Archaeological Investigation at Whirlow Hall Farm 2018

View looking south-east across Trench 7.

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THE TIME TRAVELLERS

Archaeological works at Whirlow Hall Farm, Sheffield

ARS Ltd Report 2018/139

April 2019

CONTENTS

List of Figures

List of Tables

EXECUTIVE SUMMARY

Project Name: Archaeological Investigations at Whirlow Hall Farm 2018
Site Code: WHIR'18
Location: Whirlow Hall Farm, Sheffield
Geology: Carboniferous Rough Rock Sandstone
NGR: SK 31233 83177
Dates of Fieldwork: May -June 2018
Date of this Report: August 2018

Archaeological investigations in the form of targeted trenching and test pits were undertaken over a two week period in May and a three week period in June 2018 as part of a programme of ongoing research, recording and archaeological investigations into the History of the Whirlow Hall Farm landscape. The archaeological investigations were carried out jointly by Archaeological Research Services Ltd, the Time Travellers, the University of Sheffield and Whirlow Hall Farm Trust, and included a field school for students and volunteers.

Previous works within the fields that formed the focus of this study have included geophysical survey and fieldwalking. A sketch plan of a possible ditched enclosure and its recognition on satellite imagery, together with subsequent geophysical survey have revealed the presence of a large sub-circular ditched enclosure and a linear ditch with a break in it within 'Grass' field, and a ditched feature in 'Fire station' field. The fieldwalking revealed a notable density of Neolithic struck flint in Grass field which is unusual for the farm as the other fields walked have produced mainly Mesolithic material.

In total six excavation trenches and 35 test pits were excavated over three fields. The trenches were located northeast of the farm buildings in Grass field and Fire station field. The excavation trenches focused on the sub-circular ditched enclosure and the linear ditched feature in Grass field and on a rectangular ditched feature in Fire station field. The test pits were excavated primarily in Grass field together with a further small area of test pits in Lane Side field.

The trenching showed the linear feature in Grass field to be the highly truncated remnants of what appears to have been some kind of ditched boundary, possibly for stock control or to divide agricultural fields. No material suitable for radiocarbon dating was recovered from its fill and so its precise age remains unknown. Given its form it is likely to be late prehistoric or Romano-British in date. The various trenches excavated over parts of the sub-circular ditched enclosure suggest that this enclosure may not be circular in plan, but could be more of a 'D' shape, although further investigation is required to clarify the shape of this monument. What appears to be a possible entrance causeway was noted on its south side where what appeared to be a ditch terminal was observed. The ditch measured up to 2m deep below the modern ground surface and had a series of intact lower fills which contained charred wood and plant remains suitable for radiocarbon dating. Two virtually identical radiocarbon dates from the primary fills

(099) and (098) from the ditched enclosure produced a date range of 255-395 cal AD (95.4% probability), with the samples being obtained on a single entity of roundwood and a single charred sloe stone respectively. Two identical dates from the primary fill of this monument are unlikely to both be intrusive or residual and hence they present a likely date for the construction and initial use of this monument. This initial conclusion (by authors Waddington, Halton and Doonan) is not accepted by some of the other authors (Cockrell and Priede) who, a priori*, believe this monument to be a Neolithic henge and explain these dates by suggesting the ditch was cleared out in Roman times and the monument re-used as a Romano-British enclosure. The trench in Fire station field revealed this ditched feature to be relatively modern and associated with drainage purposes. The ditch turned out to be vertically cut, contained a deliberate backfill of rocks with voids and post-medieval pottery was recovered from within the interstices. Given the location of a spring lower down the field around 25m away, this feature is likely to be associated with keeping this part of the field dry.*

The test pits produced a low number of pre- post-medieval finds but one pit identified what appeared to be a substantial stone-ringed hearth pit. Charred pine wood was recovered in some quantity from this feature and has returned a radiocarbon date of 5900-5748 cal BC dating it to the late Mesolithic period. This is a highly significant discovery given that in situ Mesolithic remains are extremely rare throughout the UK. This feature warrants further investigation to see if it is part of a larger buried feature or whether other related features are present. This pit dates to around 300 years after the '8.2 kr Event' and the following Storegga Slide mega tsunami which appears to have decimated not only the Mesolithic population of northern Britain, but also caused huge damage to coastal areas and will have cut Britain off from the Continent if it had not been already. The discovery of a Mesolithic site at altitude at Whirlow is in keeping with the few other sites dated to this period which suggest that the low levels of surviving population had moved inland and were living a more upland-based existence away from the coast at this time (see Waddington and Wicks 2017).

An assemblage of Mesolithic and Neolithic chipped flints was recovered during the excavations and test pitting from the topsoil and as residual material within various feature fills across the excavation trenches, with a notable quantity from the large ditch fills of the sub-circular enclosure reflecting the high density of material found across the entire field surface during the previous fieldwalking survey.

1. INTRODUCTION

1.1 Archaeological investigations at Whirlow Hall Farm were undertaken as part of an ongoing programme of research, recording and archaeological investigation into the history of Whirlow Hall Farm and its environs (see Waddington in press). These ongoing works included a field school for volunteers and University of Sheffield students from the Departments of Archaeology and Lifelong Learning, with the works overseen by Archaeological Research Services Ltd and University staff members.

1.2 Earlier phases of research and fieldwork have been undertaken between 2011-2017, including archaeological desk-based assessment, building recording, fieldwalking, geophysical survey, test pitting and evaluation excavations. From these archaeological works, a long history of activity has been documented across the farm, starting in the Late Upper Palaeolithic and running through to the present day.

1.3 The focus of this phase of work was within three fields known as 'Grass', 'Fire Station', and 'Lane Side', all of which are located to the north of the main farm complex. The works were aimed at testing the artefact spreads identified during earlier fieldwalking, and also the features identified from both geophysical survey results and satellite imagery (Figure 3). This report provides the results from the 2018 programme of archaeological works, which included test pits and evaluation trenching. Further geophysical survey for training purposes was undertaken over fields already professionally surveyed by ARS Ltd to provide training opportunities for students. No new features were identified and so there is no further reporting of the geophysical results here. Geochemical survey was undertaken across several fields and the results of this are reported here.

Site location

1.4 Whirlow Hall Farm is situated on the edge of Sheffield, approximately 8km to the south-west of the city centre (NGR SK 31233 83177) (Figure 1) towards the head of the Sheaf valley and extends over some 55ha. The farm is situated on sloping ground which generally falls from west to east and also from north to south.

1.5 Grass field is located approximately 570m to the north of Whirlow Hall Farm and comprises a single rectangular field of *c.*1.4ha, and is defined on all sides by drystone walls. This field slopes from 267m above Ordnance Datum (aOD) in the western corner of the field to 257.7m aOD in the north-eastern corner.

1.6 Fire Station field is located immediately north-east of Grass field, approximately 687m north-east of Whirlow Hall Farm and is enclosed on all sides by drystone walls. It encompasses an area of *c.*1.49ha and slopes northwards from 258m aOD in the southern corner of the field to 247m aOD in the northern corner.

1.7 'Lane Side' field is located immediately to the north of the Whirlow Hall Farm complex and encompasses an area of 1.66ha. The trapezoidal-shaped field slopes down from the north-west at 257m aOD towards the eastern corner of the field at 238m aOD.

Landform, Geology and Soils

1.8 The underlying solid geology of the south-western part of Grass field comprises rough-rock sandstone, formed approximately 319 to 320 million years ago in the Carboniferous Period when the local environment was previously dominated by rivers. The underlying geology within the north-eastern part of Grass field comprises mudstone and siltstone of both the Rossendale Formation and Pennine Lower Coal Measures Formation. These geological formations formed approximately 318 to 320 million years ago in the Carboniferous Period when the local environment was previously dominated by swamps, estuaries and deltas. No superficial deposits are recorded within this field by the British Geological Survey (BGS 2018). The junction of these geologies appears to occur at the northern and eastern edges of this field where the land begins to slope away. The test pits and evaluation trenches indicate that superficial 'head' deposits occur across areas of both Grass and Firestation fields, including where the large ditched enclosure has been constructed.

1.9 The underlying solid geology of Fire Station field is comprised of sandstone, mudstone and siltstone of the Pennine Lower Coal Measures Formation, formed approximately 318 to 319 million years ago in the Carboniferous Period when the local environment was previously dominated by swamps, estuaries and deltas. No superficial deposits are recorded within this field by the BGS (2018).

1.10 The underlying solid geology within the majority of 'Lane Side' field is comprised of rough rock sandstone, formed approximately 319 to 320 million years ago in the Carboniferous Period when the local environment was previously dominated by rivers. The underlying solid geology within the eastern-most extent of this field is comprised of mudstone and siltstone of the Rossendale Formation, formed approximately 319 to 320 million years ago in the Carboniferous Period when the local environment was previously dominated by swamps, estuaries and deltas. No superficial deposits are recorded within this field by the BGS (2018).

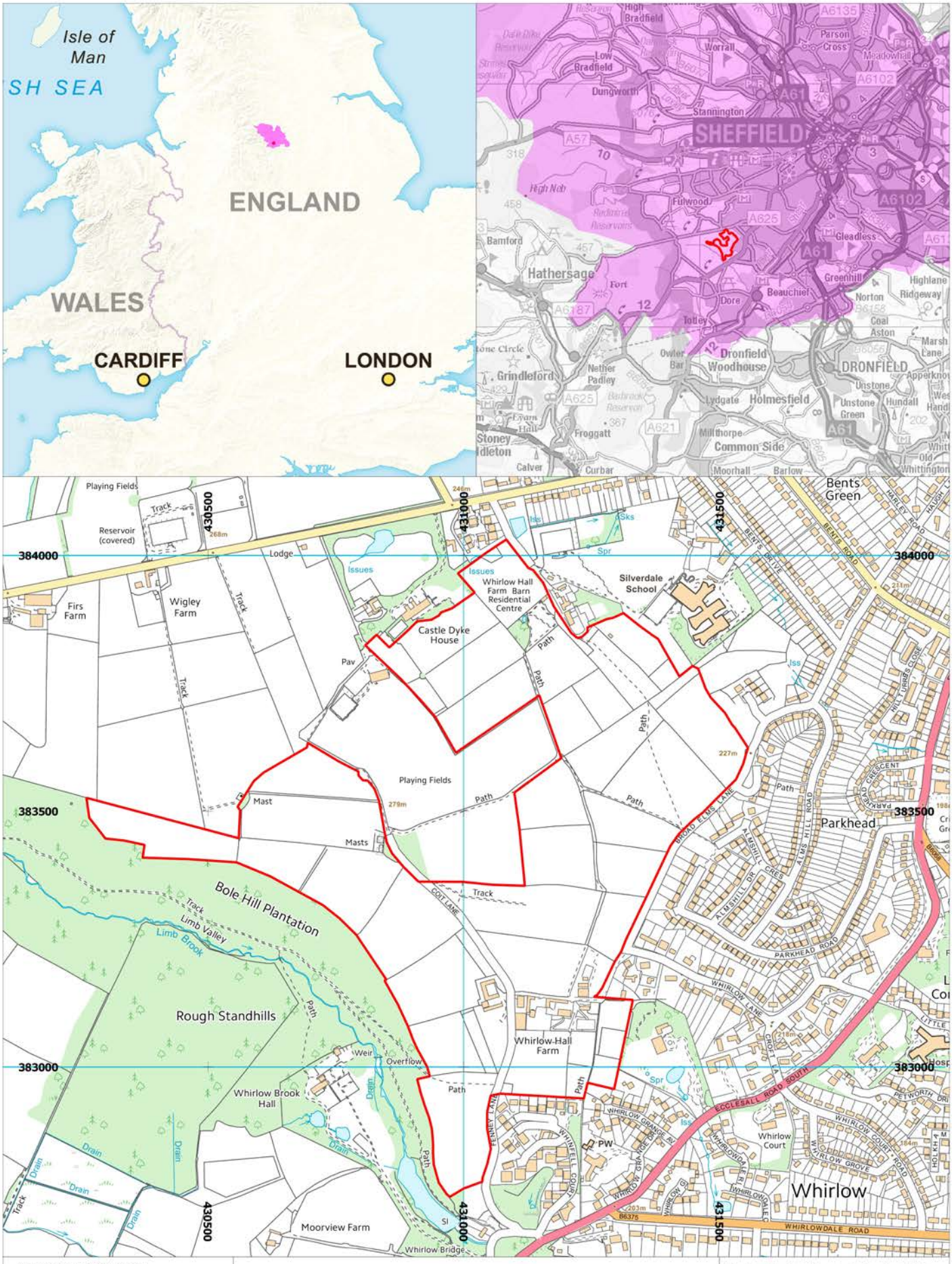
1.11 The soils of all three fields are classified as belonging to the Rivington 2 Soil Association (541g), which are typical brown earths (SSEW 1983). These soils form over Palaeozoic sandstone and shale and are characterised as "*well drained coarse loamy soils over rock. Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Steep slopes locally*" (CU 2018).

Background

1.12 Prior to the excavations taking place a desk-based assessment (Sheppy 2011a), historic building survey (Eadie 2011), fieldwalking (Sheppy 2011b; Waddington 2016) and geophysical survey (Taylor 2011; Durkin 2016) had been undertaken to help understand the development of the farm and the landscape through time, and to also identify areas of archaeological potential and buried archaeological remians.

1.13 Archaeological excavations at Whirlow Hall Farm were untaken in 2011 and 2016 and focused on a large, rectagular ditched enclosure within 'Hall' field, dating to the late Iron Age and Romano-British periods. Further work from the 2016 excavations

identified the remains of a probable Roman signal station on 'Bole Hill' (Waddington *et al.* 2016).



Site name:	Whirlow Farm
Date:	December 2017
Drawn by:	AB
Scale:	Varies

Sheffield District

Estate boundary

N

Figure 1:
Site location

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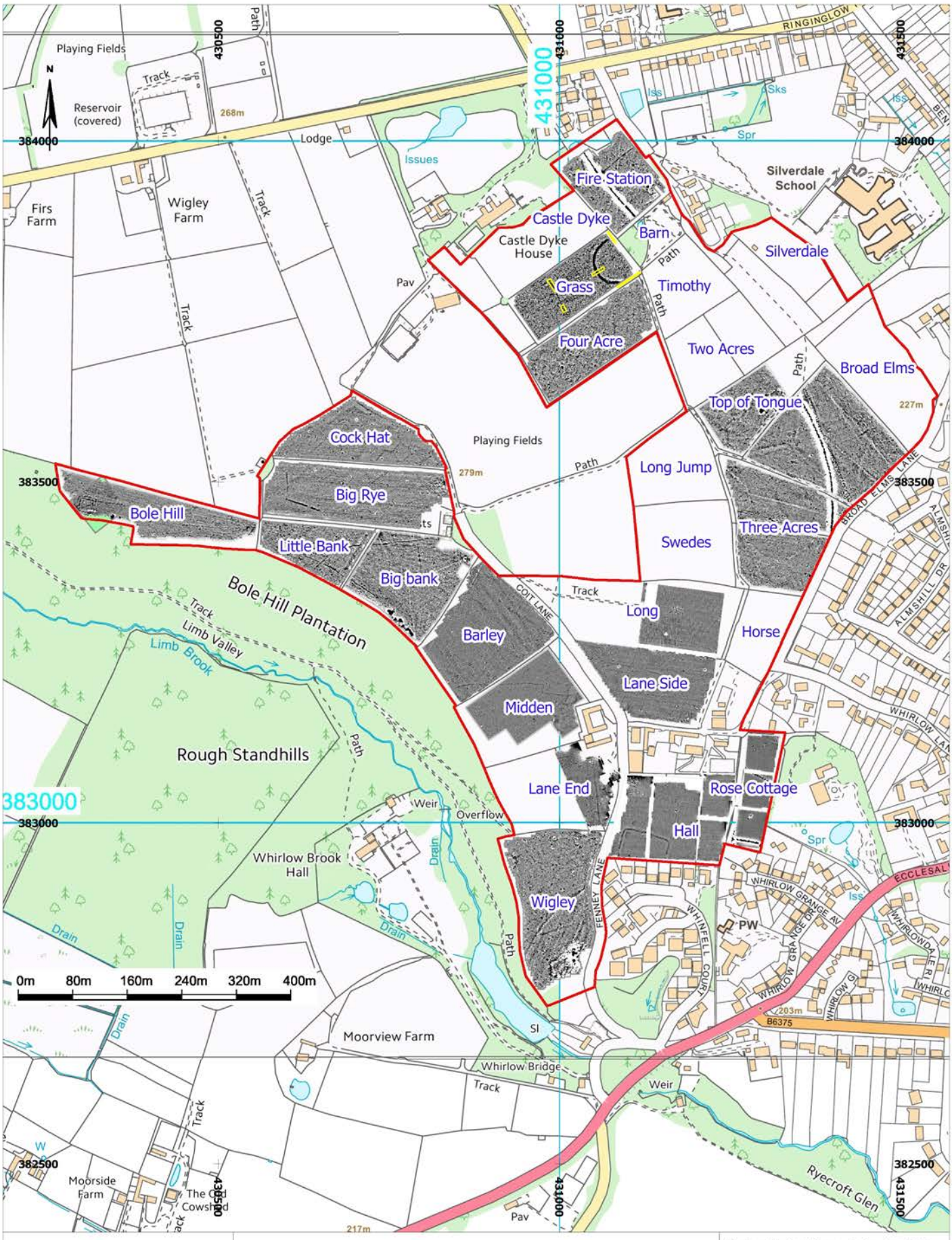

Site name: Whirlow Farm
Date: April 2018
Drawn by: AB
Scale: 1:7500 @ A4

Estate boundary

Trenches

N

Figure 2:
Trench locations

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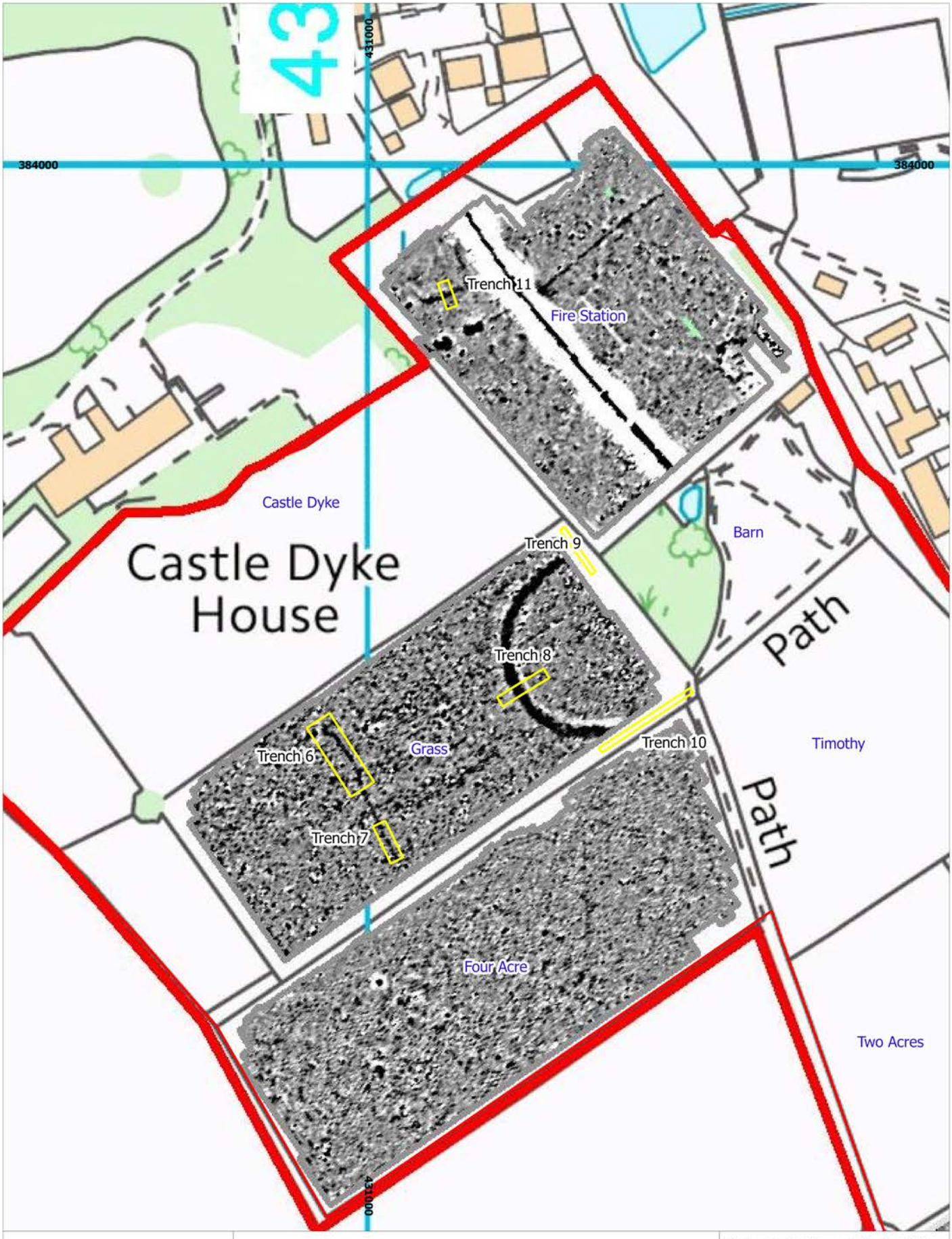
2. METHODS

2.1 The six trenches targeted features identified from geophysical survey, satellite imagery and a 1970s sketch plan. Trenches were sited in accordance with a pre-agreed trench plan using a Leica Smartrover GPS to a tolerance of 0.025m. The same GPS was later utilised to locate drawn plans and sections and to take spot heights within the trenches. The investigations followed the detailed methodology set out in the Written Scheme of Investigation (Appendix I).

2.2 Topsoil in Trenches 6, 7, 9, 10 and 11 was removed using a tracked excavator equipped with a toothless ditching bucket under continuous archaeological supervision. Further excavation within these trenches was carried out using hand tools. The topsoil within Trench 8 was removed solely by hand using hand-tools in approximate 10cm spits. The topsoil in Trench 8 was all sieved to maximise finds recovery.

2.3 Each identified feature was subject to full or sample excavation and recording, and included the collection of artefacts, environmental sampling, and samples suitable for radiocarbon dating. All features were recoded using pro-forma record sheets and were photographed using both black and white film and colour slide photography.

2.4 A total of 35 test pits were also excavated as part of this phase of archaeological works. These pits were located along the western edge of Lane Side field and in the upper, western part of Grass field. Each pit was hand excavated in 10cm spits down to either the geological natural or the first archaeological horizon. All pits and any features were recorded on pro-forma record sheets and drawings made as appropriate. The location of each pit was recorded using a Leica Smartrover GPS.



Site name: Whirlow Farm
Date: November 2018
Drawn by: MB
Scale: 1:1875 @ A4

Estate boundary

Trenches

N

Figure 3:
Trench locations (detail)

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3. RESULTS

TRENCHES

3.1 Archaeological evaluation trenching was carried out within two fields with trenches 6, 7, 8 and 10 sited in Grass field, Trench 11 sited in Fire Station field and Trench 9 located within the trackway running between the two fields in what was formerly Grass field.

3.2 Trenches 6 and 7 targeted a north-west – south-east aligned linear ditched feature identified by the geophysical survey, whilst trenches 8, 9 and 10 targeted the large ditched enclosure in the north-eastern area of the field. These three trenches were sited to help understand the extent, shape and preservation of this enclosure as the full extent of the feature has not been able to be obtained from the geophysical survey or satellite imagery alone as it extends beneath the current field boundaries where wire fences disrupt the geophysical signal and to the east where it may continue into a stand of woodland and dense vegetation.

3.3 In the north-western corner of Fire Station field, Trench 11 was positioned to target a ditched anomaly identified by the geophysical survey in close proximity to the source of a natural spring.

Grass Field

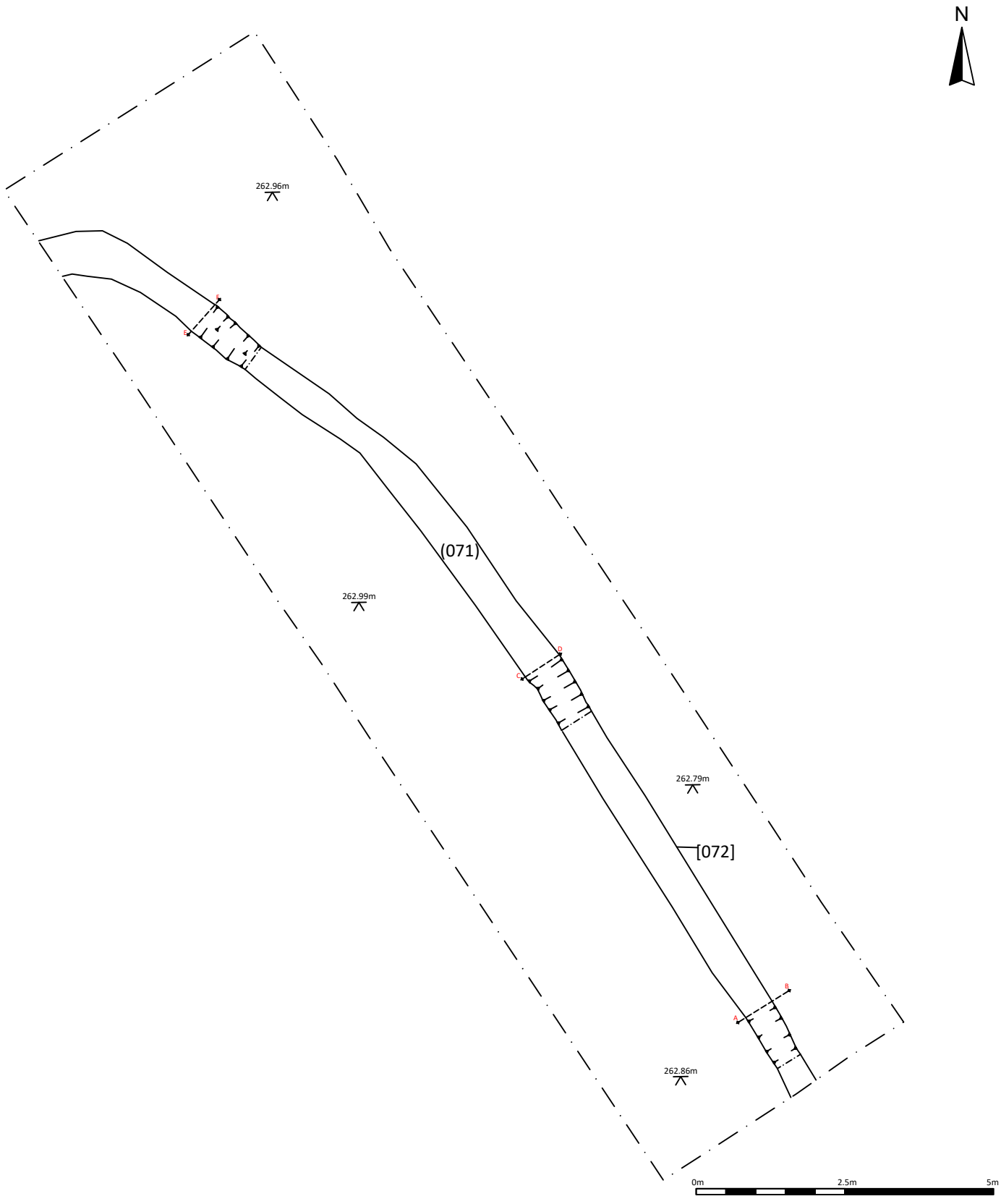
Trench 6 (Figures 4-7)

3.4 The topsoil (062) comprised a fine dark grey brown sandy silt. It was machine excavated to a depth of 0.25m below ground level (BGL), to the level of the natural clay with fragmented sandstone (063). At this depth, a north-west - south-east aligned ditch [072] was identified (Figures 4-6). The ditch was generally narrow and highly truncated. Three sections were excavated across ditch [072] in Trench 6. They showed the ditch to have a maximum width of 0.32m at the start of the archaeological horizon. Ditch [072] had steep sides and a rounded base, and was found to survive between 0.11m – 0.20m in depth from the start of the archaeological horizon. It contained a single fill (071) of uniform dark yellow brown silty clay with occasional angular sandstone fragments. No finds or plant remains were recovered from the fill of the ditch. This linear ditch is interpreted as the remnants of a boundary feature, likely associated with agricultural practices, which has been heavily truncated by later ploughing. Its form and shape are typical of later prehistoric – Romano-British ditches that formed field systems or paddocks.

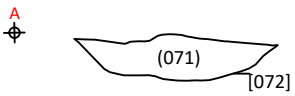
Figure 4. View north-west across Trench 6 showing the faint traces of ditch [072] with the three sections cut across it (scale = 0.5m graduations).

Figure 5. South-east facing section of ditch [072] (large scale = 0.1m graduations).

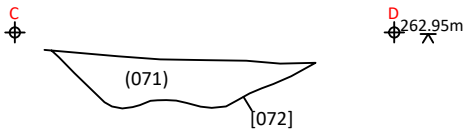
Figure 6. South-west facing section of ditch [072] (large scale = 0.1m graduations).



South east facing section of [072], Slot 1



South east facing section of [072], Slot 2



South east facing section of [072], Slot 3

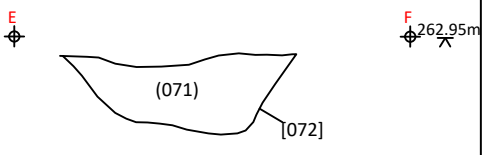
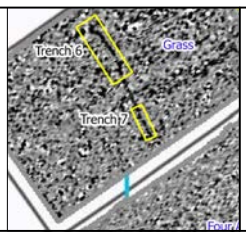


Figure 7. Plan of ditch feature [072] in Trench 6 and associated sections
Scale: As shown @ a4

Key:

aOD (m)



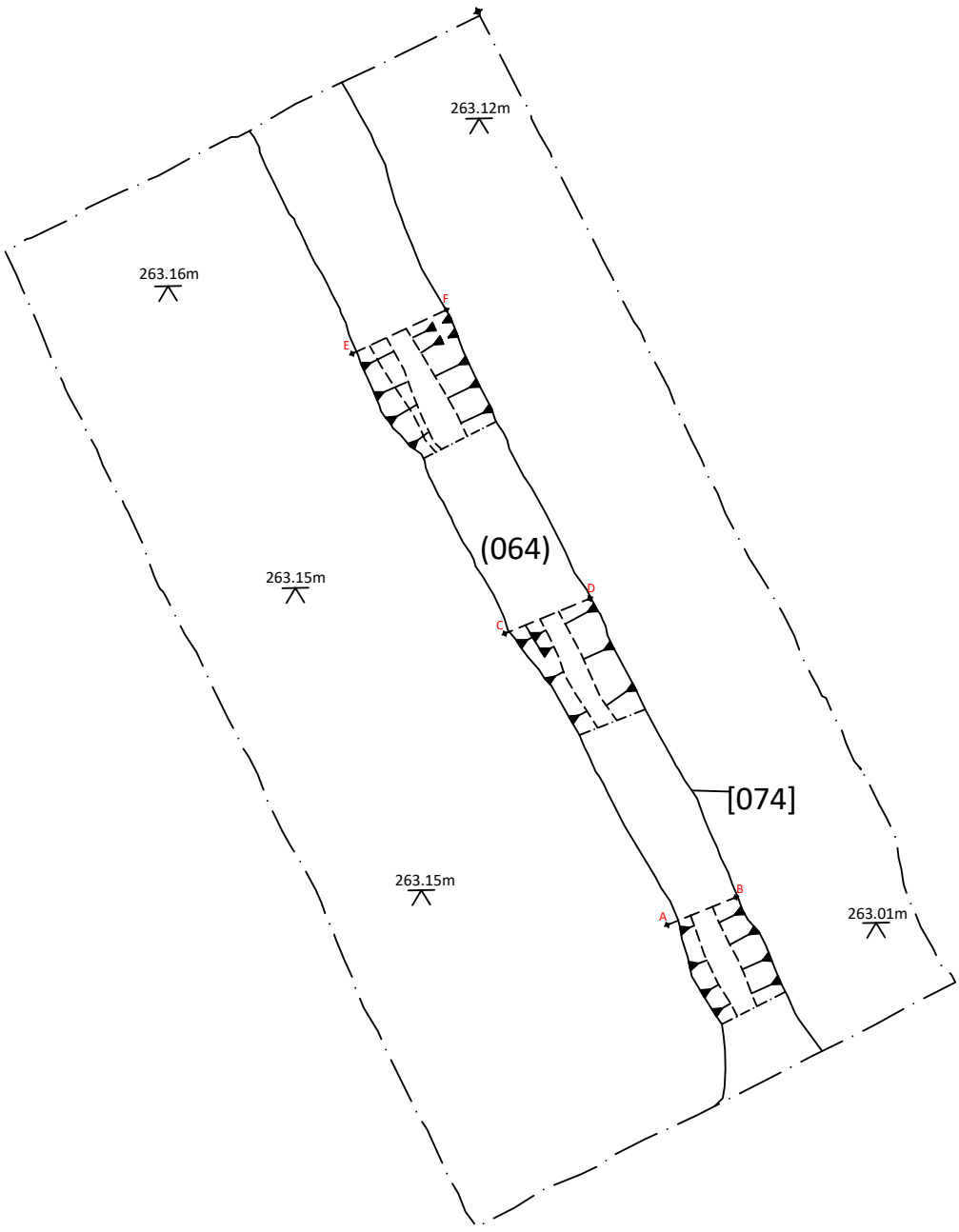
Trench 7 (Figures 8 – 10)

3.5 Topsoil (062) had a thickness of 0.24m and overlay the natural 'head' comprising clay with angular sandstone inclusions (063) similar to Trench 6. Beneath topsoil (062), a parallel sided narrow ditch [074], which was the western extent of the same ditch [072] identified in Trench 6, was encountered on a north-west - south-east alignment cut into the natural deposit (063) (Figure 8). Three sections were excavated along the length of the ditch in Trench 7, in the same as way for Trench 6. At the southern end of the trench, the ditch measured up to 0.5m in width and 0.22m in depth from the start of the archaeological horizon, though away from the edge of the trench, the ditch widened to a maximum 0.81m in width and here survived up to 0.31m in depth.

3.6 Unlike ditch [072], this ditch contained two distinct fills (064) and (073) (Figure 9). Primary fill (073) comprised of a fine, dark grey silty clay with occasional angular stones which represents the weathering of the sides when the ditch was first in use. The upper fill (064) comprised a fine, orange brown silty clay with occasional angular and sub-rounded stones. No finds were recovered from either of the fills. Samples of each of the fills from this ditch were collected, but palaeoenvironmental analysis yielded no surviving plant remains.

Figure 8. View south-east across Trench 7 showing ditch [074] (scale = 0.5m graduations).

Figure 9. South-east facing section of ditch [074] (large scale = 0.1m graduations).



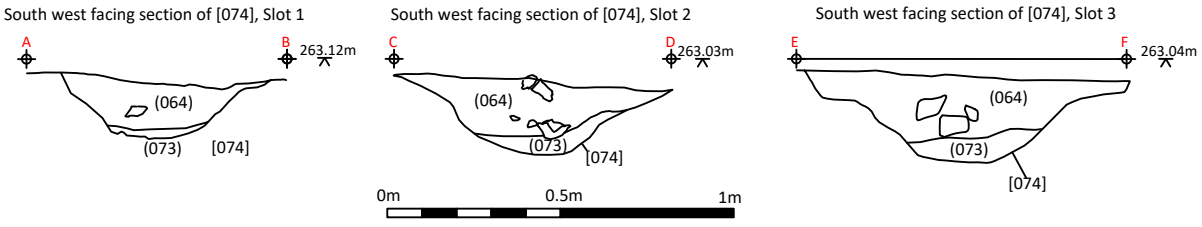
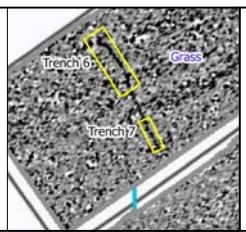


Figure 10. Plan of Gully [074] in Trench 7
and associated sections
Scale: As shown @ a4

Key:

aOD (m)



Trench 8 (Enclosure Ditch) (Figures 11-12)

3.7 Removal of the dark black-brown clay-silt topsoil (087) took place in 10cm spits. The topsoil, approximately 0.3m deep, was characterised by very frequent and thin small to medium sized angular and sub-angular shattered sandstone in the top half (Fig 1.). The lower half of the topsoil was identical to the upper on either side of the enclosure ditch, but over the ditch was characterised by only a small number of the aforementioned inclusions, a difference that was distinct in observation. The lower half, therefore, was distinguished between the topsoil to the south west of the ditch (088), that overlying the ditch (089) and that to the north east of the ditch (090). All topsoil contexts produced a variety of finds associated with early modern activity, as well as 107 artefacts of prehistoric struck stone. The highest concentration of struck stone was recovered from (089) overlying the ditch.

3.8 The upper fill (093) of the ditch [092] consisting of a dark red-brown clay silt had frequent inclusions of small angular and sub angular sandstone pieces. These took the form of distinct, but merging, layers of stones at the top of the ditch at its edges that pitched into the feature at slight angles. They were considered distinct enough to be assigned context numbers (094) and (095). The upper fill was significantly deeper than subsequent fills, at approximately 0.6m (*c*.1m below ground level). The context yielded two early modern finds: a well preserved tobacco pipe bowl of early form that probably dates to the late 17th century AD, and a chunk of burnt and crushed chert probably associated with early modern agricultural soil fertilisation. The remaining finds were 22 prehistoric chipped stone pieces.

Figure 11 South-east facing section of the enclosure ditch.

Figure 12. Post excavation photograph of Trench 8 with feint plough lines showing where ploughing has truncated the topsoil and subsoil layers overlying the natural underlying yellow-coloured 'head' deposits.

3.9 Below (093), a fine textured dark yellow brown clay silt (096) was excavated, with occasional inclusions of small chips of sandstone and had a maximum of thickness of 0.2m. No finds were recovered from this deposit. Below (096) was a rubble layer (097), 0.3m thick, consisting of a fine textured dark red-brown clay silt with 60% inclusions of medium to large sized sandstone rock fragments. Four pieces of chipped stone were recovered from this context. Below (097) was a dark black-brown clay-silt (098), a maximum of 0.4m thick, with occasional chips of sandstone. One struck stone artefact was recovered from this context. The final deposit to be excavated (ie. the primary fill) consisted of a dark yellow-brown sandy silt (099), a maximum of 0.2m thick, with 90% inclusions of medium to large sandstone rock fragments. No finds were recovered.

3.10 Palaeoenvironmental data recovered included charred seeds from below (093) indicative of a relatively open landscape. This is consistent with agrarian activities. A radiocarbon date obtained from a sample of shortlived roundwood charcoal from the basal fill (context 099) yielded a calibrated date range of AD 255-395 (95.4% probability) or AD 263-384 (68% probability), and an identical date from a charred sloe stone was also obtained from the overlying fill (098). Rooting that relates to recent decades was also present in the lowest contexts.

Phasing

3.11 The earliest phase is represented by the cutting of the ditch through the natural substrate (091). Counter to expectations, this was not bedrock but a series of superficial deposits beginning with a compacted thick layer (approximately 0.3m thick) of mid yellow brown sandy silt with 90% thin small to medium sized angular and sub

angular sandstone rock fragments. This thick layer was the deposit immediately underlying the topsoil across the entire trench, into which were cut numerous plough marks of recent date (Fig. 12). An observation made by more than one member of the team was that the areas of (091) immediately adjacent to the edges of the ditch appeared less compacted than those areas beyond approximately 2-3 metres further from the ditch edges (Fig. 12). The inclusions appeared coarser, larger and less abraded. The deposits below the thick compacted band consisted of vertically stratified and alternating bands of sediment containing sand and then shale (Fig. 11). These superficial deposits extended to an indeterminate depth, as related above. This contrasts with Hall field, for example, where the sandstone bedrock lay around 0.5m – 0.75m below the modern ground surface in most places.

3.12 The morphology of the ditch comprises a "V" shaped profile and appears to have a slightly steeper and less carefully excavated gradient of slope to its outer edge than its inner. This might relate to the original construction strategy, perhaps relating to different teams of workers to either side of the ditch. Alternatively, it might be indicative of later re-cutting connected with maintenance activities.

3.13 At the base of the ditch is the primary deposit (099). There was no sign of sedimentary deposition below this fill, indicating that the rubble might have been deposited soon after excavation of the ditch. However, it was from this deposit that the Late Roman radiocarbon date was obtained. If (099) was deposited soon after excavation of the ditch (meaning that it belongs to the first phase), either the ditch was cut sometime not long before the third century AD, the sample is intrusive, or the rubble layer (099) is in fact much later in date than the first phase. The second phase consists of sedimentary deposition (098) overlying the primary fill (099). An episode of more rubble deposition (097) lies directly above it. Since the upper sedimentary layer (096), is slightly different to the lower (098) it is possible that the upper layer was deposited under different environmental conditions, indicating a significant separation in time. It should thus be regarded as a third phase. If this is correct, the implication is that the ditch was being maintained periodically until the beginning of the later silting, at which time it is likely that the use of the enclosure (and perhaps the field) had changed, or ceased. The second phase has associated with it the stone implement from (098) and four implements from (097). One of the latter is a utilised flake of probable Neolithic age. These must be regarded as residual pieces washed in during sedimentary filling.

3.14 The fourth phase is the latest and is a deliberate backfilling episode, as evidenced by its character and the presence of distinct tip layers of rubble in its upper part (094) and (095). The presence of the pipe bowl of probable late 17th century date indicates that the event is unlikely to predate it, although it is the only find from the ditch that is likely to post-date the Bronze Age.

Discussion

3.15 Modern root action that penetrates as low as the lowest fills of the ditch (Parker, this volume) indicates, *prima facie*, that much of the ditch was open into recent times. (Note: Several of the authors - CW, CH, RD and Parker - disagree with this

statement as it is common for roots to penetrate through stoney soils to such depths). However, the silting in two contexts of different character, separated by an episode of rubble infilling, indicates that the feature had long been disused. If the radiocarbon dated charcoal was not intrusive, the last time that the ditch was fully cleaned (or was originally excavated) was in the 3-4th century AD. The later sedimentation, of different character to the earlier, indicates that re-cutting or maintenance of the ditch might have continued for an indeterminate period of time after the 3-4th century, but to a shallow depth. Charred seeds recovered from the lower contexts are indicative of open landscapes at that time, possibly of an agrarian character (Parker, this volume). This supports the interpretation that the area around beyond the enclosure was likely given over to farming during this phase of the enclosure's use. The character of the later sedimentation might reflect the end of that.

3.16 The upper fill appears to represent a backfilling event that can be related to the period after the end of the 17th century AD to judge from the presence of a pipe bowl. However, the almost complete absence of the early modern material to be found in abundance in the topsoil indicates, *prima facie,* that this backfilling event occurred before the advent of the manuring that generated it. The backfilling is thus likely to have occurred sometime in the 18th century.

3.17 Authors Cockrell and Priede believe evidence for an outer bank around the outer edge of the enclosure ditch could be observed in Trench 9, although this is categorically disputed by Waddington and Halton who excavated this trench and also Doonan who closely observed this excavation as well. This trench was located parallel to and along the edge of the modern field boundary, where Cockrell and Priede argue that it might be expected that ploughing would impact less on upstanding remains. Further, they believe that scrutiny of the post-excavation photograph and working shots show the eroded remains of what appears to be a bank at the north end of the trench. The geophysical survey plots produced in work by the University of Sheffield (Cockrell *et al.* forthcoming) and ARS (see WSI), Cockrell and Priede believe, show anomalies along the edges of the circumference of the enclosure ditch both internally and externally that support the possibility that there were two banks, with the enclosure ditch between them.

3.18 At this point it should be recalled that during the excavation, some traces of less abraded and compacted natural (091) sediments were observed to either side of the ditch (Figure 12 and see description above). It was suggested at the time (T. Allen, pers.comm.) that this could be accounted for by the former existence of banks that protected the natural from ploughing for longer than those areas beyond the banks. The suggestion was made on the basis of similar work undertaken on the locations of former Neolithic Long Mounds in Lincolnshire.

3.19 To summarise, the truncated sub-circular ditched enclosure was originally approximately 75m in diameter. Cockrell and Priede believe it consisted of an external bank, a 5.5m wide ditch that was more than 2m deep, with possibly an internal bank. They further believe that both the cropmark images and geophysical survey results indicate that two entrances survive at right angles to each other, although this has yet

to be confirmed by excavation. Interpretation of its date and original function (which must relate to before the post Roman period) rests in no small part on its morphology, which necessitates comparison with similar features, especially in the region. It is well known that henges are defined by circular or sub-circular ditched enclosures with external banks and one or more entrances (Wainright 1989). They relate to the Late Neolithic and Early Bronze Age. The present feature is located not far from henges of similar scale and morphology at Arbor Low and the Bull Ring in Derbyshire (Barnatt 1990). They are not identical, and the present feature does not fit within the conventional definition described above because of its possible internal bank. However, it has long been recognised that there is considerable variation between the morphology of henges and their settings across Britain, and that the variants have a regional dimension to them (Clare 1986a; 1986b). The Thornborough henges of the Vale of York, for example, are characterised by having one bank and two ditches (Harding 2013). The enclosure at Whirlow, Cockrell and Priede believe, mirrors that arrangement. It is not unique in this characteristic. At Wombwell in the Dearne Valley, close to Barnsley, there is an upstanding feature preserved in woodland that is almost identical in morphology to the enclosure at Whirlow which is approximately 80m in diameter (Cockrell 2017, 126-127).

3.20 The lithic assemblage from Trench 8 is taken by Cockrell and Priede to support this interpretation. The only material culture recovered, with the exception of early modern material, relates to the Bronze Age or earlier. It is an unusually large assemblage by the standards of the region, but it is consistent with the high density of chipped lithics found across the entirety of this field during the previous fieldwalking survey. The majority of diagnostic material from the ditch fills, as with the rest of the field surface, is Neolithic. This accords with the material recovered from the two fieldwalking events on Grass Field (Waddington *et al* 2017; Cockrell *et al* forthcoming). Apart from the aforementioned early modern material, the assemblages from that work consists almost entirely of prehistoric struck stone, including a barbed and tanged arrowhead of Early Bronze Age date. The only exceptions to this are two sherds of medieval pottery. The fieldwalking assemblage was also viewed as constituting an unusual concentration by local comparison.

3.21 The presence of material radiocarbon dated to the 3-4th century AD in the lowest two ditch fills could support the interpretation that the ditch was excavated not long before. However, a *terminus ante quem* in soil above the ditch does not of itself prove that. Supporting evidence is required. The morphology of the enclosure and the recovered material culture (from anywhere in the field) does not provide that. Perhaps the most likely explanation is that the two pieces of radiocarbon dated material, along with the modern rooting noted earlier, is intrusive. However, if it is not intrusive the prospect is held open that either the ditch was maintained until the 3-4th century AD or, perhaps more likely, that it remained partly open and visible until that time and was re-cut to re-use the enclosure in activities connected with animal husbandry, probably as part of the estate belonging to the settlement at the Hall Field site.

3.22 Cockerell and Priede are of the belief that space does not allow for more detailed discussion, including a discussion of the landscape context which would be

highly informative. However, they believe that the data and argument outlined above shows that the only plausible interpretation of the feature is that it is a hitherto unknown henge monument in South Yorkshire. The other authors of this report dispute this interpretation as they do not believe it accurately characterises what was found (for example see description of Trench 9 below) or is a credible interpretation. Rather, they prefer to follow the data, and on current evidence, it appears that this sub-circular ditched enclosure is of late Romano-British date and might possibly be a successor site, and a more defensive one, than the earlier Romano-British rectilinear ditched enclosure in Hall field. Ultimately, the latter authors retain an open mind subject to the recovery of further reliable excavation data that helps to establish the morphology, status and date of this enclosure.

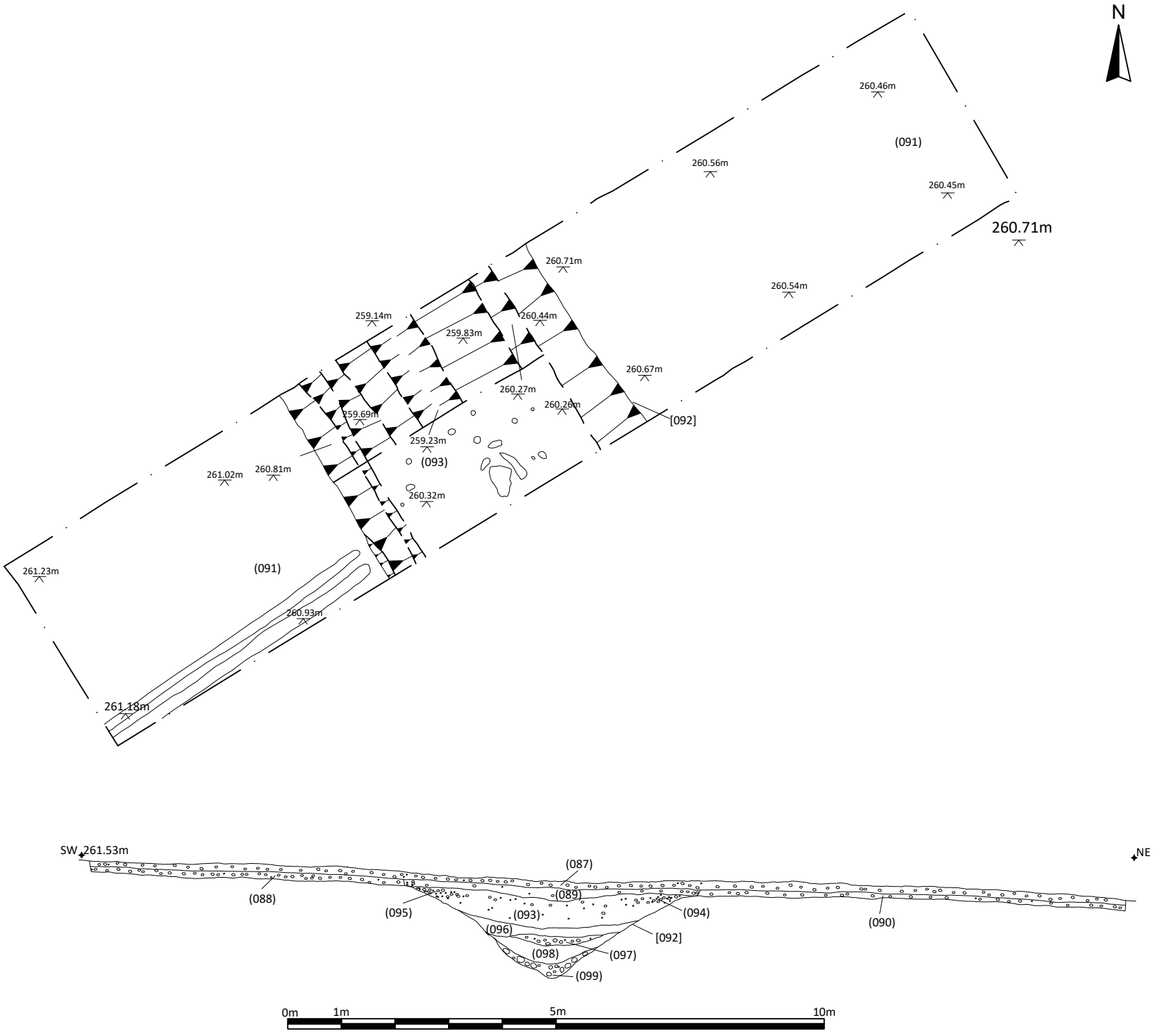
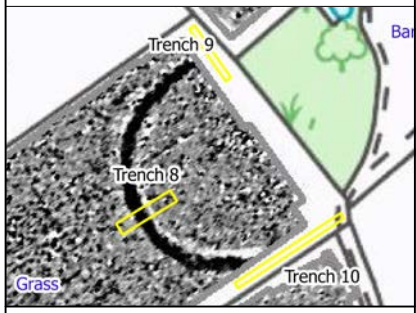


Figure 13. Plan and section of Trench 8 and enclosure ditch [092]
Scale: As shown @ a3

Key:

aOD (m)



Trench 9 (Enclosure Ditch) (Figures 14, 15 and 18)

3.23 Located on the trackway between Grass field and Fire Station field where the sub-circular enclosure ditch circuit could not be geophysically surveyed, trench nine measured 21.7m x 1.5m and was excavated to a depth averaging 0.25m. The topsoil (062) comprised a mid-grey brown sandy silt similar to that in Trenches 6 and 7. Beneath topsoil (062), the outer edge of enclosure ditch [076] was identified within the south-eastern half of the trench. This edge of the ditch was observed curving across the evaluation trench at its north-west end extending on from where it was known from the geophysical survey and continued beyond the limit of excavation (Figures 14-15). Another edge (presumably the inner edge of the ditch) was identified curving across the south-eastern end of the trench some 6.6m from the outer edge, but its curve did not parallel that of the outer ditch, but instead was curving so as to converge with the outer edge if they were both projected on their curving axis (see Figures 17 and 18). This edge could therefore be potentially related to a ditch terminus, and if this is the case, then it could potentially mark the side of an entrance causeway into the enclosure. If indeed this is the terminus of the ditch then it would also mean that the enclosure is likely to be more of a flattened circle or 'D' shape rather than circular in plan. The shape of the enclosure is, however not certain as this is only a narrow trench and it has thrown up a conundrum as to the form and shape of the ditch in this section of the enclosure circuit. Another possibility is that the ditch has an enlarged width here before it closes back to a possible terminal. If there was an entrance to the enclosure in the northern quadrant of the enclosure it would open out on to the natural slope down into Firestation and Castle Dyke Fields. Embellishing enclosure ditches and banks immediately around their entrance/s is not unusual and this could possibly explain some of the complexity of what is being observed here.

3.24 Further investigation of this segment of the enclosure ditch would be necessary to resolve the enclosure's form and shape in plan. The uppermost few centimetres of the fill of the enclosure ditch were excavated so that the edges of the ditch could be defined with certainty as the dryness of the soil made identifying the edge otherwise imprecise. This is what has created the little step-profiles observed in Figure 14 at either side of the ditch. These 'steps' should not be confused as representing the upstanding remnants of either an internal or external bank (as Cockrell and Priede contrastingly insist is the case), none of which survived underneath what is a very shallow topsoil cover. The topsoil directly overlay the natural angular and weathered sandstone brash deposit and, elsewhere in the trench, the ditch fill. This can be clearly observed in Figures 12 and 13. The excavation of the upper few centimetres of ditch fill have created what looks to be a low 'hump' at the north-western end of the trench, but this is a consequence of removing the uppermost fill of the ditch fill in order to define the ditch edge rather than being the remnants of an upstanding man-made feature. It is also notable that there is a change in the sub-surface geology here, and hence why the ground slopes away, and the ditch has been cut on the junction of these two geologies. No further excavation into the ditch fill was undertaken here at this time, as it was agreed that the aim of this evaluation trench was to assist in understanding the form and shape of the enclosure, whilst Trench 8 was aimed at sampling and understanding the ditch form and fill.

Figure 14. View south-east across enclosure ditch [076] (scales = 0.5m graduations) with the uppermost fill of the ditch removed exposing the red-brown fill.

Figure 15. View north-west across enclosure ditch [076] in Trench 9 (scales = 0.5m graduations). The darker brown soil in the foreground is differentiated from the lighter brown soil beyond due to this area having been freshly trowelled in advance of the photograph. The stony material in the foreground is part of the natural geology as is the pale grey material (ie. head deposit) at the far end of the trench before the ground falls away down the natural slope of the field to the east. The huge width of the ditch here is deceptive as it seems likely that the ditch is turning near the field gate (middle left) and the evaluation trench is actually positioned obliquely across it until it terminates where the natural deposits are encountered in the foreground (scales = 0.5m graduations).

Trench 10 (Enclosure Ditch) (Figures 16-19)

3.25 Trench 10 was located within the south-eastern corner of 'Grass' field, running parallel to the drystone boundary wall of the field. It measured 30m in length by 2m wide and was positioned to locate the direction of the southern segment of the enclosure ditch in order to identify and define as much of the enclosure circuit as possible where the geophysics could not reach. The topsoil (062) measured between 0.25m - 0.3m and contained pieces of charcoal, clay pipe and post-medieval pottery. Below the topsoil lay the natural sandstone brash (063) or 'head' deposits, within which the external edge of the curving enclosure ditch [070] was identified *c*.6.2m from the north-western end of the trench. The outer edge of the ditch extends from the western edge in a north-eastern direction beyond the extent of excavation. The full width of the ditch within trench 10 could not be established as it continued beyond the eastern and southern extents of the trench. At the start of the archaeological horizon, the ditch fill appeared to have a similar 'upper fill' (067) which comprised an orange brown clay sandy silt. The fill and surrounding natural brash has been heavily affected by roots from nearby trees. The particularly dry conditions meant that although visible as a very feint feature, the visibility of the cut was poor. In wetter ground conditions the differentiation of this feature would have been more stark.

Figure 16. View north-east across Trench 10 with the curve of the enclosure ditch [070] situated along the left hand side (scales = 0.5m graduations).

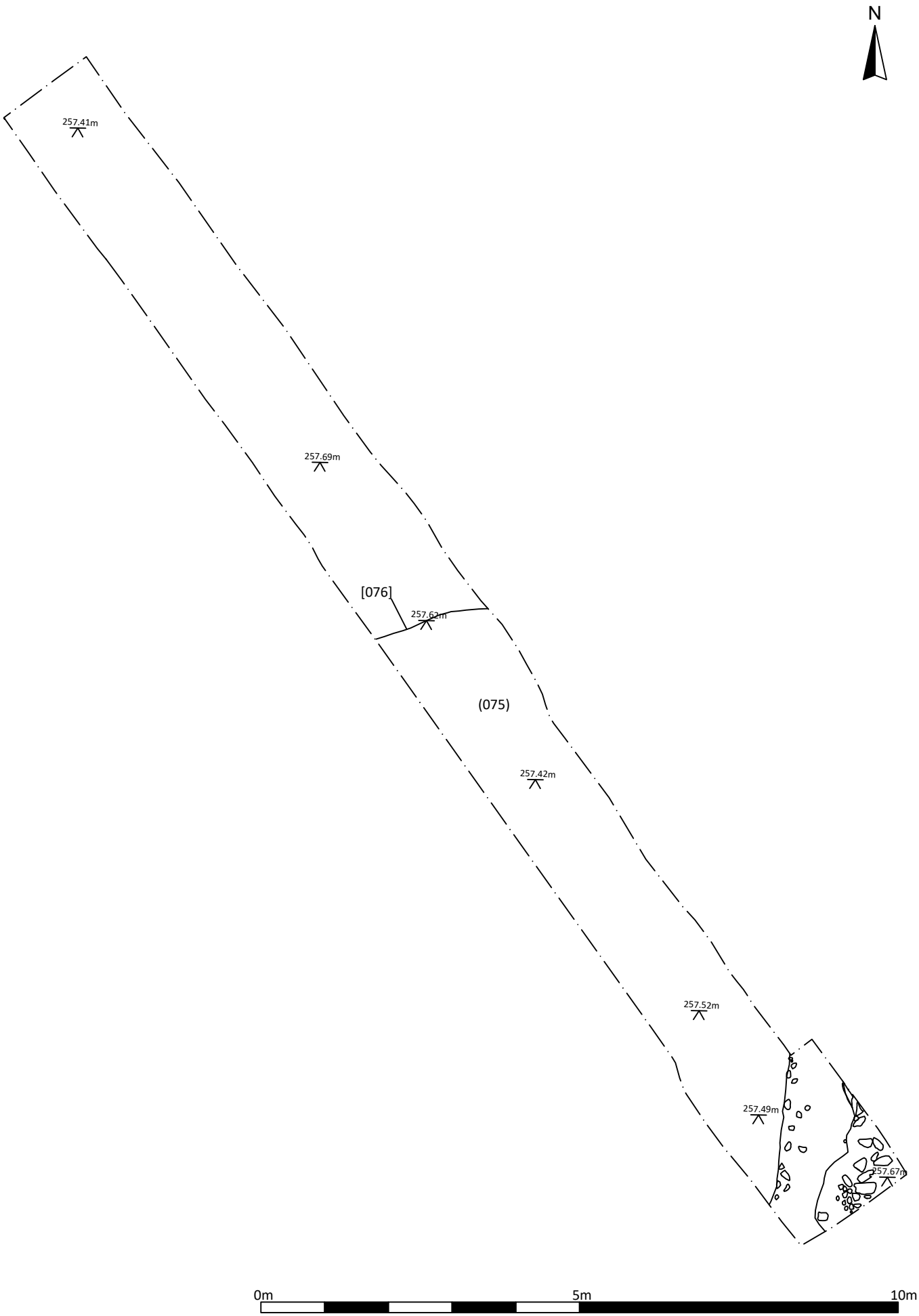
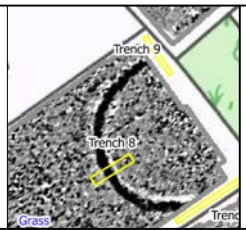


Figure 17. Plan of circular enclosure [076] in Trench 9.
Scale: As shown @ a4

Key:

aOD (m)



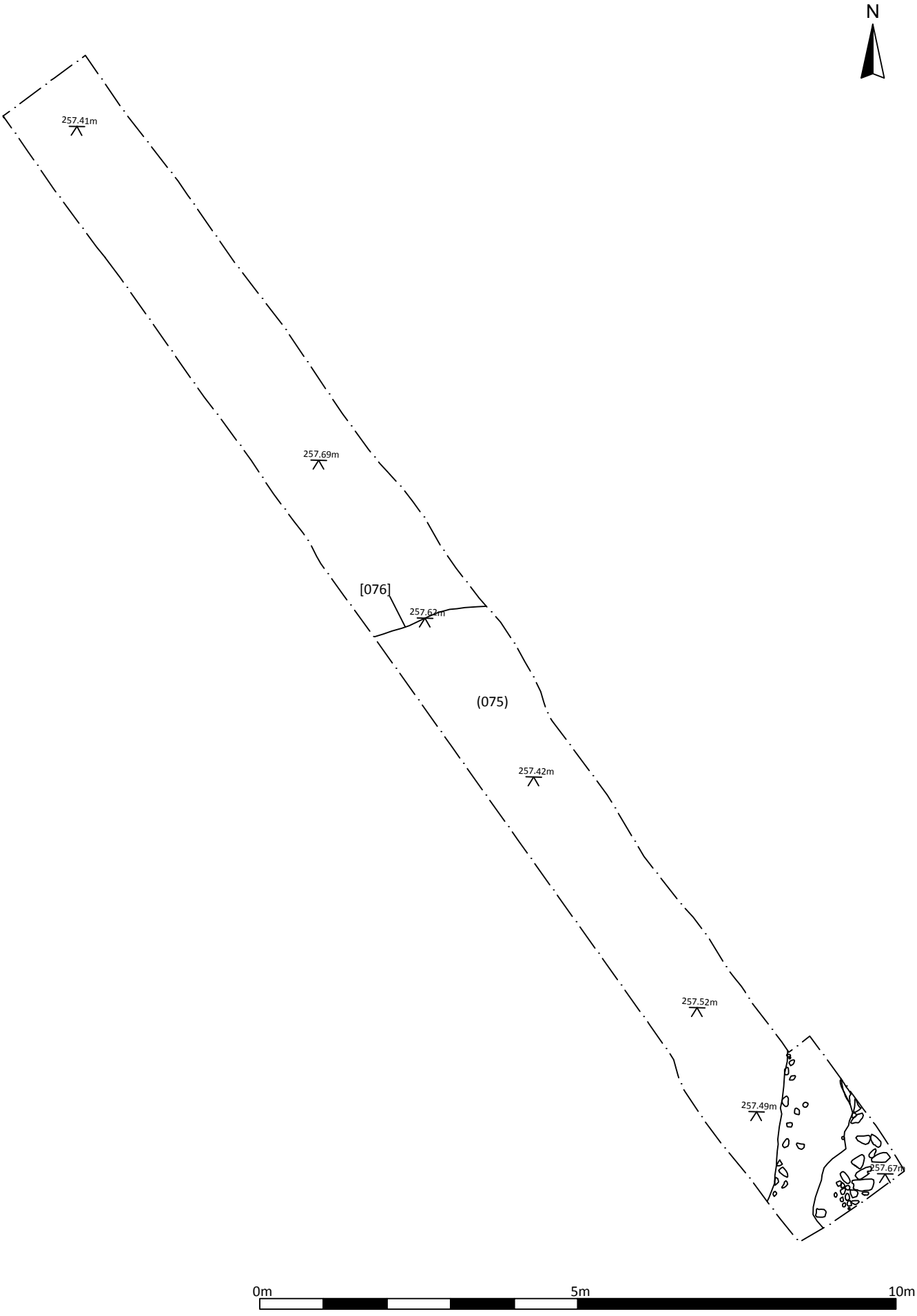


Figure 18. Plan of circular enclosure [076] in Trench 9.
Scale: As shown @ a4

Key:

aOD (m)

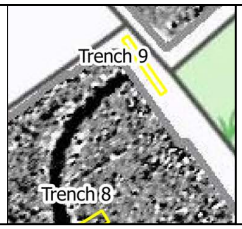
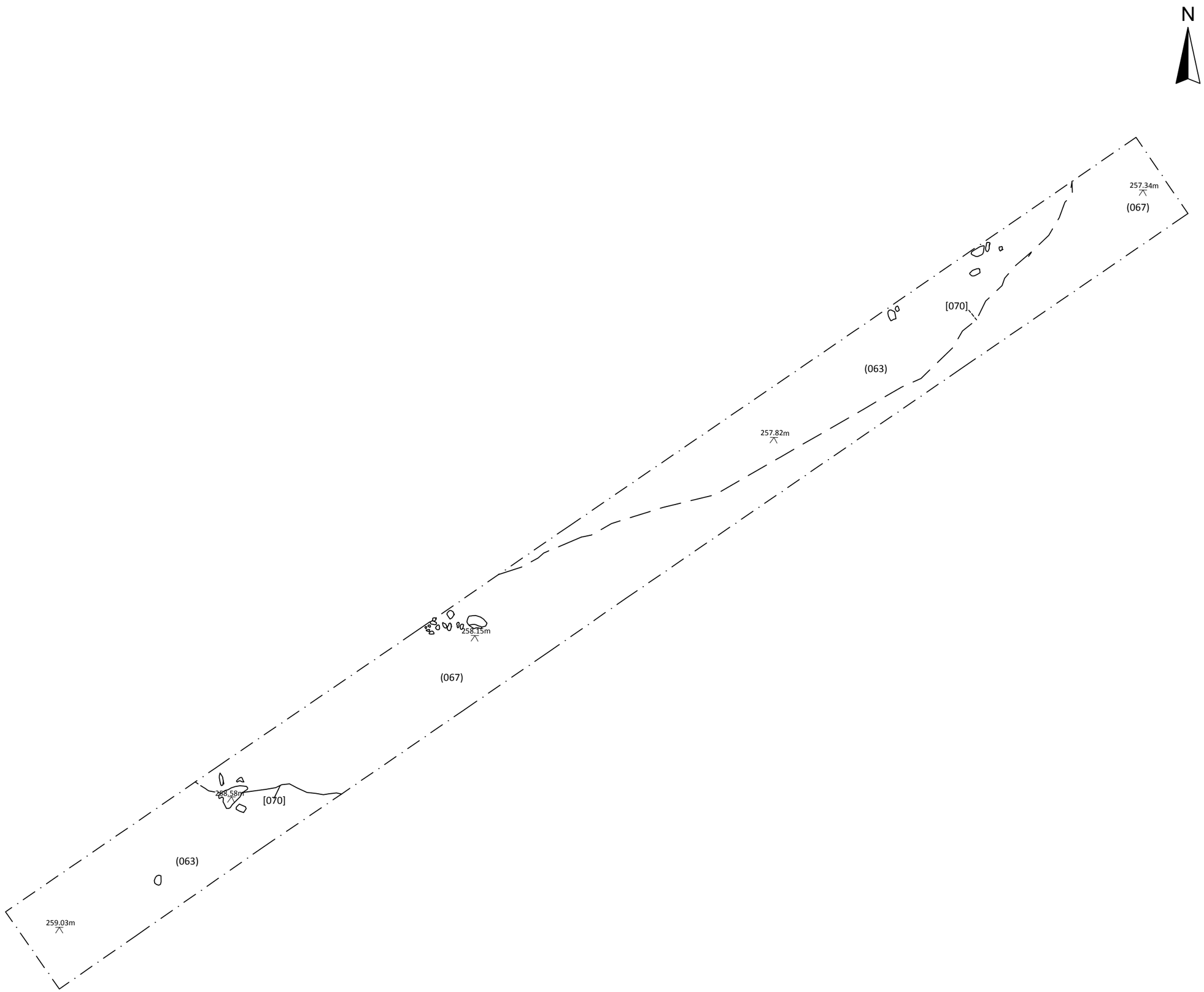


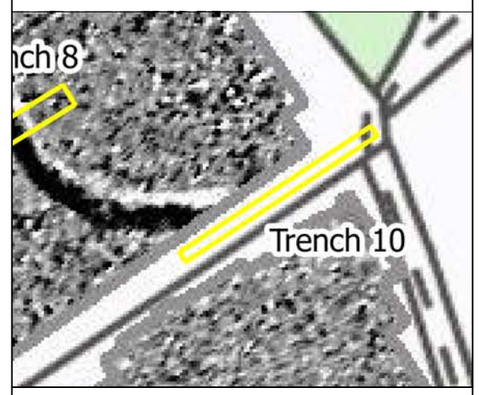
Figure 19. Plan of Trench 10 showing enclosure ditch [070]
Scale: As shown@ A3



Key:

aOD (m)

Proposed edge of enclosure



Fire Station Field
Trench 11 (Figures 20 – 24)

3.26 Trench 11 measured 10m in length by 4m wide, and was positioned on a north-west –south-east alignment in order to target a three-sided rectangular-shaped ditch feature identified on the geophysical survey. The topsoil (062) measured between 0.28m and 0.32m and comprised a mid-grey brown sandy silt loam which contained pieces of coal and charcoal and occasional sandstone inclusions. The topsoil was found to contain bits of broken clay pipe, glass and post-medieval pottery, in addition to several pieces of chipped flint. The topsoil overlay the natural sandstone brash (063) or 'head' in the upper west part of the trench and redeposited brash over the ditch and the lower eastern half of the trench where the redeposited natural had been smeared over the then ground surface following the excavation of the ditch.

3.27 Beneath topsoil (062), the ditch fill [065] was observed cut into the natural (063) running across the trench (Figure 20). It measured *c.*3.6m wide at the start of the archaeological horizon and traversed approximately 4m across the trench in a north-east – south-west alignment. The uppermost fill (066) comprised a mid orange brown clay silt with *c.*20% angular sandstone inclusions, and extended *c.*0.29m in depth and represents the redeposition of a mix of the surrounding natural brash and topsoil that had filled the upper part of the ditch during its backfilling [066].

Figure 20. View south-west across the section through the uppermost fill (066) of the ditch (scale = 0.5m graduations).

3.28 Below fill (066), the cut of the ditch [065] was more clearly identified (Figures 21 and 22) . This feature was found to have a sharp break of slope, with steep concaving sides which became vertical at a depth of 0.6m and continued below the safe working limit of excavation. The ditch is deeply cut and appears to had been purposely

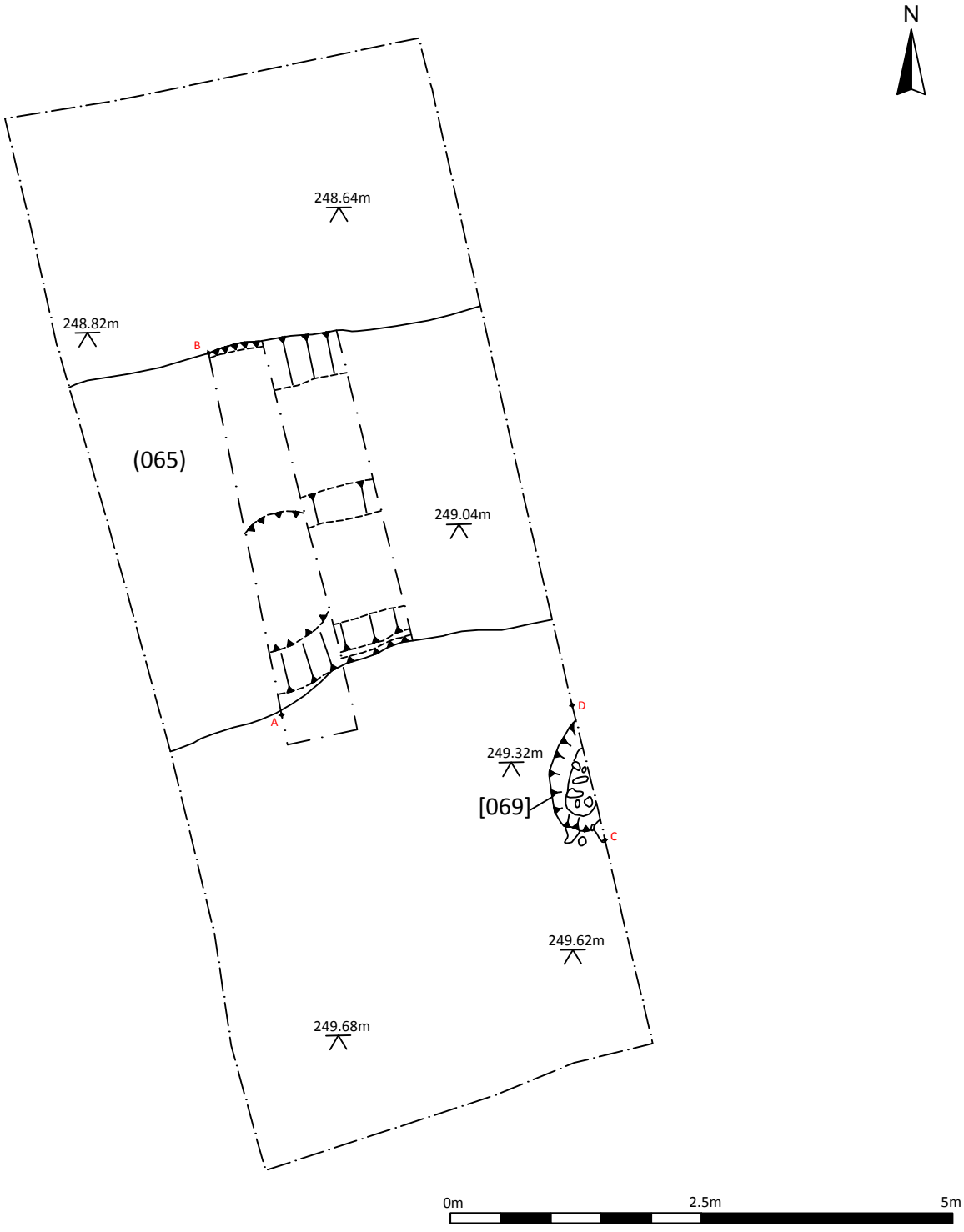
backfilled with redeposited natural material (084) and with introduced material (086). The lowest most visible fill (086) comprised a wet yellow-grey sandy clay with a high density of fragmented sandstone inclusions and was identified in the deepest, narrow and vertical-sided part of the ditch where it measured 0.9m in width. Fill (086) was sealed by redeposited natural (084), a mid-yellow grey, silty clay with frequent small angular fragmented sandstone inclusions. A mid-brown clay silt soil (083) was identified some 0.35m below the archaeological horizon, and had been cut by ditch [066]. This deposit is thought to represent an old topsoil horizon, the top of which was the old land surface, that has had upcast material smeared over it after the deep ditch was excavated. Chipped flints were located from the various fills above the ditch, but not from within the lowest fill (086) which comprised introduced material, and these are all considered to be residual within the contexts within which they were found. Those from the old soil layer (083) are likely to be 'near situ' as they have come from the topsoil where they may have been turbated by past ploughing, bioturbation and soil movement since they were originally discarded.

Figure 21.North-east facing section of excavated section through ditch [066] (scale = 0.5m graduations), showing the redeposited natural brash above the buried topsoil and previous ground surface on the right hand side and the vertical cut of the ditch filled with redeposited natural, large sandstone blocks and yellow clay on the left hand side (scale = 0.5m graduations).

Figure 22. View south- east of section through [066] (scale = 0.5m graduations).

3.29 A small ovoid pit feature [069] was located on the eastern edge of trench 11, some 2.2m from its south-eastern corner (Figure 23). This feature continued north-east beyond the extent of excavation. The pit is situated *c.*1.3m to the south of the ditch in the upper half of the trench. Measuring 1.04m in length with a minimum width of 0.45m at the start of the archaeological horizon, the feature had a depth of 0.2m and was found to have a sharp break in slope, steep concaving sides and a flat base. It contained a single uniform fill (068) of sandy silt, mid orange brown in colour, which contained frequent angular pieces of sandstone varying from 60mm - 150mm in size. A small assemblage of chipped lithics was retrieved from its fill. Palaeoenvironmental sampling was carried out for fill (068) but it yielded no results.

Figure 23. South-west facing section of pit [069] (scale = 0.5m graduations).



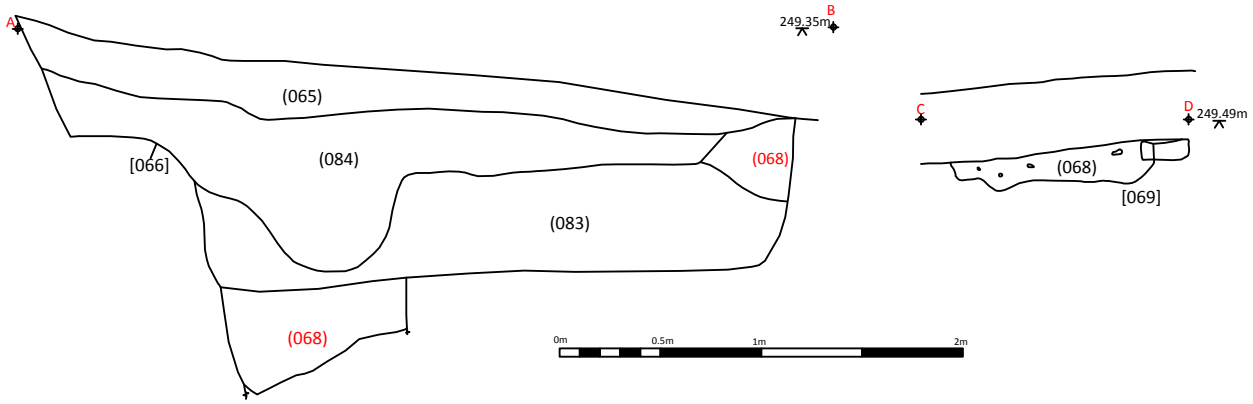
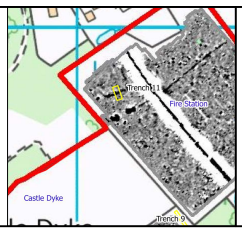


Figure 24. Plan of feature [066] and Pit [069] in Trench 11 and associated sections
Scale: As shown @ a4

Key:

aOD (m)



TEST PITS

3.30 The test pitting element of the archaeological works involved the excavation of 35 1m x 1m test pits across two fields. Fifteen test pits were sited along the relatively flat plateau within 'Lane Side' field and twenty test pits were laid out within 'Grass' field. One test pit (TP 35) identified a stone setting, composed of limestone brought into the area, surrounding ash and charcoal and is interpreted as some kind of hearth feature and this test pit was opened out into a 2m x 2m area to better record and sample the feature.

3.31 All the test pits were similar in nature and were made up of two distinct stratigraphic layers: an upper layer of topsoil, which comprised a mid black brown sandy silt and a lower layer of the geological natural sandstone brash or 'head'. Finds recovered from the topsoil consisted largely of post-medieval pottery, clay pipe fragments, glass and ceramic building material (CBM) (Tables 1 and 2).

Test Pit No.	Field Name	Topsoil depth	Finds
13	Lane Side	0.60m	Glass, slag, post-medieval pottery, CBM, coal, clay pipe
14	Lane Side	0.40m	Clay pie, coal, post-medieval pottery, glass, slag
15	Lane Side	0.40m	Clay pipe, post-medieval pottery, flint, animal bone, glass
16	Lane Side	0.38m	Glass, post-medieval pottery, clay pipe, CBM, slag
17	Lane Side	0.20m	Clay pipe, post-medieval pottery, slag
18	Lane Side	0.3m	Clay pipe, pottery, glass
19	Lane Side	0.40m	Fe object, clay pipe, CBM, glass, post-medieval pottery
20	Lane Side	0.40m	Post-medieval pottery, clay pipe, glass, slag
21	Lane Side	0.40m	Clay pipe, ceramic, glass, slag, CBM
38	Lane Side	0.3m	Clay pipe, post-medieval pottery
39	Lane Side	0.3m	Post-medieval pottery
40	Lane Side	0.30m	Clay pipe, post-medieval pottery, glass
41	Lane Side	0.30m	Clay pipe, post-medieval pottery
42	Lane Side	0.40m	Clay pipe, glass, post-medieval pottery
43	Lane Side	0.50m	Glass, post-medieval pottery, slag, clay pipe

Table 1. Test pits excavated within 'Lane Side' field.

Test pit No.	Field Name	Topsoil depth	Finds
30	Grass field	0.15m	Clay pipe, post-medieval pottery, glass, slag
31	Grass field	0.25m	Clay pipe, post-medieval pottery, glass
32	Grass field	0.23m	Post-medieval pottery, clay pipe

Test pit No.	Field Name	Topsoil depth	Finds
33	Grass field	0.26m	Clay pipe, post-medieval pottery, glass
34	Grass field	0.20m	Clay pipe, pottery, glass
35	Grass field	0.2m	Animal bone, clay pipe, CBM, glass, post-medieval pottery
36	Grass field	0.34m	Post-medieval pottery, clay pipe, glass, metal
37	Grass field	0.25m	Clay pipe, post-medieval pottery
44	Grass field	0.30	Clay pipe, post-medieval pottery, slag, CBM
45	Grass field	0.33	Post-medieval pottery, glass, metal, bone
46	Grass field	0.3	Post-medieval pottery
47	Grass field	0.3m	Clay pipe, post-medieval pottery, animal bone
48	Grass field	0.28m	Post-medieval pottery
49	Grass field	0.25m	Glass, post-medieval pottery, slag, clay pipe
50	Grass field	0.25m	Clay pipe, post-medieval pottery, CBM, glass, slag
51	Grass field	0.35m	Clay pipe, post-medieval pottery, CBM, glass
52	Grass field	0.30m	Post-medieval pottery, clay pipe, slag, glass
53	Grass field	0.33m	Post-medieval pottery, glass, clay pipe, flint
54	Grass field	0.20m	Clay pipe, post-medieval pottery, glass, flint
55	Grass field	0.20m	Glass, post-medieval pottery, flint, CBM

Table 2. Test pits excavated within 'Grass' field.

3.32 Test pit 35 was excavated to a depth of 0.7m. It was made up of topsoil (062) overlying a thin layer of a medium orangey brown sandy silt which was interpreted as a thin layer of surviving subsoil, and which in turn overlay the natural brash (063) (Figures 25-27). Set into the natural brash was an ovoid feature [077] comprising a setting of substantial stones surrounding a central area of burning. Although not all of the feature was exposed it extended for 2.19m in length and had a width in excess of 0.8m. The sides of the pit into which the stones had been set were steep and concaving and it had a rounded base. It was filled by ashy and charcoal-rich deposits (078) and (079). At the base, the lower fill (079) was up to 0.19m thick and comprised a dark black brown clay silt with frequent inclusions of charcoal and burnt stone. Sealing (079), upper fill (078) comprised a dark red-brown clay silt that also contained inclusions of charcoal and burnt stone but were not as frequent as in the lower fill (079). The nature and location of the charcoal and burnt stone inclusions between and around the large limestone boulders indicates a hearth-like feature. The environmental analysis of the fills indicated that the charred wood was pine wood.

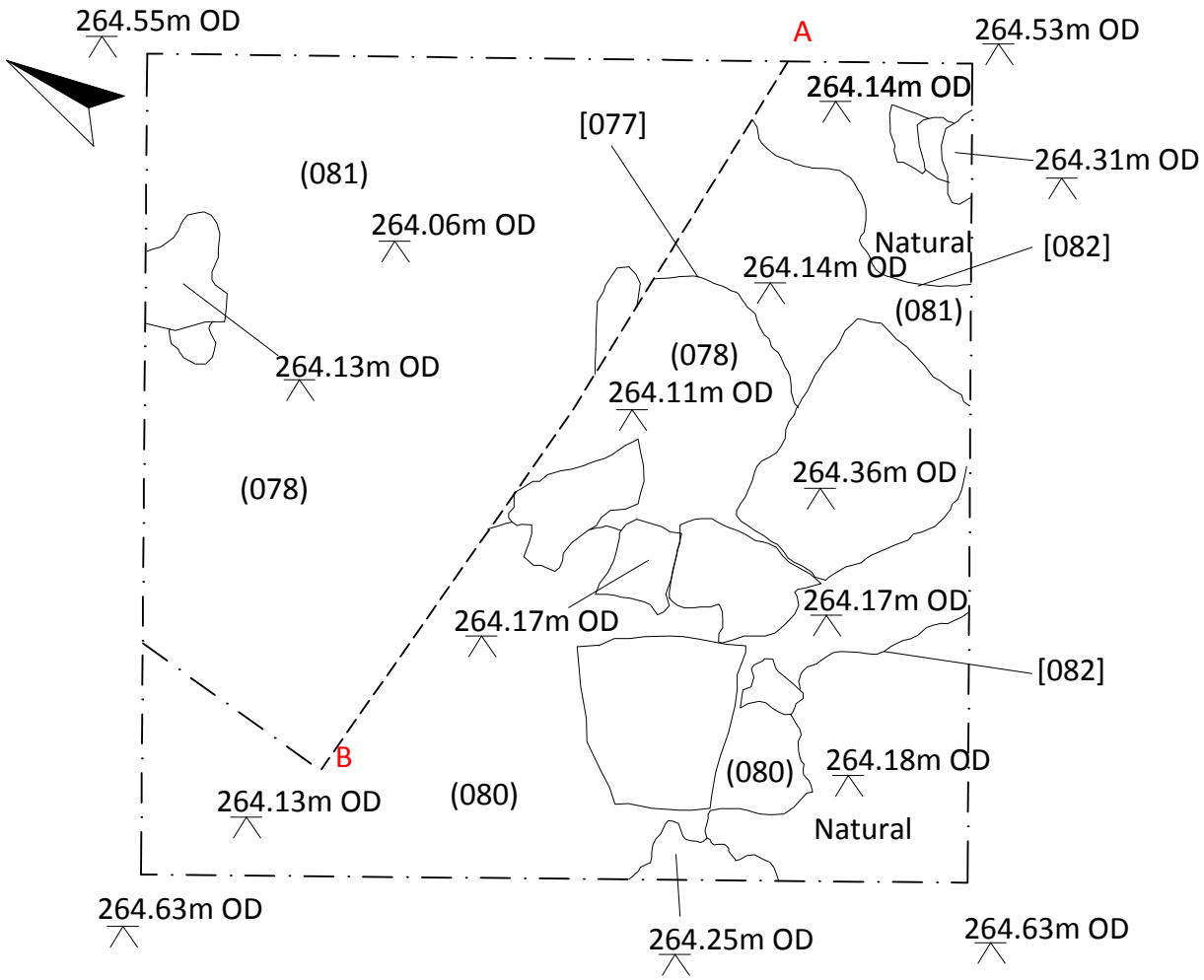
3.33 Below [077] a further pit feature [082] was identified by its fills (080) and (081) which had been truncated in the centre by hearth [077]. On investigation one edge of [082] was identified in profile, with a steep concave eastern slope, the feature has a minimum width of 1.94m with a minimum depth of 0.28m. It eastern fill (080), comprised a dark orange brown clay sand with frequent sandstone inclusions and occasional flecks of charcoal. Fill (081) comprised medium textured, light yellow brown sandy silt with small sandstone inclusions. Both fills appear to be similar in nature to

natural brash (063) and is considered to represent redeposited natural brash indicating a man-made action of backfilling.

Figure 25. View north-east of test pit 35, showing topsoil (062) overlying subsoil (100) and at the base, charcoal deposit (079) (scale = 0.1m graduations).

Figure 26. View south-east of test pit 35 which has been extended showing hearth feature [077] (scale = 0.5m graduations).

Figure 27. North-facing section through hearth [077] and possible pit [082] (scale = 0.5m graduations).



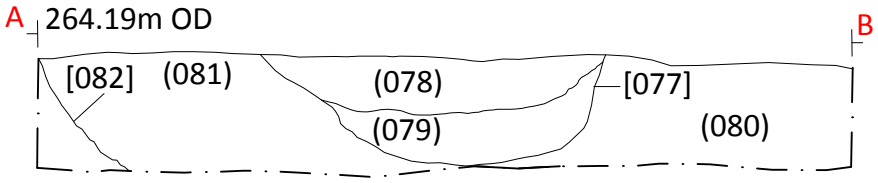


Figure 28. Post-excavation plan of Test pit 35
Scale: As shown @ a4

Key:

aOD (m)

4. RADIOCARBON DATES

Clive Waddington

4.1 A total of three radiocarbon dates were obtained from archaeological samples from the excavations in Grass Field. These are summarised as conventional radiocarbon ages (Stuiver and Polach 1977) in Table 3 below, and quoted following the recommendations of the Trondheim convention (Stuiver and Kra 1986). The dating was undertaken with advice from SUERC.

4.2 The radiocarbon dates were produced at the Scottish Universities Environmental Research Centre, with all the samples being single entities (Ashmore 1999) and prepared and measured as detailed in Dunbar *et al*. (2016) and Naysmith *et al*. (2010). All radiocarbon calibration was undertaken using OxCal v4.3 (Bronk Ramsey 1995; 1998; 2001; 2009) and the internationally-agreed northern hemisphere calibration curve (IntCal13) of Reimer *et al*. (2013).

4.3 A single entity sample of charred pine round wood from the fill of the hearth pit at the base of Test Pit 35 produced a date of 5900-5749 cal BC (SUERC-84938 (GU50428)). This indicates a late Mesolithic date for the use of this feature.

4.4 A piece of single entity, shortlived unidentified roundwood from the primary fill (099) of the sub-circular enclosure ditch in Grass Field returned a date of cal AD 255-395 (95.4% probability) (SUERC-83157 (GU49569)). This is a late Romano-British period date which the calibration suggests most likely falls in the 4th century AD.

4.5 A single entity, shortlived charred sloe stone from the secondary fill (098) immediately overlying primary fill (099) of the sub-circular enclosure ditch in Grass Field returned a date of cal AD 255-395 (95.4% probability) (SUERC-84937 (GU50427)). This is a late Romano-British period date which the calibration suggests most likely falls in the 4th century AD. It is, quite unusually, identical to the corresponding date form the primary fill, so no weighted mean for the two dates would serve any purpose. The uniformity of these dates is suggests taphanomic integrity of these lowest ditch fills and a functional relationship between the dates and the time when the ditch was in use.

Laboratory no.	Feature and context description	Sample	Radiocarbon Age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95.4% probability) calibrated	Calibrated date range (68.2% probability) calibrated
Mesolithic (intrusive sample)						
SUERC-84938 (GU50428)	Basal fill of hearth pit found at base of Test Pit 35	Pine charcoal	6957 ±25	−26.2	5900-5749 BC	5881-5801 BC
Romano-British						
SUERC-83157 (GU49569)	Primary fill (099) of sub-circular enclosure ditch, Trench 8	Indet. charred roundwood	1709 ±24	−27.2	255-395 AD	263-384 AD
SUERC-84937 (GU50427)	Secondary fill (098) of sub-circular enclosure ditch, Trench 8	Charred sloe stone	1708 ±22	−26.4	255-395 AD	264-384 AD

Table 3. Radiocarbon dating results.

5. FINDS ASSESSMENT

Chipped Lithics
Clive Waddington

Introduction
5.1 A total of 217 chipped lithics were retrieved from the test pits and Trenches 6-11. A total of 157 were retrieved from Trench 8 with the majority of these being from the fills of the ditched enclosure, 49 from Trench 11, two from Trench 7, two from Trench 9, one from Trench 6, one from Trench 10, and one each from Test Pits 48, 49, 50, 52 and 53. The pieces from stratified deposits are considered to be residual from earlier activity on the site and therefore represent material that has become incorporated into the various ditch fills. All finds were located according to the context in which they were found and each find was bagged and given a unique find number. Measurements are given for complete pieces only in accordance with lithic recording conventions (Saville 1980). A full catalogue with details of each individual lithic was produced and forms part of the site archive. Table 4 below shows the breakdown of lithic types by context. The assemblage is of moderate size, and it is notable that although Mesolithic material is present there is a notable component of Neolithic material from the various interventions in Grass Field. This is consistent with the composition of the fieldwalking assemblage also recovered from this field.

Chronology
5.2 The assemblage contains material from two distinct periods/traditions, these being a Mesolithic component (*c*.10,000-4000 cal BC), as evidenced by the concern for blade production, many with triangular sections and being small and narrow, and a Neolithic component as evidence by the larger, fresher broader blades with a more shallow trapezoid section, many of which have retouched long edges.

Distribution
5.3 The inclusion of flint artefacts in a range of deposits, including the unstratified topsoil, reveals lithic material becoming incorporated into later deposits when the ground was disturbed to construct later features on the site. The presence of Mesolithic material across all areas of Whirlow Hall farm testifies to the widespread use of this landscape by Holocene hunter-gatherer groups. The notable focus of Neolithic activity in Grass field, however, is conspicuous and highlights this area as a locale favoured for Neolithic activity.

Raw Material
5.4 The raw material recovered during the excavations is a combination of flint (185) and chert (32 pieces), of which 75 are from a nodular source (chalk bearing strata) and therefore imported to the region, 84 from a glacial, or secondary, source, the rest of the material having no, or insufficient, cortex remaining to indicate their provenance. The nearest nodular source is the Lincolnshire Wolds which lie 55km distant from the site at their nearest point. The nearest sources of secondary flint probably lie in the tills and sand and gravel deposits of the Trent Valley. Any flint found

on the site has, therefore, to have been imported and this indicates that material was being brought to the site over a considerable distance during the Mesolithic and Neolithic periods. Most of the Neolithic material is made on nodular flint suggesting flint mining and exchange networks were well established at this time.

Flaking and Manufacture

5.5 The assemblage displays evidence for the use of both hard and soft hammer working, with most of the edge-trimming and retouch being unifacial. The manufacturing tradition for Mesolithic material relies on a blade-based technology that includes slender blades where possible, but also thicker stubby blades when the raw material dictates. The blades typically have a triangular section and the production and use of microblades is featured within the assemblage. The Neolithic material is nearly all produced on flint, rather than chert, and much of it is in a fresh condition and typically on flint from a nodular origin. The manufacturing tradition is again based on blade-based production, but these pieces are typically larger than the Meoslithic blades, they more typically have a trapezoidal rather than triangular section and are shallower and broader in shape. It is not uncommon for them to have retouch along the full length of one or both long sides and sometimes around the entire piece.

Types

5.6 A range of tool types is present in the lithic assemblage and these are summarised in Table 4 below.

5.7 The assemblage is dominated by flakes and chipping waste. It includes a significant quantity of utilised, edge-trimmed and retouched blades together with a smaller quantity of utilised, edge-trimmed and retouched flakes together with occasional scrapers, microliths, two microliths and two possible arrowhead roughouts. The presence of processing tools, such as the various retouched and utilised pieces and the scraper, indicate a wide range of processing activities, which are usually taken as an indicator of settlement actiivty (Schofield 1991, 1994). The presence of the microliths and two possible arrowhead roughouts suggests that the use and maintenance of hunting weapons took place on the site.

`	**Test Pits 48, 49, 50, 53, 53**	**Trench 6**	**Trench 7**	**Trench 8**	**Trench 9**	**Trench 10)**	**Trench 11**	**Total**
Chunks				30				30
Flakes	2			30	1	1	34	68
Rejuvenation flake				5				5
Blades		1		9			5	15
Chips	1		1	22			3	27
Utilised Blades				7			1	8
Edge trimmed blade	1			3			2	6
Retouched blade			1	3	1			5
Utilised flake				21			1	22
Edge-trimmed flake				9			1	10
Retouched flake	1			6			1	8
Core				5				5

Scraper				3			1	4
Microliths				2				2
Arrowhead roughout				2				2
Total	5	1	2	157	2	1	49	217

Table 4. Summary of lithic types by context.

Discussion

5.8 The area around Whirlow Hall Farm has evidently formed a focus for Mesolithic, and later, Neolithic activity, as evidenced by the lithic material recovered by the fieldwalking survey as well as by the finds from these and previous excavations. The Sheaf valley provides a natural routeway for both animals and humans and gives access from a lowland river basin, now occupied by Sheffield City Centre, with the high moorlands at the head of the Sheaf valley. This location would have afforded many opportunities to take a variety of wild animals, such as red and roe deer, wild pig and so forth and take nesting birds form the rich woodland that would have mantled much of this area. During the Neolithic this locale afforded commanding views, an area of free-draining plateau and proximity to the freshwater spring located on the slope below and which together would have made this an attractive locale for early farming groups.

General finds from Topsoil

A wide variety of material other than chipped lithics was recovered from the topsoil in all trenches. These finds comprised for the most part post-medieval-modern finds that included varieties of broken ceramics, field drain, clay pipe fragments, rusted metal object fragments, slag, animal bone and glass. A full catalogue of this material has been produced and is included in the site archive, together with a more detailed description of the assemblage. The archaeological significance of this material is low and has not added further information from that already noted by similar finds noted in the topsoil during previous excavations at Whirlow Hall farm.

Pottery

In total 189 sherds of ceramic were recovered from the topsoil across the trenches and mostly comprise 19th century salt glazed domestic ware, blue and white, earthen ware, unglazed earthen ware and domestic stone ware.

Clay pipe and glass

Across the site a clay pipes were recovered including fragmented stems and bowls were recovered from the topsoil along with C19th and C20th century domestic glass.

Metal

The metal objects recovered (in total 33) comprise of a rusted nails, a modern animal metal tag, linen button back, aluminium strip and metal brackets.

Animal bone

A small assemblage of animal bone was recovered from topsoil, and comprised of 3 fragments, of which two were unidentifiable and the other represents a sheep tooth.

6. PALAEOENVIRONMENTAL ANALYSIS AND CONSERVATION ASSESSMENT

Luke Parker

Introduction

6.1 Palaeoenvironmental analysis was undertaken on samples taken from the fills of excavated archaeological features. 40L of fill from each archaeological feature was sampled where possible, unless the feature contained less than 40L of fill whereupon the entirety of the excavated fill was sampled.

Methods

6.2 Bulk fill samples were processed via water floatation through graduated sieves with the smallest being 500µm. Heavy residues were washed and scanned by eye for palaeoenvironmental material which would require re-floating, non-floating mineralised or waterlogged material, or archaeological finds. Flots were weighed, air dried, and scanned using a low-power binocular microscope (x40). The entirety of the flots were dry-sieved through 5mm, 1mm and 500µm sieves in order to separate into three size fractions which were then scanned and separated out into charcoal and plant macrofossils.
Where possible up to twenty random identifications were made per sample; half from the >5mm size fraction and half from the 1-5 mm size fraction. Charcoal with a size of >2mm was fractured to obtain clean sections on the tangential, transverse, and radial planes. These could then be identified using a high power Leica GXML3030 binocular microscope (up to x600). Species identification was undertaken using plates and guides from Scoch *et al.* (2004) as well as comparison with a modern reference library held by ARS Ltd.
Plant macrofossil identification was undertaken using a low-power binocular microscope (x40). Plant macrofossil identification utilised plates and guides from Martin and Barkley (2000) and Cappers *et al.* (2006). Plant macrofossil nomenclature follows Stace (1997). Cereal identification utilised the guide by Jacomet (2006). All plant macrofossils present were assessed and what is suspected to be modern contamination was roughly quantified.

Results

6.3 Samples which yielded palaeoenvironmental material are shown in Table 5.

6.4 Beneath the probable post-medieval upper fill (093) of the circular ditched enclosure [F092] the four fills (096), (097), (098), and (099) all contained small assemblages of what were generally poorly preserved charred remains. The charcoal, particularly, was poorly preserved and badly fragmented. Within these four fills there were also uncharred modern rootlets which made up a moderate component (50% for (096) and 20% for the other three (097), (098), and (099)) of the resultant flots. Considering the depth of the uppermost of these fills (096) is around 1.5m below the current land surface, and the lowermost (099) is around 2.5m deep, it is clear that modern rooting had reached significant depth. There was no evidence for waterlogging on the site, with the site being on the side of the valley, far above the water table and above permeable basal sediment.

Context No.	**96**	**97**	**98**	**99**	**78**	**79**
Quantity	0.77g	6.74g	2.64g	2.05g	4.74g	36.56g
Charcoal						
Alder (Alnus glutinosa Gaertn.)				1		
Oak (Quercus sp.)						
Pine (Pinus sp.)					9	20
Maloideae sp.				c.f. 1		
Indet. twig			4	1		
All indet. charcoal	-	-				
Notes	50% of remains modern rooting	20% of remains modern rooting	20% of remains modern rooting. Sloe fruit present on stone	20% of remains modern rooting		
Plant Macrofossils						
Wild seeds						
Sloe (Prunus spinosa)			1			
Red campion (Silene dioica)				2		
Hairy crabgrass (Digitaria sanguinalis)				2 (1 burnt and warped)		
Harebell (Campanula rotundifolia)			2			
c.f. Trifolium sp.			21			
Forget-me-not (Myosotis sp.)		1				
Cleaver (Galium sp.)		4				

Table 5. Recovered charred palaeobotanical and charcoal remains. Green highlight indicates material suitable for radiocarbon dating.

6.5 Ditch fill (096) contained a very small quantity (around 0.34g) of badly fragmented indeterminate charcoal. This charcoal was accompanied by roughly the same amount of rootlets. The underlying fill (097) contained a larger assemblage of charred remains, though this was still mostly composed of small pieces of badly fragmented indeterminate charcoal. Alongside this charcoal however was a single charred forget-me-not (*Myosotis sp.*) seed and four charred cleavers (*Galium sp.*). Around 20% of this 6.74g assemblage was composed of rootlets. Ditch fill (098) contained a small charcoal assemblage which was all indeterminate, however four fragments of charred twigs were also recovered. Twenty one charred seeds which are probably clover (*c.f. Trifolium* sp.) and two charred harebell (*Campanula rotundifolia*) seeds were recovered from this charred assemblage. Also, a single charred sloe (*Prunus spinosa*) stone was recovered, with charred fruit matter still surrounding parts of the

stone. The primary ditch fill (099) contained a fragmented charred assemblage, of which one fragment of alder (*Alnus cf. glutinosa*) charcoal, one fragment of probably *Maloideae* charcoal, and one indeterminate charred twig was recovered. There were also two charred red campion (*Silene dioica*) and two hairy crabgrass seeds (*Digitaria sanguinalis*). Around 20% of this assemblage was composed of modern uncharred rootlets.

6.6 The upper (078) and lower (079) fills of pit [077] contained palaeoenvironmental assemblages exclusively composed of charcoal remains. Pit [077] is interpreted as being a hearth due to the presence of the charcoal and burnt stone, the latter of which was described during excavation as likely being placed stones surrounding the area of burning. The lower fill (079) contained the majority of charcoal, though in both fills the identified charcoal was all pine (*Pinus* sp.).

6.7 A linear feature [072] was also excavated and the two fills (074) and (073) yielded no charred remains. All recovered organic material was composed of modern rootlets.

Discussion

6.8 The ditch [092] fills (096), (097), (098), and (099) all contained relatively small assemblages of badly fragmented pieces of charcoal, alongside small numbers of charred botanical macrofossils. The high degree of fragmentation, small quantity and relative poor preservation condition is likely indicative of having been incorporated into the ditch from elsewhere. Either this material has been transported some distance from its original location and disposed of in the ditch, or it is reworked material which has been eroded from its original context before being redeposited within the ditch. Relatively small assemblages of poor-condition charred material in assemblages with notable degrees of modern rootlets should always be treated with caution (Pelling *et al.* 2015). All charred botanical macrofossils are from species commonly found in agricultural settings. The sloe stone found in the second lowest fill (098) from the ditch [092] cannot be identified as being gathered by humans or directly associated with human consumption. It is in relatively good condition compared to all other macrofossils and charcoal, and so despite the natural resilience of fruit stones may have not undergone as significant degree of transportation as the other remains. The charred twig from primary fill (099) provides the most suitable sample for obtaining a radiocarbon date related to the initial use of this feature.

6.9 The exclusivity of pine wood within the fills of hearth [077] could suggest that this was made and used as part of a single event, where pine wood was used as fuel, and following which it was disused. A pine twig fragment from lower fill (079) provides the most suitable sample for obtaining a date on the initial use and construction of this feature.

7. GEOCHEMICAL SURVEY

Roger Doonan and Matthew Lester

7.1 Geochemical survey was undertaken across 10 fields (Castle Dyke, Grass, Four Acre, Fire Station, Barn, Timothy, Two Acres, Top of Tongue, Big Bank, and Lane side). This data complements surveys undertaken in 2011 in Hall field (Doonan and Slater 2011) and in Bole Hill field 2014 (Doonan *et al*. 2016). All survey was undertaken at 10m resolution except the 2011 survey in Hall field across the IA/RB enclosure which was sampled at 4m resolution. A total of 1823 survey points have now been determined across a survey area of 16.1 ha (Figure 29).

7.2 The results of geochemical survey are reported for two land parcels, firstly the fields to the north-east, Land parcel 1 (LP1),(Castle Dyke, Grass, Four Acre, Fire Station, Barn, Timothy, Two Acres, Top of Tongue) and secondly those to the south-west, Land parcel 2 (LP2),(Big Bank, Lane side, Hall, and Bolehill) prior to a comparative analysis across all survey areas.

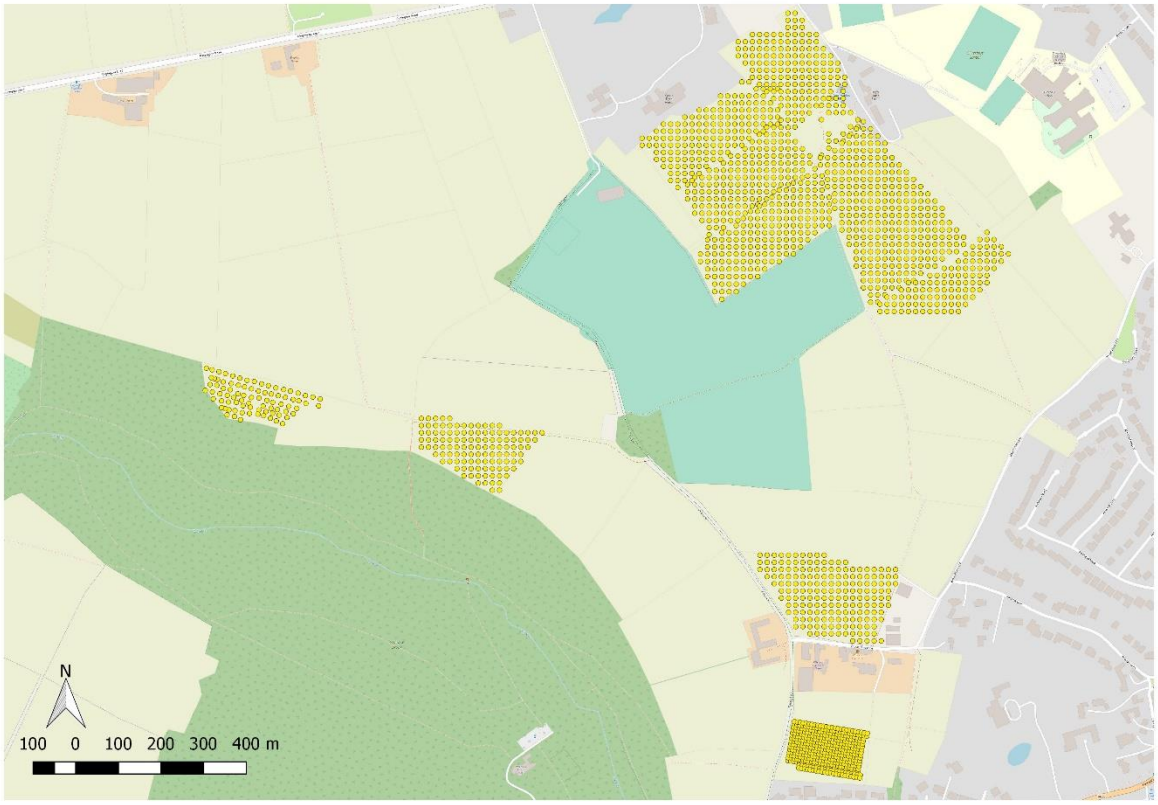


Figure 29.Sampling points for geochemical survey (all point 2011-2018)

Land parcel 1 (LP 1)

7.3 Land parcel 1 comprises the cluster of fields centred on Grass field in the north-east part of the farm where excavations and test pitting were undertaken.

7.4 Figure 30 shows the spatial variability of lead (Pb) across LP1. The most prominent feature in this area is a linear anomaly running north-west to south-east in Fire Station field. This seems to continues in a diffused state into Timothy field where it may turn South-west and follow the field boundary. For all fields in LP1 apart from Grass field, Pb ranged from 80 - ~160ppm. Grass field has higher levels of lead with a maximum of 555ppm noted in the vicinity of the sub-circular ditched enclosure. While the maximum values were noted in Grass field with a broad enhancement around the enclosure there was no structured anomaly similar to that noted in Fire Station field. Castle Dyke, Four Acre, Two Acres and Top of Tongue were all notably low in lead.

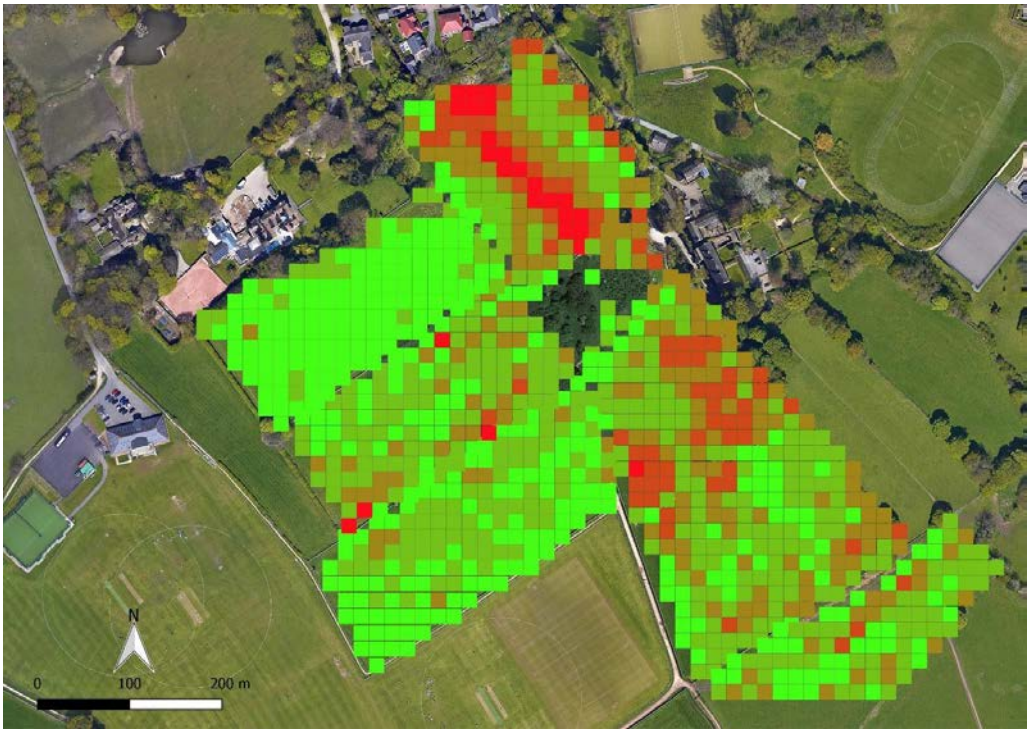


Figure 30.Variation in Pb across LP1

7.5 Zinc distribution across LP1 is generally low and uniform but there are structured anomalies in the south-east of Fire Station field and in Grass Field, in the vicinity of the enclosure (Figure 31). The anomaly in Grass Field extends from the vicinity of the enclosure in a south-west direction. Zn ranged from 40 - ~ 290ppm across the area of land parcel 1 with the highest levels again encountered in Grass Field.

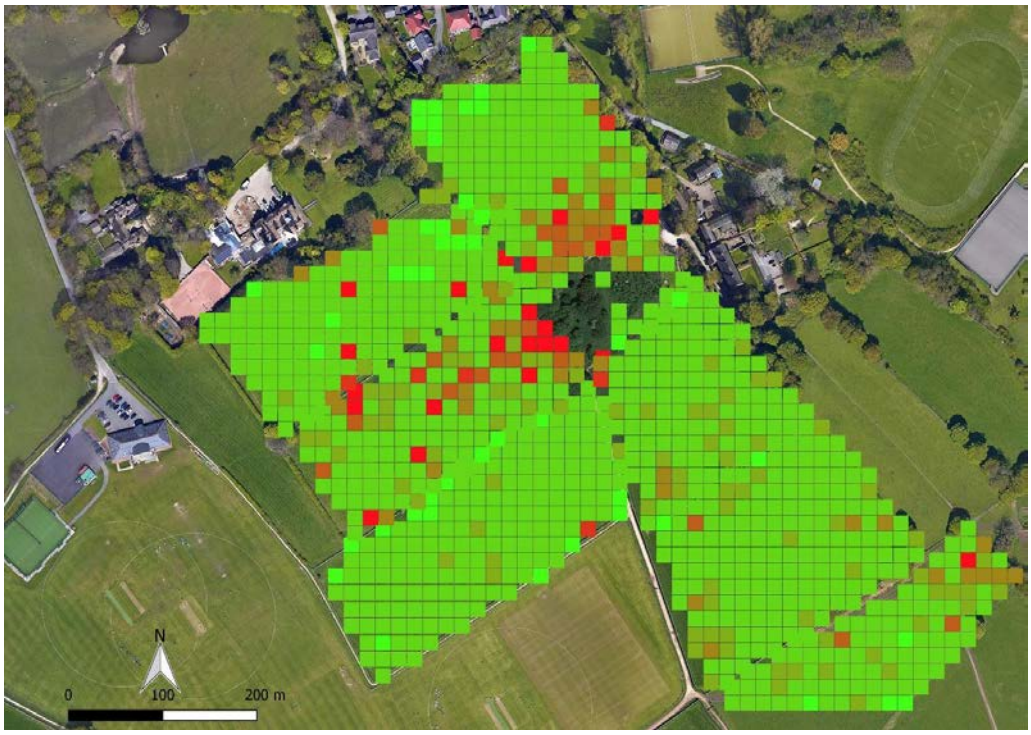


Figure 31. Variation in Zn across LP1

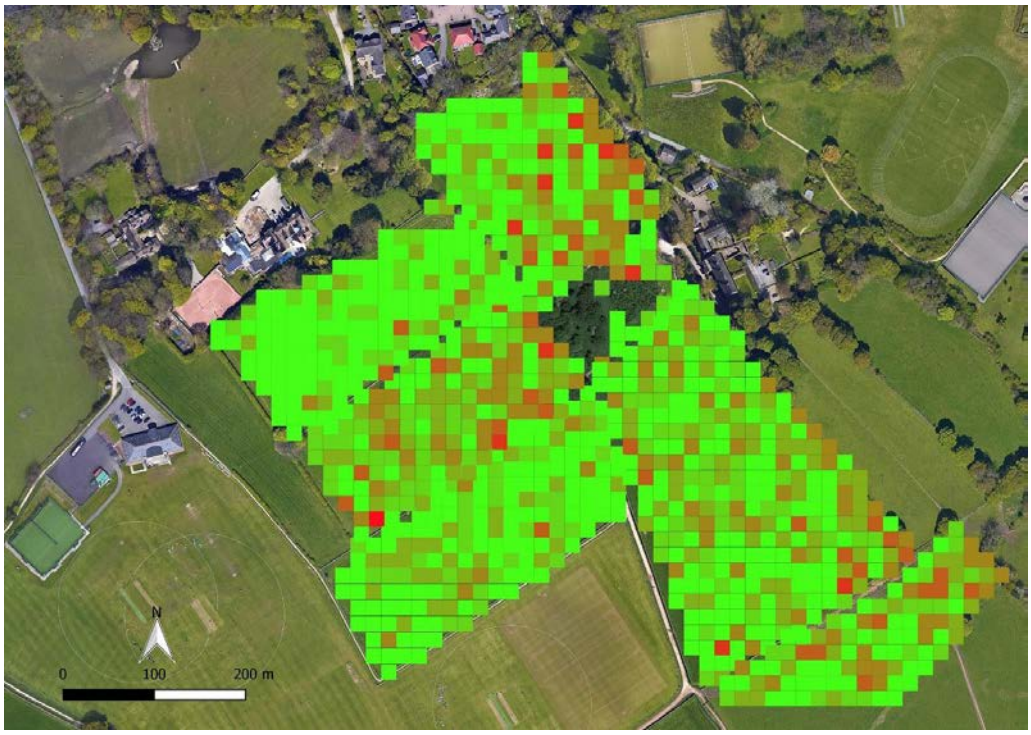


Figure 32.Variation in Cu across LP1

7.6 Copper distribution across Land parcel 1 is generally low and uniform but there are enhanced concentrations in Grass field and in the south-east of Fire Station field (Figure 32). Cu ranged from below the limits of detection to maximum ~70ppm, although in Grass field the maximum was 114ppm. The average across Grass field was 31ppm compared to 14 and 17ppm for Castle Dyke and Four Acre, highlighting the contrast between Grass and neighbouring fields.

Land Parcel 2 (LP2)

7.7 Land Parcel 2 comprises the arc of fields that stretch from Bolehill to Hall field situated to the south of LP1. LP2 includes Bolehill (site of the Roman signal station), Big Bank, Lane side and Hall fields.

7.8 Figure 33 shows the spatial variability of lead (Pb) across LP2. The most prominent feature in LP2 is the very high concentration of Pb in Bolehill field in close proximity to the signal station (Figure 31). The concentration of lead in this area is quite different to anything else across LP2 or LP1 with values ranging from 181ppm to 3700ppm, over seven times higher than anywhere across Whirlow. These levels suggest a primary metallurgical function and most likely relate to the Q pits and suspected lead boles present on the top of the Bolehill field.

Figure 33.Variation in Pb across LP2

7.9 When the peak levels of Pb at Bolehill are stripped and set to 300ppm further geochemical anomalies are visible across LP2. Figure 34 shows the distribution of Pb to the north of the IA/RB enclosure in Hall field reported in 2011 (Doonan and Slater 2011). It is also apparent that the southern extent of the Lane side field is enhanced in lead albeit at significantly lower levels than Bolehill. The concentration noted in Lane side field is of the same order of magnitude as that noted in LP1 (see above).

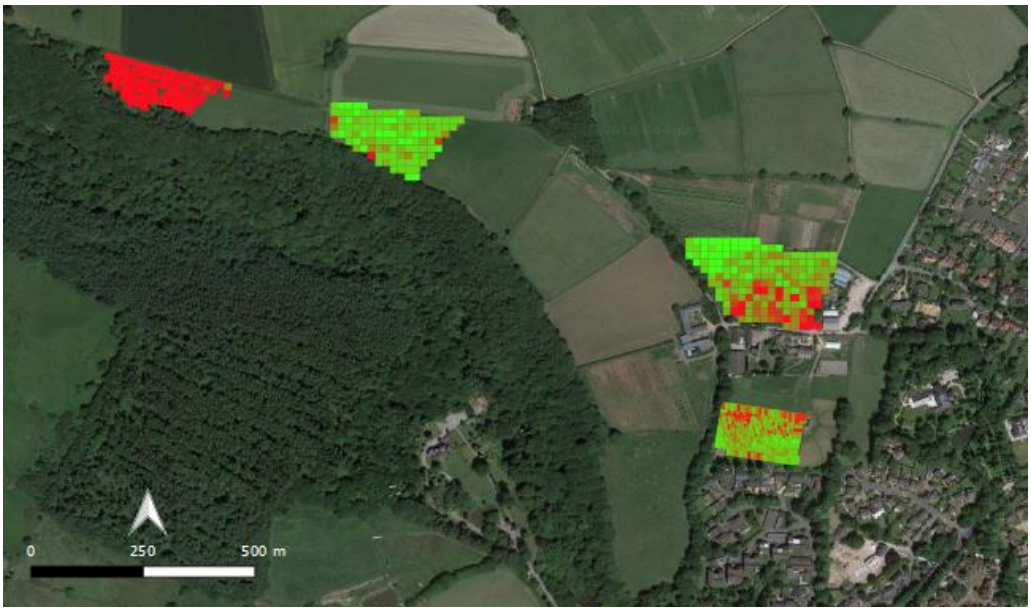


Figure 34. Variation in Pb across Land Parcel 2 (peak stripped)

7.10 Figure 35 shows the spatial variability of zinc (Zn) across LP2. Zinc distribution across LP2 shows elevated levels in Big Bank and again concentrations previously reported at Bolehill and to the north of the IA/RB enclosure. Distributed high spots are noted in Lane side field but these do not form a structured anomaly.

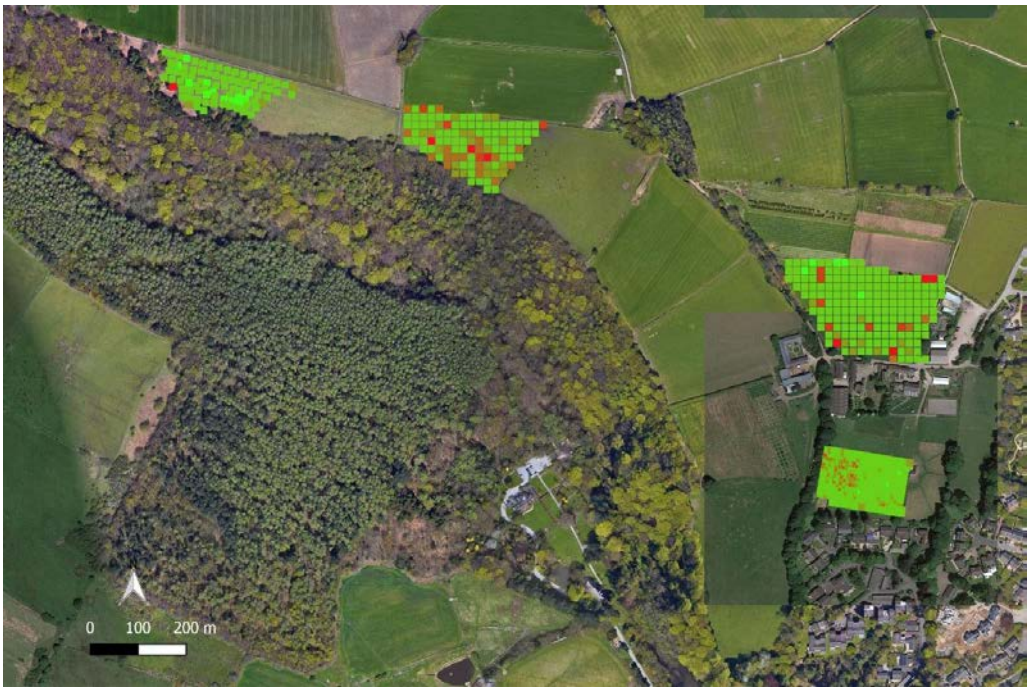


Figure 35. Variation of Zn across LP2

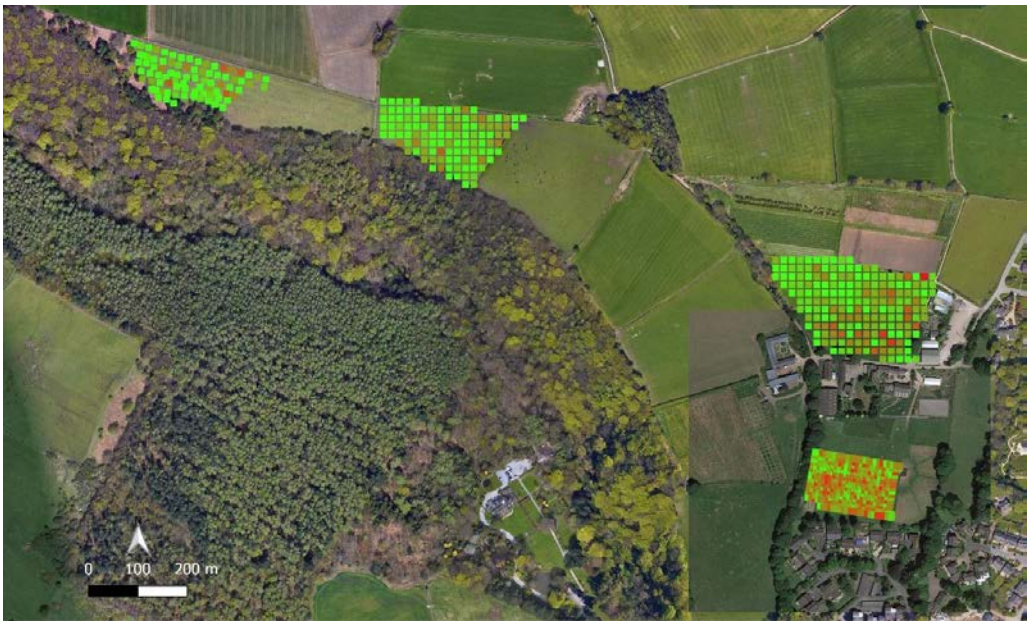


Figure 36 Variation of Cu across LP2

7.11 Figure 36 shows the spatial variability of copper (Cu) across LP2. Copper distribution across LP2 lacks the structured anomalies seen for Zn and Pb but is it s apparent that the IA/RB enclosure in Hall field shows the highest levels of copper (Doonan and Slater 2011).

Comparative analysis

7.12 Geochemical studies undertaken at Whirlow Hall Farm since 2011 have resulted in an extensive geochemical dataset that allows comparative analysis across individual sites. Figure 37 shows the comparison of max, min and average values of lead (Pb) across all fields.

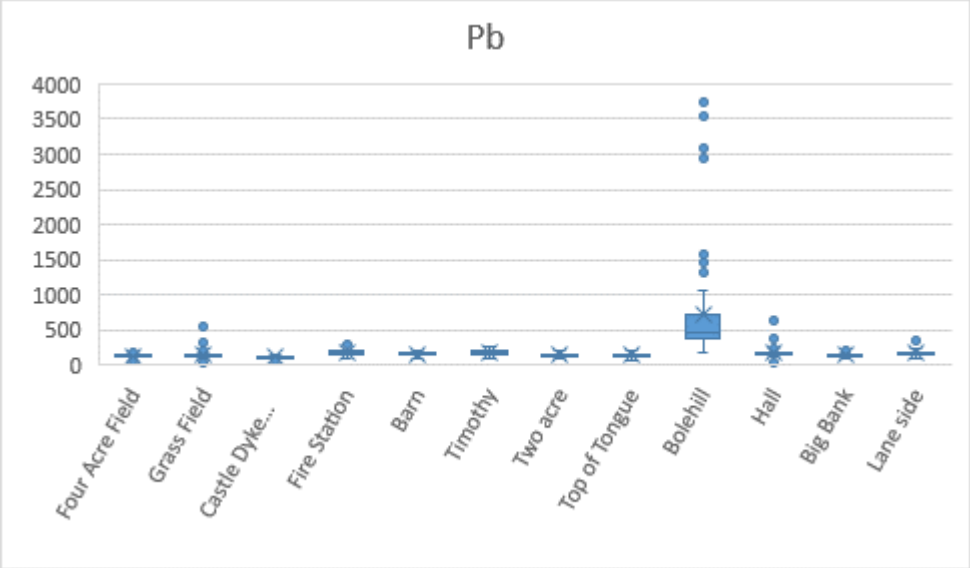


Figure 37. Box and whisker plot showing variation between survey sites for Pb.

7.13 Bolehill, shows significant outliers >1000ppm and is likely related to primary lead production. It is also apparent that the two sites associated with significant archaeological deposits, Grass and Hall field also show significant high lead outliers >500ppm.

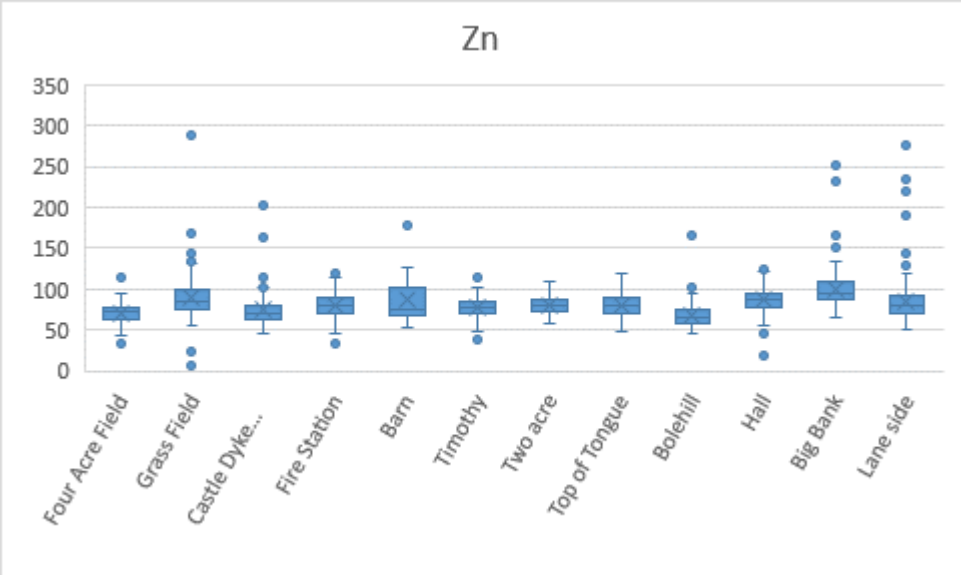


Figure 38. Box and whisker plot showing variation between survey sites for Zn.

7.14 Figure 38 is a similar box and whisker comparative graph showing the variation among sites for Zn. Grass field shows the highest levels of Zn for all fields with Lane side and Big Bank also showing significant enhancement.

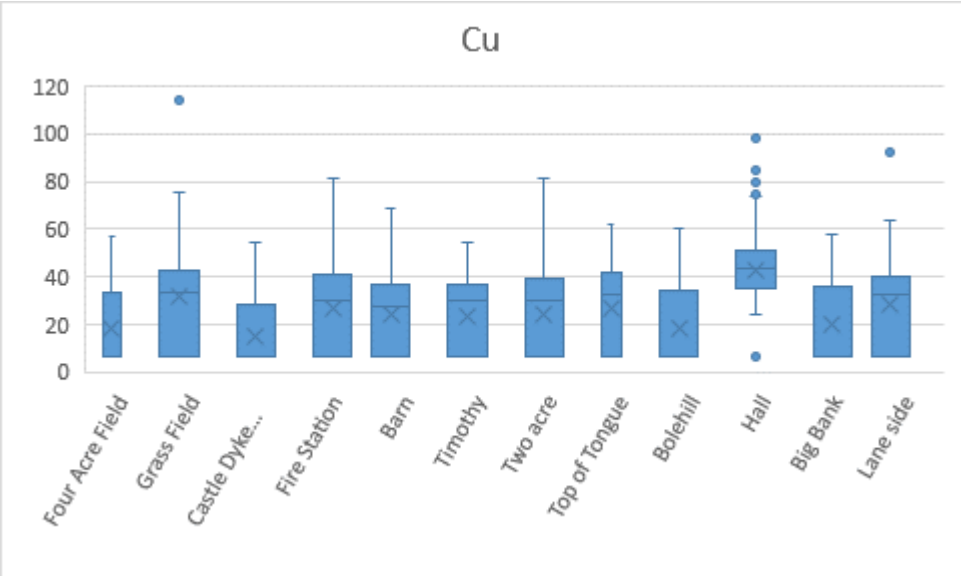


Figure 39 Box and whisker plot showing variation between survey sites for Cu.

7.15 Comparison of the copper levels across sites again show that Grass field and Hall field are associated with high outliers (Figure 39).

Discussion

Survey

7.16 The extensive geochemical survey undertaken at Whirlow Hall Farm has highlighted a number of structured anomalies across the survey area. Significantly, these correlate with areas shown to be the location of archaeological activity. Bolehill was notable for its very high lead levels and likely indicates the presence of primary lead production. Hall field, the site of the the IA/RB enclosure, shows clear elevation of Cu, Zn and Pb and Grass field, the location of the sub-circular enclosure also shows elevated Cu and Zn. The significant lead anomaly in Fire Station field is well-defined and likely correlates with the recent historic activity noted in Trench 11. Results from Grass field indicate elevated heavy metals in the vicinity of the enclosure and these are seen to extend in a south-west direction from the enclosure. This feature may well relate to the use of the enclosure.

Geochemical analyses-Excavation trenches

7.17 All trenches were routinely subjected to geochemical analysis. The results are presented below.

Trench 6

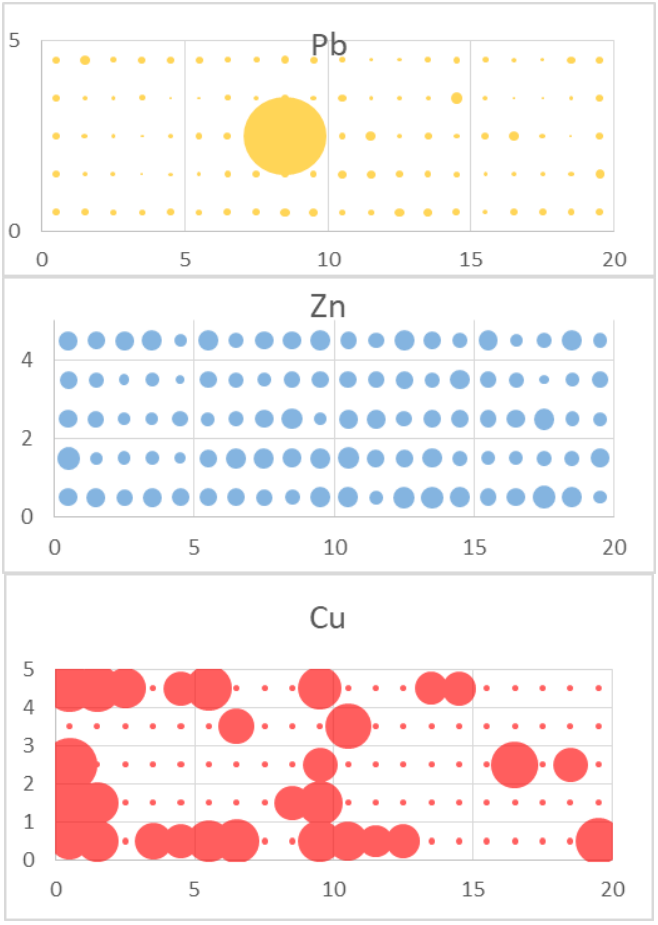


Figure 40. Cartogram showing distribution of Pb, Zn, and Cu across Trench 6 as bubble density

Trench 7

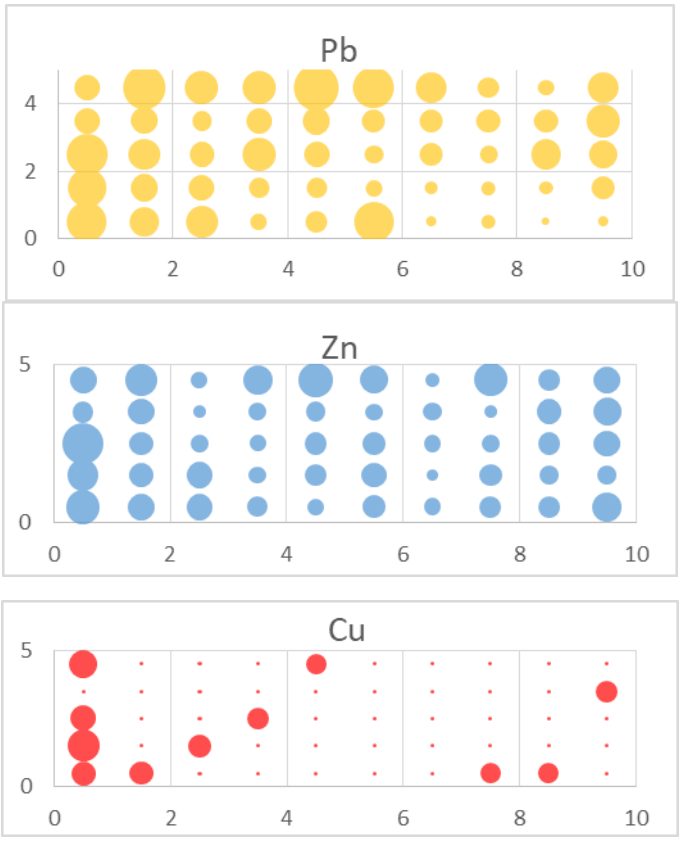


Figure 41. Cartogram showing distribution of Pb, Zn, and Cu across Trench 7 as bubble density

Trench 8

7.18 Upon completion of excavation of the enclosure ditch in Trench 8 a geochemical profile was determined at a sampling interval of 10cm (Figure 40). Heavy metal concentration is elevated for all key anthropogenic heavy metals (Cu, Zn, Pb) in the upper 70cm of the profile. In strata below 80cm there is a significant reduction in heavy metal concentration. For all elements the highest concentration is identified at -20cm. Below -80cm, heavy metals are present in low concentrations suggesting that primary silting of the ditch took place in an environment which was not routinely enhanced with key heavy metals.

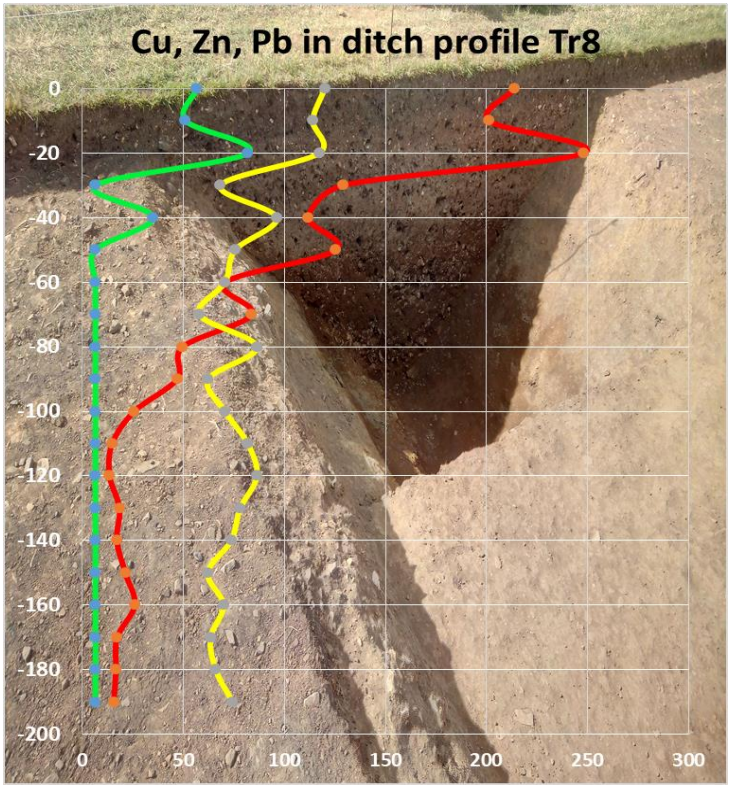


Figure 42. *Chemical profiles in prehistoric ditch. (Red Pb, Yellow Zn, Green Cu)*

Trench 9

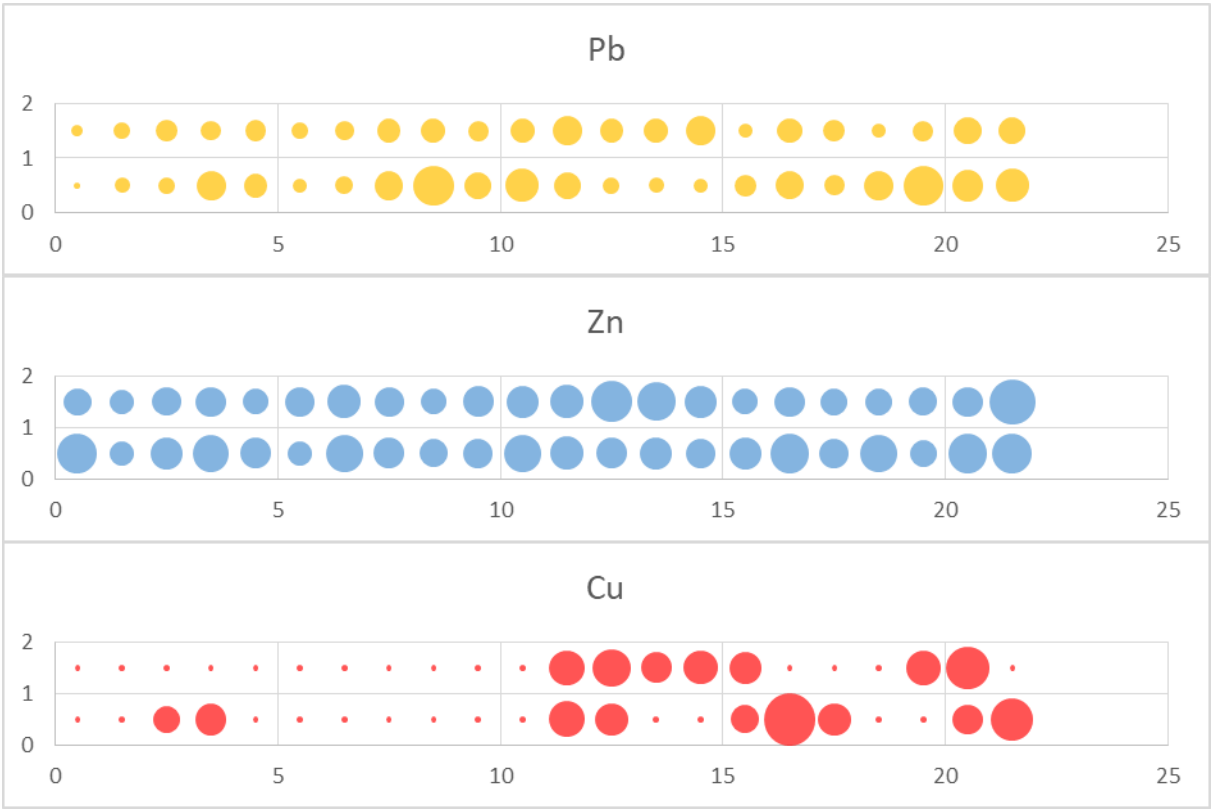


Figure 43. Graph showing geochemical analysis of Trench 9, looking at variations in Pb, Zn and Cu

Trench 10

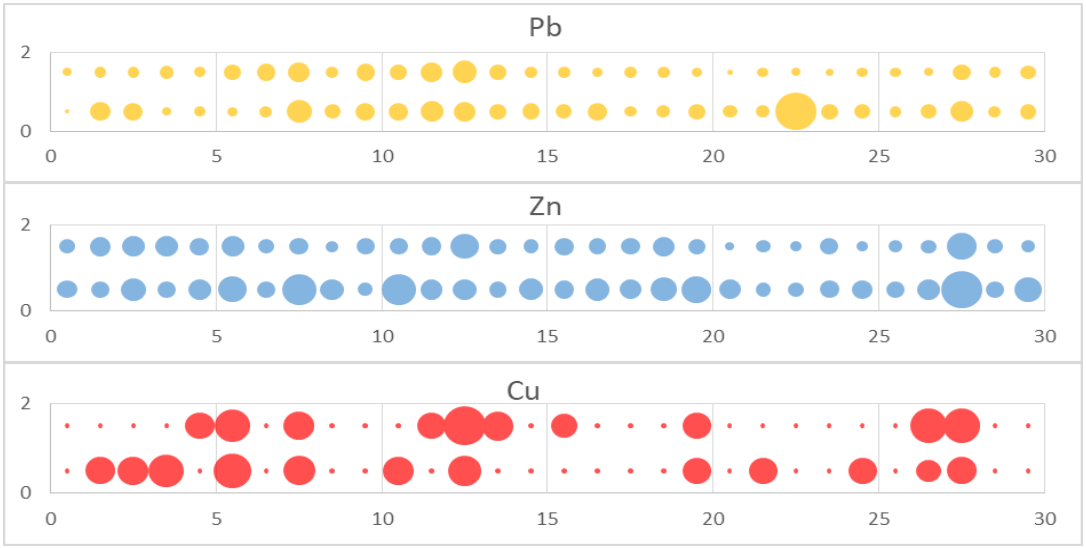


Figure 44. Cartogram showing distribution of Pb, Zn, and Cu across Trench 10 as bubble density

Trench 11

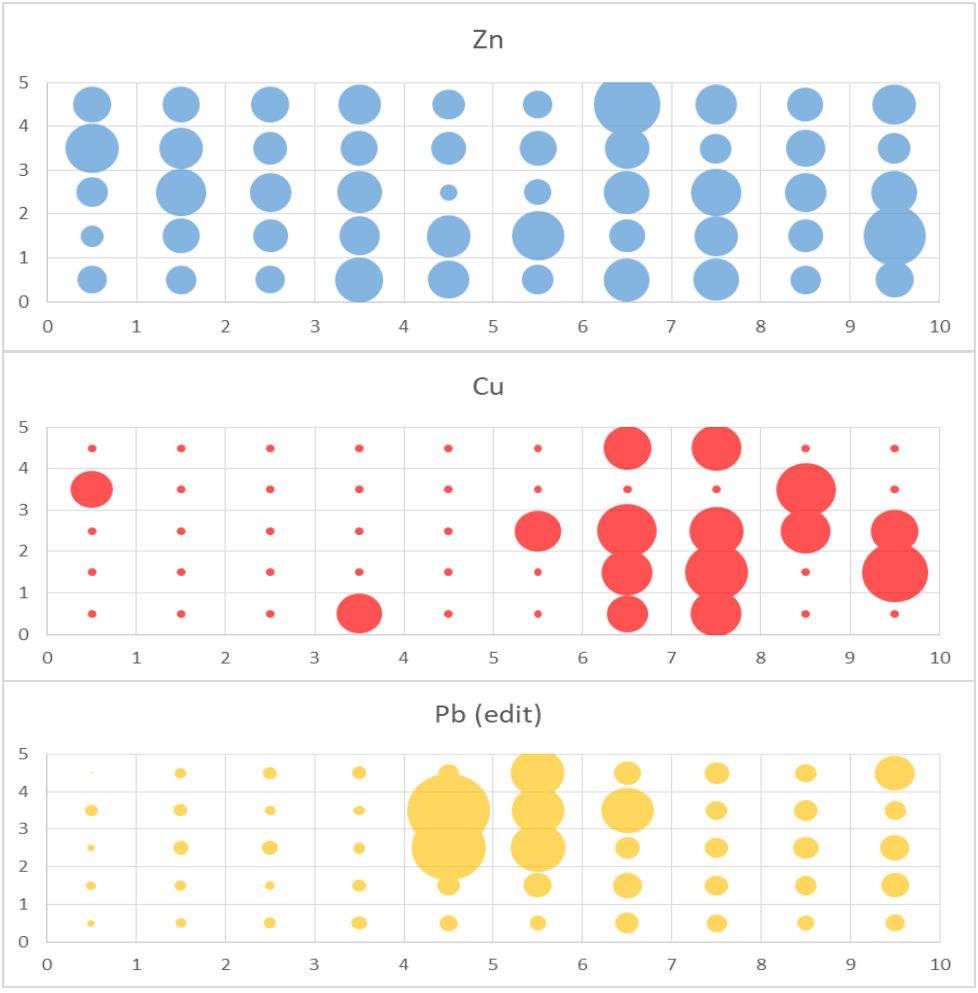


Figure 45. Cartogram showing distribution of Pb, Zn, and Cu across Trench 11 as bubble density

Conclusions

7.19 The 2018 season saw the significant expansion of the geochemical survey across Whirlow Hall Farm. There are clear correlations between geochemical anomalies and archaeological evidence for human activities. Most prominent is the very high lead concentrations in Bolehill field which indicate the presence of nearby primary lead production, unsurprising in light of the toponym. Elevated Cu and Zn in Grass field was associated with the area in and around the sub-circular enclosure, yet the ditch profile suggests that the first sediments in the ditch fill were not associated with heavy metal enhancement, anthropogenic or otherwise. This may suggest that the concentration of Zn in the enclosure area may relate to later activities. Comparative analysis among the field sites indicate that Hall, Grass and Firestation are the most associated with heavy metal enhancement and these enhancements exhibit clear spatial structure.

8. DISCUSSION

8.1 The 2018 investigations undertaken at Whirlow Hall Farm have identified and tested a range of archaeological features on the eastern side of the farm that have included a late Mesolithic hearth pit, Mesolithic and Neolithic flintwork, a substantial late Romano-British ditched enclosure, with arguably an earlier origin, together with late Iron Age – Romano British field boundary that could be associated with the ditched enclosure, and post-medieval or later drainage around a spring head.

Early prehistoric Activity

8.2 The evidence for Mesolithic and Neolithic activity on site occurs in the form of struck flint and chert. Noticeably the majority of these were recovered from 'Grass' field in the topsoil and from the excavated fills of the ditched enclosure in Trench 8 and from the topsoil and buried soil in Trench 11 in 'Fire Station' field.

8.3 Hearth pit from test pit 35 produced a Late Mesolithic date indicating the survival of in situ Mesolithic remains buried in this field. This feature is unlikely to be isolated and could either form part of a larger feature (e.g. a Mesolithic dwelling structure for example), or alternatively may have other features associated with it. This remarkable find not only demonstrates the utility of test pits, but also indicates the need for further, targeted excavation work around this feature to understand more about this Mesolithic activity.

Later Prehistoric Activity

Large enclosure

8.4 The primary and secondary fills (099 and 098 respectively) of the large ditched enclosure have been dated to 255-395 AD (95.4% probability) on the basis of a charred twig and a charred sloe stone. The enclosure occupies an area of plateau towards the end of a subtle spur immediately above moderate to steeply sloping ground to the north and east with gently falling ground to the south and gently rising ground to the south-west. Without the current tree cover that runs along the north-east margin of the enclosure the site commands wide views over and along the Sheaf valley towards what is now Sheffield City centre and the confluence of the Sheaf and the Don. The enclosure ditches have been cut deeply into the superficial 'head' deposits that occur here and this may reflect a deliberate choice to avoid having to cut through the sandstone bedrock which occurs closer to the surface on the south and west sides of the farm. Some of the authors of this report believe the enclosure to have had an earlier phase, based primarily on a morphological argument, such that they believe this monument to have originally been a henge. The other authors believe this to be unlikely and that the monument, based on the currently available evidence, appears to be a late Romano-British enclosure occupying a defendable site with deeply cut ditches also suggesting a defensive purpose. There remains disagreement as to whether an outer bank is present (see Trench 9 above). Henges typically have an outer bank and inner ditch, but there can be some variation in this, whilst defensive enclosures sometimes have counterscarp banks on the external side of the defensive ditch as well as the main defensive bank on its inner side. This is an intriguing monument and one

which requires further examination, particularly of its interior, to ascertain a more precise understanding of its date, phasing, form and function.

Ditched Boundary

8.5 The shallow linear ditch exposed in Trenches 6 and 7 is of a form and shape consistent with late Iron Age – Romano British field systems and associated stock pens, paddocks etc. The ditch runs in a continuous line on a north-west – south-east alignment before turning west. Although no dateable material was recovered from the fill of this ditch it appears to be associated with the Iron Age – Romano-British farmstead enclosure located at the south end of Whirlow Farm and which has been the subject of a previous campaign of excavation (Waddington in press). The geophysical survey has identified various other lengths of similar sized ditch features running across parts of the farm and it is currently thought that they testify to the remnants of a once extensive filed and boundary system associated with this settlement.

Post medieval

8.6 Post medieval or later activity is attested in Trench 11 in the form of a steep sided and deep drainage ditch [66] intentionally backfilled with stone blocks to create a 'French drain'. It was excavated around the head of a natural spring and appears to have been constructed to drain this otherwise wet area of the field, thus allowing it to be brought into agricultural production. It is most likely this occurred either in the 'Enclosure' period (ie. the early 19th century around the time of the Napoleonic Wars when there was famines and a huge demand for more food) or perhaps in more modern times. Finds recovered from the redeposited back fill included a piece of post medieval pottery and several residual flint flakes. The area of topsoil that had been covered by ditch upcast contained numerous chipped flints related to much earlier Mesolithic and Neolithic activity in this area.

9. ARCHIVE

9.1 One bound copy of the report with a digital copy in PDF/A format on disc will be deposited with the South Yorkshire Sites and Monuments Record (SMR). A .pdf version of the final report will also be uploaded as part of the OASIS record for online access via the Archaeological Data Service (archaeol5-334524).

9.2 The physical and digital archive will be deposited with Weston Park Museum, where the previously recovered material from this project has been lodged.

9.3 The digital archive will be prepared in line with the WSI (Appendix 1).

10. PUBLICITY, CONFIDENTIALITY AND COPYRIGHT

10.1 Any publicity will be handled by Whirlow Hall Farm.

10.2 Archaeological Research Services Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988).

11. STATEMENT OF INDEMNITY

11.1 All statements and opinions contained within this report arising from the works undertaken are offered in good faith and compiled according to professional standards. No responsibility can be accepted by the author/s of the report for any errors of fact or opinion resulting from data supplied by any third party, or for loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in any such report(s), howsoever such facts and opinions may have been derived.

12. ACKNOWLEGMENTS

12.1 Archaeological Research Services Ltd would like to thank all staff and volunteers at Whirlow Hall Farm for their help and assistance. Particular thanks are due to The Time Travellers including Glynn Burgin and Nigel Dakin and the many volunteers who both assisted and helped to carry out the excavation. Thanks is also due to Ben Davies and the staff of Whirlow Hall Farm who allowed the excavations to take place and supported the work throughout, Jim McNeil of South Yorkshire Archaeology Service, and the various specialists who have kindly contributed to this project including Roger Doonan. ARS Ltd staff who helped supervise the excavations and contribute to this report, putting in much effort on the way, include Caitlin Halton and Luke Parker and from the University of Sheffield; Roger Doonan, Colin Merrony, Camila Priede, Tim Cockrell and Bronwen Stone.

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APPENDICES

Appendix I. Written Scheme of Investigation (WSI)

Whirlow Hall Farm Archaeological Programme 2018

Written Scheme of Investigation

On behalf of Whirlow Hall Farm Heritage Committee

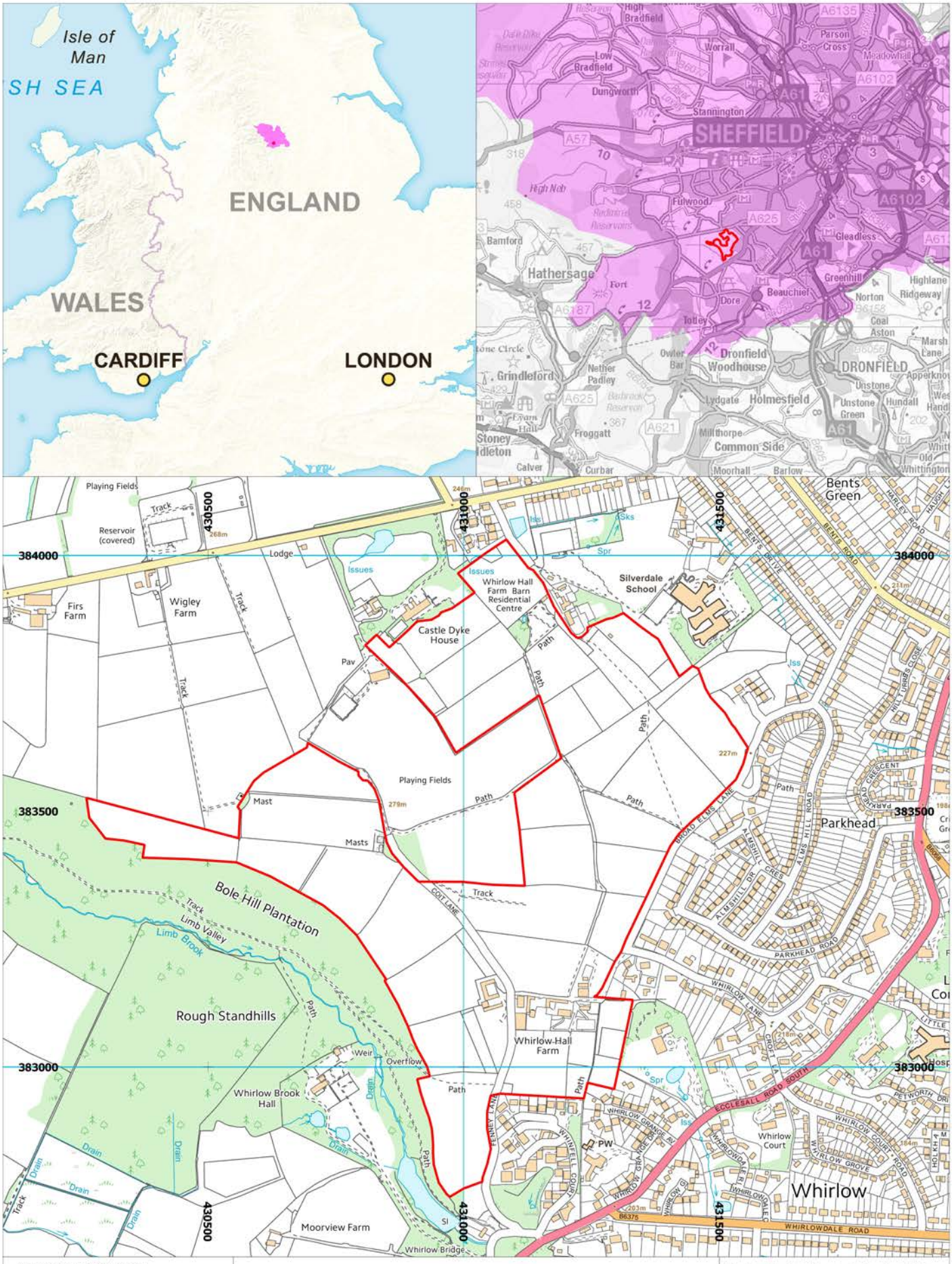
1. Introduction

1.1. Project Background

1.1.1. Whirlow Hall Farm is occupied by Whirlow Hall Farm Trust, an educational charity that works with children and young adults from across the region. The Whirlow Hall Farm Heritage Committee (WHFHC) was set up in 2017 to co-ordinate all future archaeological and heritage works at Whirlow Hall Farm (Figure 1) and to ensure all works are integrated, contribute to the Trust's aims and objectives and are carried out to a consistent standard with clear outcomes and benefits. The Committee is chaired by the Chief Executive of Whirlow Hall Farm Trust and includes representatives from Archaeological Research Services Ltd who established and helped resource the archaeological project at the farm, together with representatives from the University of Sheffield Archaeology Department and The Time Travellers voluntary archaeology group.

1.1.2. The Whirlow Hall Farm archaeological works for 2018 comprise a programme of ongoing research, recording and archaeological investigations into the history of Whirlow Hall Farm and its environs that will focus around a summer field school for volunteers and University of Sheffield students. All work will be overseen by the WHFHC with archaeological oversight and quality assurance provided by Archaeological Research Services Ltd. All fieldwork, post-excavation and publication will be professionally-directed with opportunities for training, participation, learning activities and public engagement throughout. The labour for much of the fieldwork will comprise volunteers from The Time Travellers, students from the University of Sheffield Archaeology Department and students from University of Sheffield Lifelong Learning. Professional supervision will be provided by members of staff from Archaeological Research Services Ltd and staff from the Department of Archaeology and Lifelong Learning with support from the more experienced Time Travellers.

1.1.3. Earlier phases of research and fieldwork were undertaken during 2011-2017, including the production of an archaeological desk-based assessment, building recording, fieldwalking, geophysical survey, test pitting and evaluation excavations. This work has been very successful in identifying previously undiscovered archaeological remains and artefact spreads and has allowed a long history to be documented for the farm starting in the Late Upper Palaeolithic, running through to the present. Approximately 75% of the farm's area has been surveyed by magnetometry (see Figure 2 for summary plot). During previous phases of work excavation has focused on the west side of the farm aiming to test and understand features identified on the geophysics in this area. For the 2018



Site name:	Whirlow Farm
Date:	December 2017
Drawn by:	AB
Scale:	Varies

Sheffield District

Estate boundary

N

Figure 1:
Site location

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campaign it is intended to switch the focus to the north-east side of the farm with the aim of testing the artefact spreads and features identified by the fieldwalking and geophysical survey respectively in 'Grass' field and 'Fire Station' field (see Figure 3). The recent discovery of a large circular ditched enclosure in Grass field on satellite imagery backed up by a detailed geophysical survey is an important addition to the other new features recently identified and which are listed below and can be seen on the geophysical results in Figure 2. Further background information on the large circular ditched enclosure is provided in Appendix 1.

1.1.4. The key archaeological discoveries to date are summarised as:

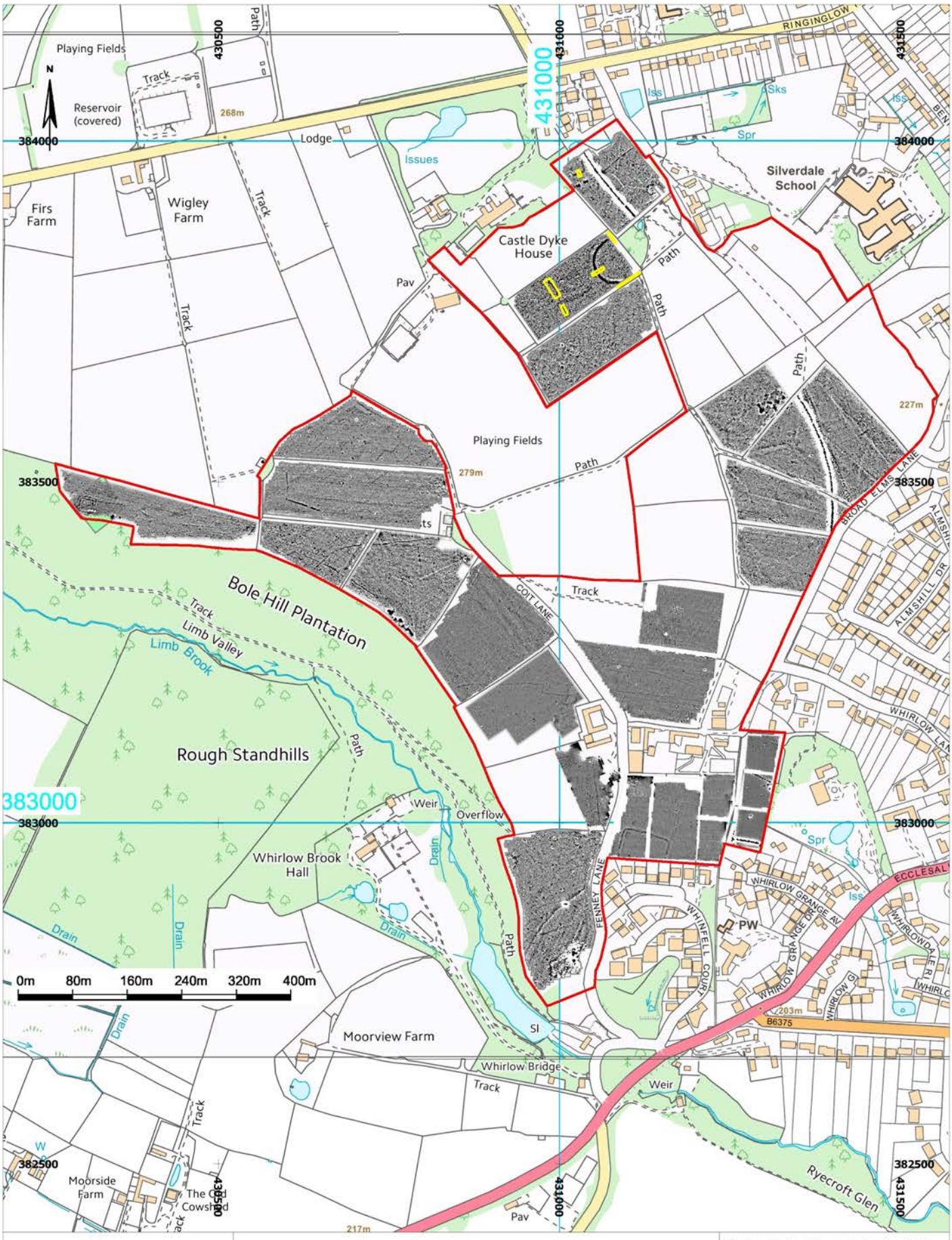
- Late Upper Palaeolithic, Mesolithic, Neolithic and Early Bronze Age lithic scatters
- A large ditched circular enclosure discovered on satellite imagery (Google Earth) and by geophysical survey (currently uninvestigated) in Grass field
- Geophysical evidence for prehistoric land allotment/field boundaries (currently uninvestigated)
- Part of a narrow ditched enclosure and a possible second (currently uninvestigated)
- A large Iron Age – Roman rectilinear enclosure (sample excavated) in Hall field
- A possible Roman signal station (sample excavated)
- Possible Medieval crucks in several of the standing post-medieval farm buildings

1.1.5. All previous archaeological works undertaken at the farm have been published as standalone reports which can be accessed on-line (http://www.archaeologicalresearchservices.com/projects/whirlow-hall-farm) and formal publications of all the work have also been produced (Waddington 2012; Waddington *et al*. in press). The site archive is ready for deposition with Sheffield Museums and accession should take place in early 2018. Interpretation and public engagement has been at the heart of the Whirlow Archaeology Project since its inception and a wide range of interpretive and educational materials have been produced. New information panels will be installed during 2018 that tell the story of the farm's rich history.

1.2. **Overarching Aims**

1.2.1. The overall aims of the proposed fieldwork are as follows:

- To investigate the early origins of Whirlow Hall farm and examine the question of Mesolithic, Neolithic and Early Bronze Age activity in the Sheffield area.
- To investigate the relationship between such earlier prehistoric activity at Whirlow Hall Farm, and the later Iron Age/Romano-British occupation previously identified.
- To understand the form, function, extent, phasing and chronology of the large circular ditched enclosure in Grass field.



Site name: Whirlow Farm
Date: December 2017
Drawn by: AB
Scale: 1:7500 @ A4

Estate boundary

Trenches

N

Figure 2:
Trench locations

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- To understand the form, function, extent, phasing and chronology of the linear ditched feature and/or pit alignment in Grass field.
- To understand the form, function, extent, phasing and chronology of the small rectangular ditched enclosure in Fire Station field.
- Assess variation in soil geochemistry across the farm how this informs and relates to patterns of past human activity.
- Producing a rich image library accompanied by digital models of specific landforms and buildings and other digital mapping data.
- To increase the knowledge and awareness of the heritage of Whirlow Hall Farm for a wide audience, to include volunteers, university students, visitors, and the local community.
- To provide volunteers, university students, lifelong learning students and underrepresented groups from widening participation backgrounds training and experience in recording and looking after historic and archaeological remains in a safe and supportive environment.
- To inform the future management of heritage assets on Whirlow Hall Farm

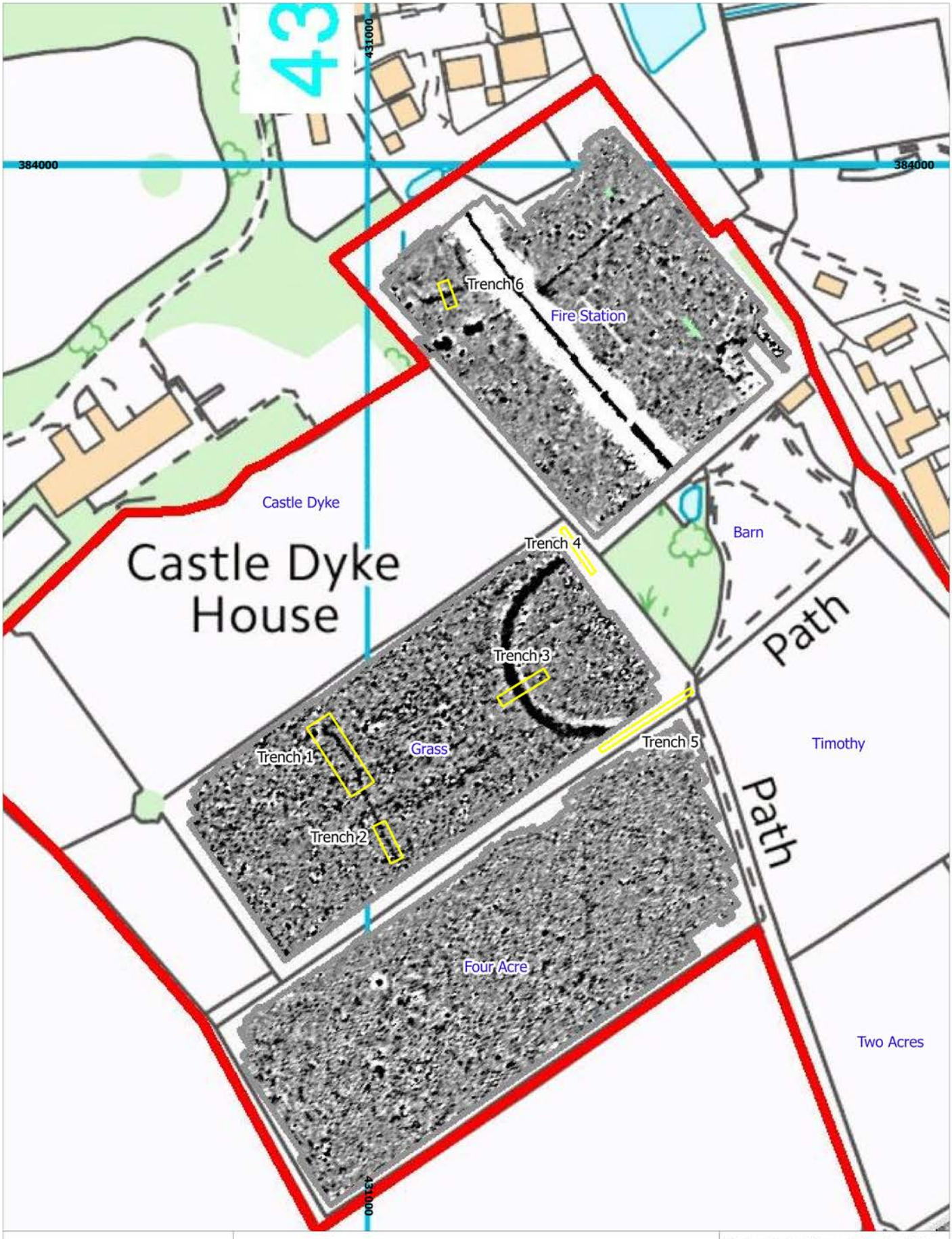
1.2.2. Any changes to the agreed WSI will be discussed with, and agreed with, South Yorkshire Archaeology Service before implementation.

2. Archaeological Excavation

2.1. **Objectives**

2.1.1. The specific objectives of the 2018 archaeological excavation is to:

- Define the extent, form, function and dating of the linear feature in Grass field (Trenches 1 and 2: Figure 3), together with any other associated buried features, its condition of preservation and its potential to throw light on aspects of Whirlow Farm's earlier history and any relationship it may have with the nearby circular ditched enclosure.
- Define the extent, form, function and dating of the circular ditched enclosure in Grass field (Trenches 3, 4 and 5: Figure 3), together with any other associated buried features, its condition of preservation and its potential to throw light on aspects of Whirlow Farm's earlier history and any relationship it may have with the nearby linear feature.
- Define the extent, form, function and dating of the rectangular ditched enclosure in Fire Station field (Trench 6: Figure 3), together with any other associated buried features, its condition of preservation and its potential to throw light on aspects of Whirlow Farm's earlier history and any relationship it may have with the nearby spring.
- Recover artefacts and palaeoenvironmental data suitable to help date activity associated with the various buried sites and to shed light on past activities as well as use of the wider landscape.



Site name: Whirlow Farm
Date: December 2017
Drawn by: AB
Scale: 1:7500 @ A4

Estate boundary

Trenches

N

Figure 3:
Trench locations (detail)

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2.2. **Methodology**

2.2.1. The proposed excavations will include the opening of six excavation trenches. Trenches, 1, 2, 3, 4, and 6 will be machine stripped down to the start of the archaeological horizon under professional archaeological supervision. Trench 3, located over the ditch of the circular enclosure, will have its topsoil removed by hand as part of the training process for lifelong learning students.

2.2.2. The location of the trenches is shown on Figure 3.

- Trench 1 measures 5m x 20m and is located to assess the northern segment of the linear feature in Grass field and to include a possible entrance or causeway in its northern corner, whilst also being wide enough to see if there are any internal features within the area this feature might have enclosed.
- Trench 2 measures 5m x 10m and is positioned at the southern end of the linear feature in Grass field in order to test whether this feature is of the same form along its length (the geophysical plot suggests that it may consist of a combination of lengths of continuous ditch as well as individual pits) and whether it is single or multi-phase.
- Trench 3 measures 4m x 20m and is positioned so as to sample across the ditch and part of the interior of the circular ditched enclosure.
- Trench 4 measures 2m x 20m and is positioned to locate the ditch of the enclosure in order to help define as much of the circuit of this ditched enclosure as possible. Once the trench is hand cleaned and the position of the ditch accurately mapped it is not intended that any further excavation will take place and the trench will be backfilled.
- Trench 5 measures 2m x 40m and is positioned to locate the ditch of the enclosure in order to help define as much of the circuit of this ditched enclosure as possible. Once the trench is hand cleaned and the position of the ditch accurately mapped it is not intended that any further excavation will take place and the trench will be backfilled.
- Trench 6 measures 4m x 10m and is positioned so as to sample across the ditch and part of the interior of the rectangular ditched enclosure in Fire Station field.

2.2.3. The precise locations of these trenches and any extensions will be discussed and finalised in advance with SYAS and the English Heritage Regional Science Advisor. A contingency of an additional 100m^2 is included in case further clarity is required on the extent of any features encountered.

2.2.4. All archaeological work will comply with:

- *Regional statement of good practice for archaeology in the development process, Yorkshire, the Humber & the north east* (SYAS 2011 - available for download from the SYAS website).
- The Chartered Institute for Archaeologists (CIfA) *Code of Conduct* (2014a) and *Standard and Guidance for Archaeological Field Evaluation* (CIfA 2014b).
- Relevant Historic England best practice guidance documents (see below).

2.2.5. Any changes to the agreed project design will be discussed with, and agreed by, SYAS before implementation.

2.2.6. All topsoil and backfilled spoil will be carefully removed by machine (except for Trench 3 which will be removed by hand) and carefully mounded to one side of the trench with a berm of at least 1m to prevent collapse of mounded material into the trench. Once the trenches have been cleaned, features will be examined by sectioning as appropriate.

2.2.7. Excavation of archaeological features will be undertaken as far as is required to characterise them, identify sequence and, where possible, to establish their date.

2.2.8. All archaeological features and deposits will be excavated by hand using trowels and small tools unless unusually large feature fills, such as large ditch deposits, occur when in such instances larger hand tools may be used. All archaeological deposits and features will be recorded with an above ordnance datum (AOD) level.

2.2.9. The site will be accurately tied into the National Grid and located on a 1:2500 or 1:1250 map of the area. The site archive will include plans and sections at 1:50; 1:20 or 1:10 as appropriate with long sections of each trench and sections and profiles of each feature, a photographic record, and full stratigraphic records on recording forms/context sheets. Each context will be recorded on pro-forma records which will include the following: character and contextual relationships; detailed description (dimensions and shape; soil components, colour, texture and consistency); associated finds; interpretation and phasing as well as cross-references to the drawn, photographic and finds registers. Each context will be recorded on an individual record.

2.2.10. A photographic record will be maintained including photographs of all significant features and overall photographs of each area or trench. All images will be taken in black and white print, colour slide and digital format, and will contain a graduated photographic scale. The main photographic archive will comprise 35mm b/w SLR print film and 35mm colour slides, supplemented by digital SLR (minimum 7 megapixels).

2.2.11. All stratified finds will be collected by context or, where appropriate, individually recorded in 3 dimensions. All finds and pottery will be retained for review by a specialist. Discard of more modern material will be informed by the specialist assessment.

2.2.12. Any deposits relating to funerary/ritual activities, such as burials and cremation deposits, will be left in situ, where feasible. However, should it be deemed necessary to remove any such human remains, this will be undertaken in line with best practice (English Heritage 2004a; English Heritage and The Church of England 2005; APABE/English Heritage 2013; Brickley and McKinley 2004). Domestic/industrial activity (such as walls, postholes, floors, hearths) will be sufficiently excavated to understand their form and function and to recover potential dating evidence and artefact and ecofact assemblages. Typically this will be a minimum of 20% of all linear features, half-sections of discrete features (e.g. post holes) and 100% of hearths or artefact-rich pits which have high potential for recovery of artefacts and ecofacts.

2.2.13. Area deposits such as buried soils, or middens, will be hand excavated at a minimum 10%. Subsequent excavation by machine will be considered.

2.2.14. The 'Science Advisor, Yorkshire, Historic England', will be provided with advance notice of the commencement of the fieldwork and afforded the opportunity to visit the site once the fieldwork is underway. For all securely stratified deposits not contaminated by high-levels of residual material and relevant to the aims of the sampling strategy, 40-60 litres of sample will be taken, or 100% of the sample if smaller. This material will be floated and passed through graduated sieves, the smallest being a 300µ mesh. Should other types of environmental deposits be encountered appropriate specialist advice will be sought and an appropriate sampling strategy devised. Samples will be assessed by a suitable specialist with provision for further analysis as required. All environmental sampling will be undertaken in line *with Environmental Archaeology a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage 2011).

2.3. **Finds Processing and Storage**

2.3.1. All finds processing, conservation work and storage of finds will be carried out in compliance with the CIfA *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (2014d) and those set out by UKIC (1990).

2.3.2. All artefacts will be retained until assessed by a suitable specialist and their recommendations discussed with the museum.

2.3.3. Bulk finds which are not discarded will be washed and marked, including animal bone, marked. Marking and labelling will be indelible and irremovable by abrasion. Bulk finds will be appropriately bagged, boxed and recorded. This process will be carried out no later than two months after the end of the excavation.

2.3.4. All small finds will be recorded as individual items and appropriately packaged (e.g. lithics in self-sealing plastic bags and ceramic in acid-free tissue paper). Vulnerable objects will be specially packaged and textile, painted glass and coins stored in appropriate specialist systems. This process will be carried out within two days of the small find being excavated.

2.3.5. Metal finds will be sampled, processed and analysed in line with *Centre for Archaeology Guidelines: Archaeometallurgy* (English Heritage 2001), and *Guidelines on the X-radiography of archaeological metalwork* (English Heritage 2006a). Any waterlogged artefacts or ecofacts will be sampled, processed and analysed using *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (English Heritage 2010) and *Waterlogged Organic Artefacts. Guidance on their Recovery, Analysis and Conservation* (English Heritage 2012).

2.3.6. Artefacts, ecofacts and deposits suitable for dating purposes will be identified and obtained in line with *Dendrochronology: Guidelines on producing and interpreting dendrochronological dates* (English Heritage 1998), *Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates* (English Heritage 2006b), and

Luminescence Dating: Guidelines on using luminescence dating in archaeology (English Heritage 2008b).

2.3.7. Any surface finds will be collected, recorded and processed in line with *Our Portable Past: a statement of English Heritage policy and good practice for portable antiquities/surface collected material in the context of field archaeology and survey programmes (including the use of metal detectors)* (English Heritage 2014) and any finds deemed to constitute 'treasure' under the terms of the *Treasure (Designation) Order 2002* will be dealt with in line with *The Treasure Act 1996 Code of Practice* (England and Wales (DCMS 2008). Any metalwork recovered by the excavation will be analysed and reported on by a relevant specialist. The metalwork recovered from the original excavation has now been analysed and reported on and this will be integrated with any further analysis resulting from this excavation and included in the site report.

2.3.8. During and after the excavation all objects will be stored in appropriate materials and storage conditions to ensure minimal deterioration and loss of information (including controlled storage, correct packaging, and regular monitoring, immediate selection for conservation of vulnerable material). All storage will have appropriate security provision.

2.3.9. All retained artefacts and ecofacts will be cleaned and packaged in accordance with the requirements of the recipient museum.

2.3.10. A risk assessment will be undertaken before commencement of the work and health and safety regulations will be adhered to at all times.

2.3.11. A site information board will be mounted in an accessible position for visitors to the farm to inform them about the excavations and regular site tours will be given. An open day will also be held during the excavation.

2.4. **Report**

2.4.1. Following completion of the excavation, the contractor will produce a report which will include:

- A non-technical summary.
- Introduction and objectives of the excavation.
- Methodology of the excavation.
- An objective summary statement of results.
- A phased stratigraphic discussion of the archaeological features.
- An interpretive discussion of the results, placing them in a local and regional framework and an assessment of the importance of the remains.
- Appropriate supporting illustrations, including a site plan, trench and section plans, feature sections and plans and a phased site plan.
- A site location plan at 1:2500 or 1:10000 as appropriate and a phased interpretation of the site as appropriate.
- The results of an assessment of artefacts, ecofacts and industrial residues carried out by suitable specialists, who will be furnished with relevant contextual and

stratigraphic information.

- If sufficiently significant remains are recovered then an analysis of the above based upon the specialist assessment recommendations.
- A detailed context index and supporting data in tabulated form or in appendices.
- An index to and the proposed location of the archive.
- References.
- A copy of the brief and OASIS form
- Photographs of work in progress on the site.

2.4.2. Within the report:

- All plans will be clearly related to the national grid.
- All levels will be quoted relative to ordnance datum.

2.4.3. Copies of the final report will be deposited with the South Yorkshire Sites and Monuments Record (SMR), and will be submitted to South Yorkshire Archaeology Service as a digital copy by email.

2.4.4. Additional project dissemination will be undertaken as required by the significance of the archaeological finds and deposits encountered. Additional dissemination may include: an article for the Annual Review of archaeology in South Yorkshire, a talk at South Yorkshire Archaeology Day, more formal dissemination such as a journal article as well as on-site interpretation at Whirlow Hall Farm.

2.5. **Archive Deposition**

2.5.1. A digital, paper and artefactual archive, which will consist of all primary written documents, plans, sections, photographs and electronic data will be submitted to archive. Advice on the retention and discard of finds and samples will have been provided by specialists during the assessment and/or analysis phases and this information will be discussed with the museum when preparing the site archive. Arrangements for the deposition of the finds and site archive will be made with Museums Sheffield in advance of commencement of fieldwork. In line with the "Archaeological Archive Deposition Policy for Museums in Yorkshire and the Humber" the uniform region-wide approach to the preparation and deposition of archaeological archives will be followed. This process requires the completion and submission of forms to Museums Sheffield at the project initiation, mid-point review and completion stages (the template forms from the SYAS website will be used). The archaeological contractor will contact the museum's archaeological curator (Martha Lawrence) to discuss archaeological archiving requirements at the project initiation stage. Following agreement with the client, details of archiving arrangements will be incorporated into the project design. This will include confirmation that a budget to cover the museum's deposition charge has been allowed for. The digital archive will be prepared in line with current best practice outlined in Archaeology Data Service /Digital Antiquity Guides to Good Practice (ADS/Digital Antiquity 2011) and a copy will be deposited with the Archaeology Data Service at the University of York. On completion, confirmation of

deposition with Museums Sheffield will be supplied to SYAS.

2.5.2. The contractor will either arrange for copyright on the deposited material to be assigned to the archive, or will licence the archive to use the material, in perpetuity; this licence would allow the archive to reproduce material, including for use by third parties, with the copyright owner suitably acknowledged.

2.5.3. All artefacts and associated material will be cleaned, recorded, properly stored and deposited in the archive (see above), in line with *Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation* (Brown 2007), and *Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives* (CIfA 2014e).

2.5.4. A full set of annotated, illustrative pictures of the site, excavation, features, layers and selected artefacts will be supplied to the HER and deposited with the archive as digital images on a CD ROM that will be attached with the report.

2.5.5. South Yorkshire Archaeology Service will be notified on completion of fieldwork, with a timetable for reporting and archive deposition.

2.5.6. Written confirmation of the archive transfer arrangements, including a date (confirmed or projected) for the transfer, will be included as part of the final report.

2.5.7. An OASIS online record http://ads.ahds.ac.uk/project/oasis/ has been initiated for the project. Key fields will be completed on Details, Location and Creators forms. All parts of the OASIS online form will be completed for submission to the HER. This will include an uploaded .pdf version of the entire report (a paper copy will also be included within the archive).

2.5.8. South Yorkshire Archaeology Service will be notified of the final deposition of the archive.

3. Geophysical Survey

3.1. **Coverage**

3.1.1. Geophysical survey has been undertaken during previous work on the site covering the areas depicted on Figure 2. It is intended to conduct further geophysical (magnetometry) over the remaining areas of the farm as crop conditions allow so that 100% coverage is ultimately achieved.

3.1.2. In addition to this, as part of the 2018 works, students will be trained in the use of both magnetometer and resistivity survey on areas already surveyed with a view to enhancing information on anomalies already identified.

3.2. **Selected technique for completing the main Farm survey**

3.2.1. The geophysical survey technique selected for continuing and completing the site is magnetometry as this has been shown to work well across the farm to identify archaeological remains. Magnetometry using Fluxgate Gradiometer instruments is the preferred geophysical technique utilised for the detection of buried features such as iron-based features and objects, or those subjected to firing such as kilns, hearths and even the buried remains of brick walls. It is also used to locate more subtle features such as boundary or enclosure ditches, pits and post holes which have been gradually in-filled by more humic material. The breakdown of organic matter through microbiotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil allowing features to be detected. In addition to this, variations in the magnetic susceptibility between the topsoil, subsoil and bedrock have a localised effect on the Earth's magnetic field enabling the detection of features such as backfilled ditches or pits due to the fact that the topsoil has more magnetic properties than the subsoil or bedrock, resulting in a 'positive' magnetic anomaly. Conversely, earthwork or embankment features can also be identified as 'negative' magnetic anomalies due to the action of placing less magnetic subsoil on top of more magnetic top soil.

3.3. **Objectives**

3.3.1. The objective of the detailed gradiometer survey is to identify anomalies of possible archaeological origin within the survey area (see Figure 2) in order to inform on the location and potential significance of any further buried archaeology on the site.

3.3.2. The presentation and interpretation of the results will be carried out in accordance with the *Code of Conduct of the Chartered Institute for Archaeologists* (CIfA 2014a) and will follow the English Heritage guidelines (2008a) *Geophysical Survey in Archaeological Field Evaluation* and the CIfA *Standard and Guidance for archaeological geophysical survey* (2014c)..

3.4. **Methodology**

3.4.1. A survey grid comprising 30m x 30m individual grids will be set up over the selected survey areas. The survey will use a temporary survey grid accurately positioned using a suitable DGPS system. The temporary grid will be co-registered to the Ordnance Survey National Grid using digital tiles provided by ARS Ltd or suitable digital map tiles provided by the client.

3.4.2. These grids will then be surveyed using a Bartington Grad 601-2 gradiometer. The Grad 601-2 has two gradiometer sensors and therefore collects two lines of data during each traverse. Data are collected in a zigzag fashion within the grid starting in the north-west corner, facing east. Readings are taken every 0.25m on traverses 1m apart. This equates to 3600 readings in a complete 30mx30m grid. Sensor balance will be checked and adjusted at regular intervals.

3.4.3. At the end of each day the data will be downloaded to a PC or laptop using *Geoscan Geoplot V3*.

3.4.4. All staff employed on the geophysical survey will be suitably qualified and experienced for their respective project roles and have practical experience of geophysical survey.

3.4.5. All staff will be made aware of the archaeological potential of the area and will be fully briefed on the work required by this WSI.

3.5. **Data Processing, Interpretation and Report**

3.5.1. Data processing will be undertaken by a geophysicist using *Geoscan Geoplot V3*. Anomalies will be digitised and geo-referenced. They will be colour coded using ARS Ltd's standard scheme to provide the most likely interpretation. Anomalies will be numbered and catalogued as systematic groups or individual anomalies as appropriate. The final report will include a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology. The report will describe the work undertaken and the results obtained. It will (as a minimum) include the following.

- A Non-technical summary
- Introduction
- Geological and topographical setting
- Methodology
- Discussion of archaeological and historical background
- Discussion on the results of the survey
- Conclusions and recommendations
- Sources
- Copy of brief
- Figure showing location of the site
- Figure showing location of survey grids and referencing
- Figure showing processed data
- Figure showing trace plots of processed data
- Figure showing abstraction and interpretation of anomalies.

4. Fieldwalking

4.1. **Introduction**

4.1.1. The fields at Whirlow Hall Farm are only ploughed intermittently in alignment with the needs of the farm as an educational resource, and it is therefore likely that only a limited number of areas will be available for fieldwalking during 2018. Fields that are ploughed during the course of the project and are suitable for fieldwalking will be surveyed using the methodology outlined below. At least two, and ideally four, fields are anticipated as being able to be fieldwalked.

4.2. **Methodology**

4.2.1. Fieldwalking undertaken at close-spaced intervals of 2m transects provides a c.100% surface coverage assuming each person observes the ground 1m either side of their transect and that the field in question is walked when there is bare soil or limited sprouting crop. Fields will be line-walked at 2m intervals following the detailed methodology set out in Passmore and Waddington (2009).

4.2.2. All walkers will be asked to keep to this range of visibility to ensure consistency throughout the survey. Every find spot will be point-referenced with a total station and the field boundaries surveyed so that field plots can be related to the Ordnance Survey grid.

4.2.3. Each find will be marked by a cane inserted into the ground and the find inserted into a plastic bag for ease of cataloguing and identification.

4.2.4. Each field will be mapped according to slope unit (morphometric mapping) so that each find spot can be ascribed to the type of slope on which it was found. The slope unit categories will be based on those devised for fieldwalking projects elsewhere in England (Waddington 1999, 45-6), which were abstracted from standard slope types identified by Butzer (1982, 58).

4.2.5. Slope type will be recorded as this has important implications for the interpretation of surface artefact distributions as geomorphic processes operating on different slope units will affect artefact distribution and retrieval in different ways (Waddington 1999, 85-91). These processes need to be taken into account before meaningful inferences can be made.

4.2.6. A catalogue of all finds will be produced noting type, date, measurements and material etc. for the various finds. A report will be produced containing accurate field plots showing slope units and findspots of different types of material as well as text descriptions of each field, together with discussion.

4.3. **Report**

4.3.1. A report detailing the results of the fieldwalking will be submitted to SYAS. The report will describe the work undertaken and the results obtained. It will (as a minimum) include the following.

- A Non-technical summary
- Introduction
- Archaeological and Historical Background
- Methodology
- Discussion on the results of the survey including specialist analyses.
- Conclusions and recommendations
- Figure showing location of the site
- Figure showing location of the fieldwalking finds.

- Colour photographs of selected artefacts.

5. Test Pits

5.1.1. A series of 1m x 1m test pits will be excavated in transects in Grass field and its environs to supplement the results of the fieldwalking artefact spreads and to enhance information in relation to the buried archaeological remains in this field. Their placement will be finalised once the depth of soil and stratigraphy is known from the stripping of the trenches and also on the basis of any additional fieldwalking evidence that might be obtained beforehand. It is only intended to excavate the test pit down the start of the archaeological horizon. Some test pits will also be excavated on the east side of the circular ditched enclosure to test whether any intact prehistoric soils survive in this area where they may have not been disturbed by the agricultural ploughing that has taken place across most of the western part of the enclosure. Carefully placed test pits within the wooded copse to the east of the enclosure may also be helpful in identifying the alignment and extent of the ditch on this side.

5.1.2. All test pits will be excavated in spits of *c*.10cm with the soil from each spit passed through a 5mm mesh sieve to maximise finds retrieval. Soil will be stored next to each pit, after completion of recording will be backfilled and reinstated to the same surface level as before.

5.1.3. All test pits will be surveyed in using a survey grade GPS unit or total station. Each pit will be recorded using a pro-forma recording sheet which will include a sketch section and measurements of the stratigraphy, together with a digital photograph and plan of any features encountered at its base. All finds will be bagged by spit and then by test pit. On returning to the office all small finds will be cleaned, bagged and analysed as per the excavation methodology above. The results of the test pit work will be included in the excavation report.

6. Geochemical and Magnetic Susceptibility Survey

6.1.1. Previous campaigns of geochemical survey (over the Iron Age-Roman rectilinear enclosure and the Roman signal station) have demonstrated the variability of heavy metals in the soil and have shown the presence of structured geochemical anomalies. It is proposed that the 2018 season will see an extended campaign of geochemical analysis that will aim to provide complete coverage of the estate by the close of the 2019 season.

6.1.2. The survey technique is rapid and non-invasive with only a thimble-worth of soil sample required for each sample. Sampling will be undertaken on a grid pattern typically at 10m resolution but down to 2m intervals depending on whether a known below-ground feature is present or not. Decisions as to the final grid size will be informed by further geophysical and fieldwalking results.

7. Photogrammetric Modelling and 3D Recording

7.1.1. Digital recording and the generation of digital models offers not only efficient recording workflows but also the potential for generating impressive digital images and artefacts (3D printing) for education and outreach. Equally, the use of such techniques offers pedagogic opportunities for the field-school. It is therefore proposed that a campaign of digital recording will be undertaken that will focus on the following areas, excavation trenches and test pits, specific landforms across the WHF estate, specific medieval and post-medieval components of buildings and architectural details identified as significant, and key artefacts.

8. Training Provision

8.1.1. As one of the principal aims of the project is 'To provide volunteers, school children, young people and members of the public with training and experience in recording and looking after historic and archaeological remains', the project in 2018 will revolve around a summer fieldschool populated by volunteers, Archaeology Department students and Lifelong Learning students. All fieldschool participants will be directed and supervised by experienced professionals providing training in archaeological techniques. Volunteers and students will be involved in the fieldwalking, geophysics, excavation, test pit, geochemical and digital modelling elements of the project with further opportunities for desk-based research and post-excavation work.

8.1.2. The programme for the field school is set out below:

8.1.3. The excavation is to occur in two blocks of *c*. 2 weeks each. One during May 2018 involving volunteers and Department of Archaeology students totalling around 70 people which will be supervised by ARS Ltd and staff from the Dept. of Archaeology (7th-18th May). The second will take place during early June (11th-15th) involving volunteers and Lifelong Learning students totalling around 15-20 people which will be supervised by staff from Lifelong Learning and professional field archaeologists with oversight from ARS Ltd. The ratio of professional/experienced archaeologist to volunteers/students will be in the order of 1:6. Four members of staff on site have longstanding experience running and supervising student training excavations and so there will be more than adequate management experience to ensure all archaeological work is carried out to high professional standards whilst also ensuring a well-run and informative field school experience.

8.1.4. Classroom facilities for training volunteers/students will be available at Whirlow Hall Farm to supplement the on-site work and will provide opportunities for training and finds processing in the case of bad weather.

9. Changes to Methodology or Work Programme

9.1.1. Changes to the approved methodology or programme of works will only be made with the prior written approval of South Yorkshire Archaeology Service.

10. Monitoring Arrangements

10.1.1. The contractor will liaise with South Yorkshire Archaeology Service at regular intervals throughout the course of the work so that appropriate monitoring visits can be arranged

South Yorkshire Archaeology Service
Development Services
Sheffield City Council
Howden House
1 Union Street
Sheffield
South Yorkshire
S1 2SH
01142 736428

11. Project Management and Resourcing

11.1.1. The project will be overseen by Archaeological Research Services Ltd, a Chartered Institute for Archaeology Registered Organisation.

11.1.2. Resourcing for the project (both financial and in-kind) is being provided by a range of stakeholders including Archaeological Research Services Ltd, Whirlow Hall Farm, Time Travellers, University of Sheffield (including both the Department of Archaeology and Department of Lifelong Learning). A grant from the University's Faculty of Arts and Humanities' Widening Participation budget has also been obtained.

11.1.3. Post-excavation analysis will take place under the oversight of ARS Ltd with provision of palaeoecological, osteological, lithic and ceramic analysis provided by ARS Ltd *pro bono*. Radiocarbon dates will be funded by way of the Community Archaeology Radiocarbon Dating (CARD) Fund by way of a Time Travellers application. This fund is funded by ARS Ltd and provision will be made for the Whirlow Hall Farm Project which has already benefitted from five radiocarbon dates provided by this fund. ARS Ltd undertake to ensure that all work is carried out to professional standards and that all project work will be written up and published in a timely manner as per all previous phases of work.

11.1.4. All staff employed on the project will be suitably qualified and experienced for their respective project roles and have practical experience of geophysical surveying and reporting. All staff will be made aware of the archaeological importance of the area surrounding the site and will be fully briefed on the work required by this specification. Each member of staff will be fully conversant with the aims and methodologies and will be given a copy of this WSI to read. All professionals employed on the works will be fully qualified and experienced archaeologists; this will ensure that appropriate decisions regarding excavation and sampling will be made in the field.

Post Excavation Timetable

Finds processing, digitisation - July 2018
Specialist assessment and analysis - August 2018
Draft report and illustrations - October 2018
C14 dates (if required) - February 2019
Final Report - March 2019

12. Staff and Specialists

	Person	**Organisation**
Chair of WHFHC	Ben Davies, CE	CE Whirlow Hall Farm Trust
	Dr Clive Waddington, MCIfA, FSA	MD ARS Ltd
Co Director	Dr Roger Doonan	University of Sheffield
Co Director	Glynn Burgin	Time Travellers
Co Director	Dr Camilla Priede	University of Sheffield
Co Director	Colin Merrony	University of Sheffield
Supervisor	Dr Tim Cockerell	Independent
Supervisors	TBC	ARS Ltd
Palaeoecologist	Luke Parker, ARS Ltd	ARS Ltd
Osteologist (human and animal)	Milena Grzybowska, ARS Ltd	ARS Ltd
Lithics analyst	Dr Clive Waddington, MCIfA, FSA, MD ARS Ltd	MD ARS Ltd
Prehistoric ceramics	Dr Clive Waddington, MCIfA, FSA, MD ARS Ltd	MD ARS Ltd
Iron Age-Roman ceramics	Pauline Beswick	Independent
Geophysics	Richard Durkin, ARS Ltd	ARS Ltd
	Dr Roger Doonan	University of Sheffield

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Appendix 1

Circular Ditched Enclosure – Grass Field

In summer 2016 a semi-circular cropmark was noted on a google maps satellite image (Figs. 1 and 2 below). This shows both as a cropmark and as a soil mark. This document outlines the rationale for evaluation trenching of this feature, and the opportunity that exists in terms of funding which has been granted for this by The University of Sheffield. The work outlined will enable the better understanding of a newly discovered archaeological site, inform its management and conservation and provide a mechanism for widening access to Whirlow's heritage to underrepresented groups.

The geology of the site is Carboniferous Rough Rock Sandstone (NERC 2017), and is situated on a shelf on a valley-side setting immediately overlooking the upper Sheaf valley, and has extensive views of the wider landscape to the south and east with a much more limited horizon to the north and west where the ground rises. Figures 1-3 below show how the site appears in aerial photographs, and from the Environment Agency's open access LIDAR data.

Figure 1 Cropmark image of site (Google Images, accessed July 2016).

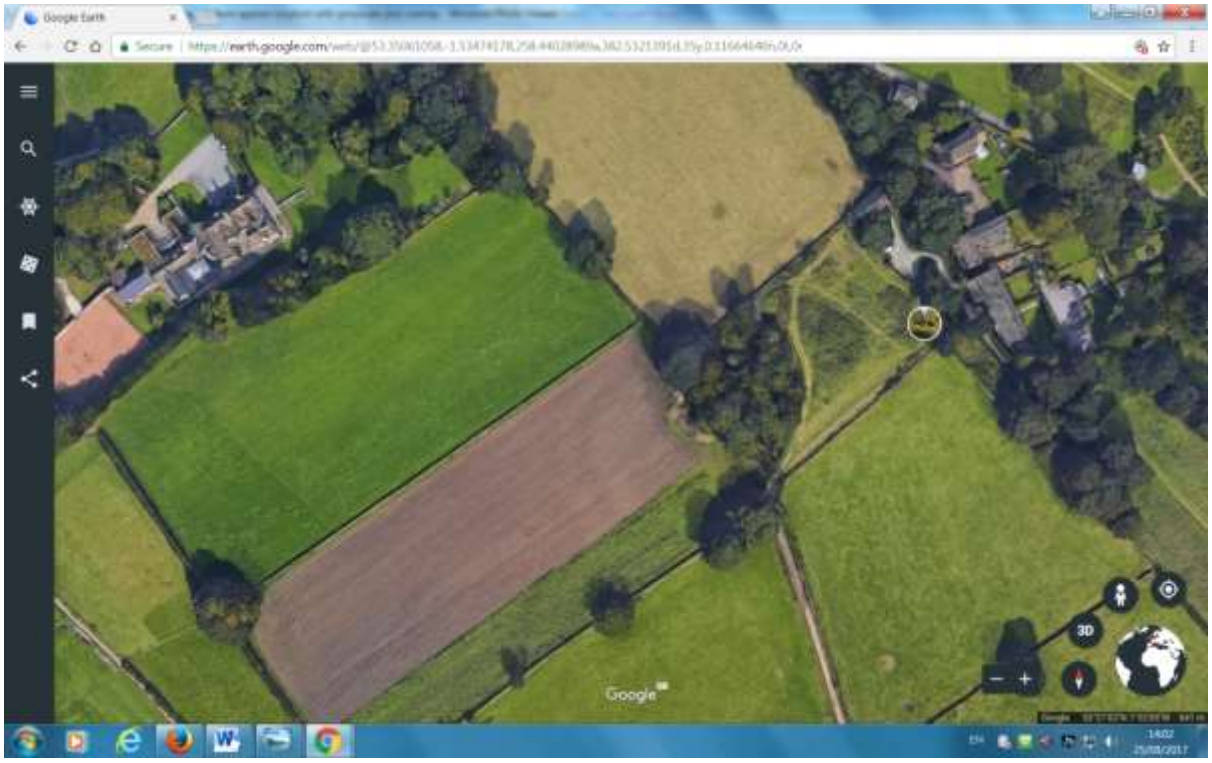

Figure 2 Soil maRL image of site (Google maps accessed 24/9/17).

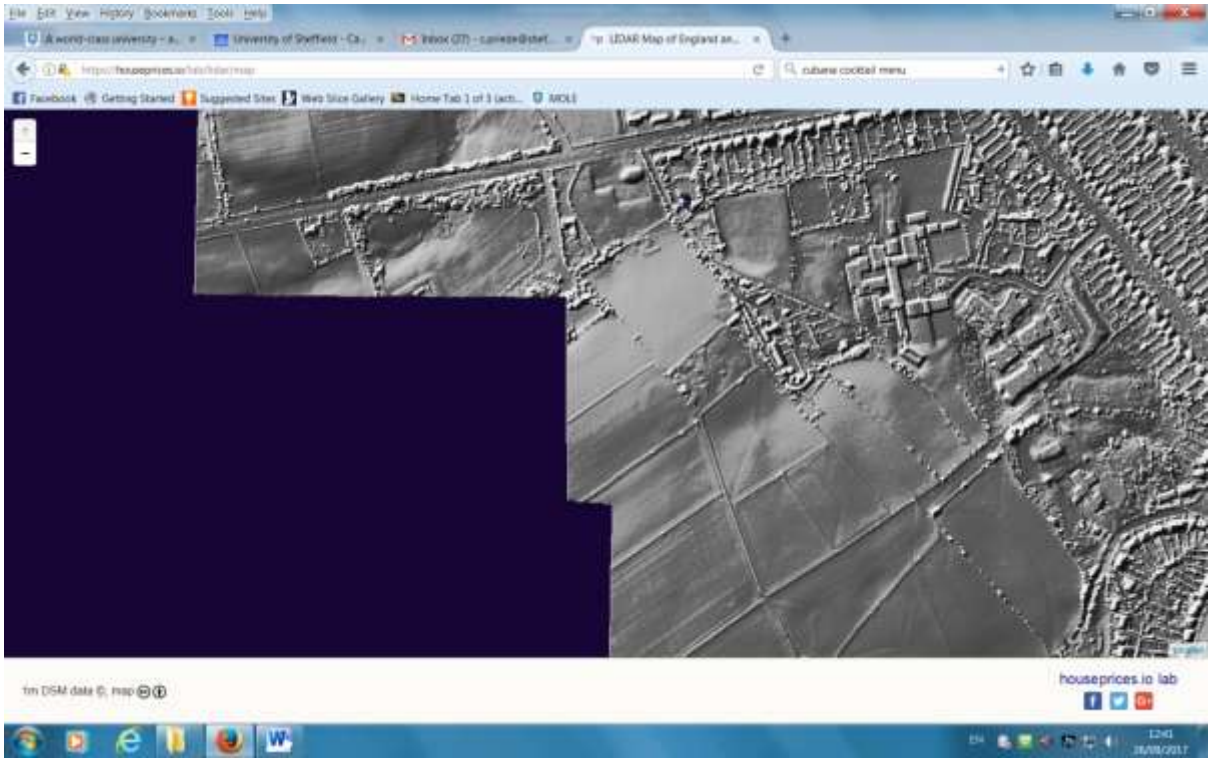

Figure 3 Field shown on the Environment Agency Lidar data (houseprices.io accessed 25/9/17).

The dark green crop-mark suggests that the line of a ditch is present, and the Lidar image (which shows detailed topography) shows that the site still retains some subtle surface expression within the ploughed field in which it is situated. The site would benefit from investigation, in order to better understand its significance and status and to inform its future research and management (English Heritage 2004). Recent agricultural activity has included cultivation and the erection of a fence to define a vehicle route. On the other side of the boundary the land is left as scrub habitat, with a badger sett and man-made pond. The better understanding of the significance of the monument and its vulnerability to cultivation and erosive processes as a low earthwork can inform a plan for sustainable management. When Dr Priede first identified she alerted the Archaeologist for South Yorkshire, Dinah Saich, and the Regional Science Advisor for Historic England (Yorkshire Region), who has visited the site. Work undertaken so far on this site is included in an in prep. journal article (Cockerill, Priede and Merrony in prep) which examines the Hengiform enclosures of South Yorkshire and North Nottinghamshire.

Archaeological Background

An SMR search does not show any monuments in this specific location, however record #00256/01 Castle Dykes, Whirlow says: *<1> Site of "A circular entrenchment" at Castle Dykes ('Castle Dike Field' is mentioned in 1655). Now no visible remains except slight depression at SK 30818383, which may however be natural.*
Reference: Hunter's South Yorkshire Vol I, 1828, iv.
NB - PIN 00256/01 may have been duplicated by PIN 3011. The Hunter Index records this feature at SK 310838 (the location of PIN 3011), but the OS record (used to create PIN 256) cites this source and then gives the grid reference as SK 308839 - this appears to be how confusion about the location of the site has arisen). DJS 16-1-15 (South Yorkshire SMR- accessed 26/7/16)
With the permission of Whirlow Hall Farm, students from the University of Sheffield have undertaken both Resistivity and magnetometry survey of the site. This has been undertaken under the supervision of Colin Merrony from the Archaeology Department. The results of these plots are shown below. The site has also been surveyed by magnetometry as part of the Whirlow Hall Farm Heritage Project by ARS Ltd and the results of this survey can be seen in Figure 3 relating to the main section of the WSI. The site has also been fieldwalked by DLL students, and also, more extensively and comprehensively by the Time Travellers. Waddington (2016:8) notes that the field is '*a high density area of the farm for chipped stone tools'*. No previous reports make mention of the crop-mark feature, and previous work (e.g. Sheppey 2011), associates the 'Castle Dyke' name with a larger potential ditched enclosure which is bisected by Ringinglow Road, which is a longstanding and well-known association.

Figure 4 Magnetometry plot of site (Merrony, C 2017).

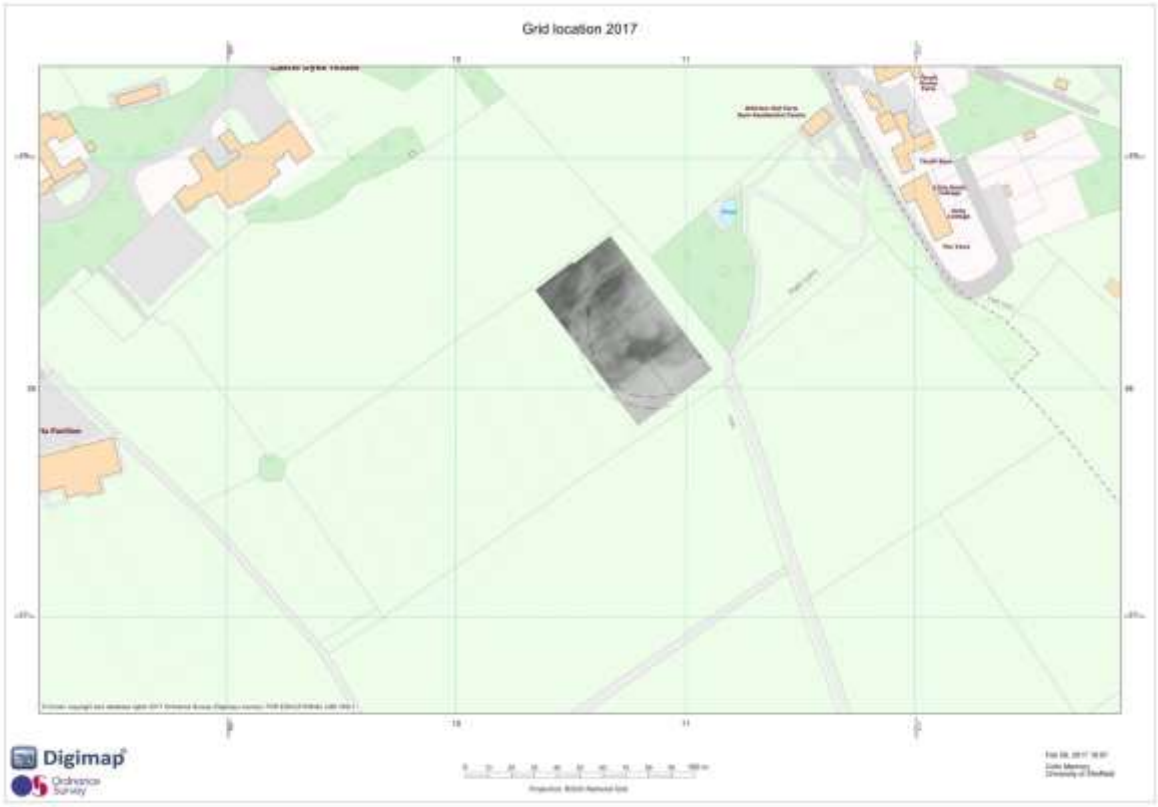

Figure 5 Resistivity plot of site (Merrony, C 2017).

The combination of all of the lines of evidence outlined suggests that there is a monument of significance in the field. This size and shape of the crop / soil mark suggests that this may be a henge monument or another type of prehistoric enclosure. The cropmark is similar in size to the two Peak District henge monuments; Arbor Low and the Bullring (Cockerill, Priede and Merrony, in prep), although it is of similar form and size to the many late prehistoric circular enclosed settlements which are known throughout the British Isles. As mentioned above, the fact that the site is evident as a soil-mark (Fig. 2), and with some possible surface expression of the ditch and possibly the berm and bank (see Fig. 3), this also suggests that the site needs to be better understood to inform future management of this heritage asset. If, as suggested so far by the evidence, the site is prehistoric in date, this will add further the suite of archaeological remains at Whirlow Hall farm and add to the rich palimpsest of activity surviving across the site.

Current Interpretation and Research Questions

Henges are enclosures where, unlike those with a defensive purpose, the ditch typically lies inside the bank. A classic henge would normally have a stone or timber settings inside it, as at Arbor Low and Avebury (English Heritage 2011). Their purpose is unknown, but when excavated artefacts and deposits are often found which suggest that these are sites which held religious / ritual significance to those who used them (Edmonds 2001, Kitchen 2000). A number of other henges are either currently being, or have recently been, investigated in their landscape context, meaning that our knowledge of this enigmatic monument type is growing (e.g. http://www.arborlowenvironsproject.org/, Carpenter and Winton 2011; Deegan 2005).

Work undertaken so far on this site is currently being written up as a journal article (Cockerill, Priede and Merrony in prep) which examines the potential hengiform enclosures of South Yorkshire and North Nottinghamshire. This article highlights that whilst there are a number of potential hengiform enclosures within the Don catchment, none of these have so far been investigated, leading to a paucity of information about the area in the later Neolithic period. The site's position, at the edge of the Pennine Ridge, between Yorkshire and the East Midlands, and the research strategies for both of these areas emphasise the potential that a better understanding of the area's prehistory has for better understanding of the Neolithic across the British Isles. '*Yorkshire* ['s prehistoric remains] *can make a contribution of national importance to studying transitions across conventional periods, and equally within them* (Yorkshire Archaeological Research Strategy: 26). Quite simply, there is a gap in our understanding of the prehistory of the area, and despite a large amount of work being undertaken on the cairnfields and stone circles of the uplands (e.g. Barnatt 1976, Barnatt, Bevan and Edmunds 2017, Kitchen 2000), far less is known about the prehistory of South Yorkshire itself, and its relationship to the wider area.

Investigation and Inclusion Strategy 2017-2019

The University of Sheffield's Department for Lifelong Learning (DLL) provides pathways to Higher Education for students who otherwise would not be able to access it. Around 90% of our students are mature, and around 40-50% have some form of mental or physical disability. Our cohort includes refugees, Care Leavers, and other groups who have had a disrupted education, and who are building a new life. The vast majority lack the traditional education qualifications required for HE study. We have a long (75+ years) tradition of adult education, and include a number of archaeologists, and members of the Time Travellers as our alumni. We offer the foundation year for the BA Archaeology (FT or PT) run by the department of archaeology, and there are currently c. 20 students on the various levels of this programme. The department works with learners, building their confidence, and self-belief and efficacy, and a number of our alumni are now professional archaeologists, or currently studying postgraduate qualifications in the field.

In summer 2017, DLL and the Archaeology department applied for funding from the University of Sheffield's Arts and Humanities widening participation fund to undertake fieldwork on this site, aimed at furthering the understanding of it, and enabling students and potential students to experience archaeological fieldwork first hand. This will be undertaken in a safe and inclusive environment, which is respectful of the diversity of individuals on the site.

The work will enable current mature students, current Foundation programme students and potential Foundation programme students to work together on the site, to build their confidence, curiosity, and resilience. It will build skills and capacity in the Whirlow area, and be an opportunity to involve groups from a number of under-represented backgrounds to be involved in the process of archaeological research.

Appendix II. OASIS Form

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: archaeol5-334524

Project details

Project name	Archaeological Investigation at Whirlow Hall Farm 2018
Short description of the project	Archaeological investigations in the form of targeted trenching and test pits were undertaken over a two week period in May and a three week period in June 2018 as part of a programme of ongoing research, recording and archaeological investigations into the History of the Whirlow Hall Farm landscape. The archaeological investigations were carried out jointly by Archaeological Research Services Ltd, the Time Travellers, the University of Sheffield and Whirlow Hall Farm Trust, and included a field school for students and volunteers. In total six excavation trenches and 35 test pits were excavated over three fields. The trenches were located northeast of the farm buildings in Grass field and Fire station field. The excavation trenches focused on the sub-circular ditched enclosure and the linear ditched feature in Grass field and on a rectangular ditched feature in Fire station field. The test pits were excavated primarily in Grass field together with a further small area of test pits in Lane Side field.
Project dates	Start: 01-05-2018 End: 30-06-2018
Previous/future work	Yes / Yes
Any associated project reference codes	WHIR'18 - Sitecode
Type of project	Field evaluation
Current Land use	Cultivated Land 1 - Minimal cultivation
Monument type	BOUNDARY DITCH Late Prehistoric
Monument type	DITCHED ENCLOSURE Late Prehistoric
Significant Finds	LITHIC IMPLEMENT Early Prehistoric
Significant Finds	POTTERY Modern
Methods & techniques	"Targeted Trenches"
Development type	Not recorded
Prompt	Research
Position in the planning process	Not known / Not recorded

Project location

Country	England
Site location	SOUTH YORKSHIRE SHEFFIELD SHEFFIELD Whirlow Hall Farm
Study area	0 Hectares
Site coordinates	SK 31233 83177 53.344297923682 -1.53081524996 53 20 39 N 001 31 50 W Point

Project creators

Name of Organisation	Archaeological Research Services Ltd
Project brief originator	Archaeological Research Services Ltd
Project design originator	Archaeological Research Services Ltd
Project director/manager	Roger Doonan
Project director/manager	Clive Waddington
Project supervisor	Clive Waddington

Project archives

Physical Archive recipient	Weston Park Museum
Digital Archive recipient	Weston Park Museum
Paper Archive recipient	Weston Park Museum

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Archaeological Investigation at Whirlow Hall Farm 2018
Author(s)/Editor(s)	Halton, C.
Author(s)/Editor(s)	Cockrell, T.
Author(s)/Editor(s)	Doonan, R.
Author(s)/Editor(s)	Parker L.
Author(s)/Editor(s)	Priede, C.
Author(s)/Editor(s)	Waddington, C.
Other bibliographic details	ARS Ltd Report NO. 2018/139
Date	2018
Issuer or publisher	Archaeological Research Services Ltd
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OASIS:

Please e-mail Historic England for OASIS help and advice