ditch as visible in the geophysical survey. The ring-ditch was 1.4-1.8m wide and filled with a black sandy silt **3102**, with a dense concentration of cobbles to the northeast and occasional clay lenses. At the western end there appeared to be multiple fills, but the extremely wet conditions did not allow this to be fully investigated. A considerable quantity of Iron Age or Romano-British pottery (360 sherds) was recovered from within the two slots excavated through the ring-ditch, chiefly from among the cobbles.

The ring-ditch was cut by a second northwest-southeast gully **[3104]**, 0.4m wide and extending beyond the northwest and southeast ends of the trench. It was filled with a black silty sand **3101**, and similar pottery was recovered from this feature as from the ring-ditch, suggesting it is also of Iron Age or Roman date.

Phase 2 - 19th-20th century drains

A single ceramic field drain **3107** with a circular profile was identified and partially excavated where it passed through the junction of gully **[3105]** and ring-ditch **[3106]**. Square tiles were laid underneath the ends of the drain segments, presumably to prevent the drain from sinking into the sand. The cut for the drain was barely wider than the pipe, and was highly regular, suggesting it was a machine laid drain dating from the 20th century.

Trench 2

Trench 2 was 20m by 3.6m and oriented ENE-WSW at an acute angle across the east-west northern boundary ditches of the central enclosure. This trench was partly designed to investigate a sharp change in the clarity of geophysical results between the east and west halves of the enclosure, and was positioned across this transition. However, the trench was

also considered to be low priority, as the nature of the archaeological features was already apparent from the crop marks and geophysical survey results.

Removal of the topsoil revealed the two large, parallel boundary ditches running east-west, along with a smaller ESE-WNW linear on the southern or interior side of the inner boundary ditch and an irregular feature between the two boundary ditches.

Due to lack of time, and with the trench partially flooded for most of the duration, no features within the trench were excavated. The question of the clarity of geophysical features was not resolved.

Phase 1 - Prehistoric / Romano-British features

While unexcavated, the boundary ditches can be assumed to date from a similar period to the enclosure's interior features. One terminal of the inner ditch was also excavated in Trench 4 and can be confidently assigned a late Iron Age or Romano-British date based on the evidence obtained there.

The northern or outer boundary ditch **[3202]** was evidenced by a 2.2m wide dark brown silty sand fill **3201** across the northeastern end of the trench. The sides of the fill were noticeably lighter, and although not clearly defined this suggests multiple fills or collapsed sides of the feature. About halfway along the exposed portion of the ditch, it cuts an earlier irregular dark brownish grey feature **3203 [3204]** that exists only as a short curve. The shape and fill of this earlier feature suggests it was a tree throw.

The inner boundary ditch **[3206]** ran parallel to and 2.7m to the south of the northern ditch. Its edges were less clearly defined and significantly banded, indicating a complex series of fills, and was up to 2.3m wide. The predominant central fill **3205** was a dark brown silty sand.

A third 0.6m wide linear feature **[3208]** was seen running ESE-WNW to the south of the inner boundary ditch, characterised by a dark brown silty sand fill **3207**. This is assigned to Phase 1 based on its appearance, but may well be of later date.

Phase 2 - 19th-20th century drains

Two narrow, parallel linear features, approximately 7.6m apart, were visible running NNW-SSE across the trench width and clearly cutting through other features. These are presumed to be field drains, likely machine-laid drains dating from the 20th century based on their very regular and narrow appearance. This would match a drain excavated in Trench 1.

Trench 3

The largest trench at 20m long by 14m wide and oriented NNW-SSE, Trench 3 was positioned in the southeastern quarter of the double-ditched enclosure, encompassing a portion of the large central ring feature and a geophysically 'noisy' area to its south. The crop

mark evidence suggested a second, smaller ring-ditch in this area, along with some linear features suggesting a smaller enclosure within the main boundary. Removal of the topsoil revealed all the features identified in the surveys, with multiple phases of use clearly evidence from intercutting and overlapping ring-ditches and enclosure features.

The features comprised a very large ring-ditch in the northwestern end, a smaller ring-ditch entirely within the trench and associated with several narrow linear features around it, a second smaller ring-ditch slightly offset from the first and extending beyond the southwest and southeast trench boundaries, and several discrete circular or sub-circular pit and post-hole features. Of the discrete features, only a subset were investigated due to the limited time available. The trench also contained a number of modern ceramic field drains.

Phase 1 - Prehistoric / Romano-British features

The majority of the features in the trench belonged in this phase, but were further separated into two sub-phases, representing two periods of occupation and building on the site (see Figure 1). While the phasing was indicated from the stratigraphic record, the dating of the pottery is not definite enough to ascribe the phases to particular periods.

Phase 1a

In the first sub-phase, the enclosure's central ring-ditch **[3346]** was approximately 15m in diameter. Close to the south of it was a narrow series of ditches **[3350]** and **[3369]** surrounding a second, smaller ring-ditch **[3330]** to the south. This matched the features seen in the geophysical survey and the crop marks, which suggested that the southeastern quadrant of the enclosure was subdivided into smaller areas in this way.

Ring-ditch **[3346]** was present in the trench for approximately 45% of its circumference, curving southeast from the western trench corner, round to the east and curving back north into the northern trench corner. It was up to 1.0m wide where its full width was visible and undisturbed, but the majority of the feature had been truncated by the later phase rebuild (see Phase 1b below). On the eastern side of ring-ditch **[3346]**, just within the northern trench corner, was a gap in the ring approximately 3m wide, with the ring terminating either side of this gap in a rounded end. Extending between the ring-ditch terminals was a faint, narrow linear 0.2m wide, but this feature was not identified until late in the project and was not excavated. The gap was interpreted as representing a doorway into the round-house, with the narrow linear being the remnant of a door or barrier, perhaps a slot to hold a threshold beam. The doorway of the round-house would thus have faced east towards the entrance into the overall enclosure.

Ring-ditch **[3346]** was filled with a dark greyish brown sand **3302=3376** containing frequent burnt sandstone cobbles and occasional lenses of clay. The pottery recovered from this fill was largely of probable Iron Age date, and carbonised residue on one of the sherds was successfully radiocarbon dated to 2194 ±24 BP: 267 ±94 calBC (95.4% probability). However, this sherd may have been residual, as some sherds from the fill had forms that

suggested a date in the 1st or 2nd century AD. Nevertheless, it is clear from the radiocarbon date that there was occupation on the site in the Middle Iron Age.

South of the central ring-ditch, and curving roughly parallel with it for most of its length, was a ditch **[3350]** that extended east and west out both the northeastern and southwestern trench limits. At the northeastern side of the trench, just outside the central round-house's doorway, ditch **[3350]** turned more directly east towards the enclosure entrance, where it was excavated as **[3338]** and filled by **3304**. This ditch, like the first phase central ring-ditch, was truncated by the later phase ring-ditch, and its original width was not possible to determine. In the relationship slots excavated, it was thought to be up to 0.9m deep, but this was not definite due to the complexity of the deposits in these slots (see discussion of Phasing Uncertainties below).

Two arms extended south and southeast from ditch **[3350]** at approximately one-third intervals along its exposed length, to the west and east of the southern ring-ditch. The former **[3369=3375]** extended up to and beyond the southwestern trench boundary, but the latter **[3331]** terminated after 8.5m in a slight bend and rounded end outside the east-facing doorway of the southern round-house. No continuation of the ditch was visible to the south, on the other side of the doorway.

Ditch **[3350]** had several fills, and while only four were numbered they are likely to have each represented multiple deposition events. In some cases the fills identified in the east-west portion of the ditch were correlated with those in the 'arms' to the south, but these equivalences may have been incorrect. Fill **3321**, in the base of the ditch, was a light grey silty sand up to 0.25m deep, although the lower portion of the fill contained a high proportion of natural sands and probably represented the collapse of the ditch sides. Above this was fill **3337=3343**, a dark greyish brown silty sand with occasional sandstone cobble fragments that was identified as corresponding to the single fill **3323** in the eastern arm terminal **[3331]**. The final fill was **3316**, a silty sand excavated as one deposit but made up of at least three discrete layers of dark and light sand. The western arm **[3369=3375]** had two fills, a soft grey sand **3374** and over it a brownish grey sandy silt **3354**. These almost certainly corresponded to fills within **[3350]**, but no correlation was made in this case.

These ditches together formed a boundary around the first phase southern ring-ditch **[3330]**, creating a subdivision within the enclosure that separated it from the central round-house. By the end of Phase 1a, the ditches had silted up, with the number of fills suggesting a series of different deposition events over some considerable length of time.

The first southern round-house was considerably smaller than the large central one, with the ring-ditch **[3330]** measuring only 8.8m in diameter and 0.8m in width. Like the central building, it had an entrance facing east, evidenced by a 2.1m gap in the ring-ditch which corresponded to a gap in the ditches surrounding it. The ring-ditch truncated three discrete earlier features **[3362]**, **[3364]** and **3378** discussed separately below.

Ring-ditch **[3330]** had a single fill, a mid greyish brown silty sand **3313=3314=3336=3352** with slight variations in colour around the circumference of the ring and occasional

sandstone fragments. A number of pottery sherds of late Iron Age or Romano-British date were recovered from this fill, including a large proportion of a single small globular jar.

There were no internal post settings that could be definitely associated with this ring-ditch, although there were several pit features of unknown phase within the interior. Like the boundary ditches around it, ring-ditch **[3330]** had silted up by the end of Phase 1a.

Phase 1b

In the second period of use, the large central ring-ditch was reinstated (**[3344]** and **[3345]**) with a greater diameter of approximately 19 metres, centred on roughly the same point as the first phase. The southern round-house was also rebuilt on a larger scale, with the later ring-ditch **[3324]** measuring 10.4m in diameter. However, the enclosure around the southern ring-ditch was not reinstated, suggesting perhaps that the use of the southern building differed following its reconstruction.

While two secondary phase cuts or recuts **[3344]** and **[3345]** were recorded for the large central ring-ditch, neither their full extent or their relationships with underlying deposits were at all clear during the excavation (see 'Phasing uncertainties' below). Their form and function was also not properly understood until the post-excavation process, when their shape in plan was more clearly defined. Cut **[3344]** was earlier, and was filled by a single greyish brown sand **3301** from which thirty sherds of late Iron Age pottery were recovered. Carbonised residue on one of the sherds was successfully radiocarbon dated to 2058 ±24 BP: 69 ±83 calBC (95.4% probability), confirming the late Iron Age date.

The second cut **[3345]** was much clearer in section as the latest feature, with an approximate width of 1m and a depth of 0.35m and a shallow U-shaped profile. It was filled with a dark brownish grey silty sand **3317** that had occasional heat-affected sandstone cobble fragments and a thick clay lens at its base. This fill was likely the same as fills **3305=3322** and **3307**, as excavated in separate relationship slots, but this was not confirmed on site. Likewise, cuts **[3339]** and **[3341]**, associated with these fills, were probably continuations of cut **[3345]**, but the boundaries of the cuts and fills were much less distinct at those points. Pottery sherds of Iron Age to Romano-British date were recovered from these fills, although as these ring-ditches cut through earlier features the finds may well have been residual.

At their eastern end, where they terminated in the doorway, the later phase ring-ditch cuts bowed slightly outwards, rather than curving north towards the opposite terminal. As the magnetometry results indicated that the northern terminal was similarly bowed, this suggested there was a porch-like structure around the round-house door. There was no evidence for a similar feature in the earlier phase. Conversely, in the rebuild there was no indication of a threshold or barrier across the doorway as there had been in the first phase.

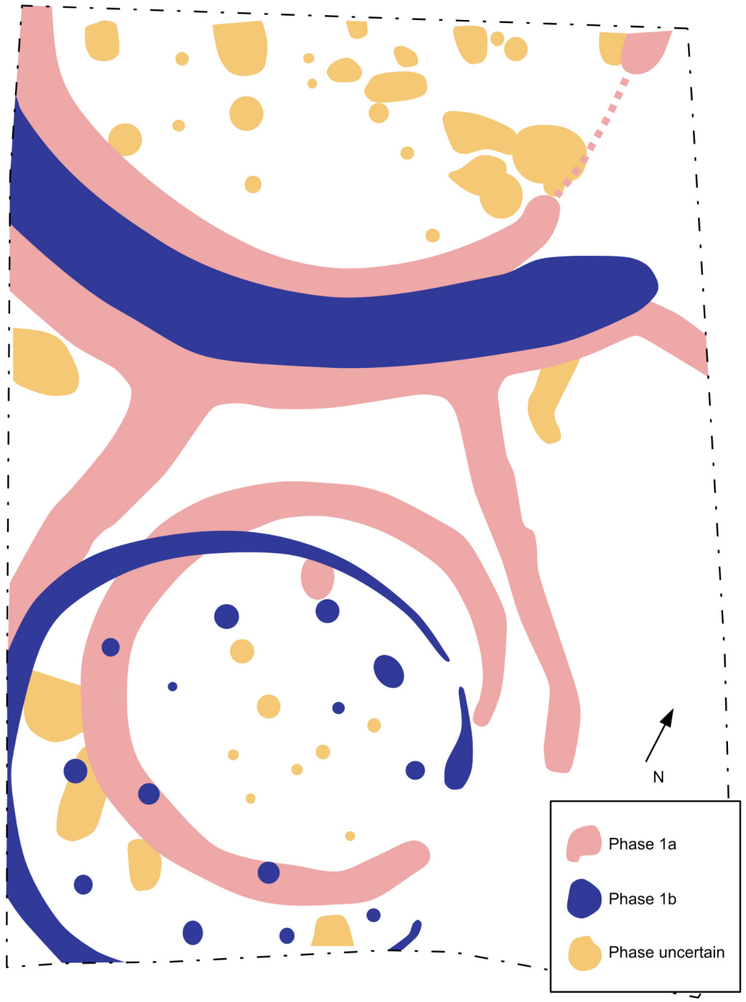


Figure 1. Simplified phase diagram of Trench 3, with field drains excluded.

The later rebuild of the southern round-house was larger than that in Phase 1a, but slightly offset, with a central point approximately 2m south-southwest of the earlier structure's centre. Ring-ditch **[3324]**, which would have surrounded the building, was also narrower and less consistent in profile, tapering away in its northeastern segment, perhaps indicating a

shorter period of use. In a large relationship slot to the west, where it interacted with the earlier ring-ditch and the enclosure features, ring-ditch **[3324]** was roughly 0.6m wide and 0.23m deep, with a U-shaped profile. By comparison, the northern terminal **[3342]** in its eastern entrance was 0.8m wide but only 0.13m deep. It was filled with a single greyish brown sandy silt **3310=3315=3351**, and had a 3m gap on its eastern side that indicated the position of the round-house doorway. This secondary ring-ditch **[3324]** cuts through the earlier ring-ditch and the enclosure ditches that surrounded it, which had both silted up by the time ring-ditch **[3324]** was instated. Several internal features were identified as post settings associated with the rebuild of this round-house, and are discussed in detail below.

Pits in northern round-house

A large number of ovate and sub-circular features were revealed within the interior of the large northern round-house. Because of the complexity of these features, and as only a portion of the round-house had been uncovered, it was decided to leave most of them unexcavated. A single 2.4m by 1m slot was dug just inside the round-house entrance, extending west from midway through the southern ring-ditch terminal and providing a section through a number of the interior features. This revealed a complicated series of intercutting pits which proved difficult to separate and interpret in the limited time and very wet conditions.

The earlier phase of the northern ring-ditch was present in the southeast corner of this complicated relationship slot, as it included a quadrant of the terminal on the south side of the round-house doorway. This cut **[3346]** had a rounded profile, 0.27m deep, and was filled with dark greyish brown sand **3302=3376**, a deposit that contained a significant quantity of burnt cobbles. The ring-ditch terminal had no definite stratigraphic relationship with any of the pits, despite their close proximity.

Located on the southern side of the slot, pit **[3359]** around 1m long, 0.7m wide and 0.5m deep, was of somewhat irregular shape. It was filled with a brown sand **3335** with occasional rounded medium stones, at the base of which was a darker layer thought to be a concentration of organic material. This pit was truncated by a later pit on the southern side **[3358]**, which was located directly inside the ring-ditch terminal. Pit **[3358]** was bowl-shaped, with a diameter of 0.7m and 0.27m deep, and was filled with a brownish grey sand **3333** from which five pot sherds of late Iron Age or Romano-British date were recovered. Its boundary with the fill **3335** of the earlier pit was quite distinct. There was a small lens of clay **3303** on top of these two pits, but it was unclear if it was associated with either fill or was simply a deposit at the base of the topsoil.

A second sequence of pits was visible on the northern side of the relationship slot, with the earliest being pit **[3367]**, an indistinct feature filled with a brownish sand **3334** with extremely diffuse boundaries. While it was recorded as being 0.25m deep, it's likely that only the upper 0.05m of this was actually a fill, with the lower portion simply natural sands stained by water seeping through the deposit above. A single small fragment of unidentifiable fired clay was recovered from this fill. Feature **[3367]** was cut by a much clearer ovate pit **[3356]**, which was 1.9m long, 1.3m wide and 0.44m deep. This pit had steeply sloping sides and a flat

base, and was filled with a mottled grey sandy silt **3332** that contained lenses of thick clay. No finds were found in this feature, but it was in turn truncated by a small circular bowl-shaped pit **[3357]**, which was located in the round-house doorway adjacent to the southern ring-ditch terminal. Pit **[3357]**, 0.4m diameter and 0.15m deep, was filled with a dark brownish grey silty sand **3360**, which was very similar in colour and composition to the fill of the ring-ditch terminal beside it. Like the ring-ditch, it contained a quantity of burnt sandstone cobbles, and though it was much shallower, it seems likely that its function was connected to that feature.

A small discrete circular post or stake hole **[3348]**, 0.2m in diameter and 0.1m deep, was half-sectioned just beyond the western end of the slot. It was filled with yellowish brown sandy clay **3347**, and contained no finds, and its function within the overall structure remained unknown.

Although there was some stratigraphic progression visible amongst these pits, none of them could be reliably placed in a phase. Further excavation revealing their position with relation to the complete round-house, and to the many other features in the interior of the structure, would be necessary to understand them properly.

Southern post settings

Certain discrete features that were excavated could be reliably placed within Phases 1a or 1b according to their stratigraphic position or location in the trench. These consisted of a number of features within the southern ring-ditch phases that represented post rings within the structures.

An ovate pit **[3325]**, 0.9m long by 0.8m wide and 0.24m deep, with shallow sloping sides and a flat base, was excavated within the northern interior of the southern ring-ditch **[3330]**. It was filled with a greyish orange clay **3309**, and as it was cut by the later phase ring-ditch **[3324]** it can be placed in Phase 1a. It may have been a post setting for the earlier southern round-house, but there was no clear ring of similar settings with which to associate it.

The later phase southern round-house appeared to have two rings of posts within its interior, although these were not all identified until after the excavation (see Figure 2). Three of the outer ring post settings were half-sectioned, with a further seven not investigated. Post setting **[3326]** was the northernmost of the ring and was a circular pit 0.5m in diameter, 0.16m deep and filled with firm orangish grey clay **3308**. The next setting in the outer ring, moving in a clockwise direction, was a post setting **[3328]**, 1.1m to the east-southeast of **[3326]**. This was oval in shape, 0.74m long and 0.56m wide, and 0.22m deep. It was filled with an orangish brown silty clay **3319**. A third circular setting **[3366]**, directly opposite **[3328]** within the ring, was excavated in the southwestern corner of the trench. This was smaller at 0.4m diameter and only 0.9m deep, and was filled with a dark brownish grey silty sand **[3365]**.

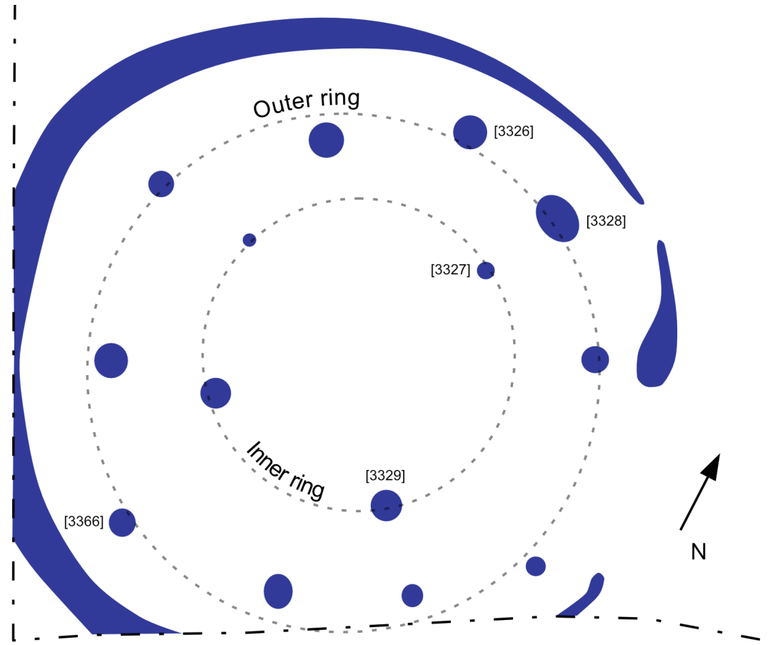


Figure 2. The inner and outer rings of post-settings within the Phase 1b southern ring-ditch in Trench 3. Excavated features have associated cut numbers. Features that have no clear association with Phase 1b have been excluded from this diagram.

The inner ring of post settings was represented by two cut features **[3327]** and **[3329]**, along with two other unexcavated features. Post setting **[3327]** was a small circular pit 0.22m in diameter and only 0.15m deep, filled with a light brown sand **3311**, although the boundary at the base of the feature was very indistinct and it may have been deeper. Pit **[3329]** was much clearer as it was cut through into fill **3313** of the earlier ring-ditch. It was 0.5m in diameter and 0.13m deep, and filled with a firm brown clay **3312**.

It was not clear if two rings of posts were needed to support the building, or if the inner ring might have formed a separate interior structure or perhaps a temporary supporting feature during the initial construction. The small diameter of some of the outer post settings suggested the former as a viable interpretation, but the truncation of any floors or occupation deposits made it difficult to answer this question.

Discrete features

Three shallow brownish grey deposits of irregular shape **3361**, **3363** and **3378** were investigated within the southwest corner of the trench. It was clearly seen in plan that they

were cut by the early phase ring-ditch **[3330]**, and thus must pre-date it. Deposit **3361**, 0.9m long by 0.5m wide, was sitting within a 0.1m deep cut **[3362]**, and **3363**, 1.03m long by 0.7m wide, within similarly shallow 0.15m deep cut **[3364]**, but neither appeared to be deliberate cuts, rather just somewhat irregularly shaped depressions or scoops in the ground. It was unclear if these were natural features such as tree throws, or earlier archaeological features, but no anthropogenic material was recovered from any of the three. Deposit **3378**, also only 0.1m deep, was identified during excavation of a slot investigating the relationship of ring-ditches **[3330]** and **[3324]** with enclosure ditch **[3369]**. It was up to 3m long and 1m wide, but as it was truncated by the ring-ditches its true extent remained uncertain. A narrow curving gully **[3371]** was present in this same area, extending northeast from the southwest trench limit and curving around east and south for some 2.7m before terminating. It cut through the second phase ring-ditch **[3324]**, and therefore must have post-dated that feature, but no finds were recovered from it to provide a better understanding of its origin. It was filled with a single dark brown sandy silt **[3370]** with distinct boundaries in section.

A small curving linear feature **[3340]**, roughly 2m long and 0.28m deep and filled with a black silty sand **3306**, was investigated just south of the large central ring-ditch entrance. No finds were recovered from the fill and the feature may have been a tree throw. Feature **[3340]** was truncated at its northern end by the enclosure ditch **[3350]**, with a brownish grey silty sand fill **3318** which was itself cut by the later central ring-ditch **[3341]**.

A light yellowish grey pure clay deposit **3320** was encountered in the eastern corner of the trench, and as it had no clear shape in plan a box section was excavated through it. The deposit proved to have an irregular base and was not filling a cut, and may have been merely a natural lens of clay. However, given that the natural sands in which it sits are aeolian deposits and thus should not rightly include large lenses of clay, it's not improbable that **3320** represents material sourced for use during occupation of the site and discarded at this spot. An alternative interpretation is that the deposit was a post-pad, but such a post would need to be part of a larger structure to stand upright, and no evidence was seen for such a structure.

Phase 2 - 19th-20th century drains

Two separate field drain systems were visible in the trench, and neither was excavated to any extent as their identity was clear. The first comprised two parallel drains extending east by south by up to 4.7m from the northwestern and northeastern sides of the trench, 8.4m apart. Ceramic pipes within the drain cuts were only barely exposed at the base of the topsoil.

The second drain system was visible in the southern end of the trench, where two similarly parallel drains were visible extending north-northwest for 5.9m from the southeastern trench boundary. These were only 6.7m apart, and were associated with a narrow drain-like feature running perpendicular to them across the middle of the trench. The perpendicular feature did not appear to contain a pipe.

Both systems correspond exactly to those uncovered in Trench 4 to the east, and the first system described above was seen to continue across Trench 3 to the north. All the field drains were given a single context number **3377** for simplicity of recording.

Phasing uncertainties

The stratigraphic details were very uncertain where the earlier southern 'sub-enclosure' is cut by the later phase of the large central ring-ditch. Two relationship slots were excavated through positions where the features meet, but the limited time for recording in the field—both slots filled with water during the process—made it difficult to unpick the complexity. There were numerous interleaving deposits, and at least four cuts or recuts visible, but even close examination of the photographs and photogrammetric models left some questions unanswered. Likewise, equating contexts between the two relationship slots proved to be only partially achievable. For example, fills **3349** and **3353** and cuts **[3372]** and **[3373]** were identified within the western relationship slot, but could not be convincingly matched to fills and cuts seen in the eastern relationship slot despite the apparent continuation of the features involved.

One definite interpretation was that the southern enclosure pre-dated the later phase of the large central ring-ditch. The spatial arrangement of the east-west arm of the southern enclosure, curving parallel to the earlier phase of the large central ring-ditch, hinted that it was at least contemporary with that round-house. This interpretation then suggested that the later phases of both ring-ditches were also contemporary, giving a fairly straightforward breakdown into two prehistoric/Romano-British phases which was used here. Future work may be able to provide further stratigraphic definition and understanding.

Trench 4

Trench 4, at 14.5m long by 8.8m wide, was located over the eastern entrance to the large central double-ditch enclosure, taking in the terminals of the boundary ditches on both the northern and southern sides. Removal of the topsoil revealed these terminals in the positions predicted, along with a number of discrete ovate and linear features and five field drains.

Due to inclement weather and limited time, the only ditch excavated was the terminal of the inner boundary to the north of the entrance. This was first investigated via three small relationship slots before being half sectioned for 3.5m along its length. Three of the discrete ovate features, all on the interior of the enclosure, were also excavated.

Phase 1 - Prehistoric / Romano-British features

The features collected within this phase almost certainly represent a broader range of use than is suggested by the grouping, but the limited nature of the excavation does not allow for greater definition or separation into multiple phases.

Northern boundary ditches

The terminal of the inner boundary ditch, to the north of the enclosure entrance, was clearly visible as a dark grey linear projecting 5.1m south from the northwest trench edge. It was overlaid by two faint parallel linear deposits **3404=3405** and **3408**, 1.5m apart, which were not in cuts but appeared to be a mix of topsoil and the disturbed upper fill of the boundary ditch. These features correspond to a double linear visible for over 60m in the resistance survey results, and were identified as 'tire tracks' from tractor movement across the field.

The boundary ditch **[3412]** contained a number of fills with merging boundaries, the uppermost being **3401=3403=3407=3409** (as excavated in different slots), a dark grey silty sand 0.57m deep with occasional small fragments of sandstone and frequent bog iron specs. It also contained occasional lenses of lighter coloured sand, suggesting it was not formed in one single event but over some time.

Under **3401** was **3415**, a light grey sand dipping down from the south and east and 0.15m deep. Some pottery was recovered from within this fill, but it appeared to mostly be made up of natural sands and was thought to represent weathering off the shoulders of the ditch.

Concentrated at the southern end of the terminal, under **3415**, was **3416**, a carbon-rich black silty sand containing frequent charcoal, charred wood, burnt bone and small angular sandstone fragments. This deposit was 0.2m deep and was interpreted as a deliberate dump of material rather than natural accumulation.

The probable primary fill of the ditch **3417** was a grey clayey sand with occasional cobble fragments. Its depth and full extent were uncertain, with the wet conditions during excavation allowing only brief exposure of the underlying natural sand, before it was re-covered with water and mud.

A number of sherds of wheel-turned pottery were recovered from the secondary fills (**3401**, **3415** and **3416**) in the boundary ditch, including Ebor ware, Central Gaulish samian ware and Dressel 20 amphora, all dating no earlier than AD120. The primary fill **3417** contained handmade pottery, suggesting an earlier date, but carbonised residue on one of the sherds was successfully radiocarbon dated to 1952 ±24 BP: 62 ±67 calAD (95.4% probability), indicating that the ditch itself is likely to be very late Iron Age or even early Roman in date, and almost certainly post-dates the first phase of the large central ring-ditch.

Cutting through upper fill **3401** to a depth of 0.4m, on the eastern edge of the ditch, was an apparent post-hole **[3424]**, visible in the south-facing section of the quadrant excavated. This was filled with **3425** a light yellowish-grey sandy clay with very indistinct boundaries.

The inner boundary ditch **[3412]** was found to cut an earlier curved linear feature **[3414]**, which extended west from the northeastern trench edge. This was filled with **3410** a dark grey sandy silt, but contained no finds. A possible continuation of this earlier feature was

visible on the further side of the boundary ditch, if the arc of the excavated segment was followed, and it's not impossible that this represents a ring-ditch pre-dating the enclosure.

The suspected outer boundary ditch was visible as a grey deposit projecting 0.5m from the northeast trench baulk, but as the full extent was not exposed, it was left unexcavated. No relationship with other features was visible.

An indistinct 0.65m wide linear feature **[3413]** was visible extending 3.4m south from the northern trench corner, parallel with the inner boundary ditch **[3412]**. It then terminates or curves to the west, but was obscured by later disturbance **3404=3405** and **3408**. It was filled with a soft brownish grey sand **3406=3411** that contained a single sherd of Iron Age or Romano-British pottery, and was 0.27m deep. The feature's orientation suggests it was likely related to the enclosure boundary system.

Southern boundary ditches

The southern boundary ditch terminal was not excavated, but was allocated context numbers in order to manage finds retrieved from the surface of the features. Two main elements of the southern boundary ditches were identified.

The first was a dark grey silty sand linear **3426**, 4m wide and extending north-northeast 6.1m from the southern corner of the trench, terminating in a rounded end, corresponding to the inner boundary ditch on the geophysical survey. This feature appeared very similar to the northern inner boundary ditch terminal and sits opposite it across the enclosure entrance, although at a different angle. A band of thick light grey clay ran along the eastern edge of the feature, along with a band of yellowish grey sand, suggesting the ditch had multiple fills.

The inner ditch appeared to overlie or truncate an earlier mid grey silty sand linear **3402**, 1.8-2m wide, which extended 5.8m west-northwest from the east corner of the trench, perpendicular to the inner ditch terminal. This had an internal corner or junction with another feature close to the southeastern trench boundary, corresponding to the position of the outer boundary ditch on the geophysics. It was not possible to determine if these were separate features or a single cut, but feature **3402** also corresponds to a faint linear anomaly on the geophysical survey which trends to the southeast before turning north approximately 40m from the trench.

While excavation was not possible, the fact that inner boundary ditch fill **3426** appears to overlie the earlier boundary feature **3402** suggests that the enclosure saw multiple phases of use, as it was reinstated at least once after feature **3402** had already silted up. This may simply have involved a recut of the inner ditch, perhaps corresponding with the Phase 1b reconstruction visible in Trench 3, but it's not impossible that the inner ditch entirely post-dates the outer ditch. Only further excavation could resolve this point.

Discrete features

Three discrete pit features were excavated on the interior side of the boundary ditches, and a fourth 0.9m diameter circular feature, on the line of the outer boundary ditch, remained uninvestigated.

Pit **[3422]** was a shallow sub-circular cut 1.1m long, 1.0m wide and 0.19m deep, with a flat base and steep sides. The boundaries were very indistinct, and it was likely slightly over dug for this reason. It was filled with a soft mid brownish grey sand **3419** that contained no artefacts.

Pit **[3423]** appeared similar in plan, although slightly smaller at 0.9m long by 0.7m wide. However, it proved to be much deeper at 0.51m, and narrowed to 0.3m with a step near the base. It was filled with a dark brown sandy silt **3420** with occasional clay inclusions towards the base.

Part way through excavation, a narrow north-south linear feature was identified entering pit **[3423]** from the south, but it proved impossible to determine the relationship between the two. The linear feature was not separately excavated and was not allocated a context number, but is just visible in the final photography and 3D model of the trench. It does not appear to extend north beyond pit **[3423]**, but does extend south beyond the limit of excavation.

The position of pits **[3422]** and **[3423]** was significant: they are located just inside the enclosure entrance, and in similar positions relative to the boundary ditch terminals. Pit **[3422]** is 1.1m southwest of the northern inner boundary ditch terminal, while **[3423]** is 1.0m northwest of the southern terminal. While the nature of the features themselves is indeterminate, these positions relative to the entrance and each other suggest they are post-settings relating to a structure at the enclosure entrance, perhaps a gate.

Phase 2 - 19th-20th century drains

There were five linear features in Trench 4, grouped as a single context **3427**, which were interpreted as field drains or of related origin. Four were consistently 0.2m wide, very straight and regular, with a mixed fill of brown sandy silt and yellow natural sand. The fifth was the same width but intermittent along its length, as if it was contained within the topsoil and machine away leaving only a trace within the trench; if so it did not contain a drain pipe. None of these features were excavated.

A single drain was present crossing the trench from southwest to northeast approximately halfway along the trench length. It does not appear to relate to the others, but matches a drain running through Trench 3 and had been identified on the geophysical surveys prior to excavation.

Two drains ran parallel north-northwest by south-southeast, roughly 8m apart, and belong to the same system as those on the same alignment in Trenches 2 and 3. The eastern one of these two extended south from the northeast trench edge, but terminated approximately 4m from the southeast trench edge. This matched those in Trench 3 which terminated on the same east-west line.

The fourth clear drain was visible running north-northwest for 6m from the southeastern trench boundary, terminating where it met the fifth, and much fainter east-west linear, which crossed the trench at this point. This fourth drain is aligned with those in the southern half of Trench 3 and with the drain in Trench 1.

Discussion

The excavations at Wheldrake revealed a multiple-phase round-house settlement of late prehistoric to early Roman date, confirming the interpretation suggested by crop-mark evidence and prior geophysical survey. This settlement, investigated in Trenches 2 to 4, initially took the form of a sub-rectangular double-ditched enclosure around one or more round-houses. Round-houses were also present outside this enclosure during the later occupation, as evidenced by the ring-ditch excavated in Trench 1. The geophysical survey and crop-marks indicate this settlement was part of a wider agricultural landscape, with many probable field boundaries visible.

The stratigraphic sequence of the main enclosure shows how the settlement changed over time, with early internal divisions between the structures silting up and abandoned in later phases even though the round-houses were rebuilt in the same positions. Similarly, the huge enclosure ditches at the entrance suggested that the inner boundary was reinstated after the outer ditch had been filled in, perhaps in conjunction with the rebuilding of the round-houses.

Pottery recovered during the excavation largely consisted of coarse hand-made jars, with only a small proportion of more characteristically ‘Roman’ wheel-turned vessels appearing in the assemblage. This suggests that the settlement, even in its later phases, had limited communication with Roman trade networks. Almost no post-Roman pottery was present, even in the modern plough soil, indicating that the site was likely used exclusively for agriculture, if at all, after the settlement was abandoned.

Only a small amount of iron smelting waste material was recovered during the excavations, suggesting that iron working was taking place nearby, but not within the settlement itself. Likewise, the animal bone assemblage was very poorly preserved and suggested merely casual disposal of food waste, in the form of sheep and cattle bones, with no in-depth interpretation possible. A single pyramidal ceramic loom weight found in the enclosure ditch, and of common Iron Age or Romano-British form, hints at the production of cloth on site. The biological evidence recovered from the environmental samples was similarly poorly preserved and provided no real interpretive information.

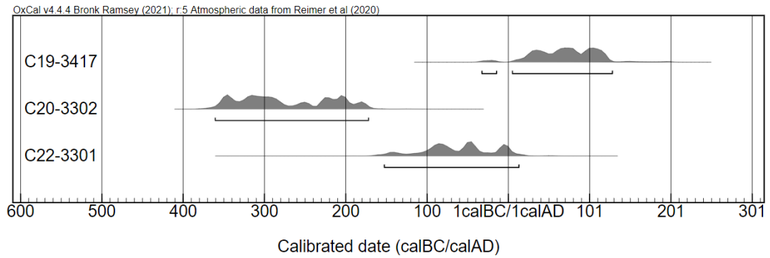


Figure 3. Radiocarbon dates from Wheldrake.

However, the dating of the settlement was fairly definite. Residual flint finds indicate earlier prehistoric occupation of the area, but the pottery assemblage is made up almost exclusively of Iron Age and Roman types. Three radiocarbon dates, obtained from carbonised residues on pottery from Trenches 3 and 4 (see Figure 3), provide more precise dating and show that the settlement was first established within the Middle Iron Age and continued in use until the 1st or early 2nd century AD. There are no features or finds to indicate occupation of the settlement beyond this point, perhaps suggesting a change in social or agricultural norms during the Roman period that caused the site to be abandoned.

In conclusion, the settlement at Wheldrake was inhabited for three or four hundred years over the late prehistoric to early Roman period. While it was a relatively small site, perhaps originally an isolated farmstead, over the course of its occupation it saw multiple phases of reconstruction that indicate it was a location of some importance. While it was perhaps never a strikingly rich settlement, its continued presence over centuries suggests that the inhabitants were in a comfortable position socially and economically. By the end of its occupation, if not originally, it appears to have been integrated into a complex system of enclosures and field systems spreading across a large part of the surrounding area.

There is considerable potential for further investigation of the site. Only a small section of the central enclosure interior was uncovered in Trench 3, and within that only a portion of each feature was excavated. The boundary ditches within Trench 2 remained untouched, and in Trench 4 only the northern inner terminus was half-sectioned, so there is significant capacity for further discoveries in these features, particularly with regard to the exact chronological sequence. Due to the wet weather, the complexities of many of the features in Trench 3 were not fully untangled, and some stratigraphic relationships were, in the end, not definitively resolved. The site would be ideal for a large-scale open-area excavation, perhaps as a university field school, if adequate funding could be obtained.

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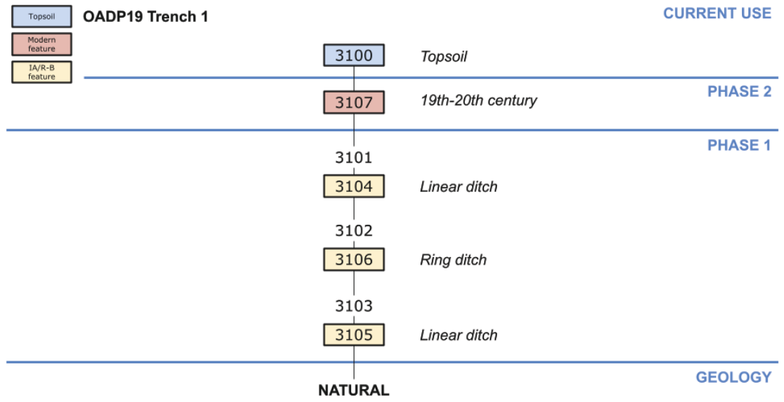
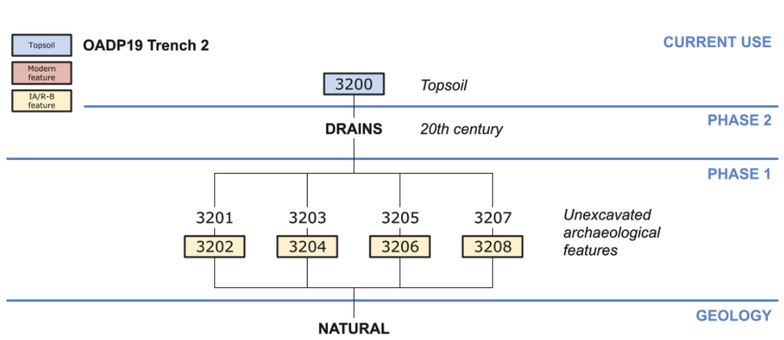
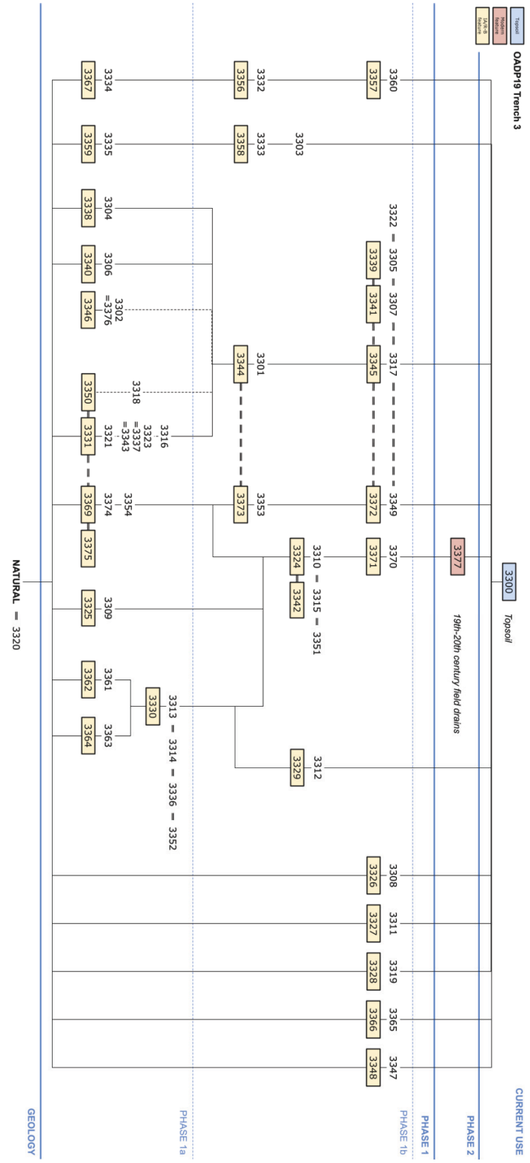
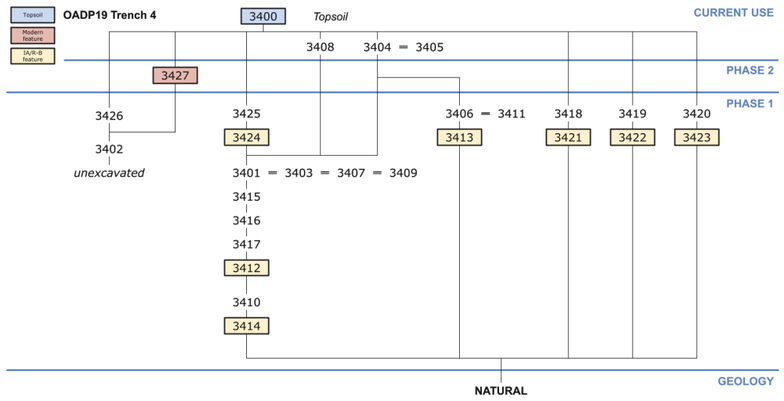
Appendix 1: Trench Matrices









A report on the pottery from North Duffield Conservation & Local History Society excavations at Cannon House Farm, Wheldrake (OADP19)

I.M. Rowlandson

March 5th 2021 *updated March 1st 2022*

Introduction

The pottery from the Wheldrake site consisted of a good range of handmade pottery, mostly with quartz-gritted fabrics, that dated to the later Iron Age to the 2nd century AD. The successful radiocarbon dates from this site have helped to place part of the pottery sequence perhaps as early as the 3rd or 4th century BC. A small quantity of local wheel made pottery, probably produced at York, and a small quantity of samian suggested that this site was occupied into the 2nd century AD. The absence of most of the Roman vessel types recorded from the Millfield Farm, Wheeldrake site (Didsbury 2009a) would suggest that activity had probably ceased on the Cannon House Farm site by sometime in the middle of the 2nd century AD.

Methodology

The pottery has been archived using count and weight as measures according to the guidelines laid down for the minimum archive by The Study Group for Roman Pottery (Darling 2004) using the codes and database format developed by the City of Lincoln Archaeological Unit (CLAU) (see Darling and Precious 2014). Fabrics have been recorded to fit to the scheme used by Cumberpatch (2016) with vessel attributes allocated following the terminology used by Knight (1998). The author has previously used more detailed fabric schemes in dealing from handmade wares from eastern Yorkshire (Rowlandson 2012; Rowlandson with Young 2016) and accepts the potential for further subdivision of the material but has favoured a more easily replicable system for the pottery from this project to fit with the prevailing orthodoxy of many of the other specialists working in the area. Some of the material was presented for study unwashed with the view of preserving organic residues adhering to some of the vessels some of these vessels have been broadly attributed to the H2 code as it was not certain if a broader range of rock inclusions were present. The description of these fabrics has been provided in the quantified tables below. It was noticeable that the vessels in the H2 fabric group all appeared to contain quartz-sand, quartzite or sandstone all inclusion types likely to be available from drift deposits in the Vale of York rather than the dolerite and other igneous rock often evident in vessels when Boulder Clay deposits, outcropping along the east coast, may have been utilised. The material has been extensively illustrated and paralleled and it is hoped that this can help to bridge some of the variable terminology used to categorise handmade pottery from this region (eg. Challis and Harding 1975; Cumberpatch 2016; Evans 1995; 1999; 2006; Didsbury 2004; Didsbury and Vince 2011; Monaghan 1997; Rigby 2004; Rowlandson 2012). Hugh Fiske has assisted the author with the data entry for this project.

The merits and demerits of dating Iron Age and coarse-gritted Roman pottery in Eastern Yorkshire by form have been extensively discussed elsewhere with varying levels of optimism (Challis and Harding 1975; Evans 1995; Mackey 2003; Didsbury 2004; Didsbury and Vince 2011, 196; Rigby 2004; Rowlandson 2012; Cumberpatch 2016). One of the main problems facing the researcher is the strong

conservatism amongst both potter and consumer on rural sites from the 1st Millennium BC into the Roman period. There is a change from the more angular forms common in earlier Iron Age assemblages to the later Iron Age repertoire but this continues with few changes into the early Roman period. Identifying the Roman transition is difficult on a site with very low levels of wheel made pottery. The handmade tradition continued into the 3rd century AD and 4th century AD with the addition of composite built calcite-gritted wares and late Roman handmade wares continuing in use into the early 5th century AD (Rowlandson and Fiske 2021; Monaghan 1997). In the later 5th century there was a change to handmade pottery in the Anglo-Saxon tradition although this too is not always simple to split from earlier types (Vince 2010; Jane Young pers. com.). Dating of small fragments of handmade pottery are therefore, by necessity, broad. Dating typically rests upon more diagnostic forms or feature sherds but the presence of diagnostic wheel made pottery or the application of radiocarbon dating techniques provides the best way to refine both pottery and site chronologies. Rather dispiritingly it can perhaps be easier to recognise which part of Yorkshire where the pottery was most likely produced, on the basis of fabric, than the date that it was made. Looking to produce ceramic 'periods' in which vessel types can be place a broad date of late Iron Age to 2nd century AD may be appropriate for many of the handmade vessels from these sites.

The Pottery

A total of 782 ceramic fragments were presented for study (19.394kg). This consisted of 768 sherds from a maximum of 602 vessels (18.378kg, 6.74 RE) and a further nineteen fragments of fired clay (1.076kg) were recorded with most of this by weight from a single loom weight (No.35)

The majority of the pottery (584 vessels, 742 sherds, 17.552kg, 6.42 RE) was handmade and in the later Iron Age to Roman tradition typical of sites across much of eastern Yorkshire. In addition to this a small quantity of grey ware, Central Gaulish samian and Ebor ware were also recorded. The vessels in the Roman tradition suggested that some of the activity on the site occurred in the later 1st and 2nd centuries AD. The range of pottery has been described in detail by context. As discussed in the methodological introduction the nature of the handmade pottery often precludes close dating so the date ranges offered for some of the contexts are broad. It is likely that much of the activity on the site occurred in a more limited time frame restricted to the 1st century BC to mid 2nd century AD. Where no Roman wheel made pottery was retrieved from a context an Iron Age date remains possible. Additional information from the stratigraphic sequence and the radiocarbon dates from SUERC has been added to this report to refine the dating sequence.

Fabric summary

Fabric code	Fabric group	Fabric details	Sherd	Sherd %	Weight (g)	Weight %	Total RE %
SAMCG	Samian	Central Gaulish	4	0.51%	6	0.03%	0
DR20	Amphora	Dr 20 amphorae	2	0.26%	600	3.09%	0
EBOR1	Oxidised	Ebor 1	7	0.90%	37	0.19%	0
EBOR1?	Oxidised	Ebor 1	1	0.13%	32	0.16%	0
OX?	Oxidised	Misc. oxidised wares	4	0.51%	9	0.05%	0
GREY?	Reduced	Miscellaneous grey wares	3	0.38%	82	0.42%	32
H1	Handmade	with calcareous tempering	15	1.92%	813	4.19%	140
H2	Handmade	with non-soluble stone tempering	328	41.94%	8209	42.33%	167
H2Q	Handmade	with coarse quartz	116	14.83%	4009	20.67%	136
H2SS	Handmade	with sandstones	15	1.92%	564	2.91%	67
H3	Handmade	with mixed or other tempering	2	0.26%	31	0.16%	0
H4	Handmade	vesicular, normally leached H1	264	33.76%	3862	19.91%	132
H5	Handmade	with grog	2	0.26%	64	0.33%	0
DAUB	Fired Clay	Daub	5	0.64%	60	0.31%	0
FCLAY	Fired Clay	Fired Clay	13	1.66%	1002	5.17%	0
FCLAY?	Fired Clay	Fired Clay	1	0.13%	14	0.07%	0

Handmade pottery by rim type

Rim	Form description	Vessels	Sherd	Weight (g)	Total RE %
-	No rim	526	611	12650	0
EB	Externally bevelled	1	1	12	7
EVEB	Everted externally bevelled	1	1	12	8
EVIC	Everted with Internal channel	2	6	207	49
EVR	Everted Rounded	17	37	1771	253
FD	Flattened direct	3	4	168	28
FEE	Flattened lip, rim expanded externally	2	2	34	4
FLE	Flanged externally	1	1	13	7
FRE	Flattened lip, rim rounded externally	3	5	355	43
RD	Rounded direct	9	40	1230	71
RDA	Rounded direct, internal angle at base of rim	6	9	344	50
RRE	Rounded lip as RD, outer edge more gently rounded	4	10	209	37
SS	Square sectioned	3	5	234	33
TRIR	Triangular profile with rounded lip	2	4	216	35
U	Unknown	3	5	38	6

Handmade pottery by body type

Form code	Form description	Vessels	Sherd	Weight (g)	Total RE %
-	No body fragments	20	23	635	43
GLOB	Globular	52	171	7293	479
GLOB/OV	Ovoid or globular	7	8	236	79
Open	Open (hemispherical)	3	6	369	30
OV	Ovoid	2	2	51	11
U	Unknown	500	532	8968	0

Handmade pottery by base type

Base	Form description	Vessels	Sherd	Weight (g)	Total RE %
-	No base present	554	638	13888	612
FLP	Flat Base, pinched out	7	62	807	7
FLT	Flat	23	42	2857	23

Trench 1

Ditch fill **3101** contained 24 mostly handmade sherds including a quartz-gritted vessel with a flat base. A small sherd of Central Gaulish samian (1g) dated the group to sometime after AD120.

Ring ditch fill **3102** contained a good fresh group of handmade pottery along with a few fragments of daub and fired clay perhaps from the structure of a round house (365 fragments, 6.738kg, 2.25). No wheel made sherds were recorded and the main vessels have been illustrated (No. 1-6) along with a barrel-shaped jar (Challis and Harding 1975) and sherds from vessels with pinched out and flat bases. A late Iron Age or later 1st to mid 2nd century date appears possible.

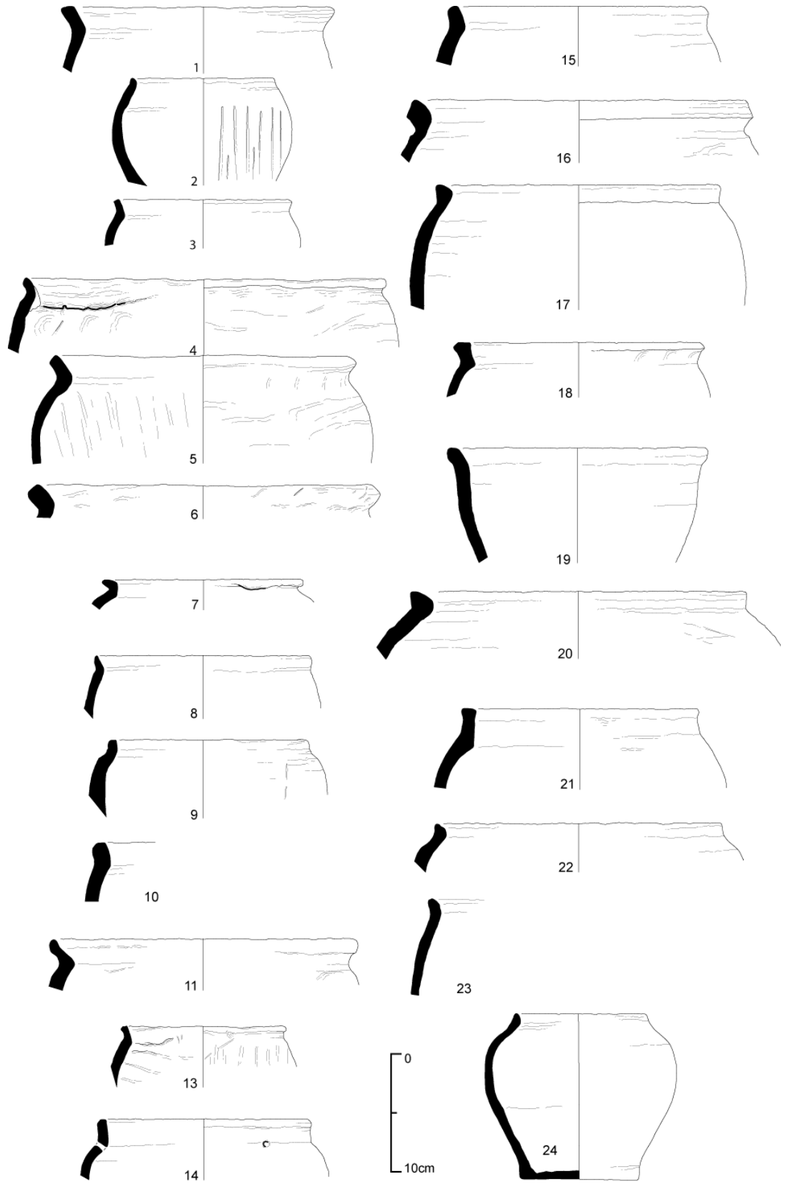
1- **H1** A jar with a flattened top similar to examples from Rudston considered to be of Flavian to Antonine date (Rigby 1980, Fig. 27.9) and Bursea House (Creighton 1999, Illus. 5.39.1.14) *Ring ditch fill 3102, D31*
2- **H2** A globular jar with a rounded rim similar to example considered to date to the Iron Age from Hawling Road (Evans 1999, Illus. 7.10 G01- J21). See also number 24 and examples dated to the later 1st to mid 2nd century AD. *Ring ditch fill 3102, D35*
3- **H2** A jar with an everted rim and externally bevelled rim. Types such of this were ubiquitous in eastern Yorkshire such as an examples from Hawling Road from a context considered to date to the 1st to 2nd century AD (Evans 1999, Illus. 7.17 GO91- J01). *Ring ditch fill 3102, D36*
4- **H1** A large jar with an everted rim. The rim has been formed by roughly luting a collar of clay onto the vessel to form the rim without being smoothed and evened out. A similarly formed rim was evident on a vessel from a later Iron Age phase at Old Ellerby (Cumberpatch 2016, No. 22). Examples of jars with similar large open forms are ubiquitous across the region including an Iron Age example examples from Nuttles (Cumberpatch 2016, Nos. 100) and broadly similar Roman examples such as one from Shiptonthorpe (Evans 2006, Illus 7.9 G03.1) *Ring ditch fill 3102, D32*
5- **H1** A handmade jar with an externally bevelled rim, a ubiquitous type amongst assemblages from the later Iron Age to early Roman period (Evans 1999, Illus. 7.16 G01- J02). *Ring ditch fill 3102, D33*
6- **H2SS** A large jar with an externally bevelled rim. This form is ubiquitous and similar to examples from Newbridge (Rowlandson 2012, Fig. 32.27) and Rudston (Rigby 1980, Fig. 28.18) perhaps later Iron Age to early Roman. *Ring ditch fill 3102, D34*

Ditch fill **3103** contained a medium sized group of handmade sherds (31 sherds, 0.287kg, 0.48 RE). The group included vessels 7 and 8 along with a small fragment from a small jar with a beaded rim. A date in the 1st to 2nd centuries AD would appear possible.

7- **H4** A handmade jar similar to an example from East Garton (Didsbury 2013b, Fig. 11.6) from a deposit considered to date to the 1st to 2nd century AD. *Ditch fill 3103, D25*
8- **H4** A handmade jar similar to examples from Burton Constable Structure 5 considered to be most likely to be of Iron Age date (Cumberpatch 2016, No. 5) and an example with a slightly more splayed rim from Newbridge Phase 1 probably also of Iron Age date (Rowlandson 2012, Fig. 31. 6). *Ditch fill 3103, D24*

Trench 1 Dating

The dating of the sequence of features in Trench 1 was fairly open due to the lack of much wheel made pottery and the unsuccessful attempt to extract a radiocarbon date from carbonised material from context 3102. Context 3101, the latest ditch fill, included a tiny sherd of Central Gaulish samian that would suggest that feature 3104 remained at least partially open until sometime after AD120. However with such a small scrap it is possible that this feature may have also been established in the Iron Age. The exclusively handmade material from context 3102 might suggest a later Iron Age to 2nd century AD date judging by the local parallels but a close date for this group and the earlier fill 3103 from Ditch 3105 in the absence of any other dating evidence must be considered to be broadly late Iron Age to perhaps 2nd century AD.



Trench 3

Twelve sherds were retrieved from Topsoil **3300** including a sherd of Ebor ware 1 (Monaghan 1997), fired clay and handmade sherds including a jar with a square sectioned rim and another with an externally bevelled everted rim. The material present all ranged in date from the later Iron Age to the 2nd century AD.

Ditch fill **3301** contained 30 sherds all from handmade vessels. All of the vessels appeared to be globular jars with everted rims similar to illustrated vessel number 5 and a further vessel with a beaded rim. This group contained no wheel made pottery so a later Iron Age date would appear likely. Carbonised internal residues were present on two vessels and an external carbonised residues on a further vessel. The radiocarbon date from this feature would appear to suggest pre-Roman Iron Age activity with a 1st or 2nd century BC date likely.

Ring ditch fill **3302** contained a good fresh group of 72 sherds (2.214kg, 0.36 RE). The vessels present mostly had globular profiles with examples of plain and pinched out base types. A few of the unillustrated vessels from this context showed signs of carbonised residues, probably from use as cooking vessels. Looking at the range of forms present an Iron Age date would appear likely. The radiocarbon date from this context would suggested that the vessel that was sampled was in use sometime between the 4th to earlier 2nd century BC. This would fit with some of the vessels with early parallels such as numbers 10, 14 and 15.

9- **H2Q** A globular jar with a rounded rim similar to an example from Hawling Road from an Iron Age context (Evans 1999, Illus 7.16 G01-J22. *Ring ditch 3302, D27*

10- **H2Q** A large jar with an upright rim similar to vessel number 15. Examples of similar vessels include an Iron Age example from Hawling Road (Evans 1999, G32-J01) and an example from Nuttles Structure 1 with a radiocarbon date of 348-52 cal BC (Cumberpatch 2016, No. 32; Glover et al. (eds) 2016). *Ring ditch 3302, D28*

11- **H2** A large vessel with a slightly channelled rim. Examples of this form can be dated to the Iron Age (Rowlandson 2012, Fig. 31. 9) or the later 1st to 2nd century AD (Didsbury 2013b, Fig. 11.53). *Ring ditch 3302, D22*

12- **H2** The base and a lower wall of a handmade jar. This vessel was hard fired and yet shows considerable cracks have opened in the wall perhaps as a result of firing faults rather than caused by post-depositional compression. *Ring ditch 3302, Photo (see above)*

13- **H4** A jar with an everted rim perhaps similar to an example from East Garton (Didsbury 2013b, Fig. 11.53) but a ubiquitous type that might be of later Iron Age to early Roman date. *Ring ditch 3302, D23*

14- **H4** A jar with a square-rim examples of similar vessels are known from Scorborough Hill (Cumberpatch 2016, No. Glover et al. (eds) 2016, 64) where it was stratified within a ditch with wheel made pottery dating to AD120 or later. Another example has been recorded from Old Ellerby from Round House Structure 2 that contained a cattle tooth that "returned a radiocarbon date of 180 to 1 cal BC" (Cumberpatch 2016, No. 32; Glover et al. (eds) 2016, 9). Broadly similar vessels have also been illustrated by Didsbury from Sewerby (Didsbury 2009b, Fig. 176.1) dated to the 1st century BC/AD and Wharram Percy (Didsbury 2004, No. 52). In the absence of other stratigraphic dating this vessel probably dates to somewhere from the 1st century BC to the 2nd century AD. The vessel has a post-firing piercing to the neck, a feature of a few handmade vessels from eastern Yorkshire perhaps suggesting that the vessels was customised for a specialist purpose. *Ditch fill 3305, D04*

15- **H2Q** A jar with an upright rim similar to examples from Nuttles stratified with Structure 1 radiocarbon dated to 348-52 cal BC (Cumberpatch 2016, No. 108; Glover et al. (eds) 2016). A later Iron Age date for this vessel is therefore possible. *Ditch fill 3305, D05*

16- **H2SS** A jar with a square-rim examples are known from Scorborough Hill stratified with Roman pottery dating to AD120 or later (Cumberpatch 2016, No. 148; Glover 2016, p64). *Ditch fill 3305, D06*

Ditch fill **3307** included sherds from four handmade vessels including a globular jar with scored diagonal lines and a globular jar with a wedge-shaped rim (No. 17). A further calcareous-gritted sherd from this context also had an external carbonised deposit. On the basis of this small group a date of 100BC- 100AD is favoured for the pottery from this group.

17- **H2Q** A globular jar with a wedge-shaped rim with external carbonised deposits. Examples of this type of form are commonplace in Lincolnshire and Yorkshire. This handmade example is similar to examples from the EMG scheme and excavations at Healham Bridge (Cumberpatch 2016, No. 18; 2017, No. 9). A date of around 100BC- 100AD would appear favoured for similar vessels. Variants of this form continued to be produced into the earlier 2nd century AD in Lincolnshire and examples at Wharram Percy have been recorded with Antonine grey wares (Rigby and Stead 1976, Fig. 77. 58; Didsbury 2004, Fig. 105, 106-7). *Ditch fill 3307, D03*

Two sherds were retrieved from Ring ditch fill **3310** including illustrated vessel 18. A broad 1st century BC to 2nd century AD date would be appropriate.

18- **H4** Broadly similar examples are known from Crakye Beck (Didsbury Unpublished No. 156, 177-8), Aldbrough (Didsbury 2013a, Fig.21), Garton Slack (Challis and Harding 1975, Fig. 33.2 and 9) and perhaps also Rudston (Rigby 1980, Fig. 32.53). On the basis of the example from Aldbrough example Didsbury considered a broad 1st century BC to early 2nd century AD date range would fit. *Ring ditch fill 3310, D02*

A single handmade body sherd in the H2 fabric was retrieved from Ring ditch fill **3315**. A broad Iron Age to 2nd century AD would be appropriate for this small group.

Twelve fresh sherds were retrieved from Ditch fill **3316**. This group could be broadly dated to the Iron Age to early Roman period as there was little diagnostic material within it. Carbonised deposits were evident on sherds from two vessels. As the group was stratified beneath Ditch 3344 an Iron Age date would appear more likely.

Twenty four handmade sherds from a maximum of 17 vessels were retrieved from Ditch fill **3318**. The two diagnostic vessels have been illustrated that would suggest a date in the late Iron Age to early Roman period. As the group was stratified beneath Ditch 3344 an Iron Age date would appear more likely.

19- **H2Q** An example of an 'Everted Rimmed Open Jar' type in the sandy quartz-rich fabric (Cumberpatch 2016). Example of a similar vessels has been illustrated from Structure 4 of New York site with a C14 date of 201 to 46 cal

BC (SUERC- 38667; Cumberpatch 2016, Fig. 97. 124), Sewerby late Iron Age group (Didsbury 2009b, Phase 2, Fig. 176. 11) and an example from Newbridge Quarry found in association with a grey ware jar dating to the 2nd century AD (Rowlandson 2011, No. 42). A date in the 1st century BC/AD would appear most likely. *Ditch fill 3318, D08*

20- **H2Q** A jar with a triangular or wedge shaped rim. The same parallels discussed for vessel 17 would be appropriate. A date in the 1st century BC to early Roman period would appear likely. *Ditch fill 3318, D07*

Five handmade sherds from two vessels were retrieved from Pit fill **3333**. A rim fragment from a globular jar with an everted rim with external carbonised residue was the only diagnostic fragment. A broad Iron Age to 2nd century AD date would be appropriate for this vessel.

A single fragment of fired clay or from a vessel was retrieved from Pit fill **3334**. The fragment was unwashed and identification was uncertain.

Pit fill **3335** contained four handmade sherds notably illustrated vessel 21. On the basis of this vessel the group could be dated to the 1st century BC/AD.

21- **H2Q** A handmade jar with a vertical rim with a flattened off top. This example can be paralleled amongst a number of broadly similar jars from eastern Yorkshire notably and example from Salthouse School (Challis and Harding 1975, Fig. 41.6) and from ring ditch Structure 5 at Burton Constable (Cumberpatch 2016, Fig. 95. 64). Structure 5 contained large quantity of handmade pottery along with four possibly intrusive wheel made sherds the C14 date achieved from stratified animal bone offered a date of 86BC-AD71 (Glover et al. 2016, p16-7). This would fit with Cumberpatch's dating for this type of 100BC- AD100 (2016, p112 VRJ-CT). A similar date would be appropriate for this vessel from Wheldrake. *Pit fill 3335, D13*

Pit fill **3336** contained seven handmade sherds from a maximum of five vessels. Two vessels (No. 22 and 23) have been illustrated, both likely to date to the later Iron Age.

22- **H2** A globular jar with a rounded rim. Examples of similar vessels have been illustrated from Kilham and Salthouse School (Challis and Harding Fig. 25.8 and Fig. 41.10). *Ditch fill 3336, D12*

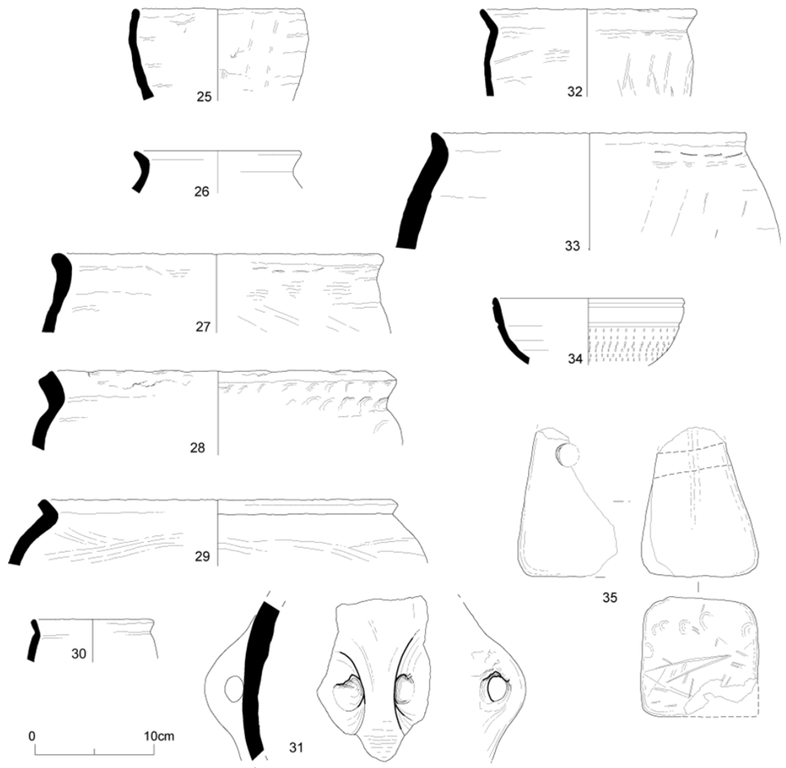
23- **H2Q** A further handmade jar with a globular profile perhaps similar to an vessel from a context dated to the Iron Age by Evans at Hawling Road (1999, Illus 7.17 G29-J04). *Ditch fill 3336, D11*

Two handmade vessels have been illustrated from a bag marked 3363 with a tag marked 3336 (**3336/3363**). The material suggested a date in the later Iron Age to 2nd century AD.

24- **H2** A large proportion of a small globular jar with a rounded rim. Parallels for this vessel include An example from Hawling Road from a context attributed a date in the 1st century AD (Evans 1999, G01-J25), Costa Beck (Challis and Harding 1975, Fig. 52.3) and examples dated to the early Roman period from Healham Bridge (Cumberpatch 2017, Fig. 147.4) and Lease Rigg Fort (Vince and Steane 2009, D2). *Ditch fill 3336/3363, D15*

25- **H2** A barrel-shaped jar (Challis and Harding 1975) similar to an examples from Newbridge (Rowlandson 2012, Fig. 31.4 & 18) probably Iron Age in date although the form had a long currency from the Bronze Age to the Roman period. *Ditch fill 3336/3363, D16*

Ditch fill **3337** contained sherds from two handmade vessels one was a barrel-shaped jar similar to illustrated vessel number 25. An Iron Age date for this group would be appropriate. As the group was stratified beneath Ditch 3344 the superposition and scientific dating would support an Iron Age date.



The pottery from Ditch fill **3349** was one of the few groups that could safely be attributed a Roman date on the basis of sherds of Ebor ware 1 including fragments of two flagon handles, a wheel made or wheel-finished jar in a quartz-gritted grey ware type fabric with patchy surfaces (No. 26) and sherds from handmade jars including a vessels with an everted rim and carbonised residues. Flavian to early Antonine date might be most likely for this group with an early Roman date most likely.

26- **GREY?** This vessel had some affinities in form to jars examples from Flavian contexts at York (Monaghan 1997, No. 3761, Form JA). The fabric appeared to be a well-fired quartz-gritted grey ware but it was not certain that the vessel had been fast wheel thrown. *Ditch fill 3349, D10*

Fourteen sherds were retrieved from Ring ditch fill **3352** from a maximum of 11 handmade vessels. Two vessels were illustrated from this group perhaps suggesting a date in the 2nd century AD.

27- **H1** A large jar with a slightly everted rim. Examples of similar vessels are common including at Burton Constable with an Iron Age date (2016, No. 61) and Aldbrough dated to the 2nd century AD (Didsbury 2013a, Fig. 20.75). *Ring ditch fill 3352, D30*

28- **H1** A jar with a square sectioned rim, numerous examples of similar jars are known from Yorkshire. Similar vessels including illustrated vessel number 6 and examples from Rudston (Rigby 1980, Fig. 28.18) and East Garton (Didsbury 2013, Fig. 13.96). *Ring ditch fill 3352, D29*

Ditch fill **3353** contained three sherds and a fragment of fired clay. The small fragment of Ebor ware 1 suggested a broad date in in the later 1st to 2nd century AD. A single handmade vessel, number 29 was the only diagnostic handmade fragment from the context that could be illustrated.

29- **H2Q** A jar with an everted rim with similar examples from Newbridge (Rowlandson 2012, Fig. 31.6) and an example from Hawling Road dated to the later 1st century AD (Evans 1999, G32-J02). *Ditch fill 3353, D09*

Ditch fill **3354** contained a single handmade sherd that could be dated to the Iron Age to early Roman period.

Trench 3 Dating

The stratigraphic sequence and radiocarbon dates from Trench 3 provide the best dating evidence for Iron Age activity on the site. The group from Ring ditch 3346, fill 3302 now offers a good dated group of pre-Roman handmade material that can date sometime between the 4th to earlier 2nd century BC.

The radiocarbon date from Ditch 3344 fill 3301 would appear to suggest pre-Roman Iron Age activity with a 1st or 2nd century BC date likely. The linked context 3353 contained small quantities of Ebor ware however this may represent material that has been deposited later or be intrusive from later feature 3372 that also contained wheel made Roman material. The as the association between fills 3301 and 3353 must be considered tentative due to the nature of their excavation and an Iron Age date for context 3301 should be favoured.

On the basis of the two radiocarbon dates and the stratigraphic sequence it would appear that Trench 3 had the best demonstrable sequence of Iron Age deposits. Although the parallels presented for a number of the vessels are often attributed fairly vague dates it would appear that the majority of the pottery from this trench could be dated to the pre-Roman Iron Age with only fill 3349 certainly to represent activity post-dating the Roman conquest. All of the features stratified beneath Ring ditch 3344 would appear to date to the Iron Age date.

Trench 4

Ditch fill **3401** contained a small sherd of Ebor ware 1, a sherd of Central Gaulish samian, and two sherds from a Dressel 20 olive oil amphora with a gritty fabric. These vessels suggested a date sometime after AD120 for the backfilling of this feature. The absence of any material likely to be exclusively of later 2nd or 3rd century AD might suggest an optimum date in the mid 2nd century AD for this group. A small number of handmade wares including illustrated vessel number 30 and a small scrap of fired clay were also present.

30- **H2** A handmade jar with an everted rim, a similar vessel from a context dated to the 1st century AD has been illustrated from Hawling Road (Evans 1999, Illus 7.16 G03-J02). *Ditch 3401, D26*

Ditch fill **3402** contained three very abraded sherds including wheel made sherds in oxidised and reduced fabrics of uncertain date. These vessels dated to the Roman period or later.

Ditch fill **3409** contained a small scrap of Ebor ware 1, a fragment of fired clay and sherds from four handmade vessels including fragment from a lug-handled jar (No. 31). The conventional date range for Ebor ware 1 would be from the late 1st century AD until the early 3rd century AD (Monaghan 1997). Looking at the range of material present from the other features a latest date in the mid 2nd century AD is probably likely.

31- **H2** A handle fragment from a handmade lug-handled jar similar to an example from Burton Constable (Cumberpatch 2016, No. 45). *Ditch fill 3409, D21*

A single handmade sherd was retrieved from Ring ditch fill **3411**. This featureless sherd could only be broadly dated to the Iron Age to Roman period.

Ditch fill **3415** contained sherds from four handmade vessels including a jar with an everted rim (No. 17). This vessel probably dated the group to the later Iron Age or early Roman period

32- **H2SS** A handmade jar with an everted rim similar to an example illustrated from Shiptonthorpe (Evans 2006, Illus. 7.10 G25.2). *Ditch fills 3415 and 3416, D17*

Ditch fill **3416** contained 36 sherds and fragments of fired clay. The wheel made fragments present included a grey ware bowl (No. 34) and an oxidised sherd from a flagon or jar, probably Ebor ware 1. This group dated to AD120 or later. The majority of the group consisted of handmade vessels (32-4) and a loom weight (No. 35).

33- **H2** A large jar with a globular jar with a rounded rim, a common form with some similarities to vessel number 8. *Ditch fill 3416, D18*

34- **GREY?** (above) This vessel was an unusual grey ware fabric with slightly patchy oxidised surfaces that may have been subjected to burning. This hemispherical bowl with a rouletted lower wall was similar to examples from York including a discoloured example from Bedern (Monaghan 1997, No. 3955). Monaghan notes that rouletted

examples in Ebor ware are quite common and suggests that they are likely to date to after AD120 (1997, No. 3955). *Ditch fill 3416, D19*

35- **FCLAY** A loom weight, numerous examples are known from Iron Age and Roman contexts (cf. Barford et al. 1996). *Ditch 3416, D20*

Ditch fill **3417** contained sherds from four handmade jars including a jar with an everted rim with carbonised residues. In the absence of more diagnostic material this group could be broadly dated to the later Iron Age to 2nd century AD.

Trench 4 Dating

Small quantities of handmade pottery from context 3402 and 3411 could only be broadly dated to the Iron Age or perhaps earlier Roman period. The material from boundary ditch 3412 was of greatest interest as basal fill produced a radiocarbon date from fill 3417 suggesting a date in the 1st century AD or perhaps early 2nd century AD was possible for the backfilling of the feature. This would fit with the material from fills 3401, 3409, 3415 and 3416 that suggested deposition of pottery in the later fills dated to after after AD120.

Discussion

This project has recovered good groups of handmade pottery from activity spanning the later Iron Age to the 2nd century AD. The post-excavation analysis has further highlighted the benefits of utilising radiocarbon dating to refine site chronology and the dating of the associated pottery. The method of dating carbonised material from the surfaces of pottery, when successful, is better way for advancing the dating of pottery types. This method helps to date the last date the vessel was used rather than other carbonised material from the context that may have been reworked from other earlier deposits. At present some of the traditional form typologies in use in this region are supported by limited numbers of radiocarbon dates usually from bone or burnt wood or grain. With an increasing number of assemblages dated by scientific techniques it may become possible to test some of the existing handmade pottery typologies in use in Yorkshire. The assemblage from this site and stratified sequence from Trench 3 offers further evidence for helping to date the handmade pottery styles and a number of the groups also offer an insight into changes in material culture after the Roman conquest. It would appear that the excavations encountered evidence for the use of pottery on the site from the later Iron Age into the 2nd century AD. No later Roman types were noted and it is possible that the focus of settlement moved elsewhere in the 3rd century AD (eg. Didsbury 2013a).

The assemblage of pottery from Wheldrake is a valuable addition to the limited number of known Iron Age sites that have been recorded in the Vale of York (Vyner 2018; Manby *et al.* 2003; Addyman 1984). Vyner highlights a limited number of Iron Age pottery assemblages from sites at Narburn, Fulford and Heslington East although this material has not been subjected to detailed analysis and dating (Vyner 2018; Jones 1988; Evans 1996; Roskhams and Neal 2020; Didsbury 2013c; Jenner 2009). The group from Wheldrake is of interest as it is one of the few that now has radiocarbon dates for some key groups of pottery including a good fresh assemblage from Ring ditch 3346. The assemblage can now be used to contrast with other assemblages from the area and contribute to the discussion of dating handmade pottery in areas of eastern Yorkshire more generally.

The majority of the pottery from the sites fell into the H2 sand/ sandstone and quartz-gritted wares category. It would appear likely that most of these vessels were locally produced in the Vale of York, indeed the basal fragment from Ring ditch fill 3302 (No. 12) showed heavy cracking although it may have partially failed in firing. Iron Age to early Roman sites closer to the Yorkshire Wolds show much higher proportions of calcite/chalk-gritted wares with even some of the sand gritted wares also containing calcareous material (Mills 2015, 227-8) presumably due to the productions sources along the Wolds. By the later Roman period it would appear that supply networks resulted in the more consistent distribution of H1/H4 and later Roman equivalent calcite and chalk-gritted wares to sites across the Vale of York (eg. Didsbury 2009a; Monaghan 1997; Leary 2013).

The Wheldrake Roman assemblage appears similar to other sites in this part of Yorkshire that include sites such as the early ditch at Hasholme (Hicks and Wilson 1975) with small quantities of Roman wheel made wares but mostly local handmade vessels suggesting limited uptake of Roman wheel made wares in the early Roman period. The most common wheel made vessels on sites such are types such as beakers, samian or mortaria that were not within the repertoire of the local potters. The uptake of Roman coarse ware jars may be affected by a number of factors, not all mutually exclusive. One commonly cited suggestion is that the conservatism or resistance of the local people encouraged them to cling to their own traditions. One issue with this is that we find on a number of sites the uptake of a small number of more 'Roman' type vessels including samian, amphorae and mortaria (Didsbury 2013a; Hicks and Wilson 1975). It does not appear that there was a conscious total rejection of things associated with the invading Roman army. Another issue may be the access to and the level of integration with the Roman economy. Sites that were not located close to York, Brough or the River Humber may not have had as much contact with the Roman economy. At sites located close to the north bank of the River Humber greater quantities of Roman wheel made pottery appear to have been available to local inhabitants (Precious et al. 2011; Leary and Cumberpatch 2016). This may be due to issues of supply as kilns working in the 1st and 2nd century AD are known at Dragonby, South Ferriby and a number of other sites in northern Lincolnshire along with production in the 2nd century AD near Brough on Humber. At locations along the River Humber transport and integration with the Roman economy was presumably easier and wheel made pottery was probably available in greater quantities. A greater availability of pottery and a link to riverine transport networks that may have made the vessels easier to acquire. The availability of a variety of traded goods may have also stimulated the production of an agricultural surplus to acquire new products. In some cases if the indigenous inhabitants of the Vale of York were not integrated with the Roman economy in the early Roman period and continued a largely subsistence practice of agriculture they would have limited opportunity or means to acquire Roman ceramic vessels even if they may have desired them.

The site located at Wheldrake would perhaps have been closest distribution networks from York and the oxidised wares from the Wheldrake site would appear to suggest the presence of pottery from potters working at York. Hemingbrough, the focus of previous investigations by the society, although located close to the River Ouse lies near to the area of West Yorkshire were pottery use was less common (Rowlandson 2014, 2017a and 2017b; Cumberpatch 2013, Site 1 and Tr. 4). It is possible that activity on the Hemingborough site continued into the Roman period but it is also might be expected that limited quantities of wheel made vessels may have reached the site in the 1st and 2nd centuries AD as it was not until the later 2nd- 3rd century AD that most rural sites appear to have been supplied with a broader suite of wheel made pottery for example Little Fenton (Leary 2013, Site 2) Howden (Didsbury forthcoming; 2011, Plots 178 & 179 and Milfield Farm, Wheldrake (Didsbury 2009a). This is also the period when the production of wheel made pottery production became more common in this part of Yorkshire with the development of the Holme on Spalding Moor industries in

the Foulness Valley (see Halkon 1987). Some sites, perhaps were more close links to the Roman economy, such as the Thorpe Hall site near Howden that may have been close to a Roman villa (Didsbury forthcoming, Didsbury 2011, Plots 182 and 184) and the unusual site at Barlby excavated by MAP Archaeological Consultancy (Phil Mills and Paula Ware pers. com. 2017) were clearly integrated with the Roman economy or controlled by the Roman administration in the Roman period. The pattern of pottery usage at sites such as this and at roadside settlements (Mills 2015; Evans 2006) also appears to be markedly different from basic rural assemblages with access to greater quantities of Roman wheel made wares in the later 1st and 2nd centuries AD.

Activity on the Wheldrake site pre-dated the Roman conquest as the dated sequence from Trench 3 shows. It would appear that in the early phases that the pre-Roman Iron Age inhabitants had a similar suite of handmade pottery to some of the other settlements in the Vale of York (cf. Jenner 2009). By the later 1st to mid 2nd century AD a few wheel made vessels reached the site but it appears likely that locally hand made jars remained in use for many functions. Didsbury, in his discussion of the pottery from Aldbrough, East Yorkshire, perhaps sums up the best interpretation of the assemblage such as that from Cannon House Farm, Wheldrake "Reasonably early contact with the Roman ceramic repertoires may be indicated… …but the settlement shows no sign of having been especially or rapidly integrated into Romanised supply networks in the early Roman period" (Didsbury 2013a, 32).

Recommendations

It is recommended that the pottery from this site should be deposited in the relevant local museum. As there have been few Iron Age and early Roman assemblages from the area around York that have been studied the whole assemblage should be retained as there may be potential for revisiting this group if a region wide study of handmade Iron Age pottery is undertaken with scope for further radiocarbon dating (Hamilton et al. 2015; Jay et al. 2012; Hamilton 2011).

As much of the pottery was in a fresh condition, with benefit of radiocarbon dates this assemblage might be suitable for inclusion within a broader Organic Residue Analysis (ORA) project to establish the function of some of the vessels from the site. There is a growing number of samples from contrast from investigations in the East Midlands and this site could perhaps be studied as a good example of a later Iron Age to early Roman site (Historic England 2017; Dunne and Evershed 2018a &b; Dunne et al. 2020 a, b & c).

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OADP19 Sherd data																
Context	Fabric	Form	Rim	Body	Base	Decoration	Vessels	Alt	D. Ref.	Pub. No.	Comments	Join	Sherd	Weight	Rim diam	Rim eve
3101	H2	-	-	U	-	HM	5	ABR			BS; IRF		5	20	0	0
3101	H2	-	-	-	FLT	HM	1				BASE; IRF		1	22	0	0
3101	H2Q	-	-	U	-	HM	1	VAB			BS; IRF		1	25	0	0
3101	H2Q	-	-	U	-	HM	5	ABR			BS; IRF		5	113	0	0
3101	H4	-	-	U	-	HM	1	ABR			BS; IRF		8	89	0	0
3101	H4	-	-	U	-	HM	2	ABR			BS; IRF		2	11	0	0
3101	H4	-	-	U	-	HM	1				BS; IRF; MUDDY		1	10	0	0
3101	SAMCG	OPEN	-	-	-		1	VAB			BS		1	1	0	0
3102	DAUB	-	-	-	-		0	ABR			DAUB FRAGMENTS; FABRIC H2Q; BURNT BONE PRESENT C14?		5	60	0	0
3102	FCLAY	-	-	-	-		0				BS; OXID		1	4	0	0
3102	FCLAY	-	-	-	-		0				BS; OXID; MUD ENCRUSTED		1	4	0	0
3102	H1	JEV	EVIC	GLOB	-	HM	1	CARBON DEP	D31	01	RIM; R		5	178	26	43
3102	H1	JEV	EVR	GLOB	-	HM	1		D32	04	RIM; R		3	130	31	27
3102	H1	JEV	EVR	GLOB	-	HM	1	CARBON DEP	D33	05	RIM; R; CARBON DEP ALONG RIM		4	324	23	45
3102	H2	-	-	U	-	HM	30				BS; IRF; ?NO OF VESSELS		30	774	0	0
3102	H2	-	-	U	-	HM	25				BS; IRF; ?NO OF VESSELS		25	453	0	0
3102	H2	J	-	U	FLT	HM	3				BASE; IRF		3	314	0	0
3102	H2	J	-	U	FLT	HM	3	ABR			BASE; IRF		3	98	0	0
3102	H2	-	-	U	-	HM	58				BS; IRF; ?NO OF VESSELS		58	350	0	0
3102	H2	-	-	U	FLP	HM	1	ABR			BASE; IRF		1	6	0	0
3102	H2	J	RD	GLOB	FLP	HM	1				RIM BASE; R; MUD ENCRUSTED; FORM AS D35 THIS CONTEXT BUT THINNER WALLS		25	321	17	7
3102	H2	-	-	U	-	HM	1				BS; IRF		1	19	0	0
3102	H2	JIR	RD	OV	-	HM	1	ABR			RIM; IRF; BARREL SHAPED JAR		1	42	12	9
3102	H2	J	RDA	GLOB	-	HM	1	CARBON DEP	D35	02	RIM; R; THICK CARBON DEP EXT		4	175	10	16
3102	H2	J	RDA	GLOB	-	HM	1		D36	03	RIM; IRF		1	17	11	9
3102	H2Q	-	-	U	-	HM	7				BS; IRF		7	170	0	0
3102	H2Q	J	-	-	FLP	HM	1				BASE; IRF		1	98	0	0
3102	H2Q	-	-	U	-	HM	12				BS; IRF		12	355	0	0
3102	H2Q	J	-	-	FLP	HM	1				BASE; IRF		1	41	0	0
3102	H2Q	J	FD	GLOB	-	HM	1				RIM; IRF		1	20	0	2
3102	H2Q	-	-	U	-	HM	8	ABR			BS; IRF		8	178	0	0

3102	H2Q	J	FLE	-	-	HM	1	VAB			RIM; IRF; AS C&H SALTHOUSE SCHOOL NO. 1		1	13	14	7
3102	H2Q	-	-	-	FLT	HM	2	ABR			BASE; IRF		2	28	0	0
3102	H2Q	J	-	GLOB	-	HM	1				BS SHLDR; IRF		1	13	0	0
3102	H2SS	J	SS	GLOB	-	HM	1		D34	06	RIM; IRF		3	90	34	17
3102	H4	-	-	U	-	HM	52				BS; IRF; ?NO OF VESSELS		52	887	0	0
3102	H4	-	-	U	-	HM	31				BS; IRF; ?NO OF VESSELS		31	815	0	0
3102	H4	-	-	U	-	HM	35	ABR			BS; IRF; ?NO OF VESSELS		35	231	0	0
3102	H4	-	-	U	FLT	HM	1				BASE; IRF		1	27	0	0
3102	H4	-	-	U	FLT	HM	2				BASE; IRF		2	18	0	0
3102	H4	J	U	GLOB	-	HM	1				RIM; IRF		1	14	0	2
3102	H4	-	-	U	-	HM	1	WHITE SURFACES EXT; CARBON DEP INT			BS; IRF		7	60	0	0
3102	H4	-	-	U	-	HM	5	ABR			BS; IRF		5	144	0	0
3102	H4	-	-	-	FLP	HM	1	ABR			BASE; IRF		1	13	0	0
3102	H4	J	RD	GLOB	-	HM	1				RIM; R; GLOBULAR JAR		1	6	16	6
3102	H4	J	FEE	-	-	HM	1	ABR			RIM SCRAP; IRF		1	14	0	2
3102	H4	-	-	U	-	HM	4	VAB			BS SCRAPS; IRF		4	7	0	0
3102	H4	J	EVR	GLOB	-	HM	1				RIM; IRF; MUD ENCRUSTED		4	82	18	33
3102	H4	-	-	-	FLP	HM	1				BASE; IRF; MUD ENCRUSTED		1	23	0	0
3102	H4	-	-	U	-	HM	5				BS; IRF; MUD ENCRUSTED		5	78	0	0
3102	H4	-	-	U	-	HM	6				BS; IRF		6	44	0	0
3103	H2	JBR	RRE	GLOB	-	HM	1				RIM; IRF		7	39	14	11
3103	H2Q	JB	EVR	OPEN	-	HM	1				RIM; IRF; FORM AS D8		2	32	0	2
3103	H2Q	-	-	U	-	HM	1				BS; R		1	8	0	0
3103	H4	-	-	U	-	HM	15	ABR			BS; IRF		15	142	0	0
3103	H4	J	U	-	-	HM	1	ABR			RIM; IRF		3	13	0	2
3103	H4	J	RDA	GLOB/OV	-	HM	1		D24	08	RIM; R; SOME SAND AND SPARSE CALC VOIDS		1	27	19	10
3103	H4	J	TRIR	GLOB/OV	-	HM	1		D25	07	RIM; IRF; SOME SAND AND SPARSE CALC VOIDS		2	26	18	23
3300	EBOR1	-	-	-	-		1	VAB			BS		1	8	0	0
3300	FCLAY?	-	-	-	-		0	ABR			FINE FABRIC; OXID		1	14	0	0
3300	H2	-	-	U	-	HM	4	ABR			BS; IRF		4	72	0	0
3300	H2	JBR	RRE	GLOB	-	HM	1	ABR			RIM; IRF		1	19	18	7
3300	H2Q	-	-	-	GLOB	-	HM	1			BS; IRF		1	46	0	0
3300	H2Q	-	-	-	-	FLT	HM	1			BASE; IRF		1	38	0	0
3300	H2Q	J	SS	GLOB	-	HM	1	ABR			RIM; IRF; FORM AS D34		1	78	30	8
3300	H2Q	JEV	EVEB	-	-	HM	1				RIM; IRF; KNAPTON TYPE		1	12	16	8
3300	H4	-	-	U	-	HM	1	ABR			BS; IRF		1	14	0	0

3301	H2	-	-	U	-	HM	15				BS; IRF		15	202	0	0
3301	H2	J	-	GLOB	FLT	HM	1	CARBON DEP INT			BASE; IRF		1	45	0	0
3301	H2	JBEV	EVR	GLOB	-	HM	1	ABR			RIM; FORM AS D33		1	66	42	7
3301	H2	-	-	U	-	HM	1				BS; IRF		1	20	0	0
3301	H2Q	-	-	U	-	HM	6				BS; IRF		6	95	0	0
3301	H2Q	-	-	U	-	HM	1	ABR			BS; IRF		1	9	0	0
3301	H2Q	JEV	EVR	GLOB	-	HM	1	CARBON DEP EXT			RIM; FORM AS D30		1	56	20	7
3301	H2Q	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	23	0	0
3301	H2Q	JEV	EVR	GLOB	-	HM	1	VAB			RIM; IRF; FORM AS D30		1	18	20	4
3301	H2Q	JBR	RRE	GLOB	-	HM	1	ABR			RIM; IRF		1	37	18	7
3301	H4	-	-	U	-	HM	1	ABR			BS; OX/R		1	21	0	0
3302	H2	J	-	GLOB	FLP	HM	1				BASE; IRF		32	305	0	0
3302	H2	-	-	GLOB	-	HM	1	CARBON DEP INT			BS; IRF		2	76	0	0
3302	H2	-	-	U	-	HM	6	VAB			BS; IRF		6	14	0	0
3302	H2	-	-	U	-	HM	2	CARBON DEP INT			BS; IRF		2	112	0	0
3302	H2	-	-	U	-	HM	5	CARBON DEP INT			BS; IRF		5	130	0	0
3302	H2	JCH	EVIC	GLOB	-	HM	1		D22	11	RIM; IRF; DENSE QU		1	29	18	6
3302	H2	J	-	GLOB	FLT	HM	1	DUNTING; CARBON DEP INT	P	12	BASE; IRF		9	1139	0	0
3302	H2Q	-	-	GLOB	-	HM	1	CARBON DEP INT			BS; IRF		2	91	0	0
3302	H2Q	-	-		FLT	HM	1	CARBON DEP EXT			BASE; IRF		2	72	0	0
3302	H2Q	J	RD	GLOB	-	HM	1		D27	09	RIM; IRF		1	38	12	8
3302	H2Q	J	RDA	GLOB	-	HM	1		D28	10	RIM; IRF; QUARTZITE		1	28	24	4
3302	H4	-	-	U	-	HM	1	ABR			BS; IRF		1	34	0	0
3302	H4	-	-	U	-	HM	2	VAB			BS; IRF		2	13	0	0
3302	H4	-	-	U	-	HM	5				BS; IRF		5	93	0	0
3302	H4	J	FRE	GLOB/OV	-	HM	1		D23	13	RIM; IRF; SOME SAND AND SPARSE CALC VOIDS		1	40	13	18
3303	H2	-	-	U	-	HM	1	VAB			BS; IRF		1	4	0	0
3303	H4	-	-	U	-	HM	3	ABR			BS; IRF		3	14	0	0
3304	FCLAY	-	-	-	-		0	ABR			OBJECT FRAGMENT?; OX/R?; FINE FABRIC		1	8	0	0
3304	H2	-	-	U	-	HM	1	VAB			BS; IRF		1	19	0	0
3304	H4	-	-	U	-	HM	1	ABR			BS; OX/R		3	93	0	0
3304	H4	-	-	U	-	HM; SDL	1				BS; IRF		1	32	0	0
3304	H4	-	-	U	-	HM	2	ABR			BS; IRF		2	20	0	0
3305	EBOR1?	CLSD	-	-	-		1	WORN?			BS LOWER WALL; SMOOTHED EDGE		1	32	0	0
3305	H2	JBL	-	-	FLT	HM	1				BASE; IRF		1	173	0	0
3305	H2	JBL	-	U	-	HM	1				BS; IRF		2	151	0	0
3305	H2	-	-	U	-	HM	10				BS; IRF		10	75	0	0

3305	H2	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	13	0	0
3305	H2	-	-	U	-	HM	1				BS; IRF		1	69	0	0
3305	H2	JEV	EVR	-	-	HM	1				RIM; IRF; THIN WALLED		1	6	10	11
3305	H2	-	-	U	-	HM	1	CARBON DEP			BS; IRF; MUD ENCRUSTED		1	10	0	0
3305	H2Q	-	-	U	-	HM	9	CARBON DEP INT			BS; IRF		9	247	0	0
3305	H2Q	-	-	U	-	HM	1				BS; IRF		1	34	0	0
3305	H2Q	-	-	U	-	HM	2	ABR			BS; IRF		2	33	0	0
3305	H2Q	J	U	-	-	HM	1	ABR			RIM; IRF		1	11	0	2
3305	H2Q	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	11	0	0
3305	H2Q	J	EVR	GLOB	-	HM	1		D05	15	RIM; IRF		1	79	24	11
3305	H2SS	J	SSEB	GLOB	-	HM	1		D06	16	RIM; IRF		1	59	22	11
3305	H4	-	-	U	-	HM	10	ABR			BS; IRF		10	46	0	0
3305	H4	J	FD	GLOB	-	HM	1	PIERCED	D04	14	RIM; IRF; PIERCED NECK POST-FIRING		2	52	19	16
3307	H2	J	-	GLOB	-	HM; SDL	1				BS; IRF		1	14	0	0
3307	H2	-	-	U	-	HM	2				BS; IRF		2	41	0	0
3307	H2Q	J	EVR	GLOB	-	HM	1	CARBON DEP EXT	D03	17	RIM; IRF		1	293	26	17
3307	H4	-	-	U	-	HM	1	CARBON DEP EXT			BS; IRF		1	15	0	0
3310	H2	-	-	U	-	HM	1	VAB			BS; IRF		1	5	0	0
3310	H4	J	FRE	GLOB/OV	-	HM	1		D02	18	RIM; IRF		1	26	24	4
3315	H2	-	-	U	-	HM	1	ABR			BS; IRF		1	25	0	0
3316	H2	-	-	U	-	HM	3				BS; IRF; MUD ENCRUSTED		3	58	0	0
3316	H2	-	-	U	-	HM	2	CARBON DEP INT			BS; IRF; MUD ENCRUSTED		2	114	0	0
3316	H2	-	-	U	FLT	HM	1				BASE; IRF; MUD ENCRUSTED		1	59	0	0
3316	H2	J	FEE	-	-	HM	1				RIM; IRF; MUD ENCRUSTED		1	20	0	2
3316	H2SS	-	-	U	-	HM	1	CARBON DEP			BS; IRF		1	26	0	0
3316	H4	-	-	U	-	HM	1				BS; IRF		1	8	0	0
3316	H4	-	-	U	-	HM	3				BS; IRF		3	79	0	0
3318	H2Q	JBL	-	U	-	HM	1				BS; IRF		5	246	0	0
3318	H2Q	-	-	U	-	HM	4				BS; IRF		4	78	0	0
3318	H2Q	J	TRIR	GLOB	-	HM	1		D07	20	RIM; IRF		2	190	31	12
3318	H2Q	J	FRE	OPEN	-	HM	1		D08	19	RIM; IRF; OPEN FORM		3	289	22	21
3318	H4	-	-	U	-	HM	8				BS; IRF		8	114	0	0
3318	H5	-	-	U	-	HM	2				BS; IRF		2	64	0	0
3333	H4	-	-	U	-	HM	1	ABR			BS; IRF		2	5	0	0
3333	H4	JEV	EVR	GLOB	-	HM	1	CARBON DEP EXT			RIM; IRF		3	35	38	9
3334	FCLAY	-	-	-	-		0				OXID; MUD ENCRUSTED; UNCERTAIN IF FIRED CLAY OR VESSEL		1	24	0	0

3335	H2	-	-	U	-	HM	1				BS; OXID		1	60	0	0
3335	H2	J	FD	GLOB/OV	-	HM	1		D13	21	RIM; IRF		1	96	20	10
3335	H2Q	-	-	U	-	HM	1				BS; IRF; COMMON QUARTZITE		1	11	0	0
3335	H4	-	-	U	-	HM	1				BS; OX/R/OX		1	3	0	0
3336	H2	JB	RDA	GLOB	-	HM	1		D12	22	RIM; IRF		1	35	30	7
3336	H2Q	-	-	U	-	HM	1				BS; IRF		1	18	0	0
3336	H2Q	J	RDA	GLOB	-	HM	1		D11	23	RIM; IRF; COARSE QUARTZ AND PEBBLE QUARTZITE		1	62	16	4
3336	H4	-	-	U	-	HM	1	ABR			BS; IRF		3	27	0	0
3336	H4	-	-	U	FLT	HM	1	ABR			BASE; IRF		1	14	0	0
3336/3363	H2	J	RD	GLOB	FLT	HM	1	CARBON DEP	D15	24	RIM BASE; IRF;BAG MARKED 3363, TAG MARKED 3336.		7	520	14	12
3336/3363	H2	JB	RD	OPEN	-	HM	1		D16	25	RIM; DENSE QUARTZ OPEN FORM		1	48	19	7
3336/3363	H2Q	-	-	U	-	HM	1				BS; IRF		2	56	0	0
3337	H2	JIR	RD	OV	-	HM	1	ABR			RIM; IRF		1	9	0	2
3337	H2Q	-	-	U	-	HM	1	ABR			BS; IRF; ?VESSEL		1	5	0	0
3349	EBOR1	F	-	-	-		1	ABR			HANDLE; 5 RIDGED STRAP		1	13	0	0
3349	EBOR1	F	-	-	-		1	ABR			HANDLE; NARROW, MAY HAVE BEEN WHITE SLIPPED		1	5	0	0
3349	EBOR1	CLSD	-	-	-		1	VAB			BS		1	7	0	0
3349	GREY?	JEV	-	-	-	WM	1		D10	26	RIM		1	28	14	16
3349	H2	-	-	U	-	HM	1				BS; IRF		3	40	0	0
3349	H2	-	-	U	-	HM	1	CARBON DEP			BS; IRF		5	36	0	0
3349	H2	-	RD	-	-	HM	1	BURNT			RIM; IRF		1	5	0	2
3349	H2	JEV	EVR	-	-	HM	1	CARBON DEP			RIM; IRF		1	11	17	7
3349	H2Q	-	-	U	-	HM	2				BS; IRF		2	40	0	0
3349	H2Q	-	-	U	-	HM	1	ABR			BS; IRF		1	5	0	0
3349	H4	-	-	U	-	HM	2	ABR			BS; IRF		2	8	0	0
3352	H1	J	SS	GLOB	-	HM	1		D29	28	RIM; R		1	66	26	8
3352	H1	JEV	EVR	GLOB	-	HM	1		D30	27	RIM; IRF		2	115	30	17
3352	H2	JBL	-	GLOB	-	HM	1				BS; IRF		1	164	0	0
3352	H3	-	-	U	-	HM	1				BS; IRF; VOIDS AND QU STONE INCLUDION		1	12	0	0
3352	H4	JEB	EB	GLOB/OV	-	HM	1	CARBON DEP EXT			RIM; IRF		1	12	17	7
3352	H4	J	-	GLOB	FLT	HM	1				BASE; IRF		3	149	0	0
3352	H4	-	-	U	-	HM	5				BS; IRF		5	46	0	0
3353	EBOR1	-	-	-	-		1	ABR			BS; SMALL SHERD		1	1	0	0
3353	FCLAY	-	-	-	-		0				FINE OXID FABRIC; FORM UNCERTAIN		1	8	0	0
3353	H2Q	-	-	U	-	HM	1	VAB			BS; IRF		1	29	0	0
3353	H2Q	J	RRE	GLOB	-	HM	1		D09	29	RIM; IRF; WEDGE		1	114	28	12
3354	H4	-	-	U	-	HM	1	VAB			BS; IRF		1	6	0	0

3401	DR20	A	-	-	-		1	ABR			BS		2	600	0	0
3401	EBOR1	-	-	-	-		1	VAB			BS SCRAP		1	1	0	0
3401	FCLAY	-	-	-	-		0	VAB			OXID FINE FABRIC FORMLESS		1	1	0	0
3401	H2	-	-	U	-	HM	7				BS; IRF		7	99	0	0
3401	H2	-	-	U	-	HM	1				BS; IRF; MUDDY		3	95	0	0
3401	H2	IEV	EVR	GLOB/OV	-	HM	1		D26	30	RIM; IRF; SMALL EXAMPLE		1	9	9	7
3401	H4	-	-	U	-	HM	2	ABR			BS; IRF		2	16	0	0
3401	OX?	-	-	-	-		1				BS SCRAP; NOT CERTAIN VESSEL		1	1	0	0
3401	SAMCG	OPEN	-	-	-		1	VAB			BS		3	5	0	0
3402	GREY?	CLSD	-	-	-		1	VAB			BASE; HOSM? OR LATE HUMBER WARE		1	23	0	0
3402	H2	-	-	U	-	HM	1	VAB			BS; IRF		1	12	0	0
3402	OX?	-	-	-	-		2	VAB			BS; MED OR EBOR1		2	4	0	0
3409	EBOR1	-	-	-	-		1	CARBON DEP			BS		1	2	0	0
3409	FCLAY	-	-	-	-		0				BS; SANDY		1	4	0	0
3409	H2	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	7	0	0
3409	H2	JLH	-	GLOB	-	HM	1		D21	31	RIM; IRF; DENSE QU; APPLIED LUG HANDLE		1	361	0	0
3409	H2Q	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	55	0	0
3409	H4	-	-	U	-	HM	1	ABR			BS; IRF		1	15	0	0
3411	H3	-	-	U	-	HM	1	VAB			BS; IRF; VOIDS & QUARTZITE		1	19	0	0
3415	H2	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	19	0	0
3415	H2	-	-	U	-	HM	1	CARBON DEP INT			BS; IRF		1	29	0	0
3415	H2Q	-	-	U	-	HM	2	ABR			BS; IRF		2	21	0	0
3415	H2SS	IEV	EVR	GLOB	FLT	HM	1	CARBON DEP	D17	32	RIM; IRF	3416	3	119	19	11
3416	FCLAY	-	-	-	-		0				FINE OXID FABRIC; ?DAUB		4	19	0	0
3416	FCLAY	-	-	-	-		0		D20	35	LOOM WEIGHT; SMOOTH PALE OX FABRIC REDUCED CORE		2	930	0	0
3416	GREY?	B37R	-	-	-	WM; ROUZ	1		D19	34	RIM; MISFIRED OR BURNT		1	31	31	16
3416	H2	-	-	-	FLT		1	ABR			BASE; IRF		1	22	0	0
3416	H2	JL	-	GLOB	-		1	CARBON DEP INT			BS; IRF		4	309	0	0
3416	H2	-	-	U	-	HM	4				BS; IRF		4	28	0	0
3416	H2	J	RD	GLOB	-	HM	1		D18	33	RIM; IRF; DENSE SANDY		2	241	24	18
3416	H2Q	J	-	GLOB	-		1	CARBON DEP INT			BS; IRF		7	197	0	0
3416	H2SS	IEV	EVR	GLOB	-	HM	1	CARBON DEP	D17	32	RIM; IRF	3415	7	270	19	28
3416	H4	-	-	U	-	HM	3	ABR			BS; IRF		3	24	0	0
3416	OX?	FJ	-	-	-		1	BURNT			BS NECK?; ROMAN OR MED JUG		1	4	0	0
3417	H2	IEV	EVR	GLOB	-	HM	1	CARBON DEP			RIM; IRF; THICK MUD; LARGER VERSION OF D36		1	126	18	10
3417	H2	-	-	GLOB	-	HM	1	CARBON DEP EXT			BS; IRF; THICK CARBON		1	93	0	0
3417	H2Q	-	-	GLOB	-	HM	1				BS; IRF		1	150	0	0

3417	H4	-	-	U	-	HM	1	VAB			BS; IRF		1	7	0	0

OADP 19. Animal Bone Report

Louisa Gidney

This season of excavation produced another small box of animal bones, recovered from the fills of ditches associated with Iron Age occupation. Preservation of bone in these features is poor, with most finds being either small burnt or calcined fragments, as described for the finds from OADP17 and OADP18. Unburnt fragments showed surface degradation and teeth were reduced to fragments of enamel.

Trench 1

The unburnt fragments were all cattle teeth, with fragments of tooth enamel in contexts 3101 and 3102. A complete maxillary molar 3 at an early stage of wear was also found in context 3102 with another example that has fragmented. The cattle size fragments are calcined and not identifiable to element. All the sheep/goat and sheep size fragments are burnt or calcined. Sheep/goat was positively identified in context 3102 from a tibia with proximal end unfused, a broken radius with proximal and distal ends fused and a further distal radius with fused epiphysis. The sheep size fragments are from long bone shafts, possibly from radius in 3102 and tibia in 3104.

Table 1. Contexts with identifiable fragments

	3101	3102	3103	3104
Cattle	1	3		
Cattle size		1	1	
Sheep/goat		3		
Sheep size		1		1

Trench 3

Unburnt cattle teeth were represented by enamel fragments in contexts 3301, 3316, 3337 and 3349. A very poorly preserved fragment of unburnt cattle humerus was found in context 3352. All the remaining fragments were calcined. The identifiable

sheep/goat elements are tibia shafts in contexts 3301 and 3305 and a fused proximal femur in context 3349. The sheep size fragments include a possible skull fragment in context 3305, a rib shaft in context 3317 and perhaps tibia shaft in context 3354. The remaining cattle and sheep size fragments are not identifiable to element.

Table 2. Contexts with identifiable fragments

	3301	3305	3316	3317	3337	3349	3352	3354
Cattle	1		1		1	1	1	
Cattle size						1		1
Sheep/goat	1	1				1		
Sheep size		1		1		1		1

Trench 4

Context 3401 produced fragments of tooth enamel that might be sheep/goat rather than cattle. All the other finds from this trench were calcined and not identifiable to species. Context 3416 contained a fragment of cattle size rib and sheep size long bone.

Table 3. Contexts with identifiable fragments

	3401	3407	3416
Cattle size			1
Sheep size			1
Indeterminate	X	X	

Discussion

None of the cattle teeth found had been burnt and all the enamel fragments appear to derive from maxillary teeth. The molar 3 at an early wear stage from context 3102 suggests an age at death between 2 and 3 years old. None of the enamel fragments had evidence for advanced wear. In the absence of any evidence for mandibular teeth, it is possible that the cattle teeth represent all that is now left of crania.

All the identifiable sheep bones were calcined and all were fragments of limb bones: radius, tibia and femur. The radius and femur fragments were from adult animals with fused epiphyses, more than 2½ years old. A younger animal, less than 2½ years old, is indicated by the unfused proximal tibia from context 3102.

The association of calcined sheep/goat fragments with unburnt cattle teeth in 3102 and the wide distribution of unassociated calcined sheep/goat fragments throughout the deposits suggests that these finds represent casual disposal of table waste on the fire, with the ashes subsequently dumped in the ditches. There is no evidence to suggest that any of these finds represent specific episodes of consumption of a single sheep carcase and burning of the uneaten remains in a manner comparable to the Passover lamb, a practice which is regularly encountered on rural Iron Age and Romano-British sites.

Palaeoecology Research Services **PRS 2020/24**

Assessment of biological remains from sediment samples collected during an archaeological excavation at Cannon House Farm, Wheldrake, York (site code: OADP19)

by

John Carrott, Jane Barker and Charlotte England

Summary

Seven sediment samples, together with a small quantity of material recovered by the excavator from sieving of an eighth, from deposits encountered during an archaeological excavation at Cannon House Farm, Wheldrake, York, were submitted for an assessment of their bioarchaeological potential. The site was first identified by aerial photography and the Vale of York Mapping Programme and appeared to consist of a roughly rectangular double-ditched enclosure (with an east facing entrance), several linear ditches and probable field boundaries, and one or two probable ring ditches. Drone images taken during the summer of 2018 revealed additional features and this more complex landscape was confirmed by subsequent magnetometer and resistivity surveys. Four trenches (Trenches 1-4) were proposed to investigate the features but only three were excavated owing to constant flooding of the area of Trench 2. Overall, the site appears to be Late Iron Age to Romano-British in date but this is subject to confirmation/refinement from further study of the ceramic assemblage and other artefacts.

Biological remains of 'ancient' origin were largely restricted to poorly preserved rectilinear charcoal, with occasional other charred plant remains (grains/grain fragments and one piece of nutshell) and traces of burnt bone. All of the few identified charcoal fragments were of native British tree species and presumably fuel waste representing the burning of local woodland resources – the other charred plant remains were very few in number and although the charred ?hazel nutshell fragment and 'grains' could potentially be human food waste this seems unlikely here and they are more likely to reflect accidental burning along with fire wood.. Traces of indeterminate bone fragments, mostly burnt, were recovered from seven of the deposits but the only concentration was a small assemblage recovered from a lower deposit within the enclosure ditch. The latter was also predominantly of indeterminate burnt fragments but included some pieces of unidentified long bone shaft, two fully calcined fragments which could be refitted to form a ?sheep/goat first phalanx and an unburnt fragment of an unerupted ?cattle cheek tooth. The only concentration of interpretatively valuable microfossils was an abundance of extremely poorly preserved diatoms in the fill of the north side of a small ring ditch which strongly suggested aquatic deposition; the sample from the west side of the same ring ditch contained only a few such remains, however, providing only a hint of the possibility of aquatic deposition and the same was true for two fills of an earlier enclosure ditch (and possibly the fill of the large central ring ditch where there were only a few remains tentatively identified as frustule fragments). Overall, the small quantities of biological and artefactual remains recovered reflect casual disposal of domestic fuel and food waste rather than systematic dumping.

Some of the charred plant remains and bone fragments would be suitable for radiocarbon dating of the deposits to be attempted but, other than the recommendation that the burnt bone assemblage should be reviewed by a human bone specialist, no further study of the limited biological remains recovered is warranted.

Keywords: Cannon House Farm; Wheldrake; York; assessment; Late Iron Age/Romano-British (provisional); plant remains; charred plant remains; charcoal; charred 'grain' (trace); charred nutshell (trace); invertebrate remains (trace; modern); vertebrate remains (mostly burnt)

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Assessment of biological remains from sediment samples collected during an archaeological excavation at Cannon House Farm, Wheldrake, York (site code: OADP19)

Introduction

An archaeological excavation was undertaken by North Duffield Conservation and Local History Society (NDCLHS) at Cannon House Farm, Wheldrake, York (the south-west corner of the field investigated was located at NGR SE 670 466), during 2019. The excavation was undertaken as part of NDCLHS's current project investigating Iron Age settlement in the southern Vale of York bounded by the rivers Ouse and Derwent.

The site was first identified by aerial photography and the Vale of York Mapping Programme and appeared to consist of a roughly rectangular double-ditched enclosure (with an east facing entrance), several linear ditches and probable field boundaries, and one or two probable ring ditches. Drone images taken during the summer of 2018 revealed additional features and this more complex landscape was confirmed by subsequent magnetometer and resistivity surveys undertaken in the spring of 2019.

Four trenches (Trenches 1-4) were proposed to investigate the features but, ultimately, only three were excavated as the area of Trench 2 was constantly flooded.

Trench 1 was positioned to investigate a ring ditch revealed as a crop mark and located a few metres to the west of the rectangular enclosure and confirmed the presence of this, together with two other ditches, one earlier and cut by the ring ditch and the other later and cutting the ring ditch. The ring ditch contained abundant fire-cracked cobbles and sherds of pottery (some of which appeared to be prehistoric), and a small assemblage of ?animal teeth and bones.
Trench 3 was positioned within the rectangular enclosure to investigate the large central ring ditch, a smaller ring ditch just to the south and possible pits in the south-eastern corner of the enclosure. An almost complete pot was recovered from the base of the large ring ditch and much of the ceramic assemblage recovered was, provisionally, Roman in date.

Trench 4 was positioned over the entrance to the rectangular enclosure and included both termini – however, only the northern terminus was investigated owing to flooding and the resultant collapse of excavated features. Artefacts recovered from the northern terminus were, again, provisionally of Roman date and included a large ?amphora body sherd, the handle of a ?storage jar and an almost complete loom weight. There was also evidence for what appeared to be a smaller enclosure ditch which either pre- or post-dated the main rectangular enclosure.

Overall, the site appears to be Late Iron Age to Romano-British in date but this is subject to confirmation/refinement from further study of the ceramic assemblage and other artefacts.

Seven 'bulk' sediment samples ('GBA'/'BS' *sensu* Dobney *et al*. 1992), from fills of the ring and enclosure ditches, together with a smaller sample of the outer part of the fill of the almost complete vessel from Trench 3 and a few remains recovered from the sieving of the inner part of the fill by NDCLHS (the two parts being differentiated by colour), were submitted to

Palaeoecology Research Services Limited, Kingston upon Hull, for an assessment of their bioarchaeological potential.

Methods

The lithologies of the submitted sediment samples were recorded using a standard *pro forma*. A very small subsample was extracted from each for examination for microfossils (see below) prior to processing of all of the remainder of the sediment from Samples 1 and 7, and approximately half of that from the other samples, for the recovery of plant, invertebrate and vertebrate remains (macrofossils), broadly following the techniques of Kenward *et al*. (1980), producing a residue and a washover in each case.

The deposits did not appear to contain ancient uncharred organic remains preserved by anoxic waterlogging and the washovers were dried for examination for macrofossils using a low-power microscope (x7 to x45 magnification).

The residues were primarily mineral in nature and were also dried prior to the recording of their components; the weights and descriptions of the residues were recorded after sorting. The residues were separated into three fractions (using 2 and 4 mm sieves) to facilitate recording. Data acquired refer to the larger items which have been extracted; smaller fragments remain in the residues and details of these are not included. All biological and artefactual remains were sorted to 2 mm; the residue fractions less than 2 mm were scanned for additional identifiable remains and their composition recorded semi-quantitatively (see below). All of the residue fractions (including those less than 2 mm) were scanned for magnetic material.

The processed sample fractions (washovers and residues) were scanned until no new remains were observed and a sense of the abundance of each taxon or component was achieved and these were recorded either as counts or using a five-point semi-quantitative scale as: 1 – few/rare, up to 3 individuals/items or a trace level component of the whole; 2 – some/present, 4 to 20 items or a minor component; 3 – many/common, 21 to 50 or a significant component; 4 – very many/abundant, 51 to 200 or a major component; and 5 – super-abundant, over 200 items/individuals or a dominant component of the whole. The abundance of recovered organic and other remains within the sediments as a whole may be judged by comparing the washover weights/volumes and the quantities of remains recovered from the residues with the sizes of the processed sediment samples.

Plant macrofossil remains were identified by comparison with modern reference material (where possible), and the use of published works (e.g. Cappers *et al*. 2006 and Jacomet 2006). Remains were identified to the lowest taxon possible or necessary to achieve the aims of the project. Nomenclature for plant taxa follows Stace (1997).

Species identifications were attempted for a small number of charcoal fragments (all of over 4 mm) recovered from the sediment samples. Pieces were broken to give clean cross-sectional surfaces and the anatomical structures were examined using a low-power binocular microscope (x7 to x45) and higher magnification where necessary (x100 and x150). Identifications were

attempted by comparison with modern reference material where possible, and with reference to published works (principally Hather 2000 and Schoch *et al*. 2004).

The few invertebrate remains noted were all almost certainly modern intrusions and were recorded in brief.

For the vertebrate remains, subjective records were made of the state of preservation, colour of the bone fragments, and the appearance of broken surfaces ('angularity'). The bones were also examined for evidence of dog gnawing, burning, butchery and fresh breaks which was noted where applicable. Where fragments of the same bone could be confidently refitted the pieces were recorded as a single element. Where possible, fragments were identified to species or species group using modern comparative reference material and published works (e.g. Schmid 1972). Remains that could not be identified to species were grouped into categories: large mammal (assumed to be cattle, horse or large deer (cervid)), medium-sized mammal (assumed to be sheep/goat (caprine), pig or small deer), and completely unidentifiable. Nomenclature for mammals follows Harris and Yalden (2008).

During recording, consideration was given to the identification of suitable remains (if present) for possible submission for radiocarbon dating by standard radiometric technique or accelerator mass spectrometry (AMS).

A small subsample (of approximately 5 ml) of sediment was extracted from each of the samples for examination for microfossils. These were investigated using the 'squash' technique of Dainton (1992), originally designed specifically to assess the content of eggs of intestinal parasitic nematodes; however, this method routinely reveals other microfossils, such as pollen and diatoms, which were also recorded if present. The assessment slides were scanned at x150 magnification and at x600 where necessary. Provisional identifications for pollen grains and spores were made by comparison with modern reference material and the use of published works (principally Moore *et al*. 1991). Determination of the presence/absence of diatoms, their abundance (semi-quantitative as outlined above) and an estimation of the minimum number of different forms represented was made with reference to published works (Barber and Haworth 1981; Hartley *et al*. 1996).

Results

The results of the investigations of the sediment samples are presented below in context number order by Trench. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers.

Trench 1

Context 3102 [fill of ring ditch; provisionally Late Iron Age/Romano-British]
Sample 2/T (12 kg/9 litres sieved to 300 microns with washover and microfossil 'squash'; approximately 9 litres of unprocessed sediment remain)

Moist, mostly dark grey (mottled with mid brown at mm- and cm-scales), unconsolidated with some crumbly lumps (working slightly soft), very ashy, sandy silt (to silty sand – varies). A single large (over 60 mm) ?fire-cracked cobble was noted and there were intrusive/contaminant remains in the form of rootlets and more substantial 'woody' roots, seedlings and live invertebrates.

The fairly large washover (dry weight 73.2 g/~150 ml) was mostly small 'crumbs' of undisaggregated (?indurated) sediment (to 3 mm but predominantly to 1 mm; score 5), with abundant sand (score 4) and fine charcoal (score 4; mostly to 2 mm with occasional larger pieces to 13 mm) and a little coal (to 4 mm; score 2). All of the charcoal was rectilinear and rather fragile/crumbly, with larger fragments typically coated in adhering sediment. Four fragments were provisionally identified as three of ?birch (cf. *Betula*) and one of ?oak (cf. *Quercus*) with a fifth positively identified as oak (*Quercus*); three other fragments examined crumbled and remained wholly indeterminate. All of the other components noted were modern contaminants/intrusions – rootlet (score 2), soil-dwelling nematode (*Heterodera*) cysts (score 2), millipede (Diplopoda) fragments, uncharred 'seeds' (score 3; including orache/goodefoot (*Atriplex*/*Chenopodium*) seeds (score 2) and knotweed (*Persicaria*) achenes (score 2) – the latter probably including water-pepper (*Persicaria* ?*hydropiper* (L.) Spach (score 2)) and also sprouted legume (Fabacae) seeds (score 2; perhaps of ?vetch – cf. *Vicia* – and including detached 'sprout' and rhizome fragments).

The medium-sized residue (dry weight 3630.6 g: >4 mm – 3105.4 g; 2-4 mm – 45.1 g; <2 mm – 480.1 g) was mostly stones (to 110 mm; score 5), with a little sand (score 2; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)). Minor components were a small amount of larger rectilinear charcoal (to 10 mm; <0.1 g – including two fragments partially identified as of a diffuse-porous species and one which was ring-porous; all three fragments exhibited a rather vitrified appearance), two part-calcined (i.e. burnt to white in places) indeterminate burnt bone fragments (to 8 mm; <0.1 g) and a little modern plant detritus (including a few fragments of ?cereal 'straw'). There was also a tiny magnetic component (to 5 mm; 0.6 g; score 1) which was almost all ?heat-affected sand, small stones (to 4 mm) and sediment concretions (to 5 mm), with just a trace (one or two pieces) of amorphous slag (to 3 mm; <0.1 g).

The 'squash' subsample was mostly inorganic but with frequent black flecks of microscopic ?charcoal/ash (score 3) and there were occasional fragments of ?phytoliths and fungal hyphae (both score 2).

Trench 3

Context 3302 [fill of large central ring ditch; provisionally Late Iron Age/Romano-British]
Sample 3/T (10.25 kg/8 litres sieved to 300 microns with washover and microfossil 'squash'; approximately 8 litres of unprocessed sediment remain)

Moist, mid/dark brown to mid/dark grey-brown (mottled at a mm-scale), unconsolidated with some crumbly lumps (working slightly soft), ashy in places, sandy silt, with occasional clasts of light/mid yellow-brown sand (to 15 mm). Stones (6 to over 60 mm; some ?fire-cracked) and ?pot sherds were present, and there was also some modern intrusive rootlet.

The fairly large washover (dry weight 72.0 g/~100 ml) was mostly sediment coated rectilinear charcoal (to 12 mm; score 5) and small 'crumbs' of undisaggregated (?indurated) sediment (to 4 mm but predominantly to 1 mm; score 4), with a little sand (score 2) and a trace of indeterminate calcined bone (to 3 mm; score 1). The charcoal was rather fragile/crumbly and often somewhat mineral impregnated – of eight fragments examined five could be partially identified as of a diffuse-porous species, the three others crumbled and remained indeterminate. Other components were rootlet (score 1), 'sprouted' legume (?vetch) seeds etc (score 2) and indeterminate uncharred fragments of other indeterminate 'seeds' (score 2) – all modern contaminants/intrusions.

The medium-sized residue (dry weight 4873.0 g: >4 mm – 4425.3 g; 2-4 mm – 70.4 g; <2 mm – 377.3 g) was mostly stones (to 110 mm; score 5), with a little sand (score 2; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)). There was also a little larger charcoal (to 10 mm; 1.0 g) – all rectilinear fragments and predominantly indeterminate but including two partially identifiable as diffuse-porous – three indeterminate calcined bone fragments (to 8 mm; <0.1 g) and 22 sherds of pottery (to 45 mm; 76.6 g). There was no magnetic component to the residue.

The 'squash' subsample was mostly inorganic with some black flecks of microscopic ?charcoal/ash (score 2). A few ?phytolith fragments (score 1) were noted, there were one or two fragments which *may* have been small fragments of diatom frustule(s) and there was a single heavily eroded ?trilete spore (cf. *Sphagnum*).

Context 3316 [upper fill of earlier enclosure ditch – east side; provisionally Late Iron Age/Romano-British]
Sample 6/T (10 kg/8 litres sieved to 300 microns with washover and microfossil 'squash'; approximately 8 litres of unprocessed sediment remain)

Moist, mostly very dark grey (mottled with mid brown, mid/dark grey-brown and light/mid grey at mm- and cm-scales), unconsolidated with some crumbly lumps, very ashy, slightly silty sand. There were no obvious inclusions other than modern intrusive rootlet and more substantial 'woody' root.

The fairly large washover (dry weight 77.7 g/~100 ml) was mostly sediment coated rectilinear charcoal (to 14 mm; score 5) and small 'crumbs' of undisaggregated (?indurated) sediment (to 5 mm but predominantly to 1 mm; score 4), with a little sand (score 2) and a trace of indeterminate burnt/calcined bone (to 17 mm but all bar one fragment <5 mm; score 2). The charcoal was rather fragile/crumbly – of five fragments examined one was of a ring-porous species and another was ?oak, but the three others crumbled and remained indeterminate. There was a single fragment of roundwood charcoal (to 14 mm; diameter to 9 mm) of alder/birch/hazel (*Alnus*/*Betula*/*Corylus*) – five growth rings were visible but the fragment lacked bark or the waney edge and so could only be said to derive from the 'core' of a twig/branch of at least five years growth. Other charred plant remains comprised two charred grains, one of ?brome (cf. *Bromus*) and the other probably a ?grass (cf. Poaceae) caryopsis. The other organic remains present were all modern contaminants/intrusions – rootlet (score 1), 'sprouted' legume (?vetch) seeds etc (score 2) and uncharred 'seeds'/'seed' fragments (score 2; including orache/goosefoot seeds (score 2) and ?water-pepper achenes (score 1)). There was also a single sherd of pottery (to 19 mm; 1.4 g).

The very small residue (dry weight 875.5 g: >4 mm – 450.5 g; 2-4 mm – 21.9 g; <2 mm – 403.1 g) was mostly stones (to 85 mm; score 5) and sand (score 4; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)). A little burnt bone (to 20 mm; 1.9 g) – 15 calcined fragments and three which were mostly black – and larger charcoal (to 5 mm; <0.1 g) was also present and there was single fragment of charred ?hazel (cf. *Corylus*) nutshell (to 4 mm; <0.1 g). The tiny magnetic component (to 4 mm; 0.5 g) was entirely composed of ?heat-affected small stones and sand.

The 'squash' subsample was mostly inorganic but with frequent black flecks of microscopic ?charcoal/ash (score 3) and there were occasional fragments of ?phytoliths (score 1) and fungal hyphae (score 2). There were also some diatoms (score 2) which were very poorly preserved, being broken and/or heavily eroded, but representing at least two different forms.

Context 3352N [fill of north side of small ring ditch; provisionally Late Iron Age/Romano-British]
Sample 4/T (11.5 kg/9 litres sieved to 300 microns with washover and microfossil 'squash'; approximately 7 litres of unprocessed sediment remain)

Moist, varicoloured (jumbled shades of grey-brown and grey from light to very dark, and occasionally light and light/mid brown), unconsolidated with some crumbly lumps, very ashy, silty sand. Charcoal and burnt bone fragments were present as were modern rootlets and seedlings.

The fairly large washover (dry weight 73.3 g/~120 ml) was mostly sediment coated rectilinear charcoal (to 11 mm; score 5) and small 'crumbs' of undisaggregated (?indurated) sediment (to 4 mm but predominantly to 1 mm; score 4), with a little sand (score 2) and a little indeterminate bone (to 12 mm; score 2 – mostly burnt but a few fragments appeared unburnt). The charcoal was rather fragile/crumbly – of four fragments examined only one could be partially identified as of a ring-porous species; the other three crumbled and remained indeterminate but two were noted to be of rather vitrified appearance. Other charred plant remains comprised five charred grains/grain fragments but none of these could be identified more closely. The other organic remains present were, again, all modern contaminants/intrusions – rootlet (score 2), 'sprouted' legume (?vetch) seeds etc (score 1) and uncharred 'seeds'/'seed' fragments (score 2; including orache/goosefoot seeds (score 2) and ?water-pepper achenes (score 2)).

The small residue (dry weight 1296.8 g: >4 mm – 235.2 g; 2-4 mm – 20.1 g; <2 mm – 1041.5 g) was mostly sand (score 5; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)) and stones (to 105 mm; score 2). Minor components were a single pottery sherd (to 27 mm; 5.4 g) and a little burnt bone (to 19 mm; 1.6 g). The latter amounted to 30 indeterminate fragments most of which were calcined (or partly so), with seven fragments being blue-ish grey and/or black. The tiny magnetic component (to 5 mm; 0.7 g) was entirely composed of ?heat-affected small stones.

The 'squash' subsample was mostly inorganic but with frequent black flecks of microscopic ?charcoal/ash (score 3). Diatoms were abundant (score 5) but very poorly preserved, being broken and/or heavily eroded (usually both), but at least three different forms were represented including (provisionally) ?*Pinnularia* and ?*Amphora* species.

Context 3352W [fill of west side of small ring ditch; provisionally Late Iron Age/Romano-British]
Sample 7/T (9 kg/7 litres sieved to 300 microns with washover and microfossil 'squash'; no unprocessed sediment remains)

Moist, mostly very dark grey (mottled with mid/dark grey-brown and light/mid grey-brown at mm- and cm-scales), unconsolidated with occasional crumbly lumps, very ashy, silty sand. Charcoal and modern rootlets and seedlings were present.

The large washover (dry weight 209.4 g/~400 ml) was mostly fragile (crumbly), slightly sediment coated, rectilinear charcoal (to 22 mm; score 5) and sand (score 4), with some small 'crumbs' of undisaggregated (?indurated) sediment (to 6 mm but predominantly to 1 mm; score 2), and a trace of indeterminate calcined bone (score 2; occasional small 'crumbs' to 2 mm (score 2) and one larger piece to 21 mm). Nine of the charcoal fragments were examined more closely – the largest was ?ash (cf. *Fraxinus*), three were alder/birch/hazel, one ring-porous, one diffuse-porous, and three crumbled and remained indeterminate. The uncharred organic remains present were all modern contaminants/intrusions – rootlet (score 2), 'sprouted' legume (?vetch) seeds etc (score 2) and uncharred 'seeds'/'seed' fragments (score 2; including orache/goosefoot seeds (score 2) and fragments representing at least two additional unidentified taxa (score 2)).

The small residue (dry weight 1241.4 g: >4 mm – 162.3 g; 2-4 mm – 115.7 g; <2 mm – 963.4 g) was mostly sand (score 5; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)) and stones (to 67 mm; score 2 – all bar one <30 mm). Minor components were a little burnt bone (to 7 mm; 0.4 g – 41 fragments almost all of which were fully calcined, a few were partly so and there were single fragments which were black and predominantly blue-ish grey), indeterminate rectilinear charcoal (to 3 mm; score 3) and a trace of uncharred modern plant detritus (probably additional legume material – see washover paragraph above). The tiny magnetic component (to 5 mm; 0.8 g) was entirely composed of ?heat-affected sand and small stones.

The 'squash' subsample was mostly inorganic but with frequent black flecks of microscopic ?charcoal/ash (score 3), a trace of uncharred organic detritus (<1%) and occasional fragments of fungal hyphae (score 2). A few diatoms (score 1) were present but all of the frustules were both broken and heavily eroded.

Context 3354 [fill of west side of earlier enclosure ditch; provisionally Late Iron Age/Romano-British]
Sample 5/T (12 kg/9 litres sieved to 300 microns with washover and microfossil 'squash'; approximately 9 litres of unprocessed sediment remain)

Moist, mostly dark grey (mottled with dark grey-brown at a mm-scale), unconsolidated with some crumbly lumps (working slightly soft), very ashy, silty sand (to sandy silt – varies). Large stones (over 60 mm) and charcoal were present and there were intrusive/contaminant remains in the form of rootlets and more substantial 'woody' roots, seedlings, fragments of ?cereal 'straw' (probably actually legume material – see below) and live invertebrates.

The rather large washover (dry weight 87.9 g/~250 ml) was mostly sediment coated rectilinear charcoal (to 14 mm; score 5) and small 'crumbs' of undisaggregated (?indurated) sediment (to 5 mm but predominantly to 1 mm; score 4), with a little sand (score 2) and two indeterminate charred grain fragments. The charcoal was rather fragile/crumbly – of six fragments examined one was ring-porous and vitrified, two were diffuse-porous and the

three others crumbled and remained indeterminate. Other organic remains present were all modern contaminants/intrusions – rootlet (score 2), frequent 'sprouted' legume (?vetch) seeds etc (score 3), other uncharred 'seeds'/'seed' fragments (score 2; including orache/goosefoot seeds (score 2) and ?water-pepper achenes (score 2)), and a few earthworm egg capsules (score 1).

The very small residue (dry weight 744.2 g: >4 mm – 451.7 g; 2-4 mm – 69.7 g; <2 mm – 222.8 g) was mostly burnt stones (to 103 mm; score 5), with some sand (score 3; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)) and a little indeterminate burnt (calcined) bone (to 7 mm; 0.3 g; ~25 fragments). There were also occasional concretions, perhaps ten in total, of mineralised root cast (to 30 mm; 2.7 g). There was no magnetic component to the residue.

The 'squash' subsample was mostly inorganic but with frequent black flecks of microscopic ?charcoal/ash (score 3), a trace of uncharred organic detritus (<1%) and a few ?phytolith fragments (score 1). A few diatoms (score 1) were present but all of the frustules were broken and/or heavily eroded.

Context 3376 [fill of complete vessel inverted on base of large enclosure ditch [3302]; provisionally Romano-British]
Sample 8/T (1.6 kg/1 litre sieved to 300 microns with washover and microfossil 'squash'; no unprocessed sediment remains)

The unprocessed sediment sample submitted was of the outer part of the fill of the vessel and the following paragraphs (other than the last) relate to description and post-processing recording of this. The final paragraph relates to small quantities of material recovered from the inner part of the fill which was sieved by NDCLHS.

Dry, very light grey-brown to light grey (shades darken to mid when wetted), unconsolidated or in brittle lumps, silty very fine sand. Modern rootlets were present.

The tiny washover (dry weight 9.2 g/~7 ml) was mostly small 'crumbs' of undisaggregated (?indurated) sediment (to 4 mm but predominantly to 1 mm; score 5), with frequent sand (score 3) and charcoal (to 6 mm; score 3), a little modern rootlet (score 2) and a trace of modern ?rhizome epidermis (score 1). The charcoal was all heavily silted rectilinear fragments which were very fragile/crumbly and mineral impregnated – three pieces were examined more closely but all crumbled and remained indeterminate.

The tiny residue (dry weight 83.7 g: >4 mm – 47.1 g; 2-4 mm – 5.5 g; <2 mm – 31.1 g) was mostly stones (to 41 mm; score 5) and sand (score 3; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)). The only material sorted from the residue was 13 sherds of pottery (to 21 mm; 5.4 g – some only tentatively identified as ?pottery). There was no magnetic component to the residue.

The 'squash' subsample was almost entirely inorganic, with just a few black flecks of microscopic ?charcoal/ash and ?phytolith fragments (both score 1).

Small quantities of material recovered after the sieving of the inner part of the fill of the vessel by NDCLHS were also submitted to PRS. The remains consisted of 25 small ?pot sherds (to 15 mm; 8,1 g), three additional sherds which were more definitively of pot (to 17 mm; 1.7 g) and 14 heavily sediment encrusted fragments of rectilinear charcoal. None of the last could be identified to species or genus but ten of the fragments were of a diffuse-porous species and, of these, nine were somewhat mineral impregnated, with three of the nine also of vitrified appearance.

Trench 4

Context 3416 [lower deposit in enclosure ditch; provisionally Late Iron Age/Romano-British]
Sample 1/T (19.5 kg/15 litres sieved to 300 microns with washover and microfossil 'squash'; no unprocessed sediment remains)

Moist, dark grey, unconsolidated with some crumbly lumps (working soft and slightly sticky), ashy, sandy silt (some clay content in places and these areas work soft and somewhat plastic). Charcoal and burnt bone fragments were present as were modern rootlets, more substantial 'woody' roots and live invertebrates.

The large washover (dry weight 187.6 g/~400 ml) was almost all sediment coated and mineral impregnated, fragile (crumbly), rectilinear charcoal (to 37 mm but predominantly <10 mm; score 5) and sand (score 3), with a little burnt (part calcined) bone (to 15 mm; score 2) and a single charred ?grass (cf. Poaceae) caryopsis. Thirteen charcoal fragments were examined more closely and eight of these were alder/birch/hazel (probably birch – *Betula*) but the five others crumbled and remained indeterminate. Other biological remains comprised rootlet (score 2) and 'sprouted' legume (?vetch) seeds etc (score 2), both of which were modern intrusions or contaminants.

The small (relative to the size of the sediment sample processed) residue (dry weight 2185.3 g: >4 mm – 770.8 g; 2-4 mm – 65.1 g; <2 mm – 1349.4 g) was mostly sand (score 5; almost all of the <2 mm fraction although there were also some black flecks of charcoal (score 2)) and stones (to 100 mm; score 4), with an appreciable quantity of burnt bone (to 50 mm; 98.7 g). The last was mostly burnt to black (~80%), with most of the remainder calcined or partly so (and only occasional fragments unburnt most of which were slivers of tooth and included one fragment from an unerupted cheek tooth of a large mammal (ungulate), probably cattle cf. *Bos* f. domestic), and predominantly indeterminate fragments although there were occasional remains of unidentified long bone shaft fragments and two fully calcined articular ends (distal and proximal) with part shafts which could be refitted to form a first phalanx from a medium-sized mammal (ungulate), probably sheep/goat (cf. caprine) – vertebrate remains identifications Dr Alison Foster pers. comm.. There was also a little indeterminate rectilinear charcoal (to 4 mm; 1.5 g) and uncharred modern plant detritus (probably additional legume material – see washover paragraph above). There was no magnetic component to the residue.

The 'squash' subsample was mostly inorganic but with frequent black flecks of microscopic ?charcoal/ash (score 3) and a few fragments of ?phytoliths and fungal hyphae (both score 1).

Discussion and statement of potential

Biological remains of 'ancient' origin (i.e. likely to be contemporary with deposit formation) were largely restricted to charcoal, with occasional other charred plant remains such as charred 'grains' from Contexts 3316 (upper fill of earlier enclosure ditch – east side), 3352N (fill of north side of small ring ditch) and 3354 (fill of west side of earlier enclosure ditch), and a single fragment of charred ?hazel nutshell from Context 3316.

Charcoal preservation was consistently poor (fragments were fragile, most often sediment encrusted and sometimes mineral impregnated) with many of the fragments examined for attempted species identification crumbling and remaining wholly indeterminate. Those fragments for which cross-sections could be examined were often only partially identifiable as diffuse-porous or ring-porous but there were occasional pieces which could be identified a little more closely; albeit mostly provisionally. Oak was positively identified from Context 3102 (fill of ring ditch) and tentatively from Context 3316, with the latter also containing alder/birch/hazel fragments (and the single charred ?hazel nutshell fragment) and the former some similar fragments which were provisionally identified more closely as ?birch. Alder/birch/hazel fragments were also present in Context 3352W (fill of west side of small ring ditch), where there was also a little ash charcoal, and Context 3416 (lower deposit in enclosure ditch) where some of the fragments were also probably of birch. A few charcoal fragments from Contexts 3102, 3352N, 3354 and 3376 (fill of complete vessel inverted on base of large enclosure ditch [3302]) also exhibited a vitrified appearance which, in the past, has been interpreted as indicative of high temperature burning (in excess of 1000 degrees Centigrade) but which experimental work by McParland *et al*. (2010) suggests is likely to reflect a more moderate charring temperature of

310-530 degrees Centigrade. All of the identified charcoal was of native British tree species and presumably fuel waste representing the burning of local woodland resources.

The other charred plant remains recorded were very few in number and although the charred ?hazel nutshell fragment and 'grains' could potentially be human food waste this seems unlikely here. There were no concentrations of nutshell and the single charred fragment is more likely to reflect accidental burning along with fire wood. Similarly, the quantities of charred 'grain'/'grain' fragments were too small to indicate waste from food preparation and/or crop processing and no remains of cultivated cereals were identified; where identifiable (tentatively), all of the remains appeared to be of ?grass caryopses (Contexts 3316 and 3416) and ?brome (Context 3316) and, again, are most likely to have been burnt accidentally.

Other plant and invertebrate remains present were clearly or almost certainly modern intrusions or contaminants – modern rootlets and 'sprouted' legumes (?vetch) and associated rhizome and sprout fragments from all eight deposits, occasional other uncharred 'seeds' from six (all bar Contexts 3376 and 3416), soil-dwelling nematode cysts and millipede fragments from Context 3102, and earthworm egg capsules from Context 3354.

Traces of indeterminate bone fragments, mostly burnt, were recovered from seven of the deposits (all bar Context 3376) but the only concentration of remains was the small assemblage recovered from Context 3416. The latter was also predominantly of indeterminate burnt fragments but included some pieces of unidentified long bone shaft, two fully calcined fragments which could be refitted to form a ?sheep/goat first phalanx and an unburnt fragment of an unerupted ?cattle cheek tooth.

The 'squash' subsamples revealed microscopic ?charcoal/ash in all of the deposits and several also contained small numbers of microfossils – ?phytolith fragments from Contexts 3102, 3302 (fill of large central ring ditch), 3316, 3354, 3376 and 3416, and fungal hyphae, which are likely to be of recent origin, from Contexts 3102, 3316 and 3352W – but the only concentration of interpretatively valuable remains was the abundance of diatoms recorded from Context 3352N. The diatom frustules were very poorly preserved (most being both broken and heavily eroded) but strongly suggest aquatic deposition of this fill on the north side of the small ring ditch. Similarly poorly preserved diatoms were also recorded from the west side of the small ring ditch (Context 3352W) but here there were only a few remains present and, consequently, only a hint of the possibility of aquatic deposition; the same being true for the two (perhaps three) other deposits which also contained small numbers of poorly preserved frustules – Contexts 3316 and 3354 (and possibly also Context 3302).

Artefactual remains were also rather few but did include a little pot (and ?pot) from Contexts 3302 (22 sherds), 3316 (one sherd), 3352N (one sherd), 3376 (13 sherds from the sample processed by PRS, three amongst the material submitted after sieving by NDCLHS and a further 25 amongst this material more tentatively identified as ?pot). The trace levels of magnetic material noted from four of the deposits (Contexts 3102, 3316, 3352N and 3352W) were almost entirely composed of ?heat-affected sand and small stones, with the only possible metalworking debris being one or two tiny (to 3 mm) pieces of amorphous slag from Context 3102 – there were certainly no concentrations of hammerscale or slag to indicate significant metalworking activity.

In the main, the rather small quantities of biological and artefactual remains recovered provided little interpretative information and appear to reflect 'background' levels of fuel and food waste suggesting accidental inclusions of domestic waste (or at most some casual disposal of same). The exceptions to this were the larger quantity of burnt ?sheep/goat bone (based on the single identified element) recovered from Context 3416 which *may* represent waste from a specific meal/event (although there were also occasional unburnt tooth fragments which included remains of ?cattle) and the abundance of diatoms within Context 3352N which, although poorly preserved, provided a strong suggestion of aquatic deposition. There were no concentrations of remains to suggest any large-scale waste disposal or deliberate dumping to infill the features.

The charcoal recovered from each of the deposits would be sufficient for radiocarbon dating (via AMS) to be attempted. This material cannot be recommended for the purpose, however, as all of the fragments were of an indeterminate number of years of wood growth and most could not be identified to species). Consequently, the associated 'old wood problems' could result in a radiocarbon date significantly earlier (but by an unknown amount) than the charring event being returned; as the carbon content of the wood is fixed at the time of its growth – a particular problem for long-lived species such as oak. The charred 'grain' and 'grain' fragments from Contexts 3316, 3352N, 3354 and 3416 and the charred nutshell fragment from Context 3316 could provide sufficient more suitable material for AMS dating. Although these remains were few they formed part of a somewhat larger charred plant component within the deposits and could, therefore, be considered for dating of the deposits – there would still be some doubt regarding the extension of any dates returned to the deposits as a whole given the presence of intrusive plant (and occasionally invertebrate) material and the resultant possibility of bioturbation and displacement of individual small remains. Similar uncertainties would apply if the more recently developed technique of radiocarbon dating burnt bone were used for those deposits with only traces of such material but this could be employed for the concentration of burnt bone recovered from Context 3416.

Recommendations

Given that only a single bone (as two fragments) could be identified within the burnt bone assemblage recovered from Context 3416, it would be advisable for this to also be examined by a human bone specialist as animal bones may be included within human cremations as offerings to the dead. Other than this, the 'ancient' biological remains recovered were too few and/or too poorly preserved (just the latter in the case of the diatoms within Context 3352N) to warrant any further study.

The remaining unprocessed sediment from Contexts 3102, 3302, 3316, 3352N and 3354 should be processed as, although further study of the biological remains is not considered worthwhile, additional charred plant remains suitable for radiocarbon dating and artefacts may be present.

Retention and disposal

Artefactual (and possible artefactual) materials recovered from the sediment samples will be returned to the excavator to be considered by the appropriate specialists and included within the physical archive for the site if warranted. Similarly, the burnt bone assemblage from Context 3416 will be returned for consideration by a human bone specialist.

All of the washover fractions and the remains sorted from the assessment (sub)sample residues should be retained, for the present at least, pending a decision regarding the submission of material for radiocarbon dating. Also, the remaining unprocessed sediment from Contexts 3102, 3302, 3316, 3352N and 3354 should be retained pending a decision regarding processing for the potential recovery of additional charred plant remains suitable for radiocarbon dating and/or artefacts.

The sorted residue fractions from the assessment (sub)samples are of no further interpretative value and may be discarded.

Archive

All of the extant material from the submitted subsample is currently stored by Palaeoecology Research Services (Unit 4, National Industrial Estate, Bontoft Avenue, Kingston upon Hull), pending return to the archaeological contractor (or permission to discard), along with paper and electronic records pertaining to the work described here.

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Site Name: **Wheldrake.** Site Code: **OADP19.**

County: **North Yorkshire.**

FLINT ASSESSMENT.

An assessment of the flint from Wheldrake (OADP19)

By Peter Makey for North Duffield Conservation & Local History Society (Last revision 23/05/19).

All flint has been fully catalogued in MS excel format (appended to OADP18). The pieces have been allocated an individual flint catalogue number (ARN Archive record number). The colour of the flints has been recorded using Munsell (1988) nomenclature.

Two pieces were submitted for examination; both have been struck. Both pieces have been analysed for the presence of both microscopic and macroscopic traces of edge use.

Context 3401 contained an unclassifiable crude **flake core.**

The core has been manufactured on a chunk and possesses two platforms (slightly keeled) exhibiting a total of eight flake removals of average thirteen mm length and breadths in the eight to eleven m range. The raw material is a medium grained chalky flint with an old total white patination. Despite the patination the piece is in a fresh state and exhibits no signs of post depositional damage. There are no traces of use wear on this piece.

Date.
Unclassifiable cores are present in all periods of prehistoric flint assemblages but the size of the flake removals and general crudeness of the piece is more suggestive of a later Neolithic date for the piece.

Context 3416 contained a very fine ovate, **extended end and side (right) scraper (Archive sketch appended).**

Manufactured on an olive grey coloured (Munsell 5Y 3/2) fine grained till derived flint. The scraper possesses a bi-facially flaked pronounced bulb. There is a small degree of old white patina and cortex on the dorsal face. The implement has received very light usage and does not have micro wear. The piece is in an unusually fresh state that would generally be consistent with flint from sealed prehistoric contexts.

Date.
Scrapers are the most ubiquitous diagnostic flint implement type in the majority of prehistoric flint assemblages. However the form and size of the scraper is more consistent with a later Neolithic date.

Bibliography.

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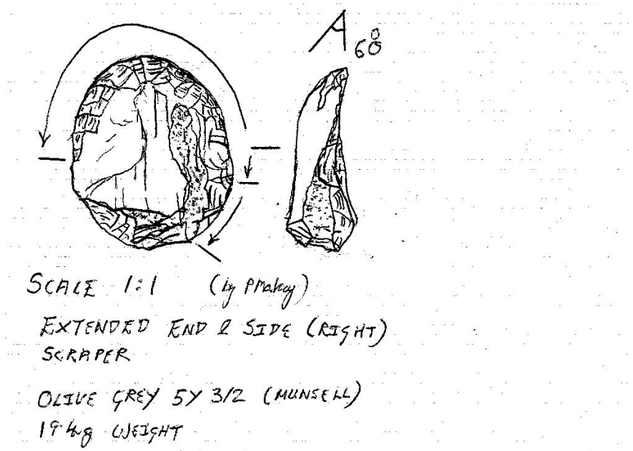
Archive Sketch of scraper from Wheldrake (context 3416).



The Industrial Waste from Cannon House Farm (OAP19)

Eleanor Blakelock

Introduction

Excavations at the Roman or Late Iron Age site, near Selby, discovered a small assemblage (1.03kg) of possible industrial waste. Cannon House Farm (OAP19) is situated in the field opposite to the side of the land on which Hard Moor Farm is located (HMF18). The crop marks from the site suggests a rectangular enclosure with double ditches, and the ceramic dating evidence suggests that the site might be Roman or Late Iron Age in date.

There are two main types of process involved in iron working: smelting (extracting metal from the ore), and smithing or forging (shaping the object). Both types of processes create different kinds of waste that can often be distinguished on the basis of their morphology, as described below.

Iron smelting took place in bloomery furnaces, which were typically clay-built, rounded structures. Iron ore was fed into the furnace where it reacted to create a spongy mass of iron metal known as a bloom. The waste from this process formed a liquid slag that was collected in the bottom of the furnace, this most likely collected in the bottom of the small furnace, however by the late Iron Age and Roman periods the slag was potentially being tapped from the furnace (Bayley *et al*. 2001). Iron smelting in the Iron Age was probably carried out on a small scale, using local ores e.g. bog iron ore. On the other hand there is evidence for iron smithing in many Iron Age and Roman settlements.

Ironworking waste classification

The ironworking waste from OAP 19 was classified predominantly using the terms used in the Centre for Archaeology Guidelines, *Archaeometallurgy* (Bayley *et al*. 2001). The categories included *tap slag, runs, smelting slag*, *hearth lining, fuel, smithing hearth bottom*, *undiagnostic slag*, *natural* and *other finds*. There is a summary of the results in table 1 with a description of the debris by context.

Tap slag and runs are by-products of the smelting process, produced by removing slag by tapping when it was hot and fluid. This waste has a characteristic shape, resembling the flow of lava, and the lower surface may be rougher as it comes into contact with the ground. Large numbers of the tap slag and run fragments appeared to be tubular in form.

Smelting slag consists of large blocks of slag waste, often with fuel impressions in the surface. It will appear to have obviously been fluid but will not show the same flowed texture as tap slag. The porosity of this slag varies greatly.

Undiagnostic slag will not have sufficient characteristics to be categorised; similar materials may be produced by either smelting or smithing operations.

The Assemblage

The assemblage weighs 1.03kg overall and is formed of three pieces of slag and an iron object. The iron object from a ditch fill is most likely a nail shaft. A diagnostic piece of tap slag, albeit it small, was recovered from the plough soil. In addition, a piece of un-diagnostic slag was recovered from the fill of a linear ditch running North-South, possibly forming a boundary around a ring ditch. This piece of slag appears to have a fluid texture with multiple runs, and could therefore be tap slag but is certainly some form of smelting slag.

The largest piece of iron slag was a relatively large piece of smelting slag, with rough surfaces on the top and bottom. There are charcoal impressions on all sides but no adhered clay lining. A fractured surface on one edge suggests that it was originally larger, and that it is most likely to have been a smelting bottom from a furnace. These can form within both non-tapping and tapping furnaces so can't be used to suggest a date for the smelting activity.

Conclusion

The small amounts of iron working waste in the overall assemblage suggest that iron working was not taking place in the immediate excavation area. However the presence of some slag from secure contexts does suggest that iron metalworking may have taken place nearby during the period of interest. It is quite common for iron working slag to be re-deposited some distance from where it was produced and it was often re-used e.g. for metalling road surfaces or to improve soil quality (Bayley *et al*. 2001).

Future work

As the assemblage is small no further work is recommended for this assemblage. If more diagnostic slag was recovered in the future analysis of the slag may reveal what type of iron ore was being used, indicating more about possible raw material procurement and trade. In addition if iron artefacts are also present on the site these could be examined using metallography to investigate the iron alloys used, manufacturing methods and also blacksmithing techniques applied. Finally by carrying out SEM-EDX analysis of both slag and iron objects from the same site it should be possible to identify whether artefacts from the site were being manufactured using the iron smelted in the area.

References

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Appendix

Table 1: Quantities (in g) of different types of waste recovered from OAP19, by context. IA indicates where the context is securely dated to the Iron Age through the pottery.

Context	Feature	Smelting			Smithing		Undiagnostic Slag			Other		Notes
		Tap	**Furnace**	**Blast Furnace**	**Hearth Bottom**	**Hammerscale**	**Clay lining**	**Fuel**	**Undiagnostic**	**Artefact**	**Natural**	
3200	Plough soil	76										
3316	Fill of ditch								22			
3317	Fill of ditch		928									
3406	Fill of ditch									5		
Total		**76**	**928**						**22**	**5**		

Proof