Archaeological Evaluation Trenching at Bleakmoor Hill Palisaded Enclosure and environs, Harden Quarry, Northumberland

An aerial photograph of the palisaded enclosure showing the trenches excavated around its circuit and within its interior.

SMC reference number S00166858

ARS Ltd Report No. 2019/77

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Executive Summary

Project Name: Archaeological Evaluation Trenching at Bleakmoor Hill Palisaded Enclosure and environs, Harden Quarry, Northumberland
SMC reference number: S00166858
Site Code: HQ17
Planning Authority: Northumberland National Park Authority and Historic England
Geology: a 'red porphyritic andesite intrusion' which occurs in the ground as a batholith
NGR: NT 96006 08859
Date of Fieldwork: August-September 2017
Date of Report: January 2018, Revised May 2019

Archaeological Research Services Ltd (ARS Ltd) was commissioned by Tarmac to undertake an archaeological evaluation at Bleakmoor Hill Palisaded Enclosure, a Scheduled Monument (NHLE no. 1008562), adjacent to Harden Quarry near Biddlestone, Northumberland. The quarry extracts and processes red porphyritic andesite, known as 'Harden Red', which occurs in the ground as a batholith. The edge of the batholith has already been reached at its southern, eastern and western extents and the only direction in which the quarry can be extended to continue production is to the north, where the Bleakmoor Hill Palisaded Enclosure is situated.

A number of phases of work have already been undertaken at the quarry in advance of quarry extraction including the production of desk-based assessments, some low-level surface survey and evaluation trenching. This is described in more detail in the 'Preliminary Heritage Statement' produced by Archaeological Research Services Ltd (2016).

The Bleakmoor Hill Palisaded Enclosure is located immediately to the north of the small village of Biddlestone, Northumberland, centred at NT 96006 08859 and covers an area of c.0.28 ha. The enclosure occupies the crest of a small hilltop where it drapes gently down to the south in what is otherwise a steeply sloping landscape. The field in which the archaeological evaluation took place rises from c.302m aOD in the east, to c.336m aOD in the west. Immediately behind the palisaded enclosure, to the north-west, a natural spring is located on the fault line between the Harden Red andesite and the Cheviot grey andesite and this has carved out a small steeply-sided valley that provides a natural barrier in this direction as a well as a source of freshwater. Further to the north, the ground continues to rise upwards into the Cheviot massif proper. Looking from the palisaded enclosure towards the south provides views across Coquetdale to the Simonside Hills beyond.

The aim of the archaeological evaluation was to provide information on the form, phasing and date of the archaeological remains on Bleakmoor Hill together with information on the condition of preservation of these remains, in order to provide a sound evidence base to inform discussion and decision-making in relation to any potential future mineral development of this area. All work was carried out to exacting archaeological standards. The trenches were excavated entirely by hand and cleaned sufficiently to allow for identification and planning of archaeological features.

The evaluation successfully and reliably dated the palisaded enclosure, and some of its internal features, to the Early-Mid Iron Age and most probably the 5th century BC, and provided information on its form, phasing, condition of preservation and significance. Furthermore, the evaluation was able to shed light on a number of additional features situated beyond the enclosure including a Beaker period clearance cairn and Early Bronze

Age ring cairn. The trenches, each of which had been situated with particular objectives in mind, provided answers to the various pertinent questions. Trenches 1, 2 and 4 revealed the heavy extent of truncation across the site and the form of the palisade's construction slot including why the slot's surface expression differed around its perimeter. While the discovery of an Early Bronze Age cremation and associated bipartite Food Vessel within Trench 5, within the heavily truncated ring cairn, was not entirely unexpected, its discovery answered the question of whether or not the monument had been used for funerary purposes. While there are more questions that would need to be addressed and answered before the site can be fully understood, it is believed that the evaluation has provided a sound evidence base to inform discussion and decision-making in relation to the Bleakmoor Hill archaeological remains.

The importance of the palisaded site has been assessed based on Historic England's Principles for Selection for Scheduled Monuments using a numeric and logical scoring system. It is concluded that should this have been considered for scheduling today, based on the condition and other attributes of this monument, together with what is now known about this class of monument and the existence of considerably more examples of this site – type than were known when it was first discovered, this site would be considered a marginal candidate for scheduling today.

1. INTRODUCTION

1.1 Archaeological Research Services Ltd (ARS Ltd) was commissioned by Tarmac to undertake an archaeological evaluation at Bleakmoor Hill Palisaded Enclosure, a Scheduled Monument (NHLE no.1008562), adjacent to Harden Quarry near Biddlestone, Northumberland (Figure 1). The quarry extracts and processes red porphyritic andesite, known as 'Harden Red', which occurs in the ground as a batholith. The edge of the batholith has already been reached at its southern, eastern and western extents and therefore the only direction in which the quarry can be extended is in a discrete area where the reserve continues to the north, where the Bleakmoor Hill Palisaded Enclosure is located.

1.2 The archaeological evaluation described in this report was carried out in order to help inform the decision-making as to the future management of this feature given the need for the mineral and its very limited spatial extent (see also Aims and Objectives section below). A total of seven hand-dug evaluation trenches were excavated as part of the archaeological evaluation which took place in August and September 2017. Four of these trenches investigated the palisaded enclosure and its internal features while the remaining three trenches investigated additional non-scheduled features of interest in the immediately surrounding landscape (Figure 2).

1.3 A number of phases of work have already been undertaken at the quarry in advance of previous phases of extraction including a rapid survey (no accompanying text) by and Gates and Ainsworth in 1979 that is held by Historic England (see Appendix VI) and the production of desk-based assessments, some low-level surface survey and evaluation trenching in 1996 by Tyne and Wear Museum Service (see Appendix VII site plan with the location of the Tyne and Wear trenches in relation to the current quarry area and the archaeological works undertaken latterly by Archaeological Research Services Ltd (and which are summarised in the 'Preliminary Heritage Statement' by Waddington and Brown 2016).

1.4 The work reported here, however, forms part of a new phase of work. Following consultation with the Historic England Inspector and the National Park Historic Environment Officer, ARS Ltd conducted a phased programme of work that has included a desk-based Preliminary Heritage Statement (Waddington and Brown 2016), geophysical survey (Durkin 2016) and an earthwork survey (Cockburn 2016), all of which was drawn on to inform the location and extent of the evaluation trenching reported here. The magnetometry survey was inconclusive due to a strong response from the underlying bedrock which masked any archaeological features. The resistivity survey identified some of the features that are already visible on the surface but otherwise detail was lacking and it added very little to what was visible on the surface. Although not particularly informative its results were considered to be reliable within the constraints of an upland environment on challenging geology generally unsuited to geophysical survey (Durkin 2016).

1.5 A detailed earthwork survey was carried out by ARS Ltd in December 2016 (Cockburn 2016) that identified a total of 42 features. These included the palisaded enclosure construction slot, together with a number of internal features including construction slots/drip gullys for ring groove buildings and pits. Beyond the palisaded enclosure the survey identified a ring bank, a number of linear banks and ditches and some probable clearance cairns. While some of these features had already been identified, the earthwork survey also highlighted some new features. Following on-site discussion with Historic

England, Northumberland National Park Authority, Tarmac, Wardell Armstrong and Archaeological Research Services Ltd it was concluded that in order to test the results of the survey, hand-dug evaluation trenches would be the most appropriate next step (Cockburn 2016).

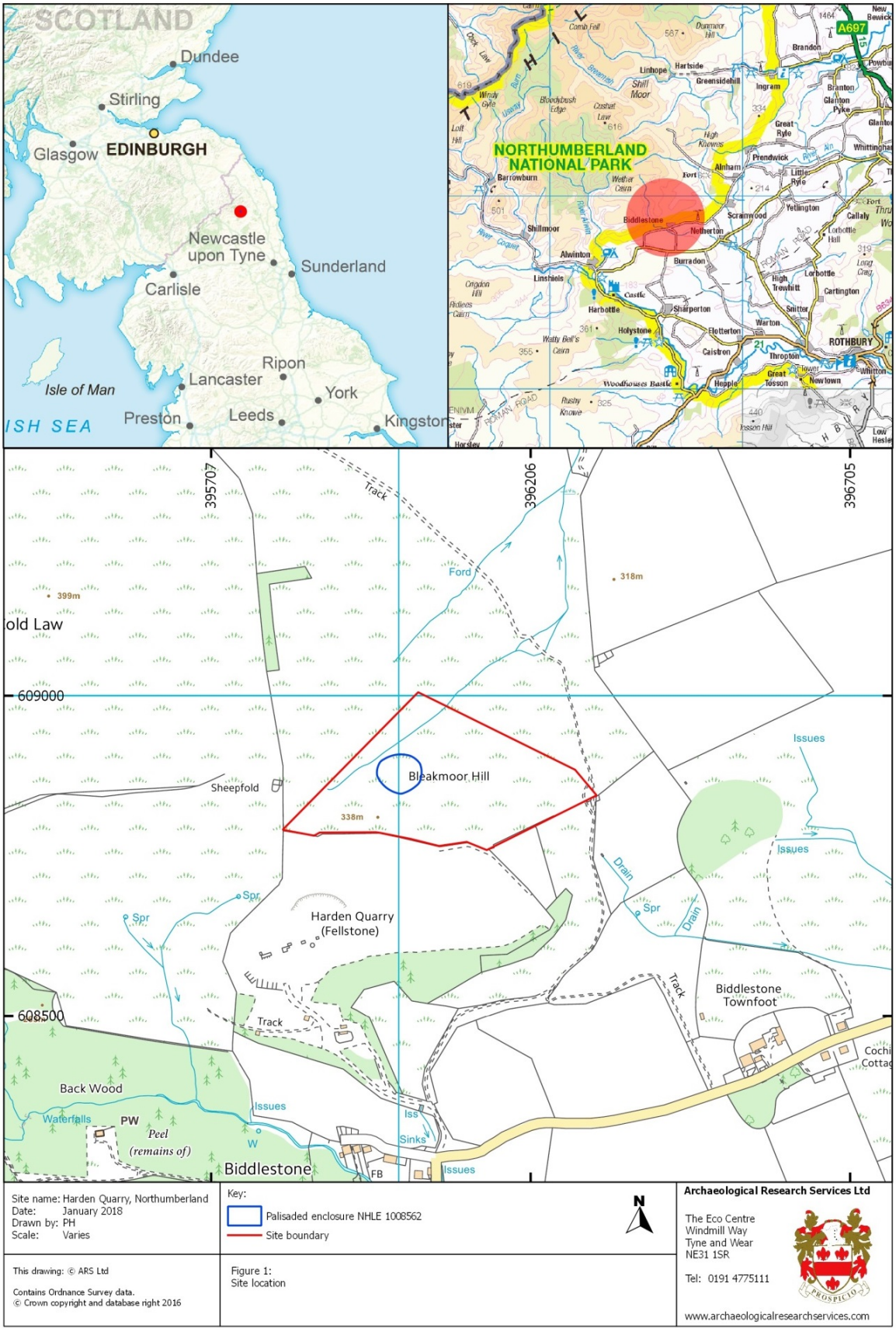


Figure 1. Site location Ordnance Survey data copyright OS, reproduced by permission, Licence no. 100045420. The Scheduled Monument is represented by the blue area.

2. SITE LOCATION AND GEOLOGY

2.1 The Bleakmoor Hill Palisaded Enclosure is located immediately north of the small village of Biddlestone, Northumberland on a shelf on the hillside above. The palisaded enclosure is centred at NT 96006 08859 and covers an area of *c*.0.28 ha (Figure 1).

2.2 The palisaded enclosure occupies the crest of a subtle dome-shaped hilltop inset as a shelf on the hillside and the enclosure drapes down from this slight dome to the south in what is otherwise a steeply sloping landscape. The field in which the archaeological evaluation took place rises from *c*.302m aOD in the south-east, to *c*.336m aOD in the west. Immediately behind the palisaded enclosure, to the north-west, a natural spring occurs that occupies an incised valley situated on the junction between the Harden Red andesite dome and the Cheviot grey andesite beyond. This small valley separates this shelf off from the rising ground to the north providing a natural barrier. Further to the north, the ground continues to rise upwards into the Cheviot massif proper. Looking south from the palisaded enclosure there are wide views across Coquetdale to the Simonside Hills beyond.

2.3 The underlying solid geology of the PDA comprises a 'red porphyritic andesite intrusion' which occurs in the ground as a batholith. No superficial deposits have been recorded (BGS 2016) and none were identified during the course of the evaluation.

3. AIMS AND OBJECTIVES

3.1 The aim of the archaeological evaluation was to provide information on the form, phasing and date of the archaeological remains on Bleakmoor Hill together with information on the condition of preservation of these remains, in order to provide a sound evidence base to inform discussion and decision-making in relation to any potential future mineral development of this area. All work was carried out to exacting archaeological standards.

3.2 The objectives of the evaluation were to:

- Target specific archaeological features identified by the previous desk-based study, the geophysical survey and the metric survey, with archaeological evaluation trenches to obtain information from sub-surface deposits. The locations of the proposed trenches were agreed based on the information arising from these previous studies and as a result of a site visit and discussion between Tarmac (Matthew Pixton), Historic England (Lee McFarlane), Northumberland National Park Authority (Chris Jones), Wardell Armstrong (Nick Beale) and Archaeological Research Services Ltd (Clive Waddington).
- Position and establish the size and shape of evaluation trenches so that they ideally provided maximum information based on minimum impact, particularly in relation to the Scheduled Monument (Bleakmoor Hill Palisaded Site).
- Obtain information on buried features that will help characterise what each of the targeted features is, including structural form, any artefactual associations and associated environmental evidence.
- Obtain dating samples to inform on the dating and phasing of the various features, and specifically the Bleakmoor Hill Palisaded Enclosure.
- Provide the necessary information to assess the condition of preservation of the

various archaeological remains.

- Provide the necessary information to assess the significance of each archaeological element on the site and particularly the Scheduled Monument (Bleakmoor Hill Palisaded Site).

3.3 The archaeological evaluation will contribute to the following Key Research Themes of the North East Regional Research Agenda:

- *NB.4 Cairns*: survey and excavation of groups of cairns in order to understand their form, function and chronology
- *I1 Chronology*: contribute to building a chronology for Bronze Age/Iron Age settlement in the region and to assist in understanding settlement morphology through time
- *I2 Changing Landscapes*: assist in understanding settlements in relation to their surrounding landscape, integrating archaeological and palaeoenvironmental work, including potentially the topic of upland desertion.
- *I3 Settlement Function*: assist in improving understanding of settlement layout, form and function and in relation to associated field systems
- *SEiii Chronology*: Following appropriate sampling utilise radiocarbon dating supported by Bayesian modelling to help build a chronology for the archaeological features present, and particularly for palisaded enclosures about which very little is yet known in the region
- *AG7 Origin of Agriculture in the Region*: potential to contribute to the evolution of prehistoric field systems and farms, depending on what is encountered during the evaluation.

3.4 This evaluation will also contribute to the following parts of the Northumberland National Park's Research Agenda (Young *et al*. Undated):

- *Research Theme 1 Palaeoenvironmental Research*: if well-preserved palaeoenvironmental residues are present on the site, for instance within the possible well in Trench 2, then there is the potential for obtaining information on past environment and land-use in the immediate hinterland of the archaeological remains on Bleakmoor Hill and this would give a window of specific detail that is often unavailable by the study of regional pollen diagrams.
- *Research Theme 3 Farming Through the Ages*: this work has the potential to contribute to understanding expansion into the uplands during the Bronze Age; the analysis of variation in ridge and furrow field systems; and possibly the development and nature of transhumance in medieval and post-medieval times.
- *Research Theme 4 Death and Burial*: if any of the cairns turn out to be burial cairns then this evaluation work will enhance the knowledge base as little is currently known about Neolithic-Early Bronze Age death and burial in the National Park save for that obtained by the relatively recent excavations in the Breamish Valley as part of the BVA Project (Frodsham and Waddington 2004).

Figure 2: Site plan

Key:

1 Evaluation trenches

Natural slope

Reed bed possibly indicating buried feature

Stream bed

Current extent of Harden Quarry

Natural stone/placed orthostat

Archaeological feature

Projected line of feature mapped from Google Earth imagery

Broad ridge and furrow mapped from Google Earth imagery

Narrow ridge and furrow mapped from Google Earth imagery

Surveyable upstanding cord rig griculture

Area of cord rig agriculture unable to be mapped in detail

0 100m

N

395900

396000

396100

609000

608900

608800

Harden Quarry

4. METHODOLOGY

4.1 All elements of the archaeological evaluation were carried out in accordance with the CIfA *Code of Conduct* (CIfA 2014a) and *Standard and Guidance for an Archaeological Field Evaluation* (CIfA 2014b).

4.2 The trenches were excavated entirely by hand and cleaned sufficiently to allow for identification and planning of archaeological features.

4.3 A full methodology for the archaeological evaluation is included in the Written Scheme of Investigation (see Appendix 3) that was prepared, and approved by the National Park Historic Environment Officer and Historic England's Inspector of Ancient Monuments, prior to the commencement of fieldwork.

Figure 3. An aerial photograph of the palisaded enclosure, showing the trenches that were excavated around the enclosure's circuit and in its interior (scales = 1m and 2m).

5. RESULTS

5.1 Site Stratigraphy

5.1.1 The turf and topsoil (001) of each evaluation trench was removed by hand. This overburden had an average depth of 0.11m, and in places directly overlay a coarse layer of weathered andesite set within an orange/brown silt matrix (002a) that formed a very stony subsoil. This layer, which was discontinuous across the site, sat above the weathered andesite 'brash' (002b) which in turn graded directly into the porphyritic andesite bedrock

(003), which in some places outcropped at the surface. The 'brash' layer (002b) has been formed by weathering of the bedrock which, over thousands of years, has caused pieces of the bedrock to fracture. The layer of smaller stone chips (002a) above the brash (002b), appears to have been formed by historic ploughing, evidenced across the site by extant ridge and furrow and cord rigg agriculture (Topping 1989) which typically dates to the Late Iron Age – Romano British and medieval periods. This agricultural activity has broken up the upper part of the brash and mixed it up to create more tilth across the site. The distinction between deposits (002a) and (002b) is important on this site; they appear very similar, yet the majority of archaeological features encountered during the evaluation were overlain by the agricultural layer (002a) but could be seen to be cut through the 'brash' layer (002b) indicating that these archaeological remains pre-dated both the cord rigg and ridge and furrow, and had been significantly truncated by this subsequent agricultural activity.

Feature No.	**Context numbers**	**Description**	**Max. dimensions (m)**	**Max. depth (m)**	**Colour of fill**	**Composition**	**Calibrated date range (95.4% probability) cal BC**
Beaker period							
Trench 6							
3	(033), (034)	Clearance cairn	12.5 x 5.11	0.36	Pale brown/orange	Loamy sandy silt	2456-2201
Early Bronze Age							
Trench 5							
14	(032), (041), (052)	Ring cairn	11 x 11	0.27	-	-	-
31	[048], (049), (050), (051)	Cist containing a cremation	0.72 x 0.57	0.23	Dark to light brown	Silty clay	2456-2201 2111-1891
Iron Age							
Trench 1							
1q	[053], (054)	Large posthole or pit	1.05	0.38	Mid brown	Silty loam	747-402
1a	[004], (005), (011),	Palisaded enclosure construction slot	0.75	1	Dark brown	Sandy silt to gravelly silt	731-400
Trench 2							
1c	(012), [013], [035]	Ring groove	0.58	0.22	Mid brown	Sandy silt	736-401
1h	(030), [031], [036]	Ring groove	0.57	0.12	Brown	Silt	-
1r	(014), [015]	Shallow pit	0.95 x 0.14	0.1	Brown/grey	Sandy silt	-
1s	(025), (026), [037]	Pit with flat stones in upper surface	0.75 x 0.65	0.25	Brown/grey	Silt	728-395
Trench 3							
1a	(006), (007), (008), (009), (010)	Palisaded enclosure construction slot	0.89	0.83	Varies from yellow brown to grey brown	Sandy silt	702-389
1e	[017], (018)	Ring groove	0.59	0.18	Orange/brown	Loamy silt	4846-4716

							4345-4253 (intrusive)
1t	[019], (020), (021)	Large pit	Beyond ex.	0.4	Brown/grey/ orange	Sandy silt/loamy sandy silt	-
Trench 4							
1a	(029), [058]	Palisaded enclosure construction slot	0.51	0.58	Dark brown	Silty loam	-
Trench 7							
6	(039), (040), [043]	Linear bank	0.88	0.39	Pale brown/yellow	Loamy silt	-
7	(044)	Clearance cairn	3.4 x 3.02	-	-	-	-
Late Iron Age – Romano British							
Across site – All trenches							
32	(060)	Upstanding cord rigg earthworks overlying all observed archaeological features across the site except for the medieval ridge and furrow.	*c*.1 x 1m from rigg top to rigg top	*c*.0.2 m deep	-	-	-

Table 1. Context summary table.

5.2 Trench 1

5.2.1 Trench 1 measured 6 x 2m and was located at the north-north-eastern extent of the palisaded enclosure, orientated north-north-east to south-south-west so as to cross the palisaded enclosure construction slot at 90 degrees (Figure 2). The purpose of this trench was to investigate the construction slot and assess its form and level of preservation, as well as to attempt to locate the enclosure's entrance.

5.2.2 Cut through the brash layer (002b) and into the bedrock (003) within Trench 1 was the palisaded enclosure construction slot [004], Feature 1a (Figure 4). The slot had a narrow 'U'-shaped profile with a broadly flat base, and had a maximum depth of 0.8m from the top of the brash (002b). The construction slot was rock-cut and the sides were for the most part vertical. The base of the cut was at a height of 334m aOD. The construction slot had a maximum width of 0.7m at the top, although it narrowed to 0.2m wide at the base, and displayed a very slight curve in plan (Figure 7 and Figure 8) following the alignment of the enclosure circuit.

5.2.3 The fill of the construction slot (005) consisted of dark brown sandy silt containing large angular blocks of quarried andesite that had clearly formed packing for timber uprights (011). These blocks made up 50% of the construction slot's total fill where it was excavated within Trench 1. Noted within the north-west facing section of the construction slot was evidence of a post-pipe. This post-pipe clearly demonstrates that the construction slot had held substantial timber uprights *c*.0.18-0.25m wide providing a reliable indicator of the size

of the timbers that had been used to construct the palisade (Figure 5). The post-pipe consisted of two narrow stones angled downwards that had evidently remained *in-situ* after the timbers had been removed or rotted away and the voids became infilled with small soil particles that had percolated down through the interstices of the stone packing. While the majority of the quarried rock used to pack the palisade was porphyritic andesite, presumably the same material that had been quarried/extracted to create the construction slot, there was a single block of Fellsandstone within the slot's fill. Fellsandstone is not immediately local to this hillside or the Cheviot massif and it therefore must have been intentionally brought to the site from a kilometre or so distant where it can be found further down Coquetdale or across the valley in the Simonside Hills. Considering the physical effort that would have gone into transporting the stone, especially bearing in mind the amount of available stone already at the site, it can be assumed that it had been brought from its source for a good reason. It showed no sign of having been carefully shaped, such as for a quern for example, and so its intended use remains unknown. A piece of hazel roundwood charcoal extracted from the fill of the palisade construction slot in Trench 1 produced a calibrated radiocarbon date of 731-400 cal BC (95.4% probability) or probably 510-407 cal BC (68.2% probability) (SUERC-76569 (GU45762)). This places the palisaded enclosure in the Early Iron Age and likely the 5th century cal BC.

5.2.4 Also excavated within Trench 1 on the inside of the palisaded enclosure was a large posthole or pit, Feature 1q (Figure 6). This feature was half-sectioned and was found to be circular in plan with a maximum depth of 0.38m below the top of the brash and with an observed diameter of 1.05m. The sides of the feature were steeply sloping (Figure 8) and the base was uneven, while the fill (054) consisted of a mid-brown silty loam containing occasional medium-sized stones averaging 0.1m wide. Similar to the palisade construction slot, the pit or posthole had been excavated through the brash (002b) but was overlain by disturbed brash (002a). A piece of oak roundwood charcoal recovered from the pit produced a calibrated radiocarbon date of 747-402 cal BC (95.4% probability) and probably 536-410 cal BC (68.2% probability) (SUERC-76570 (GU45763)) and is therefore statistically consistent with the date from the palisade slot fill. These two dates suggest that the pit was in use as part of the construction or occupation of the palisaded enclosure. The function of this pit remains, however, unknown.

Figure 4. The palisaded enclosure construction slot after full excavation within Trench 1, looking south-east.

Figure 5. The north-west facing section of the construction slot showing the post-pipe. Scale = 0.2m.

Figure 6. Pit or posthole Feature 1q within Trench 1 after half-sectioning. Scale = 1m.

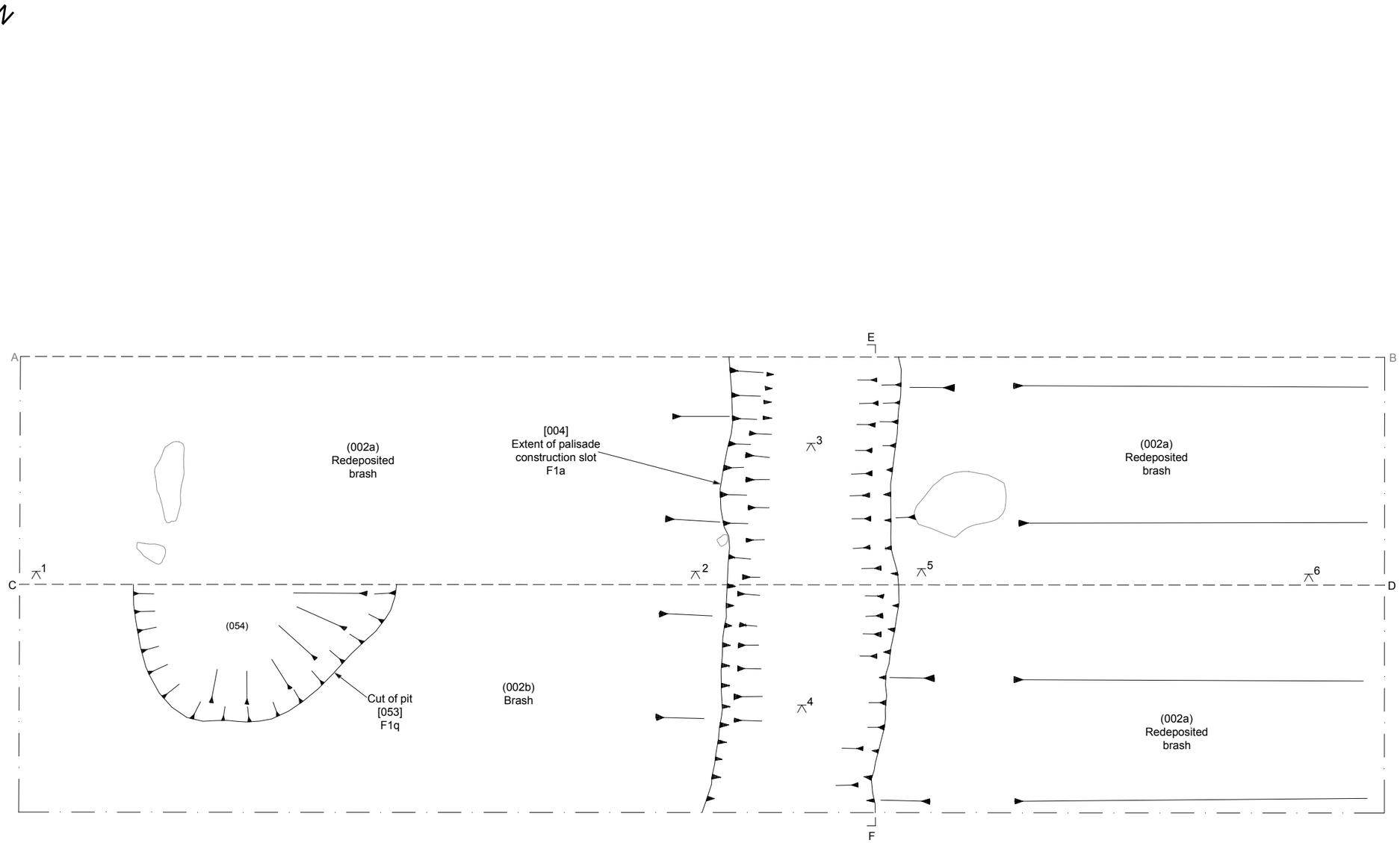


Figure 7:

Trench 1 plan.

Scale = 1:20 at A3

Key:

Heights
1. 335.07m aOD
2. 335.04m aOD
3. 334.06m aOD
4. 334.00m aOD
5. 334.80m aOD
6. 334.61m aOD

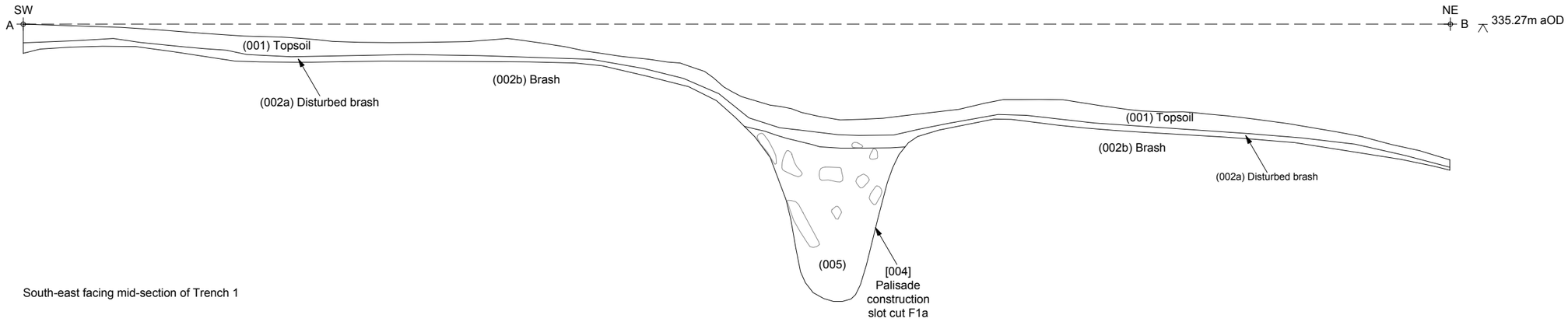
Stones

Figure 8:

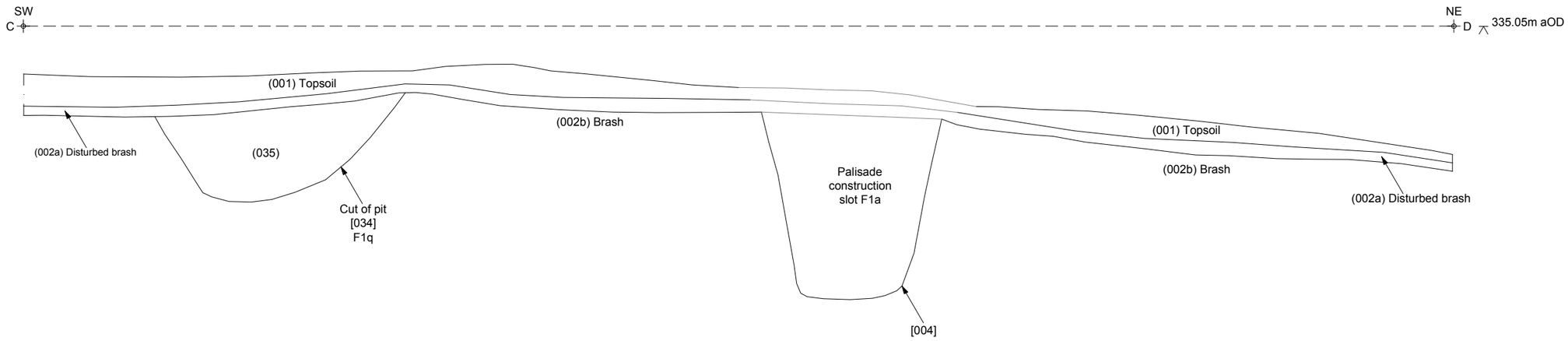
Trench 1 sections.

Scale = 1:20 at A3

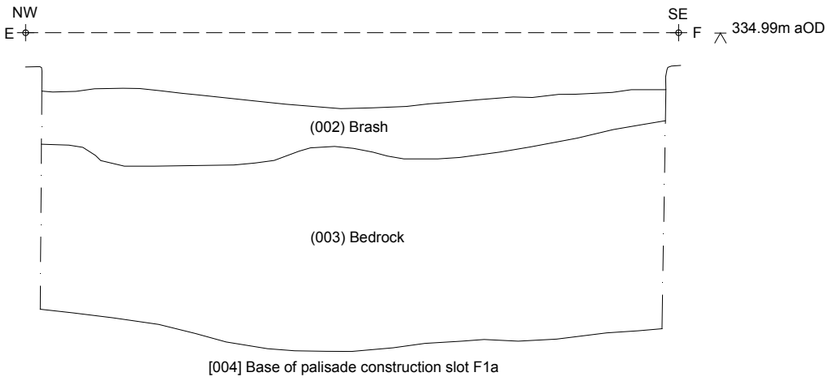
South-east facing section of Trench 1



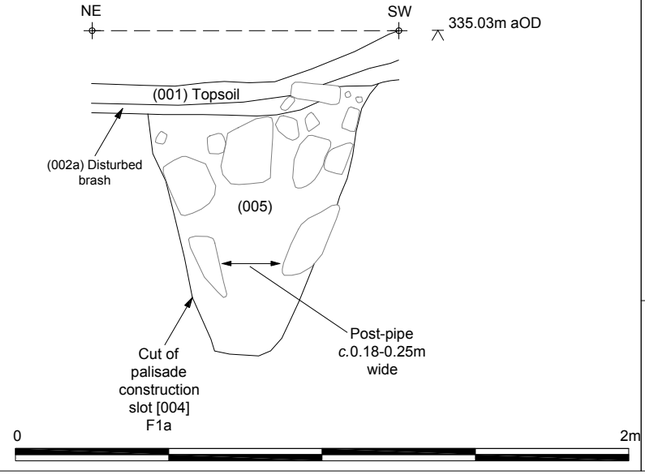
South-east facing mid-section of Trench 1



South-west facing elevation of palisade construction slot F1a, looking north-east



North-west facing section of palisade construction slot F1a



Key:

Stones

5.3 Trench 2

5.3.1 Trench 2 was an 'L'-shaped trench excavated within the centre of the palisaded enclosure to sample the two largest ring grooves, Feature 1d and Feature 1h, and a discrete circular patch of reeds. The trench measured 8m east-west by 8m north-south. The highest point of this trench was situated at 335.7m aOD (Figure 13).

5.3.2 Once the turf and topsoil (001), subsoil (002a) and brash (002b) had been removed, the north-south portion of the trench was found to contain a heavily truncated scooped hut platform and associated ring groove (Feature 1c) (Figure 9 and Figure 13). Due to the gradient of the ground, a level scooped platform [035] had been cut into the surface of the bedrock in order to create a flat surface upon which a small house-type could be constructed and which, following the subtle surface relief, suggests an internal diameter of *c*.7.4m. Circumscribing this scooped platform was a ring groove [013] that had been cut through the brash (002b) and into the bedrock (003) below. Ring groove [013] measured 0.7m wide and up to 0.31m deep from the top of the brash and was filled with finely textured brown sandy silt (012). Between the ring groove and the scooped platform were the very truncated remains of a bank (061) that had presumably been formed using the up-cast from the ring groove and the scooped platform. This bank would have provided stability and damp-proofing for the house walls. A piece of hazel roundwood charcoal recovered from the fill of the ring groove produced a calibrated radiocarbon date of 736-401 cal BC (95.4% probability) and probably 516-408 cal BC (68.2% probability) (SUERC-76572 (GU45765)). This date places ring groove Feature 1c in the Early Iron Age, and likely the 5th century cal BC, and is consistent with the radiocarbon dating for the palisade implying these internal buildings are contemporary with the enclosed/defended phase of the site.

5.3.3 In the corner of Trench 2, where the east-west section of the trench met the north-south section, was a broadly circular pit, Feature 1r, (Figure 10 and Figure 13) that lay outside the two ring groove buildings 1c and 1h. Prior to excavation a circular patch of tall reeds had been growing in this location which had drawn attention to it as the location of a probable sub-surface feature. The pit had irregular sides [015] and a concave base measuring 0.95 x 1.35m with a depth from the start of the brash of 0.07m. The fill (014) was black/grey sandy silt containing both rounded and angular stones as well as a large fragment of a broken quern stone (see section 9: Coarse Stone Assessment). The function of this shallow pit is unknown.

5.3.4 Within the east-west section of Trench 2 was a heavily truncated portion of the largest ring groove on the site (Feature 1h) (Figure 11). Like ring groove 1c it was defined by a heavily truncated and shallow outer ring groove with the scooped platform of the interior. The interior floor deposits had been completely removed by later cord rig/ridge and furrow agriculture although the remains of a shallow pit were found where what appeared to be floor paving had slumped into it (Figure 12 and Figure 13). This suggests that originally the floor of this roundhouse had been paved, but the paving has been removed by subsequent agricultural activity across the enclosure, leaving only the remnant that had slumped into a pit where it survived outside the limit of truncation. The groove, which terminated within the trench, measured a maximum of 0.57m wide and 0.12m deep and had regular, gently sloping sides [031] and a concave base. The fill of the groove (030) consisted of medium textured brown silt containing both angular and rounded small stones. At a distance of 2.4m to the east of the gully, a scooped house platform [036] had been created in order to form a level surface. Between this scooped platform and the ring groove socket were the truncated

remains of a bank (062) that had presumably been formed using the up-cast from creating the groove and the scooped platform. This bank would have provided stability and damp-proofing for the house walls. A broken blue glass bead was recovered from the interface between the topsoil and the brash within the interior of ring groove house 1h (see Section 10: Glass Finds Assessment). Located immediately inside the ring groove on the house platform was a shallow pit (Feature 1s) which had a number of internal paving stones (025) slumped into its upper surface and which are likely to be the remnants of a paved floor (see above). This pit [037] had regular sides and a concave base and measured 0.75 x 0.65m and had a depth of 0.25m from the top of the brash. The fill (026) consisted of brown-grey finely textured silt containing small angular andesite chips. A piece of hawthorn roundwood charcoal was extracted from the fill of the pit which produced a calibrated radiocarbon date of 728-395 cal BC (95.4% probability) and probably 489-401 cal BC (68.2% probability) (SUERC-76571 (GU45764)). This radiocarbon date is consistent with the other radiocarbon dates from Trenches 1 and 2 indicating a probable 5th century cal BC date for this palisaded settlement and the use of these two large ring groove houses within the central area of the enclosure.

Figure 9. Ring groove house 1c with the ring groove in the foreground, internal bank and house platform beyond (scale = 1m).

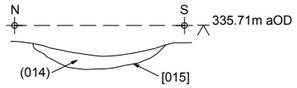
Figure 10. Pit 1r within Trench 2 after full excavation (scale = 1m).

Figure 11. Ring groove 1h within Trench 2 (scale = 1m).

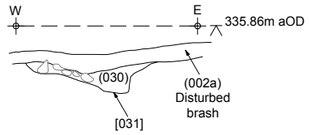
Figure 12. Ring groove 1p looking west with the truncated house platform interior scooped into the natural bedrock in the foreground, the paving stones slumped into the top of pit 1s within the house and the ring groove itself defining the outer wall of this feature at the top of the picture behind the bank (scales = 1m and 2m).

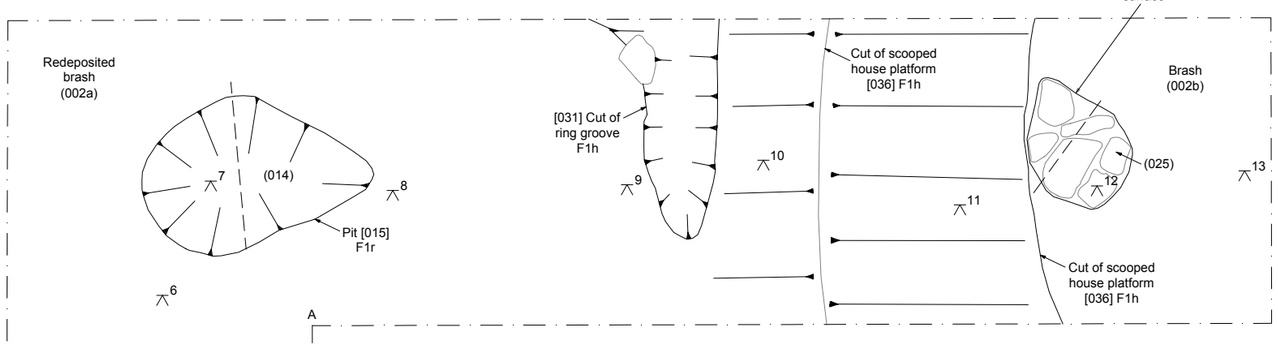
N

West-facing section of pit [015] F1r

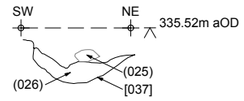


South-facing section of ring groove [031] F1p

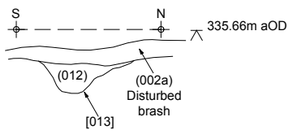




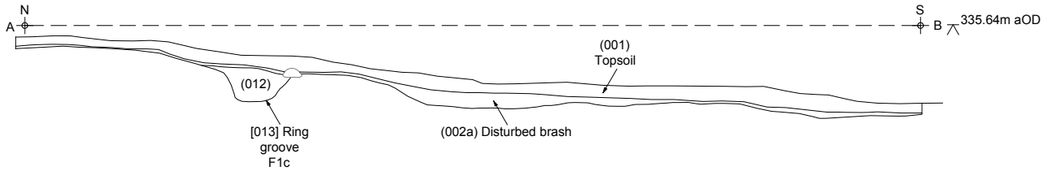
South-east-facing section of pit [037] F1s



East-facing section of ring groove [013] F1d



West-facing section of Trench 2



0 2m

Figure 13:

Trench 2 plan

Trench 2 west-facing section

Trench 2 feature sections

Scale = 1:40 at A3

Key:

Heights
1. 335.05m aOD
2. 335.14m aOD
3. 335.17m aOD
4. 335.40m aOD
5. 335.54m aOD
6. 335.62m aOD
7. 335.63m aOD
8. 335.64m aOD
9. 335.61m aOD
10. 335.61m aOD
11. 335.50m aOD
12. 335.38m aOD
13. 335.41m aOD

Stones

5.4 Trench 3

5.4.1 Trench 3 was located on the western side of the palisaded enclosure (Figure 2), orientated east-west so that it crossed the palisade construction slot at 90 degrees. The trench measured 5 x 2m and was situated at 336.2m aOD. This trench was located in order to investigate the palisaded enclosure construction slot where its surface expression had begun to grade out, while also sampling an internal ring groove 1e. No surface traces of cord rig survived here in this localised area.

5.4.2 Within Trench 3 the cut of the palisade construction slot [009] was found to have a maximum depth of 0.81m from the top of the brash (002b) (Figure 14, Figure 17 and Figure 18). The rock-cut slot [009] was vertical on its east side and steeply stepped on its western side in this portion of the perimeter. The base of the slot was flat and measured 0.16m wide. The construction slot contained three separate fills, the lowest two being only shallow primary siltation lenses. The primary fill (010) consisted of brown, medium textured sandy silt containing rounded and angular gravel and small flecks of charcoal. The secondary fill (008) was finely textured, grey/brown sandy silt containing small stones while the upper fill (006) was yellow/brown silty sand containing abundant angular packing stones. As was the case in Trench 1, the palisade construction slot had been packed full of medium to large angular blocks of porphyritic andesite that had been used to pack around the upright timbers of the palisade. The lack of weathering of this material indicated it was the upcast from the excavation of the palisade slot that had been used to re-pack the hole shortly after its excavation. There was no clear evidence of a surviving post-pipe in this case. A piece of hazel roundwood charcoal recovered from secondary fill (008) produced a calibrated radiocarbon date of 702-389 cal BC (95.4% probability) and probably 483-398 cal BC (68.2% probability) (SUERC-76573 (GU45766)). This date is consistent with those from Trenches 1 and 2 and supplies further evidence that the palisaded settlement likely dates to the 5th century cal BC.

5.4.3 Also within Trench 3 was the ring groove of a small hut or house (Feature 1e). The fill of the groove (018) consisted of finely textured mid brown/orange loamy silt which contained frequent angular weathered andesite stones (024) and charcoal. It is possible that the stones (024) had been used to pack around the timber walls/supports of the circular structure. The groove was slightly curving in plan consistent with the vague surface trace and it had a maximum depth of 0.18m from the top of the brash (002b). The eastern side of the groove was almost vertical, however the western side was no longer extant due to having been truncated by a later pit, Feature 1t (Figure 15, Figure 16, Figure 17 and Figure 18).

5.4.4 The pit [019] had been cut at an angle so as to truncate the edge of the ring groove building indicating that the building must not have been standing when the pit was made. The pit had been excavated through the brash and into the underlying bedrock. The palisade construction slot had then been cut through the infilled pit and the pit's fill could be seen in the side of the excavated palisade slot (see Figure 14). This sequence of ring groove, then rock cut pit, then palisade is important, as it indicates that there is some phasing present on the site and that it seems probable that there was a phase of unenclosed Iron Age settlement before it was enclosed by the palisade. The pit appeared to be sub-circular in plan although the trench did not contain the entirety of this feature. The pit contained two distinct fills, the primary fill was mid- brown/grey sandy silt containing small 'pea' gravel (020). The upper fill of the pit (021) was orange-brown silty sand containing chips of

porphyritic andesite. The pit was not excavated in its entirety, however its cut could be seen in section in the eastern side of the palisaded enclosure construction slot (Figure 18).

5.4.5 A piece of hazel charcoal extracted from the fill of ring groove 1e [018] was radiocarbon dated and produced a calibrated radiocarbon date of 4846-4716 cal BC (95.4% probability) and probably 4828-4729 cal BC (68.2% probability) (SUERC-76574 (GU45768)). A further sample of charred alder was radiocarbon dated and produced a calibrated radiocarbon date of 4345-4253 cal BC (95.4% probability) and probably 4336-4265 cal BC (68.2% probability) (SUERC-82096 (GU49054)). Both of these dates fall within the late Mesolithic period during the 5th millennium cal BC, although importantly they are separated by at least 400 years and therefore have resulted from entirely different events separated in time by a considerable period. Both of these dates are from small charred samples that can be confidently ascribed as being residual material resulting from earlier activity on this part of the site. They have evidently become incorporated into the fill of the ring groove slot during its construction and packing in late prehistoric, and most likely Iron Age, times when the ring groove would have been made. There are no Mesolithic parallels for such 'ring groove' structures despite suggestions that this feature could relate to the Howick pit house for example. They are of entirely different size and morphology and none of the hundreds of Mesolithic pit houses now known in north-west Europe have ring grooves. What is significant is that the presence of these Mesolithic charred samples and the occurrence of occasional Mesolithic chipped flints on the site attest to Mesolithic activity on this hilltop, and particularly in the area around Trench 3. Whether there is potential for any in situ Mesolithic remains to survive on the site remains a moot point, although given the intensive use of the hilltop during the Iron Age and the occupation of the enclosure and subsequent truncation by ploughing, the likelihood for any such remains to survive is considered to be fairly low. The presence of the hazelnut shell is suggestive of late Mesolithic activity that included the roasting/consumption of hazelnuts, probably as a snack by transitory Mesolithic groups or individuals.

Figure 14. South-facing section of palisaded enclosure construction slot Feature 1a in Trench 3, showing the packing stones (007) in the section (scale = 1m).

Figure 15. The palisade construction slot within Trench 3 during excavation with the cut of pit 1t into the bedrock visible in the west-facing section (scale = 1m).

Figure 16. Trench 3 showing the palisaded enclosure's construction slot in the background, with part of the surviving arc of ring groove 1e in the foreground. The two distinct fills of pit 1t can be seen in the left-hand side trench edge (scale = 2m).

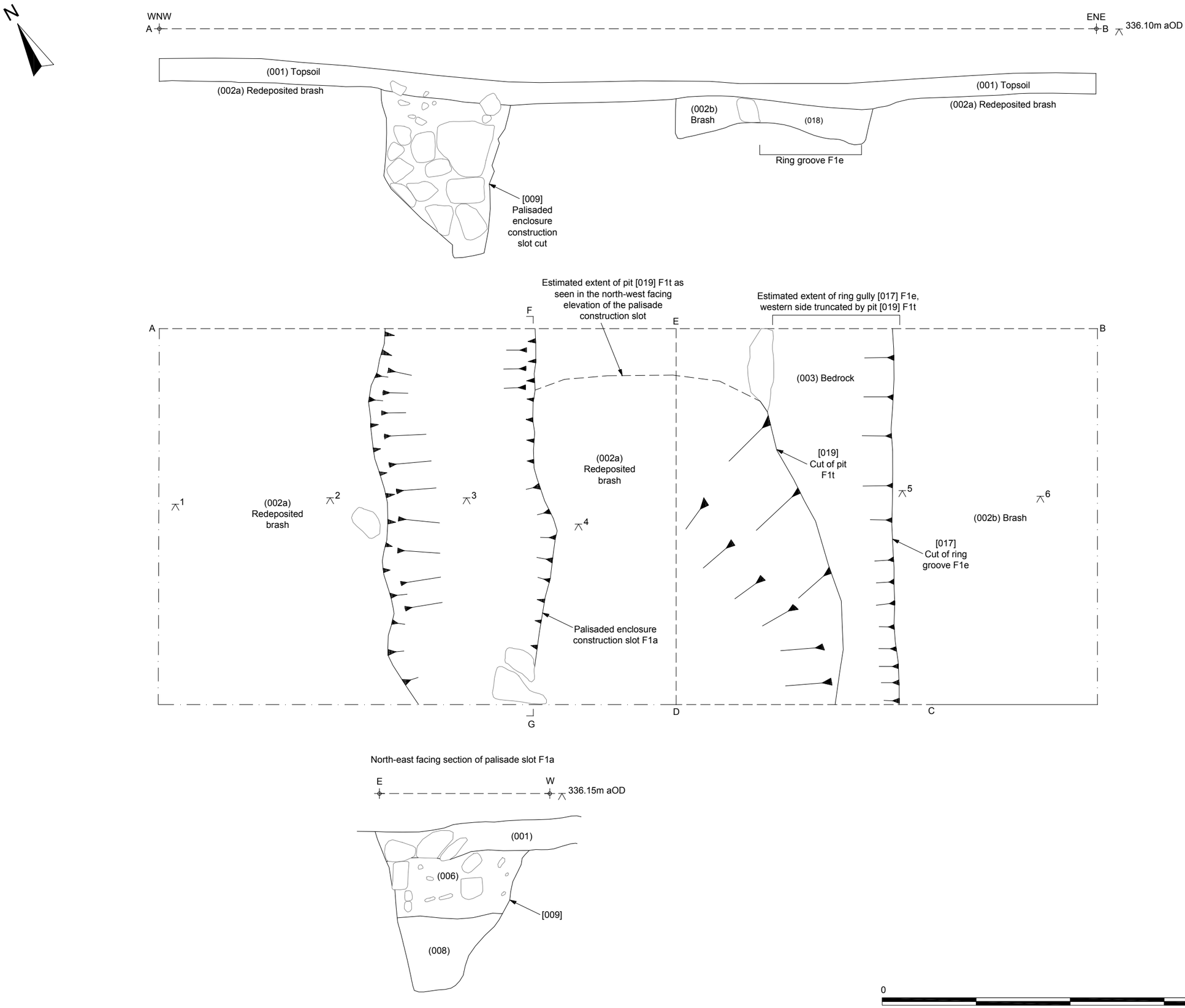


Figure 17:

Trench 3 south-south-west facing section

Trench 3 plan

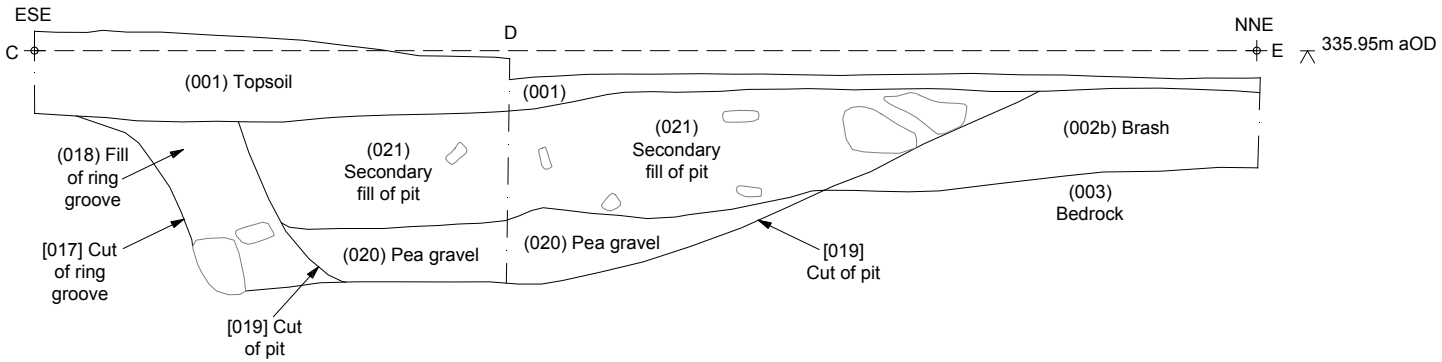
Scale = 1:20 at A3

Key:

Heights
1. 336.00m aOD
2. 335.94m aOD
3. 335.00m aOD
4. 335.85m aOD
5. 335.81m aOD
6. 335.85m aOD

Stones

Sections of drip ditch [017] and rock-cut pit [019]



North-west facing elevation of palisade slot F1a, looking south-east

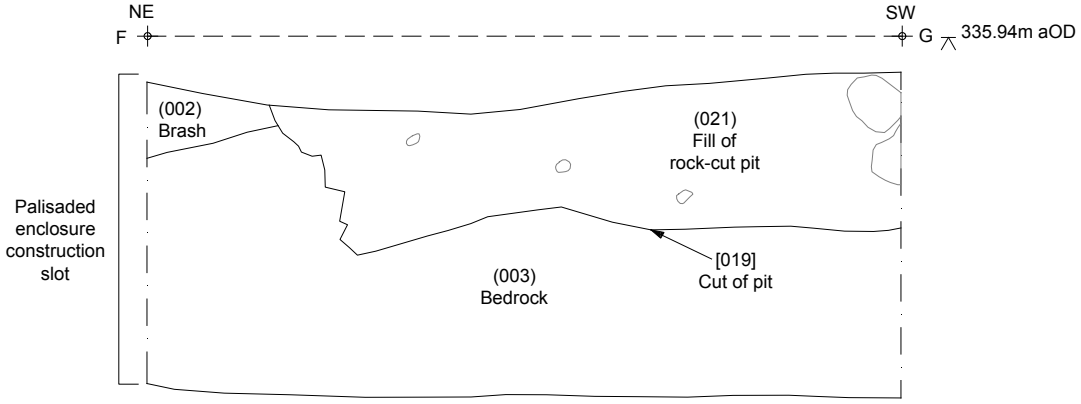


Figure 18:

Trench 3 section

Scale = 1:20 at A4

Key:

Stones

5.5 Trench 4

5.5.1 Trench 4 was located on the south side of the palisaded enclosure where its surface expression had completely graded out. The purpose of this trench was to test if there were any surviving remains of the enclosure here and to assess its preservation and determine why it was not visible on the surface.

5.5.2 Trench 4 measured 9m x 2m and was orientated north-south. The trench was situated at a maximum height of 333.74m aOD. The stratigraphy of Trench 4 differed from that of the others and was due to colluviation having occurred on this lower part of the site where material from upslope in the interior of the palisade, that was positioned on the crest of the hill, had moved downhill to create a greater depth of soil here. Directly beneath the turf (001) was a mid brown silty loam topsoil (027) averaging 0.45m thick (much thicker than elsewhere on the palisade site) and which contained frequent, large blocks of porphyritic andesite. Beneath this was orange-brown silty subsoil (028) and below this was the bedrock. The palisade construction slot was encountered at a depth of 0.47m below the modern ground surface, and was cut through the subsoil (028) and then bedrock (003) beneath. It was sealed by stony soil deposit (027). The construction slot [058] measured 0.63m deep from the top of the subsoil (028) and 0.45m wide and was steeply-sided with a concave base. The fill (029) consisted of very dark brown silty loam containing frequent large blocks of angular andesite (Figure 19, Figure 20 and Figure 21). A fragment of a broken quernstone was recovered from the topsoil of Trench 4 during excavation (see Section 9: Coarse Stone Assessment).

5.5.3 Stony deposit (027) produced three sherds from a single later prehistoric ceramic vessel that were found clustered together (see section 7: Prehistoric Ceramic Analysis). The sherds were discovered within the interior of the enclosure next to the construction slot and could have become incorporated into this soil either during the occupation of the palisaded enclosure or as a result of the later cord rigg agriculture that has truncated the upper part of the deposits in this part of the site, and may be the cause of the colluvial slopewash that has accumulated on the south side of the site where the ground naturally falls away.

5.5.4 Stony deposit (027) has been interpreted as tumble, potentially from a wall or stone cladding. It is possible that there was a need to reinforce the palisade's stockade in this location due to it having been excavated through subsoil as opposed to bedrock. Additionally this could have been where the enclosure's entrance was located and therefore a stone wall was constructed, as well as the timber stockade, in order to give a more imposing impression to visitors and those who could pose a potential threat. Very subtle surface remains on the eastern side of the trench could possibly suggest the presence of two termini, although this remains highly speculative, but if they are then this would be consistent with this being the area where the enclosure's entrance was located. This possible entrance area is not located in the blank area of the palisade circuit as depicted on the Gates and Ainsworth plan (see Appendix VI), but to the west of this in broadly the central area of the southern side of the monument. If the stony deposit (027) does represent wall tumble, it was evidently intentionally demolished and subsequently further disturbed by ploughing, as there was no indication of a wall foundation or any evidence of what its relationship with the palisade construction slot might have been. Only further substantial excavation could confirm the presence or absence of palisade embellishment in this location.

5.5.5 The Gates and Ainsworth plan (see Appendix VI) shows what is labelled as a 'trace of groove' for the palisade slot running along the southern side of the enclosure and then a short stretch where no evidence was present. Despite very careful inspection the groove could not be traced as far as Gates and Ainsworth postulated it and the area of the possible entrance as outlined above actually lies within the area where they have the 'trace of groove'. Therefore, the trace of the southern arc shown on the Gates and Ainsworth plan is probably an over-simplification and the surface subtleties are more complex than this. What we observed is that there is a short bit of very subtle/subjective extension from the visible groove, there is a possibility only of an entrance where they still have the groove continuing, and any evidence for the groove runs out slightly before their projected 'trace of groove' terminates. Because the surface traces of the archaeology are so subtle across most of this monument, and impractical to survey using orthodox technologies, this is why we believe the site requires a laser scan survey and a level of survey beyond the scope of this study and the typical requirements of pre-application work, should the extension be permissioned.

Figure 19. Trench 4 after partial excavation, looking north and uphill into the enclosure. Note the abundance of stone spread throughout the upper soil and spreading downhill form the enclosure circuit (scale = 2m).

Figure 20. The east facing section of the palisade construction slot within Trench 4 (scale = 2m).

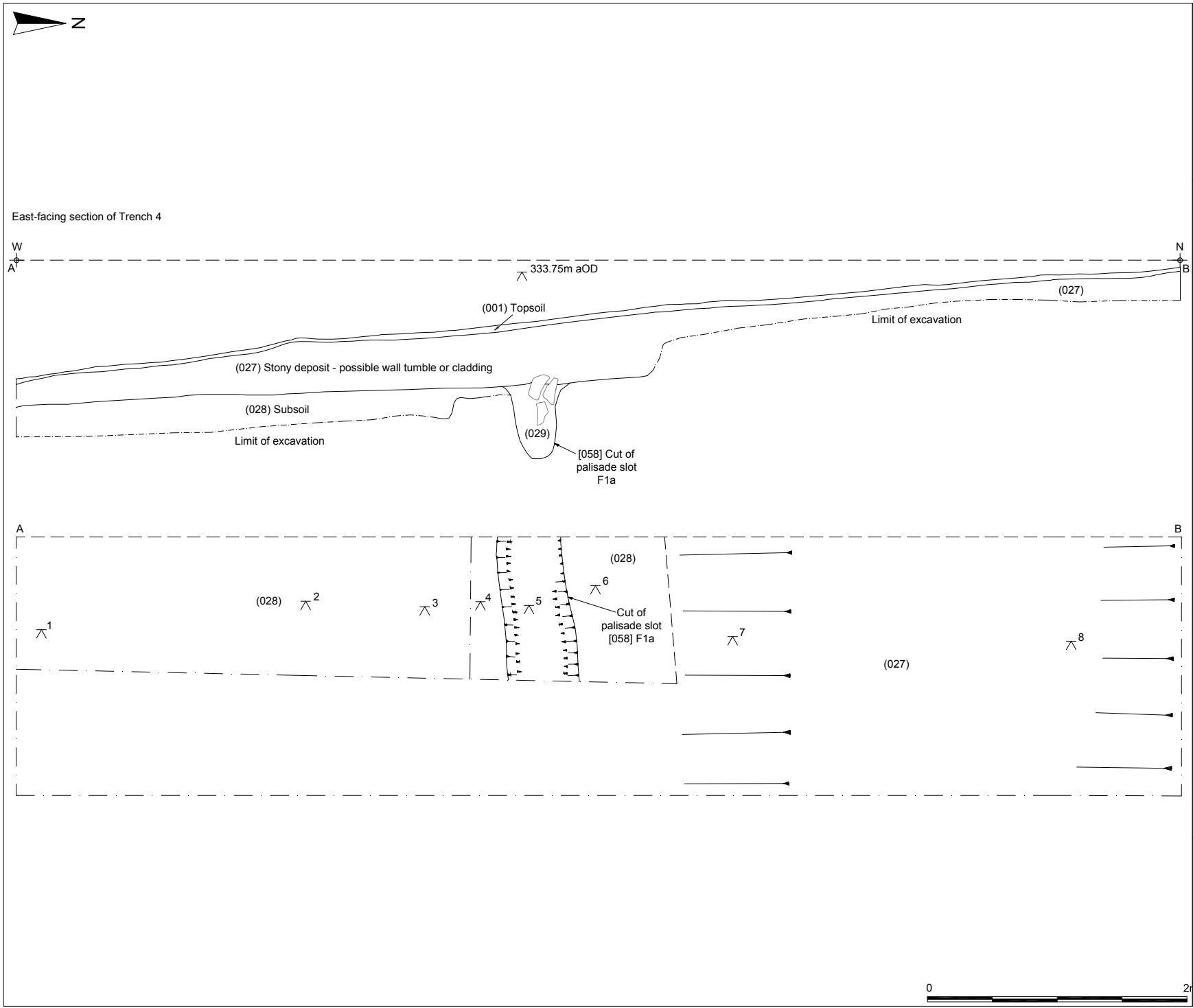


Figure 21:

Trench 4 east-facing section

Trench 4 plan

Scale = 1:40 at A4

Key:

Heights

1. 332.60m aOD
2. 332.63m aOD
3. 332.65m aOD
4. 332.89m aOD
5. 332.51m aOD
6. 332.92m aOD
7. 333.31m aOD
8. 333.48m aOD

Stones

5.6 Trench 5

5.6.1 Trench 5 was located to the south-west of the enclosure and was excavated in order to investigate a ring bank structure that had previously been identified from aerial photographs and was recorded during the earthwork survey (Cockburn 2016). Trench 5 was orientated north-south across the full width of the ring bank and measured 12 x 2m (Figure 22, Figure 23 and Figure 27). There are the remains of a denuded and truncated stone mound positioned eccentrically within the sub-circular low stone bank that forms the 'ring bank'. It is possible that the ring bank once had an entrance, however, by the time of excavation there was very little evidence of the central mound and the circular bank appeared discontinuous in places, due to plough damage resulting from the cord rigg agriculture that had extended across this feature and reduced much of the monument. The current condition of this feature could easily be misinterpreted as the ring bank and inner mound both appear as turf-covered features and the mutilation of this monument has meant it could appear as though there are several entrances whereas careful inspection suggests much of this is due to the later agricultural damage. The ring bank measured *c*.11m x *c*.11m at its maximum extents (Figure 22, Figure 23 and Figure 27) and is now an irregular shape - based on surface visibility.

5.6.2 A part of the inner mound (041) had survived and the stones comprising this mound were set directly upon the natural brash (002b) and could be seen in the trench section (Figure 27). At the northern and southern ends of the trench the truncated remains of the enclosing stone ring bank (032) also survived and could be seen protruding through the turf in places prior to excavation. These stones were also visible and recorded in trench section. The stone used in the construction of the ring bank was the local porphyritic andesite.

5.6.3 In the southern segment of the trench a shallow patch of soil immediately below the turf was discovered containing sherds of a very fragmentary and incomplete bipartite Food Vessel (see Section 7: Prehistoric Ceramic Analysis) (Figure 24). The sherds were amongst a deposit of medium textured pale brown/orange loamy silt (047) next to an dover where a cist was discovered. This material is therefore some kind of backfill or perhaps part of the mound material. Although the surviving assemblage of sherds did not make a complete vessel it appeared that this pot had once been complete, but that it had been disturbed from a nearby location and brought into the ploughzone and broken *in-situ* where it had been left in the agricultural soil. Most of the sherds were just a few centimetres below the modern ground surface and were in a very fragmentary and delicate condition.

5.6.4 Thirteen centimetres to the east of where the pot was recovered, and at a lower level, was a disturbed cist containing a compacted cremation deposit (051) (Figure 25, Figure 26 and Figure 27). The cremation was so tightly defined and had defined arcing sides that it suggested the cremated bones had likely been deposited in a bag of some sort, probably made from organic material such as cloth or leather. It appears that the cremation deposit and the vessel were associated, but that the vessel had been disturbed and moved from its original position when the top of the cist was disturbed. The cist had been roughly constructed using a number of small to medium-sized angular stones that had been constructed in a corbelled arrangement within a rectangular-shaped pit [048] measuring 0.72 x 0.57m and with a maximum depth of 0.3m below the modern ground surface. While there was no evidence of a capstone, it can be assumed that one had originally existed but that it had been broken and dislodged by the cord rigg agriculture. It is probable that the ceramic vessel came from this burial, but whether it had been placed on the capstone or

was from within the cist remains unknown. The cremation deposit itself had a maximum depth of 0.07m and was found to contain the remains of at least four individuals (see section 11: Osteological Analysis) of which two were young children, one was an adolescent/young adult and the other was a young adult/young-middle adult. Above the cremation was a 0.04m deep fill of light yellow-brown silty clay (050) containing small, rounded stones. This fill had most probably accumulated over a long period by silty material and small pebbles percolating into the cist between the cist's stones. The upper secondary fill of the cist (049) consisted of dark brown clay loam that had a maximum thickness of 0.13m. This fill was most probably deposited after the cist's capstone was dislodged, allowing soil to fill in the remaining void within the cist as part of the agricultural activity.

5.6.5 Two bone fragments from the cremation deposit (051) were radiocarbon dated. A rib fragment produced a calibrated radiocarbon date of 1905-1704 cal BC (95.4% probability) and probably 1882-1772 cal BC (68.2% probability (SUERC-76575 (GU45769)), whilst a long bone fragment produced a calibrated radiocarbon date of 2111-1891 cal BC (95.4% probability) and probably 2023-1937 cal BC (68.2% probability) (SUERC-76579 (GU45770)). These dates overlap, although they are not statistically consistent, and together they give a weighted mean of 3559 ±21 BP. The test statistic for this weighted mean is: T'=7.5; df=1; T'(5%)=3.8 (following the method of Ward and Wilson 1978). The transference of an old-wood offset from pyre material can differentially affect one sample and not the other and therefore, in this instance, the later date is the best for providing an estimate for the date of the cremations. Due to the cremation deposit's stratigraphic integrity and the fact that it was so tightly defined, there can be no doubt that it was deposited as one single comingled assemblage containing a number of individuals who appear to have all been cremated together. The radiocarbon dates place the cremation deposit, and likely the associated ceramic vessel, in the Early Bronze Age in the early centuries of the 2nd millennium cal BC.

Figure 22. Trench 5 after excavation looking north (scales = 2m + 1m).

Figure 23. Trench 5 showing the surviving part of the ring cairn's bank and inner mound, looking south (scale = 2m).

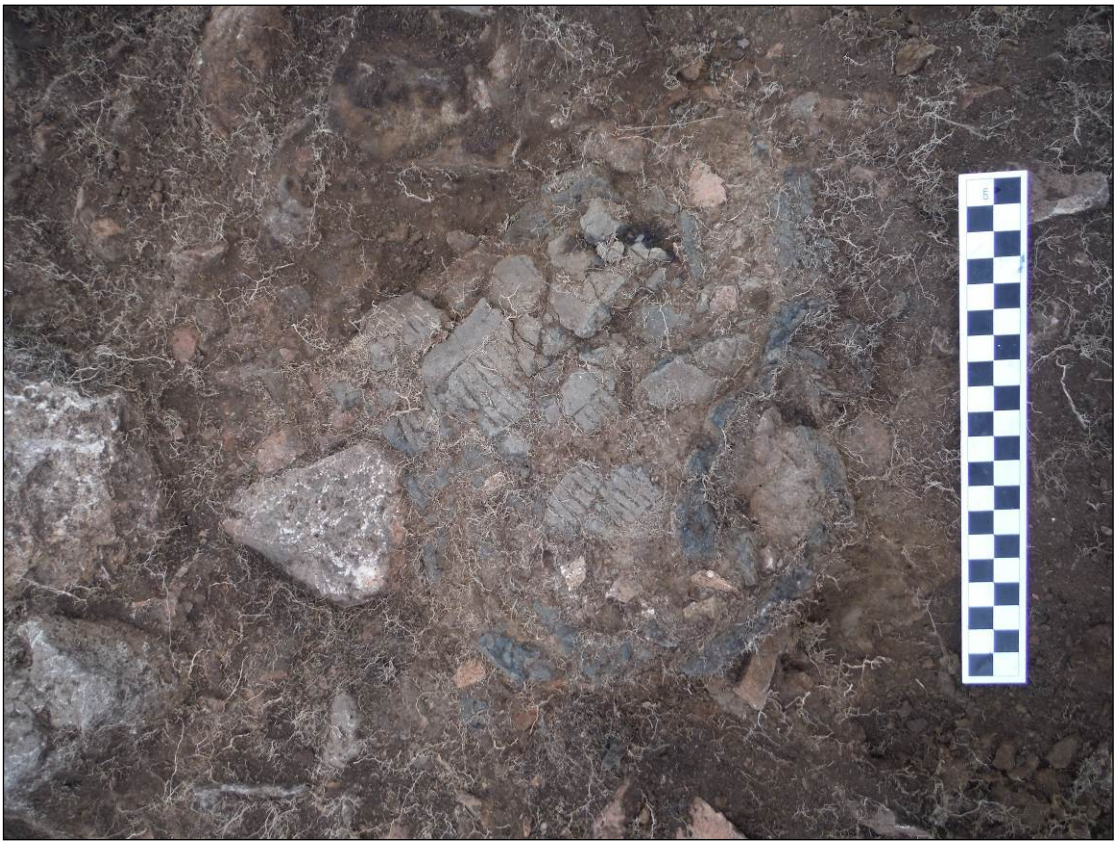


Figure 24. The sherds of the bipartite Early Bronze Age Food Vessel found in Trench 5 a few centimetres below

the turf *in-situ* (scale = 20cm).

Figure 25. The cremation cist during excavation in Trench 5 after partial excavation (scale = 1m).

Figure 26. The cremation cist in Trench 5 after full excavation and the removal of the cremation deposit (scale = 1m).

Figure 27:

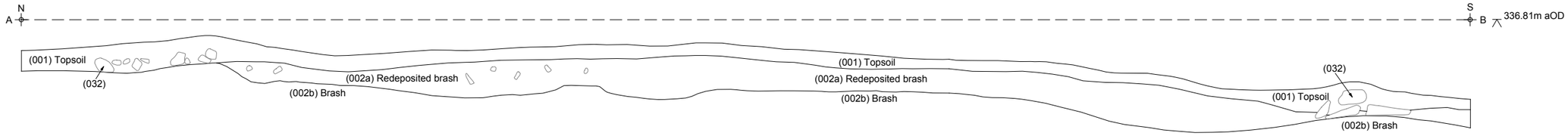
Trench 5 west facing section

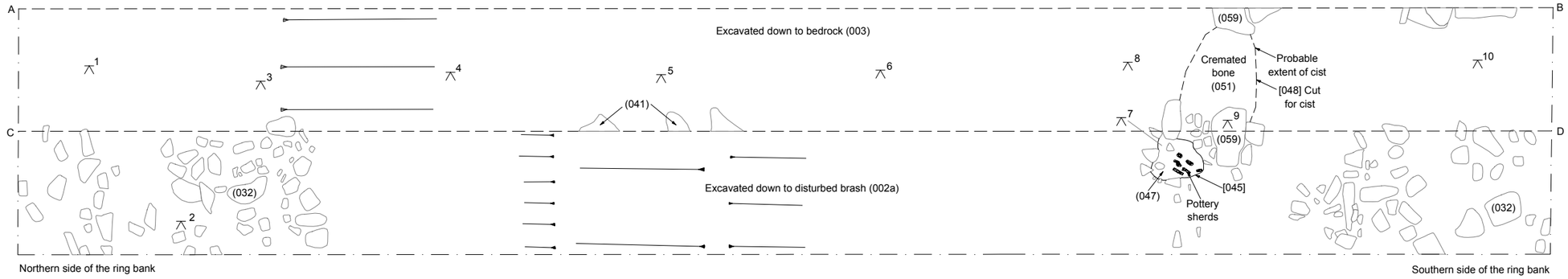
Trench 5 plan

Trench 5 east facing mid-section

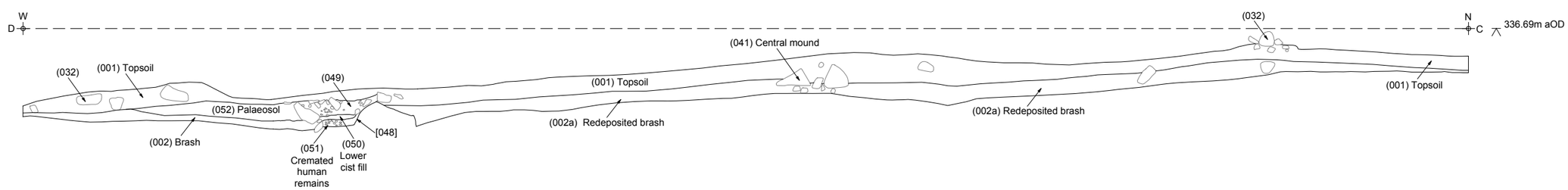
Scale = 1:40 at A3

West-facing section of Trench 5





East-facing mid-section of Trench 5



Key:

Heights
1. 336.36m aOD
2. 336.69m aOD
3. 336.31m aOD
4. 336.11m aOD
5. 336.17m aOD
6. 336.11m aOD
7. 336.14m aOD
8. 336.00m aOD
9. 335.94m aOD
10. 335.96m aOD

Stones

0 2m

5.7 Trench 6

5.7.1 Trench 6 measured 5m x 3m and was located on the south side of the field, orientated north-south across the western end of cairn Feature 3 (Figure 2). The purpose of this trench was to investigate the cairn's construction, to determine its function and to attempt to extract some dating evidence. The top of the cairn was situated at a height of 327.71m aOD.

5.7.2 Cairn Feature 3 was found to have a maximum height of 0.36m (Figure 28, Figure 29 and Figure 30). It consisted of an elongated oval-shaped pile of sub-angular, small to large-sized blocks of andesite (033) sat amongst a deposit of pale brown/orange sandy silt (034). The cairn was sat upon a thin layer of orange brown sandy silt subsoil (016) that had a maximum depth of 0.15m and was in turn sat upon the bedrock (003) that outcropped through the subsoil in places. A piece of European lime roundwood charcoal extracted from the subsoil (016) immediately beneath one of the cairn's stones produced a calibrated radiocarbon date of 2456-2201 cal BC (95.4% probability) and probably 2342-2207 cal BC (68.2% probability) (SUERC-76580 (GU45771)). This provides a *terminus post quem* for the construction of the cairn, on the assumption that this dating sample is not residual material, and if so suggests that the cairn was built in the Beaker period. Due to the lack of finds and/or human remains, the lack of a kerb or any other formal structure to this stone pile it is considered most likely that this feature is a prehistoric clearance cairn. It is located on the edge of the cultivable land before a break in slope and so its position on the edge of a cultivatable plot further suggests a clearance purpose.

Figure 28. Trench 6 after turf removal and cleaning looking south (scale = 2m).

Figure 29. The excavated section through clearance cairn Feature 3 in Trench 6 (scale = 2m).

Figure 30:

Trench 6 plan

Trench 6 section

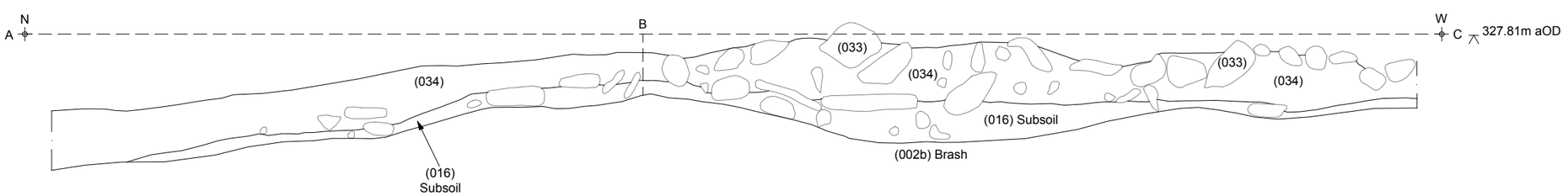
Scale = 1:20 at A3

Key:

Heights
1. 327.43m aOD
2. 327.63m aOD
3. 327.31m aOD
4. 327.45m aOD
5. 327.49m aOD

Stones

West facing and north facing sections of Trench 6



0 2m

5.8 Trench 7

5.8.1 Trench 7 was located *c*.43m to the south-east of the outer edge of the palisaded enclosure, across the line of linear bank Feature 6 (). The trench was positioned so as to investigate both the linear bank and the western side of a small cairn (Feature 7) that appeared to be butted up against the linear bank.

5.8.2 Trench 7 measured 3m x 1.5m and was orientated east to west. Linear bank Feature 6 was found to consist of a 0.9m wide and 0.4m high bank of pale brown-yellow silty loam (039) containing frequent small to medium-sized stones (Figure 31 and, Figure 32 and Figure 35). Immediately to the west of the bank was a shallow rock-cut ditch [043] running parallel to it for which no previous surface evidence had been visible. It measured 0.5m wide at the top and was 0.11m deep from the top of the brash. The ditch was filled with a primary fill of pale brown loamy silt (042) and an upper deposit of small to medium-sized, sub-angular blocks of stone (040). It appears that the ditch was cut to provide the material for the bank which, given the shallow depth of the ditch, had evidently never been very high. It is possible the bank may have been surmounted by a wattle fence or even a hedge but no evidence for such was found. When the bank went out of use some of the stone was used to infill the ditch. It is possible this was done when the cord rigg agriculture was undertaken across the site. An important stratigraphic relationship was observed here as surviving patches of cord rigg could be clearly seen overlying this bank proving that the bank pre-dates the cord rigg (Figure 33). Given that the bank evidently goes with an earlier phase of land allotment and presumably farming, it seems most likely that it is associated with either the palisaded enclosure settlement or the Beaker period – Early Bronze Age clearance, farming and burial activity. No suitable samples for radiocarbon dating were obtained from either the body of the bank or the fill of the ditch. A broken whetstone was recovered from within the ditch fill [043] (see Section 9: Coarse Stone Assessment).

5.8.3 On the east side of the linear bank a small mound of stones had been piled up against it (cairn Feature 7). This ‘cairn’ was very irregular in plan, having been partially flattened by the cord rigg agriculture, and measured approximately 3.3m x 2.9m (Figure 35). The excavation of Trench 7 found the cairn to consist of small to medium-sized sub-rounded stones (044) that had been piled into a low mound against the bank. It is considered most likely that this small cairn, of which there are several along the surviving length of this linear bank, are small field clearance mounds where stone was picked up from the field surface and dumped against the field boundary in small piles.

5.8.4 A similar and probably contemporary linear earth bank, Feature 33, was noted during the evaluation at the western extent of the site. This bank measures *c*.60m long and *c*.0.8m wide and runs in a north-east to south-west direction. The eastern end of this bank meets the western extent of the small incised valley situated immediately behind the palisaded enclosure. It is probable that the valley was made use off as a natural barrier and that the bank was created to complete the boundary and create two distinctly separate areas which were likely used for cultivation. The bank displays the distinctive ridges of cord rigg agriculture overlying it indicating, therefore, that the bank must pre-date the late Iron Age – Romano British period.

Figure 31. Trench 7 with part of the earth and stone bank still intact (scale = 1m).

Figure 32. Trench 7 after the removal of the linear bank. Rock-cut ditch [043] is to the left-hand side of the photograph (scale = 2m).

Figure 33. This photograph, taken during the earthwork survey (Cockburn 2016), shows the distinctive ridges of upstanding cord rigg (Feature 32) overlying the earth and stone bank (scales = 1m and 2m).

Figure 34. Linear bank 33 displaying the distinctive ridges caused by overlying cord rigg agriculture or quadbike ruts.

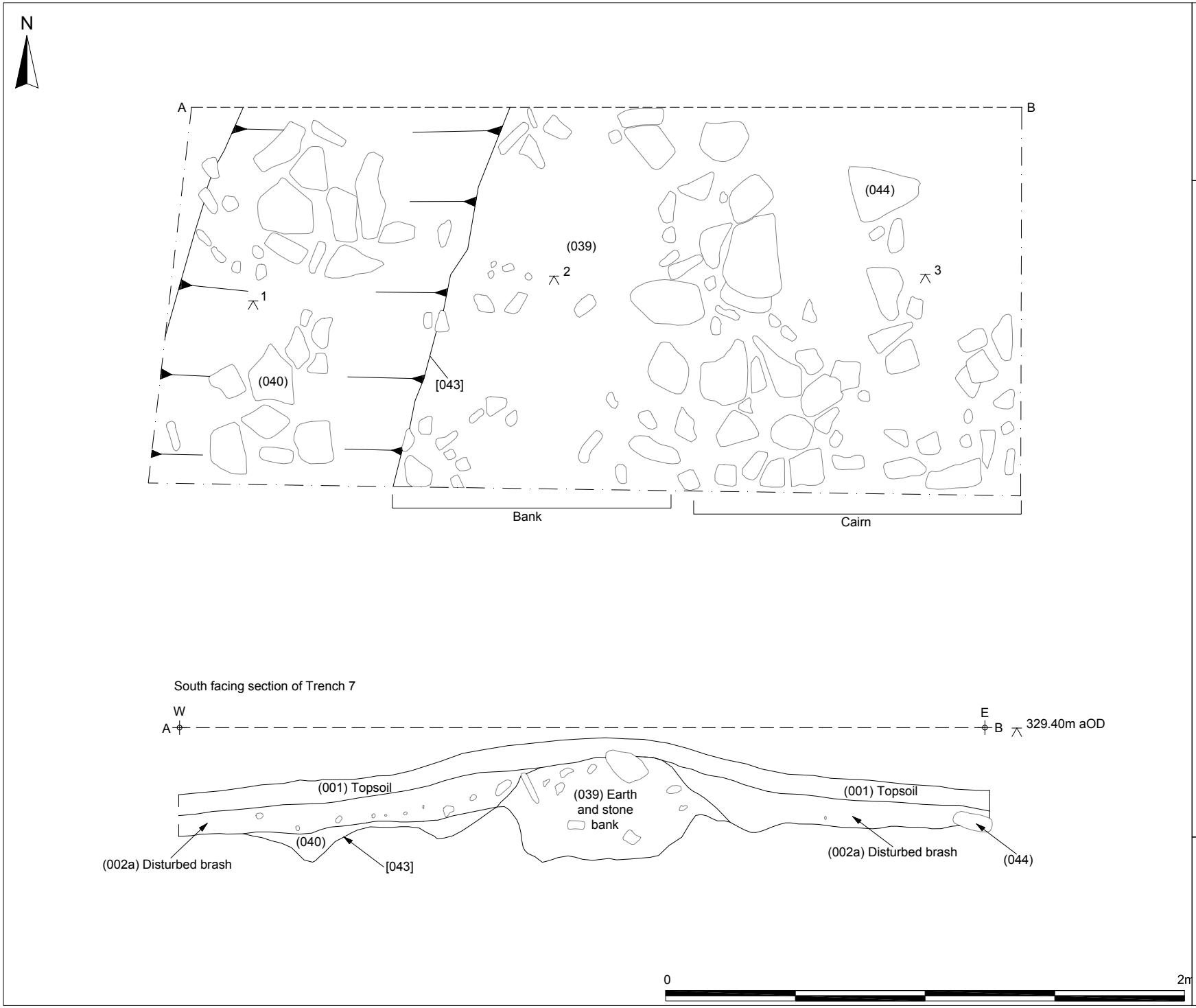


Figure 35:

Trench 7 plan

Trench 7 south-facing section

Scale = 1:20 at A4

Key:

Heights
1. 328.67m aOD
2. 329.30m aOD
3. 328.90m aOD

Stones

6. RADIOCARBON DATING

Derek Hamilton, Philippa Hunter and Clive Waddington

6.1 A total of nine radiocarbon dates were obtained from archaeological samples from the Bleakmoor Hill Palisaded Enclosure site. These are summarised as conventional radiocarbon ages (Stuiver and Polach 1977) in Table 2 below, and quoted following the recommendations of the Trondheim convention (Stuiver and Kra 1986). The dating was undertaken with advice from SUERC. Derek Hamilton (SUERC) was consulted specifically with a view to constructing a Bayesian probability model and advised that only the Iron Age activity had a suitable number of dates to produce a model with meaningful results.

6.2 The radiocarbon dates were produced at the Scottish Universities Environmental Research Centre, with the samples were single entities (Ashmore 1999) and were 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).

6.3 A sample of charred hazel obtained from the fill of Ring Groove 1e (018) produced a radiocarbon age of 5915 ±29 BP (SUERC-76574 (GU45768)). A further sample of charred Alder was also dated from this context and this produced a radiocarbon age of 5439 ±26 BP (SUERC-82096 (GU49054)). Both of these samples have been classed as residual material on account of them both being of Late Mesolithic date and resulting from activity at least 400 calendar years apart, within the fill of what is clearly a typical late prehistoric feature that appears to have been cut through an area where Mesolithic activity had previously taken place on several occasions.

6.4 A piece of European lime roundwood charcoal from the soil (034) below the clearance cairn (Feature 3) in Trench 6 was radiocarbon dated. The charcoal had a radiocarbon age of 3836 ±30 BP (SUERC-76580 (GU45771)).

6.5 A fragment of long bone from the human cremation (051) within the small cist (Feature 14) in the ring cairn returned a radiocarbon age of 3613 ±29 BP (SUERC-76579 (GU45770)) and a fragment of rib from the same cremation produced a radiocarbon age of 3499 ±30 BP (SUERC-76575 (GU45769)). The two results are not statistically consistent (T'=7.5; v=1; T'(5%)=3.8; Ward and Wilson 1978) but since they would appear to be from the same individual have been combined prior to calibration to create a weighted mean of 3559 ±21 BP.

6.6 The fill of pit (054) (Feature 1q) excavated in Trench 1 produced a piece of oak roundwood (ie. shortlived twig) charcoal that had a radiocarbon age of 2417 ±30 BP (SUERC-76570 (GU45763)).

6.7 A piece of hazel roundwood charcoal from the fill of ring gully (012) (Feature 1c) in Trench 2 produced a radiocarbon age of 2409 ±30 BP (SUERC-76572 (GU45765)).

6.8 Hazel roundwood charcoal from the fill (005) of the palisaded enclosure construction slot in Trench 1 produced a radiocarbon age of 2403 ±29 BP (SUERC-76569 (GU45762)).

6.9 Common hawthorn roundwood charcoal from the fill of a pit (026) Feature 1s in Trench 2 had a radiocarbon age of 2385 ±30 BP (SUERC-76571 (GU45764)).

6.10 A piece of hazel roundwood charcoal from the fill (008) of the palisaded enclosure's construction slot in Trench 3 produced a radiocarbon age of 2373 ±30 BP (SUERC-76573 (GU45766)).

6.11 A Bayesian model was constructed to provide a chronological framework for the dated Iron Age activity at Bleakmoor Hill (Buck *et al*. 1995). The model formed a simple bounded phase as described in detail in Hamilton and Kenney (2015) and was used to estimate the start and end date of the activity, along with the overall duration.

6.12 The model has good agreement between the radiocarbon dates and the assumed temporal grouping of the dated samples (Amodel=136). It estimates that Iron Age activity began at Bleakmoor Hill in *590–405 cal BC* (*95% probability*; Fig. RC-1; *start: Bleakmoor Hill Iron Age*), and probably in *530–430 cal BC* (*68% probability*). This activity ended in *505–335 cal BC* (*95% probability*; Table 2b (RC-1); *end: Bleakmoor Hill Iron Age*), and probably in *460–390 cal BC* (*68% probability*). The overall span of the activity was *1–225 years* (*95% probability*; Table 2c (Fig. RC-2); *span: Bleakmoor Hill Iron Age*), and probably *1–95 years* (*68% probability*).

Laboratory no.	Feature and context description	Sample	Radiocarbon Age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95.4% probability) cal BC	Calibrated date range (68.2% probability) cal BC
Mesolithic (intrusive sample)						
SUERC-76574 (GU45768)	Ring groove fill for Ring Groove 1e (018) Trench 3	Hazel charcoal	5915 ±29	−26.4	4846-4716	4828-4729
SUERC-82096 GU49054)	Ring groove fill for Ring Groove 1e (018) Trench 3	Alder charcoal	5439 ±26	−26.1	4345-4253	4336-4265
Beaker period						
SUERC-76580 (GU45771)	Soil sealed immediately below clearance cairn (034) Trench 6	European Lime roundwood charcoal	3836 ±30	−25.0	2456-2201	2342-2207
Early Bronze Age						
SUERC-76579 (GU45770)	Human cremation beneath ring cairn (051) Trench 5	Human long bone fragment	3613 ±29	−23.3	2111-1891	2023-1937
SUERC-76575 (GU45769)	Human cremation beneath ring cairn (051) Trench 5	Human rib fragment	3499 ±30	−24.1	1905-1704	1882-1772
Weighted Mean for Cremation			3559 ±21		1971-1781	1936-1887
Iron Age						
Ring grooves						
SUERC-76572 (GU45765)	Ring groove fill of Ring Groove 1c (012) Trench 2	Hazel roundwood charcoal	2409 ±30	−25.3	736-401	516-408
Pits						

SUERC-76570 (GU45763)	Pit fill located inside palisaded enclosure (054) Trench 1	Oak roundwood charcoal	2417 ±30	−27.6	747-402	536-410
SUERC-76571 (GU45764)	Pit within House 1i (026) Trench 2	Common hawthorn roundwood charcoal	2385 ±30	−27.4	728-395	489-401
Palisaded enclosure						
SUERC-76569 (GU45762)	Palisaded enclosure construction slot fill (005) Trench 1	Hazel roundwood charcoal	2403 ±29	−26.3	731-400	510-407
SUERC-76573 (GU45766)	Palisaded enclosure construction slot (008) Trench 3	Hazel roundwood charcoal	2373 ±30	−25.4	702-389	483-398

Table 2a. Radiocarbon dating results.

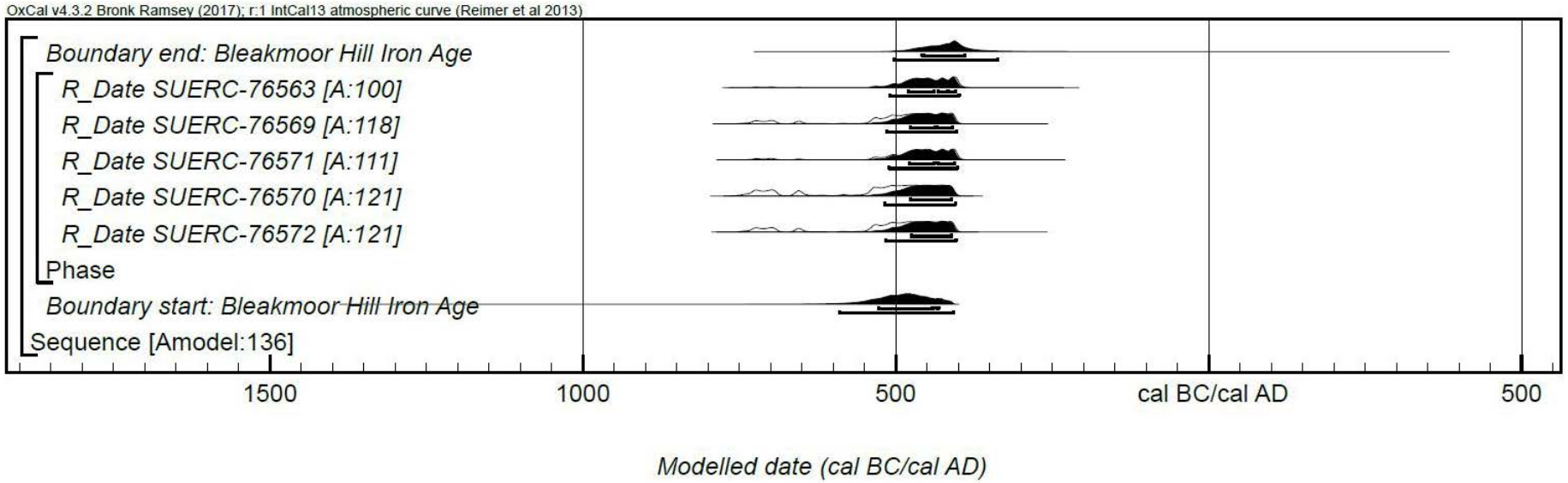


Table 2b: RC-1 Chronological model for the radiocarbon dates from the Iron Age activity at Beakmoor Hill. Each distribution represents the relative probability that an event occurred at some particular time. For each of the radiocarbon measurements two distributions have been plotted, one in outline, which is the result of simple radiocarbon calibration, and a solid one, which is based on the chronological model use. The other distributions correspond to aspects if the model. For example, '*start: Bleakmoor Hill Iron Age*' is the estimated date that Iron Age activity began, based on the radiocarbon dating results. The large square 'brackets' along with the OxCal keywords define the overall model exactly

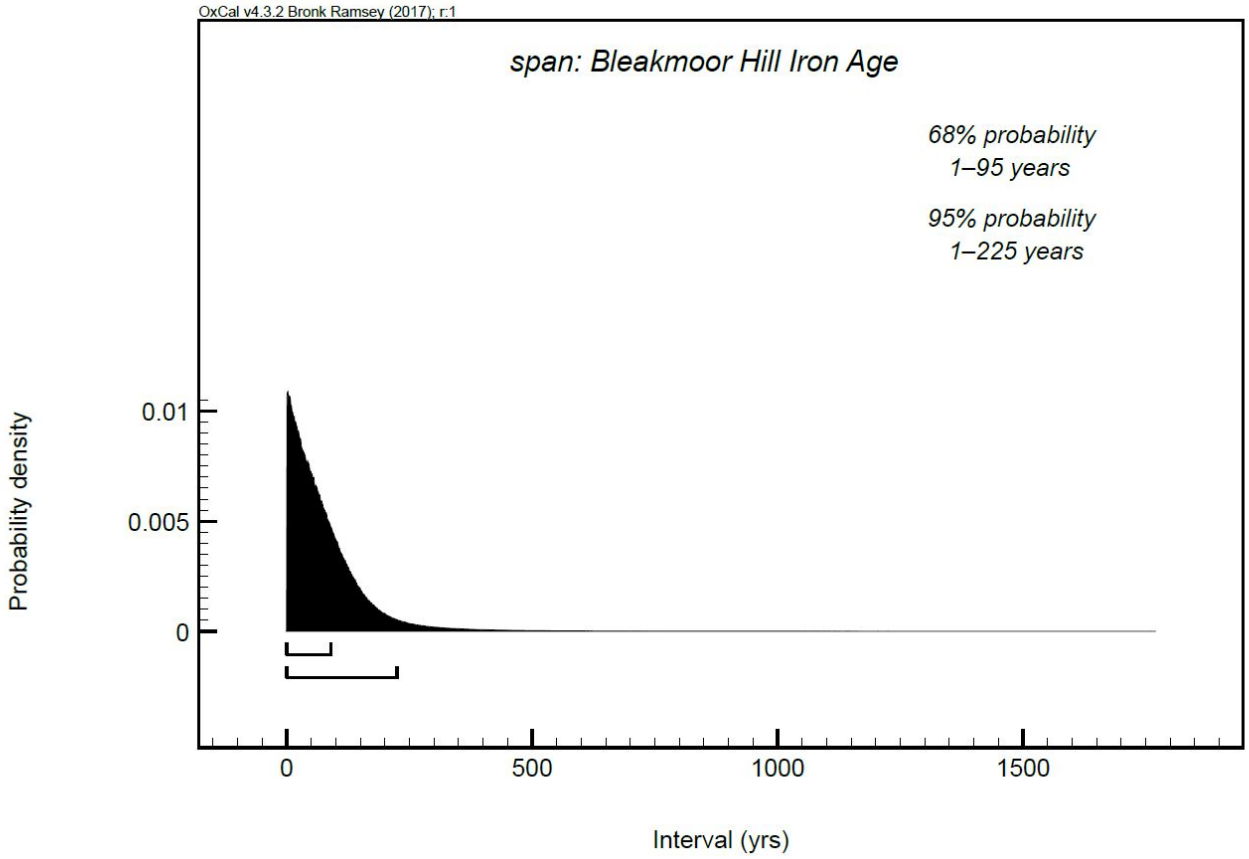


Table 2c: RC-2 Span of Iron Age activity at Bleakmoor Hill.

7. PREHISTORIC CERAMIC ANALYSIS

Clive Waddington

7.1 Introduction

7.1.1 The corpus of ceramic material recovered from the Harden Quarry evaluation comprised an assemblage of just two vessels; one an incomplete and very fragmentary Early Bronze Age Food Vessel and the other three body sherds from a late prehistoric domestic vessel. The Food Vessel (Pot 1) was recovered immediately adjacent to the top of the disturbed cist within the ring cairn (Trench 5) and the body sherds from the late prehistoric vessel (Pot 2) were found together in the subsoil of Trench 4 within the interior of the enclosure next to the palisade slot.

7.2 Method Statement

7.2.1 The sherds were gently finger-washed in cold water and then left to air dry. Once they had dried the remaining soil was gently brushed off with a sable shaving brush. The sherds were laid out according to context and then by fabric group and individual vessels. The pottery was examined macroscopically with the aid of a x10 hand lens. No microscopic analysis was undertaken. Joining sherds were refitted using HMG adhesive.

7.3 Catalogue

7.3.1 A catalogue describing each identified vessel by ceramic type is presented below.

Vessel Number	Small Find Number	Context Number	Description	Weight (grams)
1	SF13	047	Pot 1 comprises an incomplete and fragmentary bipartite Food Vessel. It has a flat base, flared body and upright neck with gently everted rim, although the carvetto zone has a slight concavity as is typical for these vessels. Although very fragmentary the approximate dimensions of the vessel are in the order of 110-120mm in height, the base is *c*.70mm in diameter and the internal diameter of the rim is 140-150mm. There are around 57 sherds and many small crumbs that would have made up around half of the pot. The wall thickness ranges between 8.5-9.5mm and is thickest at the base where it is 17mm. The fractures indicate a slab-made pot. The fabric is crumbly and contains prepared, angular crushed stone inclusions, typically of sandstone, up to 8mm across and which very occasionally erupt at the surface. It has a thick slip on its outer side into which the decoration has been incised after partial drying. The outer surface is a pale brown colour and the inner surface and core is dark grey. The decoration consists of parallel, incised horizontal lines/grooves set within sub-rectangular polygons with their long axis vertical. The strongly defined carination divides areas of decoration on the body of the pot with the areas of decoration within the	765.1

			carvetto zone.	
2	SF14	027	Three body sherds from a hand-made, substantial plain vessel. It has a hard fabric, is evenly fired and has a reddened oxidised slip on its outer surface although this is pale grey beneath where it has not oxidised. It has a pale brown-grey inner core and surface. It contains crushed stone inclusions that occasionally erupt at the surface up to 8mm across. Wall thickness 11.5-12.5mm. The surviving part of the pot is not diagnostic although their shape indicates a slight curvature on the belly of the pot.	76.3

Table 3. Table of Prehistoric ceramics.

7.4 Fabric

7.4.1 This assemblage has two different fabrics present. The first is the crumbly fabric with angular crushed stone inclusions and an outer slip which Pot 1 is made from and the second is a hard and largely well-fired fabric containing angular crushed stone temper and with an oxidised outer slip from which Pot 2 is made. The sandstone used as the prepared inclusions for each pot is present at a distance locally in the hills to the immediate south, east and west of the site.

7.4.2 Surface colouration can vary considerably, even within a single vessel, as is usual with ceramics fired under a bonfire or pit clamp and repeatedly exposed to smoke discolouration, heat and differential oxygen supply. This can be seen on Pot 1. Pot 2 on the other hand is much more evenly fired suggesting a more formally controlled process and possibly one utilised for larger-scale production where the temperature and oxygen supply is more carefully controlled and possibly higher temperatures attained.

7.5 Form

7.5.1 The term 'Food Vessel' is used here to refer to the typical suite of Early Bronze Age vessels, usually resembling a small flower pot in shape, and associated with a burial. Pot 1 is a typical bipartite vessel with round flat base, flared body, carination and upright neck that is slightly concave and with a slightly everted rim. The decoration is very basic consisting of horizontal parallel incised lines set within sub-rectangular, arcing borders. Although the pot shows some sophistication in its construction, being slab made with prepared inclusions and slipped, the decoration may have been executed by a child.

7.5.2 Little can be said with regards to the form of Pot 2 as only three body sherds survive, although it evidently came from a substantial domestic pot with an arcing/rounded part to the belly.

7.5.3 The Food Vessel aligns well with the material recovered from elsewhere in North East England and Southern Scotland. The radiocarbon dates associated with this pot, by way of the human cremations from the disturbed cist above which the pot was found, place it in the Early Bronze Age which compares with the other dates for Food Vessel ceramics from the region (Gamble and Fowler 2013). The two dates from Harden make an important contribution to understanding the dating, phasing and typology of Food Vessels in the region for which only a small number of dates are currently available.

7.6 Numbers

7.6.1 A total of *c*.60 sherds and many crumbs was recovered representing two distinct vessels.

Figure 36. Pot 1 with rims along the top, carination below and upper part of belly below the carination with zones of parallel, incised, horizontal line decoration set within sub-rectangular 'boxes'.

Figure 37. Pot 1 with base sherds showing flat, circular base, and flared angle of body.

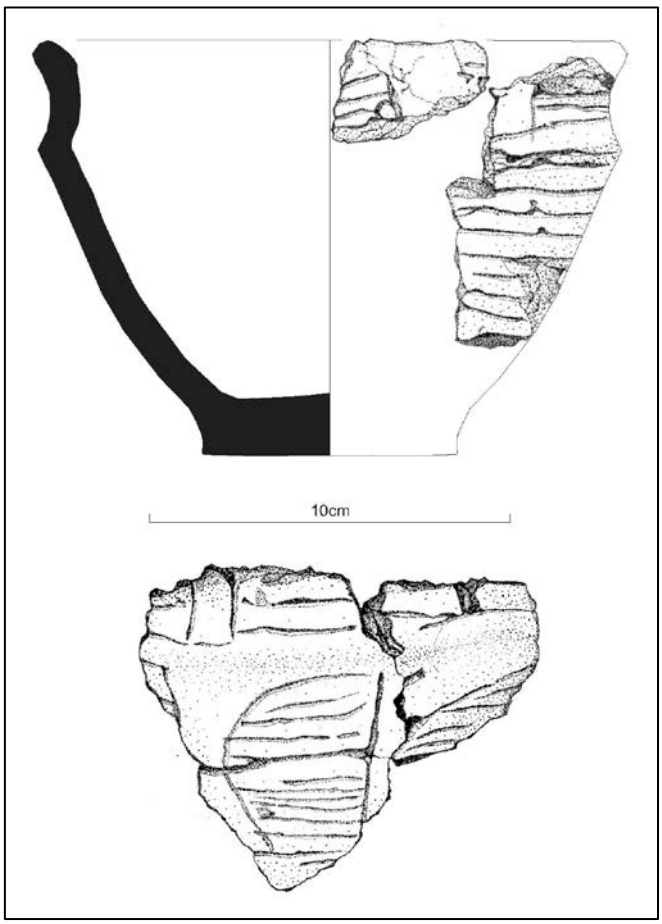


Figure 38. Hand-drawn sherds of the fragmentary Food Vessel. The lower sherd has been included to show details of the decoration (scale = 10cm).

Figure 39. Pot 2 body sherds showing oxidised outer surface.

7.7 Discussion

7.7.1 The assemblage comprises two pots of very different form, fabric and function suggesting two distinct chronological episodes of activity are represented. The Food Vessel is a typical form of grave good, or receptacle for cremation, in Early Bronze Age burial

monuments within the region. The later prehistoric pot sherds are from a domestic vessel likely to have been used for storage or cooking and appears to be associated with the occupation of the palisaded enclosure. Although small, this assemblage demonstrates that ceramic material of different fabrics survives well on the site and can be found to survive just a few centimetres below the modern ground surface (e.g. Pot 1).

7.7.2 The Food Vessel has unusual decoration and in this respect makes a useful addition to the local ceramic corpus (see Gibson 1978) for this style of vessel. Its form is typical of what Wilkin has described as the 'Cheviot Group' (Wilkin 2013, 151-55), and its association with a cremation burial in a short cist is a phenomenon noted for Food Vessels at other sites in the region (see Fowler and Wilkin 2016) including at the recently published site on the Northumberland coast at Low Hauxley (Waddington and Bonsall 2016). There remains a paucity of radiocarbon dates for Food Vessels associated with cremation burials but based on the dates so far available (see Passmore and Waddington 2012; Gamble and Fowler 2013 and Fowler 2013) the chronological milieu for Food Vessels encompasses the period *c*.2100 – 1700 cal BC.

7.7.3 The later prehistoric sherds (Pot 2) are of limited significance, although with only a meagre later prehistoric ceramic corpus for the region, even small parts of a single vessel such as this are of assistance in expanding that corpus.

7.7.4 The opportunity to gain radiocarbon dates for this pottery style is important and forms a priority in the North East archaeological research agenda (Petts and Gerard 2006).

8. LITHIC ASSESSMENT

Clive Waddington

8.1 Quantity

8.1.1 A total of 6 chipped lithic artefacts were recovered from the evaluation excavation which came from a mixture of topsoil, subsoil and discrete feature fills. All of this material is considered to be residual within the deposits they were found resulting from earlier Stone Age activity across the site.

8.2 Provenance

8.2.1 Table 1 below lists the lithics by contexts from which they were recovered.

Context No	Find No	Context Type	No Lithics	Lithic Types Present	Other asstns.	Period
001 (Trench 3)	1	Turf and topsoil	1	Small, broken chert flake	-	
006 (Trench 3)	2	Upper fill of palisade slot	1	Small, broken agate chip	-	
001 (Trench 3)	4	Turf and topsoil	1	Small, broken chert flake	-	
002 (Trench 2)	8	Subsoil brash	1	Crude flint scraper made on squat blade	-	Neolithic or Early Bronze Age
001 (Trench 4)	6	Topsoil	1	Small, broken chert flake	-	

002 (Trench 5)	12	Subsoil brash	1	Broken, retouched flake made on a squat blade or flake	-	Neolithic or Early Bronze Age
Total			**6**			

Table 4. Lithic counts by context.

8.3 Dating

8.3.1 None of the lithics are morphologically diagnostic, although the squat flint scraper is made on a broad blade removal suggesting a Neolithic or Early Bronze Age date. The use of local material such as chert and agate is suggestive of Mesolithic activity as most examples of worked local material are found in Mesolithic assemblages (Passmore and Waddington 2012) and this could correspond with the radiocarbon date on a charred hazelnut shell fragment from Trench 3, albeit a sample from a residual context.

8.4 Raw Material

8.4.1 Two pieces from the assemblage are light-medium grey flint, three are dark grey/black chert and one piece is red agate. Based on the patches of thin cortex visible on the flint both pieces appear to be from a glacial, secondary source, the most likely being flint found in the glacial tills of north-east Yorkshire. The chert and agate can be found within the glacial outwash deposits throughout much of Northumberland and particularly in the north of the county.

8.5 Types

8.5.1 The assemblage includes a crude scraper with neat unifacial retouch along its long edges and distal end. It has maximum dimensions of 43mm by 31mm by 7mm. The only other modified piece is the retouched flint flake. On this piece the retouch has been used to thin the flake adjacent to the bulb of percussion on its dorsal surface. A hinge fracture was created when the flake was removed from the core and the piece is broken perpendicular to its distal end. All of the other pieces are unremarkable flakes and a chip with no tertiary modification, all of which have broken in antiquity.

8.6 Condition

8.6.1 All of the material is in good condition. None of the pieces show fresh breaks and therefore the broken pieces have been broken in antiquity prior to discard.

8.7 Primary Sources and Documentation

8.7.1 There is no documentation that might enhance the study of this collection.

8.8 Means of Collecting the Data

8.8.1 The lithics were excavated from the ground using hand tools (trowels and small tools) and from sieves with a 1cm^2 mesh. Each lithic was washed in tap water and gently cleaned with a toothbrush before being left to air dry. Each lithic was placed in an individual plastic bag that was labelled with a unique small find number and the context number.

8.8.2 For the assessment and analysis the lithics were un-bagged and laid out on a table and grouped by context. Lithic counts were recorded and an examination made of all pieces. The lithics were then re-bagged and packed, by context, into a sturdy storage box.

8.9 Value of the Data

8.9.1 This assemblage of material is very small on its own and has limited potential to advance the regional research agenda and understand more, specifically, about lithic production, use and significance in the region, a topic that is currently poorly understood and for which few radiocarbon dated assemblages are known from the region.

8.10 Integration of Study with Other Research

8.10.1 The lithic material from this assemblage adds to the corpus for the region and this is its main contribution to regional research. As all the material is, however, residual within the contexts they were found, there is no scope to obtain associated radiocarbon dates. The assemblage documents the presence of prehistoric activity on Bleakmoor Hill prior to the occupation of the site as evidenced by the structural remains investigated as part of this study.

8.11 Storage and Curation

8.11.1 The lithics are currently contained in sealed and labelled plastic bags. Lithics from the same context are all bagged in a context specific bag. These bags are stored in a sturdy storage box with other finds from Harden Quarry.

8.12 Retention and Discard Policy

8.12.1 It is recommended that all of this collection is kept for future study.

Figure 40. From left to right: agate chip (find no.2), chert flake (find no.4), chert flake (find no.1), chert flake (find no.6), flint scraper (find no.8), flint retouched flake (find no.12).

9. Coarse Stone Assessment

Clive Waddington

9.1 Introduction

9.1.1 A total of three coarse stone tools was recovered from the Bleakmoor Hill excavations. The two querns are made from the locally occurring andesite and the whetstone is made from a fine-grained quartzitic sandstone. Quern find no. 7 was from the fill of pit 1r (014) in Trench 2, quern find no.5 was from the topsoil (001) in Trench 4 within

the area of the palisaded enclosure, and the whetstone was from the primary soil fill of ditch (042) next to the linear bank in Trench 7. The two querns are likely to be contemporary with the settlement represented by the roundhouses and the palisaded enclosure whilst the whetstone is likely to be contemporary with the field system.

9.2 Quern Stones

9.2.1 Find No. 7 is a substantial fragment of a broken quernstone made from the grey Cheviot andesite that outcrops immediately around the dome of Bleakmoor Hill. It is coarse grained rock that has been roughly shaped (Figure 1). The quern is broken in two places and has two opposed flat surfaces where there is smoothing on one side consistent with its use for rubbing (its 'upper' side), whilst on its reverse side the flat surface remains coarse and unsmoothed suggesting this side was the base and was never utilised for rubbing. The piece measures 122mm thick. It is broken across its approximate centre and so its full length is not known and its maximum width must have been more than 290mm. Given the size of this piece it is likely to be the base stone upon which a manual rubber was used. If the stone's shape is projected beyond the two breaks it suggests a broadly saddle-shaped quern, albeit without any curvature on its base.

Figure 41. Quernstone (Find no. 7) showing its upper smoothed surface with a lateral break running all the way across the stone at the top and a further break in the bottom left corner (scale = 20cm).

9.2.2 Find No. 5 is a smaller fragment of a broken quernstone made from the 'Harden Red', the pink andesite of which Bleakmoor Hill is itself composed. It, too, is coarse grained rock that has been roughly shaped (Figures 2 and 3). The quern is broken transversely across the long edge of the piece. It has a single flat surface that has been smoothed by rubbing, whilst the reverse side is rounded along the long axis of the stone. This gives it a saddle-shaped form. The piece has maximum dimensions of 131mm in thickness and is 215mm wide and has a length greater than 270mm, but as it is broken in this direction its full length remains unknown. The size and shape of this piece indicates it is likely to be the base stone upon which a rubber was used. If the stone's shape is projected beyond the break it suggests a broadly saddle-shaped quern.

Figure 42. Quernstone (Find no. 5) showing its lower domed surface with a lateral break running all the way across the stone at the left side (scale = 20cm).

Figure 43. Quernstone (Find no. 5) showing its upper smoothed surface with a lateral break running all the way across the stone at the right side (scale = 20cm).

9.3 Whetstone

9.3.1 A segment of a regular, oblong, highly smoothed sandstone whetstone that has a maximum width of 54mm and thickness of 31.5mm. Its length remains unknown as it is broken perpendicular to its long side and it also has a piece missing from its butt end (Figure 4). Both the upper and lower surfaces are flat and highly smoothed suggesting considerable use. The long sides are both slightly convex and on one side there are the clear wear marks where what appears to be a metal blade has been sharpened (Figure 5). There are few examples of prehistoric whetstones known from Britain but the form of the piece could sit comfortably in a Bronze Age or Iron Age context. The whetstone from Low Hauxley was long and slender and of different form, although made from a similar sandstone and was longer and thinner than the whetstone from Bleakmoor Hill. The Low Hauxley specimen was found

in an Early Bronze Age context having been deposited in the centuries around 2000 cal BC (Waddington and Bonsall 2016).

Figure 44. Whetstone (Find no. 15) showing one of its smoothed surfaces with a lateral break running all the way across the stone on the right hand side (scale = 10cm).

Figure 45. Whetstone (Find no. 15) shown side-on with smoothed convex surface upwards and with scored grooves visible on its right hand side indicating its use for sharpening purposes – probably for a metal bladed object/s (scale = 10cm).

10. GLASS FINDS ASSESSMENT

Alex Croom

10.1 A single broken glass bead (dimensions D:13mm H:10mm; tapering hole D:3-4mm) was recovered from Trench 2 from the interface between the topsoil (001) and the disturbed brash layer (002a).

10.2 It is an incomplete globular bead in opaque mid/dark blue glass. This is a Guido 1978, group 7 iv bead, in use in the Late Iron Age and throughout the Roman periods. Six

comparable examples of dark blue beads have been discovered at Binchester from fourth- and late fourth/early fifth-century contexts (Price and Worrell 2010, fig. 86, no. 354; 292). However, this very basic type of bead is impossible to date closely, and as this example was found in topsoil a medieval or post-medieval date cannot be ruled out. It could, however, correspond with the cord rigg agriculture that took place across the site.

Figure 46. The broken blue glass bead recovered from the interior of ring groove house 1h (scale = 10cm).

Figure 47. A side view of the broken blue glass bead recovered from the interior of ring groove house 1h (scale = 10cm.

11. OSTEOLOGICAL ANALYSIS

Milena Grzybowska

11.1 Material

11.1.1 A human cremation deposit (051) was found within a cist constructed within a ring cairn sampled by evaluation Trench 5. The remains had been placed within a small, corbelled stone cist, (059), and appear to have been associated with a decorated ceramic vessel found immediately next to the top of the disturbed cist. The fill of the cist was excavated in two stages: a third of the cremated bone was excavated *in-situ* whereas the remaining content of the cist was bulk sampled due to an exceptionally hard soil matrix, (050), in which the bone was embedded. The bone was wet sieved subsequent to excavation and prior to the analysis.

11.2 Methods

11.2.1 The works were undertaken in accordance with the standards set out by English Heritage (2004) and the guidelines of the Chartered Institute for Archaeologists (2018) and also the British Association of Biological Anthropologists and Osteologists in conjunction with CIfA (2004).

11.2.2 Cist fill (050) was floated and wet sieved using graduated sieves (2mm, 5mm and 10mm). Bone fragments from 10mm+ to 2mm were collected for examination. Flotation samples were also examined to recover plant remains and any charcoal, although little of the latter was present and none was suitable for radiocarbon dating.

11.2.3 The entire material was analysed macroscopically and, when necessary, with the aid of a magnifying glass (x5). The unidentified bone was sorted into three fractions of 10mm, 5mm and 2mm using UKAS accredited calibrated sieves and weighed to one decimal place. A complete inventory of identified specimens was compiled. The total and group weights of bone were recorded, the level of fragmentation estimated, the maximum bone fragment lengths measured and average fragment size was noted. The level of oxidation was inferred from the colour of the bone. Dehydration indicators and exogenous staining of the bone was recorded.

11.2.4 An attempt to obtain demographic data was undertaken. Age was determined on the basis of dental development (AlQahtani 2009) and epiphyseal fusion of bones (as specified in Scheuer and Black, 2000). Age was categorised as follows: foetus (up to 40 weeks in utero), neonate (around the time of birth), infant (newborn to one year old), juvenile (1-12 years old), adolescent (13-17 years old), young adult (18-25 years old), young middle adult (26-35 years old), old middle adult (36-45 years old) and mature adult (46+).

11.2.5 The minimum number of individuals (MNI) was established by combining skeletal element identification, age and sex estimation results.

11.2.6 All pathological changes to the bone and non-metric traits were recorded.

11.3 Results and discussion

11.3.1 The bulk content of the cremation deposit was wet sieved. The complete inventory of the cremated bone is included in Appendix IV.

11.4 Weight

11.4.1 Quantification of the cremated bone has the potential to inform on the cremation process including pyre technology, collection and bone deposition. The weight of the bone recovered from a deposit may be affected by anthropogenic and non- anthropogenic influences. These include the level of protection offered to the cremated remains within the burial environment, the level of post-depositional disturbance and the age and sex of the individual.

11.4.2 In modern crematoria the average weight of the bone after cremation make up about 3.5% of the total body weight in adult individuals, 2.5% in small children and 1.0% in infants (Warren and Maples, 1997). Although contemporary cremation processes result in the production of between 1227.4g and 3001.3g of bone, it has been suggested that in archaeological contexts whole body deposition should produce weights ranging between 1001.5g and 2422.0g (McKinley 1993).

11.4.3 The cremated bone contained within the cist, (059), weighed 2175.6g (Table 1) which is twice the mean weight of cremated human bone samples typically retrieved from primary Bronze Age barrow burials (1052g) (McKinley 1997). The weight of the bone retrieved from cist fill (050) was suggestive of multiple individuals and whole-body deposition.

Fragment size (mm)	Weight (gram)	Proportion (%)
>10	1054.1	48.4
<10>5	605.7	27.8
<5>2	515.8	23.7
Total	2175.6	99.9

Table 5. Cremated bone weights

11.5 Skeletal elements

11.5.1 Representation of skeletal elements can inform on the pre-cremation condition of the remains. For example, a secondary cremation of disarticulated remains is not probable if most bones of the skeleton are present. In order to aid interpretation of funerary behaviour and practice, such as the selective collection of the bone from the pyre, the weights of each skeletal region expressed as a proportion of the total weight can be compared to the expected proportion estimated for the modern cremated remains (Gonçalves 2011a).

11.5.2 All major elements of the axial and appendicular human skeleton were present within cremation deposit (051) (Table 2) arguing against a selective collection of bone from the pyre and suggesting a primary cremation of an articulated body.

Group	Weight (gram)	Fragment size range(mm)
Skull (excluding teeth)	310.1	8-51
Teeth	9.2	2-14
Vertebrae	64.9	5-46
Ribs	38.3	8-35
Clavicle	2.9	21-30
Scapula	11.5	19-45
Humerus	54.0	13-71
Radius	12.4	15-58
Ulna	0.2	14
Carpals	2.4	10-20

Metacarpals	4.1	20-45
Phalanges (hand)	11.6	5-31
Pelvis	35.2	23-41
Femur	36.6	31-61
Patella	0.6	18
Tibia	13.6	30-45
Fibula	9.8	49
Tarsals	6.7	9-26
Metatarsals	2.6	12-45
MTC/MTT	4.3	10-33
Phalanges (foot)	3.5	6-17
Epiphyses	30.2	-
Carpals/tarsals	10.2	-
Long bone shafts	278.5	-

Table 6. Group weights and fragment size range of human bone.

11.5.3 In all of the broader categories (skull, axial and appendicular), the most sizeable deviation from a normal distribution was observed in the axial skeleton (10.8 vs 21%) (Table 7). This is a common occurrence (McKinley 2004) that could be explained by preferential destruction of trabecular bone of the axial elements and therefore is not evidence for their deliberate exclusion during bone collection. The higher proportion of the skull (33.5% vs 18%) can be partially attributed to the higher probability of identification of cranial fragments, the smallest of which measured only half (8mm) of the average minimum fragment size from all identified elements (15.6mm).

Area of body	**% (identified to an element)**	**Normal distribution (%)**
Skull	33.5 (48.4)	18.0
Axial (excluding skull)	10.8 (15.6)	21.0
Upper/lower limbs	55.6 (upper limbs: 15.0; lower limbs: 20.8)	61.0

Table 7. Skeletal elements distribution.

11.6 Minimum Number of Individuals

11.6.1 Duplication of identifiable elements and age related differences (size, development and morphology) indicated that the cist (059) contained cremated remains of at least four individuals.

11.7 Demography

11.7.1 Funerary practices may differ according to the age or sex of a deceased individual. Biological sex of an individual can be established by macroscopic examination of the cremated remains as well as via metric analysis as a heat-related dimensional change of the bone does not have a significant impact on osteometric sexual dimorphism (Gonçalves 2011b).

11.7.2 Age estimation uses different stages of bone and tooth development and degeneration in order to calculate the age of an individual. The most reliable macroscopic methods of age estimation depend on the presence of specific areas of the pelvis (adult individuals) and identifiable teeth (subadult individuals).

11.7.3 The age of the individuals was estimated on the basis of dental development, epiphyseal fusion of bone and degenerative changes of pelvis. The presence of developing

permanent teeth (Table 4) indicated the presence of at least one juvenile individual, 8.5y ± 6 months old. Further, morphology and size of some cranial fragments suggested presence of the remains of a younger child that could be placed within the infant and early years of juvenile category at the maximum. Complete fusion of the proximal ends of three radii (Table 5) provided evidence for the presence of at least two individuals that reached 13 years of age. Unfused distal ulna provided upper end (≤20y) for the age brackets for one of these individuals, whereas characteristics age changes in pubic symphysis suggested the remaining adult was 25-30 years old.

11.7.4 In conclusion, the cremation deposit (051) included the remains of two young children (a juvenile and infant/juvenile), one adolescent/young adult and one young adult/young middle adult individual.

Tooth	Side	Tooth development stage	Age range (years)
Upper M1 or M2(fragment)	R	Cr3/4	3.5-7.5 ± 1
Upper PM2	L	Ri	8.5 ± 1

Table 8. Identified teeth development stage (AlQahtani, 2009).

Element	Side	Age indicators	Age (Scheuer and Black, 2000) (years) (Male/Female)
humerus	R	Fused distal	≥15/≥12
1st MTC	L	Fused proximal and distal	≥15/≥12
intermediate phalanges hand	-	Fused proximal	≥15/≥12
1st distal phalanges hand	-	Fused distal	≥15/≥12
distal phalanges hand	-	Fused proximal	≥15/≥12
pelvis	-	Fused acetabulum	≥15/≥14
MTT	-	Fused distal	≥15/≥11
proximal phalanges foot	-	Fused proximal	≥15/≥11
MTT + MTC	-	Fused proximal and distal	≥15/≥12
scapula	L	Fused glenoid	≥16/≥16
radial heads x3	-	Fused proximal	≥16/≥13
femur	L	Fused proximal	≥16/≥14
femur	R	Fused proximal	≥16/≥14
tibia	L	Fused distal	≥16/≥15
radius	R	Fused distal	≥17/≥15
humerus	L	Fused proximal and distal	≥18/≥16
ulna	R	Open distal	≤20/≤18
clavicle	R	Open medial	≤23/≤23
pubis	R	(Phase II - III: Suchey-Brooks)	F mean: 25.0-30.7y
maxilla	L	Alveoli – permanent teeth	≥12.5y ± 6 months (AlQahtani, 2009)

Table 9. Adolescent/Adult age indicators.

11.7.5 The presence of a young subadult individual was also confirmed by the appearance and small size of multiple elements of the axial and appendicular area of the skeleton (Table 9). Skull fragments that could be attributed to either an infant or a juvenile constituted 23.6% of the total weight of skull identified, whereas rib fragments reached 16.4% of the

weight of all recognised ribs.

Skeletal element (side)	Side	Weight (grams)	Age estimation based on
skull	-	71.3	Size and morphology
frontal	L	0.9	Size and morphology
frontal	L	0.5	Size and morphology: infant/early juvenile
zygomatic	L	0.3	Size and morphology
mandible	R	0.3	Size and morphology
cervical vertebrae	-	3.7	Size and morphology
ribs	-	6.3	Size and morphology: infant/early juvenile

Table 10. Subadult skeletal elements (excluding teeth).

11.7.6 Estimation of sex was attempted exclusively on the elements displaying adult appearance. On the basis of the morphology of pelvis, the cremated remains, (051), contained at least one possible female (?F) individual (Table 11) whose age falls within young adult/young middle adult category. Two cranial fragments also displayed morphology attributable to possible female.

Skeletal element (side)	Sex	Sex indicator
frontal (L)	?F	glabella and orbital margin
frontal (R)	?F	orbital margin
pubis (R)	?F A (Phase II - III: Suchey-Brooks)	subpubic concavity

Table 11. Estimation of sex.

11.8 Metric and non-metric traits

11.8.1 Metric data has a potential to inform on the stature of an individual and their ancestry. Non-metric traits are additional sutures, canals, foramina, facets and bony processes, which occur in a minority of skeletons and are attributable to mechanical stress, environment and hereditary affiliation between skeletons.

11.8.2 Due to the incompleteness of the bones no standard metric data was obtained. Non-metric traits were mostly absent, however it was possible to identify the presence of incomplete supraorbital foramen, rhomboid fossa and vastus notch.

11.9 Pathology

11.9.1 Observation of pathological lesions is a means of assessing health and lifestyle of an individual and population. It also has the potential to inform on the overall success of adaptation to the environment. Pathological analysis requires exhaustive description of abnormal modifications of the bone, its size and location. Pathological changes are categorized according to their aetiology: congenital, metabolic, infectious, neoplastic, trauma etc.

11.9.2 No pathological lesions of the bone were identified.

11.10 Efficiency of cremation

11.10.1 Cremation efficiency relies on temperature and time of burning. The process of

cremation is one of dehydration and oxidation of the organic components of the body.

11.11 Oxidation

11.11.1 Complete burning results in complete oxidation of the organic component of bone, leaving only the mineral portion of the skeleton (McKinley, 1994). Experiments have proved that the colour of the bone reflects the temperature it attained during cremation and could therefore act as a proxy for oxidation level (Shipman et al. 1984, Holden et al 1995):

Brown/black bone= charred (*c*.300°)
Blue/Grey bone= incompletely oxidized (*c*.600°)
White bone= completely oxidized (>600°)

11.11.2 As the level of the organic content of the bone and thickness of soft tissue cover influence the degree of oxidation it is not unusual to see a range of colours within one burial or even on a single bone fragment.

11.11.3 The bone within cremation deposit (051) was fully oxidised. The overall appearance of the cremated remains suggested the efficient cremation of fleshed cadavers in temperatures exceeding 600°C. A proportion (11%) of subadult cranial fragments were greyish in colour endocranially.

11.12 Dehydration

11.12.1 Dehydration during cremation results in shrinkage, fissuring, fracturing and warping of the bone.

11.12.2 During cremation various bones within an individual reach different temperatures, depending on intrinsic (e.g. soft tissue cover) and extrinsic (e.g. weather conditions, quality of pyre) factors, therefore shrinkage of the bone varies between individuals and between different skeletal elements of the same individual and may fluctuate between 0-30% (after McKinley 2000). It has been demonstrated that calcined bones present a substantially larger degree of shrinkage (-14.5%) than pre-calcined bone (-4.1%) (Gonçalves 2011a). Degree of shrinkage also decreases with age as the progression of the mineralization process within bone becomes increasingly resistant to heat-induced dimensional changes; furthermore, females tended to display more shrinkage than males (Gonçalves 2011a).

11.12.3 Heat-induced warping and fissuring/fracturing patterns can aid determination of the pre-cremation condition of human remains (i.e. fleshed vs defleshed) and potentially support identification of secondary (to excarnation) cremations. Warping of the cremated bone has been identified to be an indicator of the preservation of collagen-apatite links within cremated bone (Gonçalves 2011a). Although in modern settings warping and thumbnail fracturing of the bone has been sporadically observed on the cremated 'dry bone' (i.e. defleshed prior to cremation) (Gonçalves 2011a), they are much more typical of cremations on fleshed cadavers and green bones. Longitudinal splitting and superficial checking of the external surface and less evidence of warping have been documented for dry bones, while considerable warping, more irregular longitudinal splitting and transverse as well as thumbnail fractures have been found to be characteristic of bone cremated with flesh still attached (after Ubelaker 2009).

11.12.4 The cremated bone carried U-shaped (thumbnail), concentric, dendritic, transverse fissuring/fracturing and longitudinal fracturing. A proportion of the bones also exhibited

warping. Although in modern settings warping and thumbnail fracturing of the bone has been sporadically observed on the cremated 'dry bone' (i.e. defleshed prior to cremation) (Gonçalves 2011a), they are much more typical of cremations on fleshed cadavers and green bones.

11.13 Fragmentation

11.13.1 Dehydration increases likelihood of bone to fracture. McKinley (1994), after studying over 4000 urned and unurned cremated remains, observed that over 50% of bone fragments were in excess of 10mm in size, while the average maximum fragment size was 45.2mm.

11.13.2 Fragmentation of bone is a result of pre- and post-burial activities, which starts with the process of cremation and continues during subsequent collection by means of raking the hot bone from the pyre site, interment, excavation, transportation and post-excavation processing (McKinley 1994). It has been demonstrated that fragment sizes should be regarded as post-excavation fragment sizes rather than those of deposited fragments (McKinley 1992 1994).

11.13.3 Quantification of bone fragmentation aids assessment of the impact of overall data retrieved from cremated remains and can inform on the pyre technology as well as on cremation practices.

11.13.4 The maximum size of the bones within cremation deposit (051) was recorded during analysis. Overall preservation of the specimens was good (see Table 12), although the cremated remains displayed a higher level of fragmentation. Maximum fragment bone size for both skull and long bones were relatively high (51.9 and 71.2 respectively), however less than half of specimens (48.4%) measured over 10mm (Table 8).

Fragment size (mm)	Weight (gram)	Proportion (%)
>10	1054.1	48.4
<10>5	605.7	27.8
<5>2	515.8	23.7
Total	2175.6	99.9

Table 12. Levels of fragmentation.

11.14 Pyre goods and pyre debris

11.14.1 Less than 1 g of charcoal flecks was identified during the process of wet sieving the cremated bone and flotation of the fill (050) within cist (059).

11.14.2 Within the cremated remains, 5.9g of bone fragments were classified as mammal suggesting an animal may have been included within the cremation.

11.14.3 No pyre goods or staining were observed on any of the specimens.

11.15 Conclusions

11.15.1 The human bone was calcined, indicating exposure to temperatures of approximately 600°C or higher. No indication of selective collection of cremated bone for deposition within the cist was identified, which implies whole body deposition. The presence of small skeletal elements and almost complete absence of pyre debris indicates that a high amount of precision and effort was put into the collection of the remains from

the pyre.

11.15.2 The cremated remains included a minimum of four individuals: two sub-adults, one possible female adult and one adolescent/adult. The demography of the Harden cremation deposit broadly matches a Bronze Age mortuary practice pattern identified elsewhere in northern England whereby cremated adults and juveniles were often deposited together (Waddington and Davies 2002; Fowler 2016) with an overall predominance of females identified among some cremated individuals (Walsh 2013). However, the heavy weight of the cremated bone and the higher than average number of individuals, recovered from the Harden cremation, are unusual when compared to the results of an extensive comparative osteological study of burials of northern England (Northumberland not included), which rarely estimated an MNI higher than two individuals from a single cremation deposit (Walsh 2013).

11.15.3 A relatively small amount of duplicated elements of adolescent/adult and infant/juvenile individuals can imply usage of the same pyre for many separate cremations that could have resulted in collecting several residual bone fragments from earlier cremations upon collection of the human remains cremated later. Based, however, on the large weight of the bone from cremation deposit (051), the high MNI most likely reflects an intended deposition of multiple individuals. The Harden cremation produced in excess of over 2 kg of bone which considerably outweighed similar examples of comingled cremated remains (of a minimum of two individuals) deposited in a cist at near Cheviot Walk Wood (Eglingham, Northumberland) weighing 1350 grams (Stopford *et al*. 1985) or the weights of those cremations attributed to single adult individuals curated by Tyne and Wear museums, which did not exceed 1160g (Gamble and Fowler 2013).

11.15.4 It was suggested that in Northumberland, a trend for an accumulation of the dead including the deposition of multiple individuals within one burial emerged in the Early Bronze Age and peaked between 2000 and 1700 BC (Fowler 2016). The practice of multiple cremated individuals in one burial is known to continue into the Late Bronze Age as was noted elsewhere in Northumberland near Bolam Lake (Waddington and Davis 2002).

11.15.5 The stratigraphy of the cremation showed very clearly that all the cremated bone had been deposited as a single event as one discrete deposit of material. It appeared to have been placed in the cist within a bag, probably made of organic material, that has long since decayed. Whether all the individuals were cremated at the same time and on the same pyre cannot be known with certainty but the circumstances of deposition suggests this is the most likely scenario.

11.16 Recommendations for future research

11.16.1 Exposure of the bones to temperatures exceeding 300°C precludes ancient DNA analysis. Cremated petrous pyramid of the temporal bone (four specimens present) may provide an opportunity to conduct strontium stable isotope analysis that could inform on the childhood origin of the individuals (Harvig *et al*. 2014).

11.16.2 It is recommended that the osteological material be retained for research purposes.

12. PALAEOENVIRONMENTAL ASSESSMENT

Luke Parker

12.1 Introduction

12.1.1 The fills of 13 archaeological features from six evaluation trenches were sampled and analysed for palaeoenvironmental residues. Three of these trenches (Trenches 1, 3, and 4) were excavated across the construction slot of the palisaded enclosure, the centre of which was examined by an L-shaped trench (Trench 2) which was positioned to target two large roundhouses within the enclosure. Outside of the palisaded settlement, to the southwest, was a ring cairn with a low mound within it. Within the area enclosed by the cairn an adult human cremation burial was found situated within a small, corbelled cist, the top of which had been truncated by later agricultural activity which had also disturbed and fragmented a ceramic vessel that was found above and to the side of the cist in a very fragmentary state. Trench 5 was excavated across the ring cairn and samples were taken from the sediment surrounding the cremation within the cist box. Trench 6 was positioned over a cairn that had been placed on top of a natural outcrop of andesite bedrock and which sealed a discontinuous soil layer that was also sampled for palaeoenvironmental residues.

12.1.2 The entirety of the excavated fill from all sealed archaeological features was processed for palaeoenvironmental residues.

12.2 Method

12.2.1 Bulk fill samples from the ring cairn containing the human cremation were all gently dry-sieved through 5mm and 1mm sieves in order to recover fragments of bone as described in Historic England Environmental Archaeology Guidance (2011). Following this, the bulk fill samples were processed via on-site bucket water floatation through graduated sieves with the smallest being 300µm. The heavy residues of samples from the cremation burial contexts (049) and (050) were retained, dried, and scanned by eye for the further recovery of bone fragments. The heavy residues of other samples were not retained. Flots were weighed, air dried, and scanned using a low-power binocular microscope (x40). The entirety of the flots were scanned and separated out into charcoal and plant macrofossils. Uncharred, modern rootlet and seed contamination was removed by hand, following which the charred remains were weighed along with *in-situ* hand-recovered charcoal fragments.

12.2.2 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. Non-charred remains were excluded from this analysis because waterlogged sediments were absent from the site and the archaeological fills were located beneath thin, porous overlying soils which had been heavily affected by subsequent bioturbation. The uncharred material that was observed to be present in the flots was of uniform type comprising modern plant roots, herbaceous grass seeds and worm egg cases. Consequently, there was very little confidence in any of the uncharred material being of ancient origin. In contrast, charred material from early activity on the site survives and confidence that this material relates to prehistoric activity on the site is high (and as supported by the various radiocarbon dates from charred material).

12.2.3 Where possible up to twenty charcoal identifications were made per sample.

Charcoal from each context was dry sieved through 5mm and 1mm sieves. Random selection of fragments for identification were alternatively selected from the >5mm size fraction and 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. Fragments displaying distinctive ring curvature were noted as being roundwood fragments. It was not possible to identify subtler anatomical features such as tyloses, fungal hyphae/mycelium, insect/rootlet degradation, and radial fracturing due to the extensive fragmentation of the charcoal fragments. Therefore, further degrees of charcoal identification are not possible beyond simply species identification and the presence/absence of ring curvatures.

12.2.4 Oak fragments were identified as such even if multiseriate rays were not observable; the inability to distinguish from *Castanea* sp (sweet chestnut) is not applicable in prehistoric contexts which predate the arrival of sweet chestnut in the British Isles (Jarman *et al.* 2019). Oak was identified by a combination of ring-porous vessel patterning, distinctive dendritic or flame-like vessel arrangements, and (when observable) multiseriate rays as well as uniseriate rays. *Corylus avellana L.* (Hazel) and *Alnus sp* (Alder) were difficult to distinguish as both possessed diffuse porous vessel patterning, with the vessels being arranged in radial groups, as well as aggregate rays. The cf. hazel was identified as such by possessing somewhat more dendritic vessel arrangements than the cf. alder. The hazel fragments were also generally better preserved which enabled better identification of ring curvature. Maloideae (pomaceous fruit) family wood is difficult to identify to the species level. With the dominant identifiers of diffuse porous vessel patterning and numerous small vessels alongside bi-tri seriate rays. *Tilia sp.* (Lime) was identified as such by the diffuse porous vessel patterning, radially orientatated pore files and clusters, and tri-tetra seriate homogenous rays. Distinct spiral thickenings were visible. The single roundwood fragment of *Acer campestre L.* (field maple) displayed diffuse-porous vessel patterning, as well as the characteristically widely-spaced pores in occasional short radial multiples. Spiral thickenings were not visible, though this was not enough to discourage identification.

Trench	1	3	3	3	2	2	3	3	2
Context No.	005	006	008	010	012	014	018	021	026
Description	Fill of palisade slot	Upper fill of palisade slot	Middle fill of slot	Basal fill of palisade slot	Fill of ring gully roundhouse 1c	Fill of pit under quern stone	Fill of ring gully roundhouse 1e	Fill of rock-cut pit	Pit inside roundhouse 1i
Sample Volume	110L	40L	130L	100L	60L	10L	40L	10L	40L
Charred Material Weight	26.08g	10.10g	4.40g	1.74g	6.06g	None recovered	4.76g	6.45g	1.57g
Charcoal									
Alnus cf. glutinosa Gaertn. (alder)	2	2					1		1
Acer campestre L. (field maple)									
Corylus avellana L. (hazel)	13 (9RW)	14 (4RW)	5 (3RW)	2	2 (1RW)		2		
Quercus sp. (oak)	3	4	5	6	5		9	7	1(RW)
Fagus sylvatica L. (beech)	1								
Crataegus monogyna (hawthorn)	1		2	2	1 (1RW)				2 (1RW)
Tilia x Europa (European Lime)									
Plant Macrofossils									
Wild seeds									
cf. vicus sp. (vetch)	1								
Cereals									
Triticum dicoccum (emmer wheat grain)			1						
Bone	0.68g								

Table 13. Palaeocological residues. Notes: RW- Narrow width roundwood fragments. Green highlight indicates samples suitable for radiocarbon dating. Charred material weight refers to both *in-situ* hand-picked and flotted charred material following removal by hand.

Trench	4	2	6	5	5	1
Context No.	029	030	034	049	050	054
Description	Fill of palisade slot	Fill of ring gully roundhouse 1i	Soil sealed below cairn	Upper fill of cist above cremation	Lower cist fill surrounding cremation	Fill of pit
Sample Volume	20L	40L	40L	10L	10L	10L
Charred Material Weight	3.07g	0.26g	0.44g	-	None recovered	0.11g
Charcoal						
Acer campestre L. (field maple)						1 (1RW)
Corylus avellana L. (hazel)	5	2	1(RW)	1		
Quercus sp. (oak)	1	1				
Crataegus monogyna (hawthorn)	2	1				
Tilia x Europa (European Lime)			2(2RW)			

Table 14. Palaeocological residues. Notes: RW- Narrow width roundwood fragments. Green highlight indicates samples suitable for radiocarbon dating. Charred material weight refers to both *in-situ* hand-picked and flotted charred material following removal by hand.

12.3 Results

12.3.1 A summary of the plant remains assessment is given in Table 13.

12.3.2 Modern rootlet and seed contamination was very high in all samples taken. During excavation there was evidence for extensive bioturbation from earthworms, as well as numerous burrowing mammals.

12.3.3 The palisade slot sections all produced a mix of deciduous tree and shrub species, with *Quercus sp.* (oak) and *Corylus avellana L*. (hazel) being the dominant species. All palisade slot fills (005; 008; 010; 029) produced charcoal of these two species, with a smaller component comprising a variety of other deciduous woodland species the most frequent being *Crataegus monogyna* (hawthorn). *Alnus cf. glutinosa Gaertn.* (alder) fragments were found in the palisade construction slot fill (005) and the upper palisade slot fill (006). Within the palisade slot fill (005) there was also a single fragment of *Fagus sylvatica L.* (beech) as well as a single, charred seed of *vicus sp.* (vetch). The palisade slot also contained a single grain of *Triticum dicoccum* (emmer wheat) from the fill within Trench 3 (context 008). Adjacent to the palisade enclosure ditch in Trench 1, a pit was excavated which contained a single fragment of Acer campestre L. (field maple) charcoal.

12.3.4 The roundhouse ring grooves contained identical assemblages of charcoal to the surrounding palisade enclosure. The grooves of 1c, 1e, and 1i contained a combination of oak and hazel charcoal, with 1c and 1i also containing a smaller component of Maloideae (hawthorn). Within roundhouse 1i a pit (026) also contained one fragment of oak, one fragment of alder, and two fragments of Maloideae (hawthorn) charcoal.

12.3.5 The soil sealed below the clearance cairn (034) displayed a different charcoal assemblage. This was composed of a single fragment of field maple and two fragments of *Tilia sp*. (European lime).

12.3.6 The sediments surrounding the burial contained only a single, tiny fragment of hazel that is insufficient to provide a radiocarbon date. Fragments of bone were, however, recovered from the heavy residues taken from the upper (049) and lower (050) fills of the burial. A small quantity of tiny bone fragments were also recovered during floatation from the palisade slot fill (005). These were passed to the osteological specialist for analysis.

12.4 Discussion

12.4.1 The charcoal recovered from the palisade slot fills comprised a notably higher proportion of small-diameter roundwood fragments of hazel compared with the other charcoal species. This is most notable in the palisade slot fills (005), (006) and (008). This high proportion of roundwood may reflect coppicing of hazel being undertaken in proximity to the site, but this remains speculative as it could also result from the gathering of hazel branches for use during the charring of the timber posts that would have been set within the palisade slot. The presence of charred oak fragments is suggestive of the timber uprights forming the palisade being made of this material. The hazel charcoal was better preserved than the other species and so allowed more frequent observations to be made as to the ring curvatures. Identification of the ring curvatures of other species of charcoal was rarely possible.

12.4.2 A single, charred seed of *vicus sp.* (vetch) was recovered from the palisade slot fill (005). The very small size of the seed suggests it is a wild species of vetch rather than a

domesticated form; however species identification was not possible. This vetch seed may suggest that wild vetch was being consumed by local inhabitants of the palisaded settlement, as the seeds and leaves of wild vetch can be edible from some species such as *Vicus sativa* (common vetch, AKA Poor Man's peas) or *Vicia sepium* (bush vetch). However, there are also other wild varieties of *Vicia* which would not be considered edible such as a number of small flower species known as 'tares' and so one cannot make this assumption.

12.4.3 A single grain of emmer wheat was found in the middle fill of the palisade slot (008). Although there was damage to one of the lateral portions of the grain, the distinctive 'hump' along the dorsal outline still identifies it as emmer wheat. This grain is likely an errant charred grain which fell down in a small gap between the ground and the palisade wall and would be contemporaneous with this structure. This wheat grain illustrates the local agriculture which the inhabitants of the settlement likely engaged in. A single grain, coupled with an absence of weed and chaff remains, is insufficient to provide insight into specific local agricultural practices, or the presence of on-site processing. This grain does however represent what was likely one of the primary food sources of the inhabitants of the palisaded settlement.

12.4.4 The roundwood charcoal fragments recovered from palisade slot fill (005), upper (006) and middle (008) palisade slot fills, the gully fill of roundhouse 1c (012), roundhouse 1i pit fill (026), the soil sealed beneath the clearance cairn (034), and the pit fill (054) all represent suitable datable samples. Dating of the palisade slot should be possible through ^{14}C dating of hazel roundwood, as well as the emmer wheat grain which would also give a date for the local agricultural activity that would be occurring in the area.

12.4.5 Roundhouse 1c is suitable for ^{14}C dating using the roundwood charcoal recovered from the gully fill (012). The ring gully fill of the roundhouse 1i does not contain any identifiable roundwood charcoal. However, roundhouse 1i should still be dateable using roundwood from the pit (026). Similarly, roundhouse 1e does not contain any roundwood charcoal, though it should still be dateable using the hazel charcoal recovered from the fill as hazel is a shortlived specie. This provides dates which can be applied to the sequence of the roundhouse 1e ring gully fill (018) which is cut by the rock cut pit [019], which is itself cut by the palisade slot (006), (008), and (010). Dates can be applied to both roundhouse 1e, ring gully (018) and the palisade slot using material from the middle palisade slot fill (008), however the rock-cut pit does not contain material which would be suitable for dating. The oak charcoal recovered from this pit could not be confirmed to be roundwood and so could potentially have been taken from a long-lived tree. Dating these houses, alongside the palisaded enclosure, would illustrate whether they were contemporaneous and whether the palisade was constructed to protect the inhabitants of the houses.

12.4.6 The pit situated adjacent to, and just within, the palisaded enclosure, containing fill (054) is dateable using the single recovered fragment of roundwood oak. This would indicate whether the pit is contemporaneous with the palisade.

12.4.7 The charcoal contained within the soil beneath the clearance cairn (034) contains two fragments of lime charcoal, unlike any of the other contexts on site. This may illustrate that the clearance cairn was constructed at a different period to the Iron Age palisaded settlement. ^{14}C dating of the lime roundwood would provide evidence as to whether this is correct.

13. DISCUSSION

13.1 The aim of the archaeological evaluation at the Bleakmoor Hill Palisaded Enclosure site was to gain information on the form, phasing and date of the archaeological remains as well as their condition of preservation in order to provide a sound evidence base to inform discussion and decision-making in relation to any potential future mineral development of the area. The evaluation successfully and reliably dated the palisaded enclosure and some of its internal features and provided valuable information on its form, phasing and condition of preservation. Furthermore, the evaluation was able to provide information on the nature, form, date and significance of other features noted beyond the scheduled area. In the following section the outcome of the specific objectives of the evaluation are discussed.

Chronological and Site Summary

Mesolithic

13.2 The earliest evidence for activity on the site are the chipped lithics, and two radiocarbon dates on charred hazel and alder fragments from the fill of ring groove 1e, the latter of which indicate Late Mesolithic activity on this hilltop in the 5th millennium cal BC. Although little can be said about the nature of this activity, the presence of hunter-gatherers on this Cheviot hilltop commanding wide views across the lower lying river corridor below should come as no surprise. The two radiocarbon dates are at least 400 calendar years apart and clearly relate to different episodes of activity. They were found in a typical late prehistoric feature (a ring groove) which are a well-known type-fossil feature typically dated to the late Bronze and Iron Ages. The presence of this Mesolithic material in the fill of this feature indicate that the Iron Age settlement on the Bleakmoor Hill hilltop disturbed these fragmentary remains of an earlier archaeological period such that charred wood fragments resulting from Mesolithic activity in this part of the site got incorporated into the packing/fill of the ring groove. A suggestion that the ring groove could in some way be related to other Mesolithic structures, such as the Howick pit house, are misplaced. The Howick house bears no structural relation to the ring groove and neither do any of the remains from Lanton Quarry. The possibility that the pit that cut into the ring groove has a Mesolithic origin remains a possibility but the pit appeared to be cutting the ring groove in the evaluation trench and this is not considered likely. There is very limited dating evidence for the Mesolithic in Northumberland beyond the two well-dated settlement sites at Howick and Low Hauxley, however, it is of note that the Bleakmoor Hill dates, although not relating to any known Mesolithic archaeological remains, belong to the 5th millennium BC, a time after the catastrophic effects of the Storegga megaslide tsunami and the 8.2 kyr Event. Current modelling of the available radiocarbon dates for Mesolithic activity in north-east Britain indicate that it took around 1000 years for population levels to start to recover and the dates from Bleakmoor Hill are consistent with this (Waddington and Wicks 2017). The possibility that the charred material became burnt as a result of natural processes (e.g. woodland fire) rather than human activity should also be considered. Although this is considered less likely it therefore remains possible that this burnt material may not relate to Mesolithic human activity at all.

Beaker Period – Early Bronze Age

13.3 The next phase of activity that is evidenced is the clearance cairn (Feature 3) from

which a Beaker period date was obtained from the soil sealed immediately below it. The soil was sampled for ancient botanical macrofossils residues but no such botanical remains were present. If the quarry extension is permissioned it is recommended that further sampling work is targeted at any surviving pre-cairn soil in an attempt to recover suitable samples for pollen and further testing for the presence of palaeobotanical remains, however the potential for this remains low. This cairn is the largest of a number located within close proximity to each other across the site, but is only one of two to have been excavated so far, the other being Feature 7 located abutting the linear bank (Feature 6). It is possible that many of the cairns including Features 4, 5, 8, 9, 10, 17, 18, 19, 23 and 25, all identified during the earthwork survey (Cockburn 2016), collectively form a clearance cairnfield associated with Beaker period cultivation practices, although those abutting the linear bank may represent a later period of more formalised field system agriculture. Excavation of a cairnfield on Todlaw Pike in nearby Redesdale carried out in 2002 (Hale 2007) investigated ten clearance cairns within a trench measuring 400m x 5m. Otterburn is located 16.6km to the south-west of Harden Quarry. There was some variation in the cairns' form as some consisted solely of loosely compacted sandstone blocks while others comprised a single large block of sandstone with smaller blocks deposited against it. None of these cairns contained any burial or artefactual evidence and only one contained any structural evidence, in the form of a cist-like structure. Charcoal from one of the cairns produced a calibrated radiocarbon date of 2200-1950 cal BC (Beta-184092) which places it in the Beaker period and immediately after the Beaker period date obtained from cairn Feature 3 at Bleakmoor Hill. The lack of additional above-ground evidence for this cultivation at Bleakmoor Hill can be attributed to extensive cord rigg agriculture and later ridge and furrow agriculture, the evidence for which can be seen overlying much of the visible archaeology across the site. A segment of a sandstone whetstone was recovered from beneath the primary fill of the ditch (042) that ran along one side of the linear bank (040) in Trench 7.

13.4 A further feature, which is also likely to date to the Beaker period and be contemporary with the field clearance, is the ring bank (Feature 14) which evaluation trench 5 showed to be a heavily truncated ring cairn. The evaluation trench revealed an encircling stone rubble bank heavily truncated by the later cord rigg. Inside it there was a similarly truncated low mound. The cord rigg agriculture had disturbed a small cist within this mound resulting in a pottery vessel being brought to the surface where it had broken into many pieces and the top of the cist stones also removed. A single, discrete and tightly defined globular deposit of cremated human bone was found within the cist indicating that this material had been placed in the cist as a single event within some sort of container, most probably leather or textile, that has since decayed. The remains of at least four individuals were present within the cremated bone deposit. Radiocarbon dating of two samples of bone returned Early Bronze Age dates which correspond with the broad typological dating of the broken Food Vessel found above it.

13.5 Throughout Northumberland it is typical for burial cairns of this period to start in the Beaker period and continue in use into the early Bronze Age when cremation rites became more common, together with the deposition of Food Vessels. This has been noted most recently at the burial cairn at Low Hauxley where a Beaker period cist cemetery was eventually covered by successive phases of cairn construction that included secondary graves typically containing cremated remains and Food Vessels (Waddington and Bonsall

2016).

Iron Age

13.6 The two radiocarbon dates obtained from the fill of the palisaded enclosure's construction slot place the palisaded enclosure in the Early Iron Age and most likely in the 5th century cal BC. Three features dated from the enclosure's interior, including two pits and the ring groove for a house, returned remarkably consistent calibrated radiocarbon dates placing these internal features within the same period. Palisaded enclosures can vary greatly in size, usually being from 0.1 to 0.8ha in areal extent. The structural form of these monuments can also differ considerably with some consisting of no more than a single low timber stockade, some with associated ditches and some with multiple well-built palisades. Furthermore, there is evidence for double palisades that would have held box ramparts (Passmore and Waddington 2012). Encompassing an area of *c*.0.28ha and with only a single palisade, the Bleakmoor Hill site is at the smaller, less complex end of the scale (see survey by Gates and Ainsworth 1979 – Appendix VI of this report and Figure 2 of this report). None of the three sections cut across the palisade construction slot on different parts of its circuit gave any indication of the palisade having anything other than a single phase and having comprised stout upright timbers set within a rock-cut slot.

13.7 There are now known to be 70+ palisaded enclosures within Northumberland, one example of which is Fenton Hill, a well-preserved earthwork site and a Scheduled Monument (NHLE no. 1006536) located *c*.27km to the north of Harden Quarry. This monument began as a palisaded enclosure but excavations in 1971 and 1972 identified four further successive phases of development that saw it ultimately become a multivallate hillfort (Burgess 1984). A single calibrated radiocarbon date of 820-370 cal BC (GaK-1388) was obtained from the monument's first palisade phase which places it sometime in the Late Bronze Age – Early Iron Age. Located even closer to Bleakmoor Hill is the Scheduled Monument of High Knowes A palisaded enclosure (NHLE no. 1020254) near Alnham, *c*.3.4km to the north-east of Harden Quarry. This monument comprises a double palisade with the ditches separated by an earthen bank and it is believed that the ditches could have held a proto-box rampart (see Figure 48). On the Bleakmoor Hill monument's eastern side, a gap in the ditches and bank represent where the entrance would have been situated. While excavations on the site of High Knowes A in 1962 and 1963 did not produce any reliable dating evidence, the excavator has speculated that it was of Early Iron Age date (Jobey and Tait 1966). This site is much better preserved than the site on Bleakmoor Hill and has much more substantial surface expression having not been heavily truncated by later agriculture.

Figure 48. An example of a well-preserved palisaded enclosure at 'High Knowes A' where the surface remains comprise two concentric palisade slots, but also an upstanding earthwork bank in between. This site has better preservation than Bleakmoor Hill and would score at the high end of a preservation assessment.

13.8 The evaluation at Bleakmoor Hill successfully identified the form of the palisaded enclosure's construction slot and, based on the evidence within Trenches 1, 3 and 4, indicated only a single phase of construction with no associated ditches or banks. Within Trenches 1 and 3 the construction slot was seen to have been cut through the brash and into the solid andesite bedrock forming a steeply-sided, 'U' shaped trench with a relatively flat base. Owing to the nature of the bedrock and the way in which it fractures, the cut of the construction slot was rough and uneven in places and smooth in others. Trench 1 provided an indication of the size of the timber palisade itself, with a surviving post-pipe in the form of two angled stones surviving *in-situ* after the post had been removed or had rotted leaving a void 0.18-0.25m wide suggesting timbers averaging just over 0.2m in diameter. It is typical for posts to project above ground between 2 and 3 times their depth below ground. On this basis the palisade at Bleakmoor Hill is likely to have stood 2m – 3m in height making an effective barrier against wild animals and providing a light defence against small hostile forces.

13.9 The decision to excavate Trenches 1, 3 and 4 was partially motivated by the need to establish why the surface remains of the enclosure were more pronounced in the north and east and why it began to grade out towards the south-east and west until it was only barely visible on its southern side. Despite the enclosure's construction slot appearing less obvious on the surface where it was excavated in Trench 3, it was in fact the same depth as it was where it was excavated in Trench 1. On the south side of the enclosure circuit where Trench

4 was located the lack of surface expression here was attributable to the colluvial hillwash that had masked the remains across this lower part of the site. Careful examination of the surface relief indicated that the entrance into the palisade was most likely to be on this southern side to the immediate east of Trench 4. Here the construction slot was excavated through subsoil for the majority of its depth, only encountering bedrock at its base. There was numerous substantial stones spreading out in front of the palisade slot here, situated in the same subsoil that produced the late prehistoric pottery. The presence of this material may indicate that this stretch of the palisade had stone facing which, given the probable entrance location on this side of the enclosure, may be associated with greater embellishment of the defensive circuit at the entrance. None of the stone was in situ and so the external cladding of the palisade with stone remains only a tentative possibility.

13.10 The palisaded enclosure's internal features included at least nine ring groove buildings, pits and possible tracks/paths, all identified during the earthwork survey (Cockburn 2016). In much the same way as palisaded enclosures can vary greatly in size and form, so can the number and size of structures that they enclose. The earthwork survey identified nine possible ring groove houses/buildings within the enclosure, three of which were investigated during the evaluation and confirmed as such. These structures had external diameters ranging from 5m to 14.5m. High Knowes A palisaded enclosure near Alnham, mentioned previously and believed to be Early Iron Age in date, enclosed at least four structures ranging in size from *c*.7.5m to *c*.14m in diameter (Jobey and Tait 1966), whilst High Knowes B palisaded enclosure, located *c*.109m to the east of High Knowes A, comprises a pear-shaped double palisaded enclosure containing sixteen probable ring groove structures ranging in size from *c*.7.3 to *c*.11.5m in diameter (*ibid*). These comparisons serve to highlight the variation in palisaded enclosures within a small area of Northumberland. It is clear that a higher number of internal structures did not necessarily demand a more complex palisade.

13.11 During the earthwork survey (Hunter 2016) some of the circular ring groove buildings identified within the Bleakmoor Hill palisade were seen to be located so close to the enclosure's construction slot as to make it unlikely that they had stood at the same time as the palisade as the roofs would have projected into the palisade. The ring groove of Feature 1o in particular, located on the eastern side of the enclosure, would have intersected with the palisade. Within Trench 3 pit 1t was found to have truncated ring groove 1e, which was in turn truncated by the palisade construction slot. Therefore the ring groove building 1e appears to be stratigraphically earlier than the construction of the palisade slot. Two charred wood samples submitted for radiocarbon dating from ring groove 1e showed these samples to be residual Late Mesolithic material at least 400 years apart and therefore it has not been possible yet to date the earlier, unenclosed phase of the settlement. It is considered highly unlikely the ring groove is Mesolithic as there is no precedent for Mesolithic ring grooves and the circular shape and size of it is entirely consistent with the hundreds of Bronze Age – Iron Age ring grooves known in Northumberland. Furthermore, the two dates are at least 400 years apart which is consistent with the ring groove having been cut through an area where prior Mesolithic activity ad taken place in several episodes and the charred fragments of wood relating to this earlier activity had become incorporated into the packing/fill of the ring groove when the roundhouse had been built in late prehistoric times.

13.12 The evaluation recovered a small number of small finds from the palisaded

settlement including two quern stone fragments, three body sherds from a single ceramic vessel and a blue perforated glass bead, the latter being found in the largest, and central, ring groove house or hall. Despite the shortage of finds perhaps being related to the area excavated, it is nevertheless a surprisingly small number of finds given the generally good preservation of organic material in Cheviot soils. The heavy truncation across the entire site by cord rigg agriculture was seen to have removed all floor surfaces and associated deposits within the ring groove buildings. The only reason some paving survived in ring groove 1h was because they had slumped into a pit that had been cut below the floor surface. The lack of floor deposits within the buildings compares poorly with the preservation at sites such as Fawdon Dene 1 further north in the Cheviot Hills where paved floors and domestic debris floor deposits and up to 1m height of roundhouse walls survived intact within a larger enclosure. In this case there was no surface visibility of this site at all, it only having been recognised from aerial photographs as a parch mark. This site is far better preserved than Bleakmoor Hill yet Fawdon Dene 1 is not scheduled and Bleakmoor Hill is.

13.13 Quern stones are regularly found at Iron Age hillfort sites in the Cheviots, and the occurrence of the Bleakmoor Hill examples within pits associated with ring groove structures implies the production of foods such as bread (Passmore and Waddington 2012). Querns are commonly found on late prehistoric settlement sites in Northumberland with several, for example, being found during the excavations on the palisaded enclosures at Fawdon Dene. As with the Bleakmoor Hill examples many of these are broken and generally considered to have been discarded when they were of no further use. It is possible that there may be some kind of symbolic connotation involved in the disposal of the quernstones as part of pit fills but this remains mere speculation. As they formed part of pit infilling it might even be that they were selected for inclusion within abandonment deposits associated with the site, but they could equally just have formed handy, expendable material used to infill pits which no longer served any purpose.

Only a single grain of emmer wheat was found during palaeoenvironmental analysis of the Bleakmoor Hill samples from the palisaded construction slot fill (Trench 3). While a single grain does not provide much evidence for local agricultural practices, its presence indicates this cereal was grown and may have been a staple of the site's occupants. It is possible that the linear bank, which is likely to define the edge of a field plot, with abutting field clearance material is contemporary with the palisaded settlement as this too was overlain in parts by the cord rigg cultivation remains, although it is not clear whether the latter is related to the Beaker period – Early Bronze Age activity or the Iron Age settlement. Unfortunately no datable material was recovered from the evaluation of the linear bank. A single charred vetch seed was found within the palisaded construction slot, however its size indicates that it is a wild variety and therefore not domesticated. Nevertheless this is a possible indication of wild plant gathering and consumption alongside domesticated food. The palaeoenvironmental analysis also recognised hazel charcoal within some of the ring grooves and it is quite probable that this is due to its use in wattle and daub wall panels, while oak appears to have been used to build the palisade and for timber uprights in the ring groove houses/buildings.

Romano-British

13.14 Upstanding Late Iron Age – Romano-British cord rigg earthworks were noted during the evaluation, where they extended from linear bank Feature 6 in the east across the

palisaded enclosure and the ring cairn. The ridges noted across linear bank Feature 33 in the west have been identified as resulting from a quad bike route following further on-site survey. The cord rig is extremely subtle and this is why it has not been noted before, including by the Gates and Ainsworth survey (see Appendix VI). The surviving ridges average *c*.1m wide and varies from just a few centimetres in most places to 0.15m high in small patches. The best surviving patch has been surveyed and is shown in red on Figure 2 to the south-west of the palisaded enclosure, and there are very short stretches that survive over linear bank Feature 6. In the area to the south-west of the enclosure the small surviving patch runs in a north-east to south-west direction. Elsewhere on the site the cord rigg has evidently truncated most archaeological features, particularly the palisaded enclosure and the ring cairn where very faint traces of it can still be seen. A generic area of cord rig has been delimited on Figure 2, however in this area the cord rig is so subtle and vague that it is almost impossible to survey using traditional means. It is recommended that should the detail of this past agricultural activity be recorded then the best methodology would be a laser-scan survey which could then be used to produce a 3D model and an accurate hachure plan could be derived from that.

Medieval

13.15 Medieval ridge and furrow earthworks (Feature 29), distinctive due to their wide form, were recorded on Bleakmoor Hill from Google Earth imagery dating from 2002 (Cockburn 2016). This ridge and furrow is much wider than the narrower, upstanding ridge and furrow that can be seen in the south-east part of the site (Feature 30) and is clearly later. The wide ridge and furrow measures approximately 9m from ridge top to ridge top, and runs in a south-west to north-east direction across the site and has a sinuous alignment. This ridge and furrow appears to have affected all of the archaeological remains of Bleakmoor Hill including both the palisaded enclosure (Feature 1a), the ring bank (Feature 14) and the earlier cord rigg earthworks (Feature 32), despite having not left any upstanding remains and only now being barely visible on satellite imagery as parchmarks. This indicates that it may never have been particularly deeply cut and was probably short-lived, perhaps comprising just one ploughing episode.

Post-medieval

13.16 Narrow ridge and furrow, still visible as upstanding earthworks, occupies the south-east corner of the site and runs in a north-north-west to south-south-east direction. These earthworks measure, on average, 4.3m wide from ridge top to ridge top and appear to be enclosed by bank and ditch Feature 22 and ditch Feature 24 (Cockburn 2016). The narrow nature of these ridge and furrow earthworks indicates that they are much later than the parchmark ridge and furrow mentioned above (Feature 29).

Did the evaluation successfully target features identified by the previous desk-based study, the geophysical survey and the metric survey?

13.17 Each of the seven hand-dug evaluation trenches successfully targeted each of the features they were intended to sample. Three of these trenches (Trenches 1, 3 and 4) were situated to sample the palisaded enclosure construction slot in three different locations around its circuit while an additional trench sampled two of the ring grooves within the enclosure. The remaining three trenches sampled previously identified features within the

surrounding landscape. The majority of the features across the site had been identified in a previous survey undertaken by HSLS in 1996 that used aerial photographs and free online aerial imagery (Waddington and Brown 2016), however a number of additional features were also identified during the earthwork survey (Cockburn 2016). The underlying bedrock of the site caused the gradiometer and resistivity surveys to be of little addition to what was already visible from surface remains.

Did the position, shape and size of each trench provide maximum information based on minimum impact, particularly in relation to the Scheduled Monument, and identify what features were and any artefactual and palaeoenvironmental associations?

13.18 The position, size and shape of each evaluation trench was carefully decided upon to ensure that the trenches would be able to establish the form, phasing and date of any archaeological remains encountered within them while also having a minimum impact upon the archaeology by keeping them small. The trenches have provided detailed information on the form of the palisaded enclosure circuit, its date and what appears to be its single phase nature but multiple phases for the settlement (i.e. evidence from Trench 3 suggests that there was a previous unenclosed phase to the settlement before the palisade was built). Elsewhere the trenches revealed that the ring grooves related to broadly circular buildings that had their floors terraced into the hillside but which had all been truncated by later prehistoric-Romano British cord rigg agriculture. The ring groove slots indicated the structural form of these buildings with upright wooden walls supporting what can be inferred as conical roofs. The evaluation trenches also demonstrated the presence of three internal truncated pits, although there were no artefacts in them other than a broken quernstone in one. The palisade construction slot had frequent flecks and fragments of charcoal that may imply that the bases of the timbers were charred to aid preservation in the ground. This charred wood was useful for radiocarbon dating the palisade. The fills of the ring grooves proved similar and charred wood fragments enabled some of the ring grooves to also be dated. There was a paucity of seeds and grains from the site with only one emmer wheat grain recovered from the palisade slot. The charred wood suggests that the palisade was made for the most part from oak whilst oak and hazel appears to have been used in the construction of the ring groove houses. The trenches also showed that the occupants of the enclosure used ceramic vessels and glass beads although it is not clear whether they were manufactured on site or imported. The discovery of three small ceramic sherds from the same vessel, one glass bead and two broken quernstones is considered a meagre finds assemblage from the four trenches excavated across the site, given that between them they sampled three segments of the palisade, three pits, one of which was inside a ring groove 'house', and three ring groove buildings.

13.19 The three trenches excavated around the enclosure's circuit specifically targeted areas of its construction slot where the surface expression differed significantly. By positioning Trenches 1 and 3 in their locations the evaluation was able to determine that the differential surface expression was due to varying degrees of truncation by later cord rigg agriculture and not due to the form of the slot itself. Trench 4 showed the palisade construction slot to be similarly preserved to that in trenches 1 and 3 but in this case there was no surface expression due to having been masked by overlying hillwash.

13.20 Elsewhere on the site the trenching succeeded in broadly characterising the form and dating of the ring bank as a ring cairn dating to the Early Bronze Age. However, these types of burial monuments were typically in use for several centuries and frequently cover a sequence of burials that often commence in the Beaker period. The remains identified in evaluation Trench 5 are likely to be from a secondary burial and therefore are likely to date the latter phase of use of this monument. The dating of the earliest burial and origin of this monument currently remains unknown, and whether the earliest burials were inhumations or cremations. The trench recovered the very fragmentary and fragile remains of a Food Vessel together with a fully intact cremation deposit within a disturbed, crude cist. Very little charred wood or other environmental material was evident amongst the remains of the cairn other than the occasional very small charcoal fleck.

13.21 Elsewhere on the site the evaluation trenches established the presence of agricultural remains in the form of clearance cairns, bank and ditch land boundaries and a previously unsuspected phase of cord rigg agriculture. The discovery of the latter was significant as this provides a stratigraphic sequence across much of the site. It can be clearly seen to overlie the palisaded enclosure, the linear banks and associated cairns and the ring cairn, all of which it has truncated. As this distinctive type of agriculture is known to date to the late Iron Age – Romano-British periods it means that all the features that it overlies must be pre- late Iron Age. This is useful as it means that the cairns belong to prehistoric field clearance. The recovery of dating material from below one of the cairns suggests that the first phase of agriculture that can be inferred on this hillside took place during the Beaker period, whilst a further phase can be reasonably suggested to have accompanied the early-mid Iron Age settlement associated with the palisaded enclosure. The evaluation work to date has not been able to securely date samples from the bank and ditch features to test whether these are associated with the Beaker period agriculture or that assumed to be associated with the palisaded settlement.

13.22 The trenches were also effective for informing on the condition of preservation across the site and the degree to which remains had been truncated.

What is the condition of preservation of the various archaeological remains?

13.23 The following table has employed an objective methodology informed by professional judgement to assess each of the main heritage assets present on Bleakmoor Hill against six different preservation measures and given each feature a score out of 10 depending on its condition of preservation for each measure. The penultimate column assesses each feature in relation to a typical feature of the same type that occur elsewhere in the Cheviot Hills to provide a sense of how the features at Bleakmoor Hill compare to other examples in the same landscape. The final column gives the total out of 60 which summarises the condition of preservation for each feature by adding up the score from each measure. The totals can be divided into four quartiles to rank each heritage asset:

0 – 15 = Very Poor

15 -30 = Poor

31 – 45 = Good

45 – 60 = Very Good

Feature	Truncation 10 = no truncation 0 = extreme truncation	Occupation floor deposits /fills/burials 10 = good survival of deposits 0 = no surviving deposits	Preservation of fills in deeply cut features 10 = good preservation 0 = bad preservation	Preservation of unburnt organic material 10 = good preservation 0 = bad preservation	Preservation of charred organic material & frequency 10 = good preservation 0 = bad preservation	Overall preservation for a Cheviot site of corresponding type 10 = good overall preservation 0 = poor overall preservation	Condition of preservation (score out of 60)
Palisaded enclosure **Feature 1a**	3	3/4	8	2	8	6	30/31
Ring cairn **Feature 14**	4	6	6	2	8	4	30
Clearance cairn **Feature 3**	8	8	8	2	6	8	40
Linear banks and associated clearance cairns **Features 5, 6 and 7**	4	7	7	2	6	6	34
Cord rigg earthworks **Feature 32**	3	3	3	2	2	3	16

13.24 The assessment shows the clearance cairn and linear banks and associated cairns to have a 'good' condition of preservation. The ring cairn and cord rigg have been ascribed an overall 'poor' condition of preservation. The palisaded enclosure achieves a marginal score on the cusp between the 'poor' and 'good' condition categories. This can, for the most part, be attributed to the heavy truncation of these remains as a result of later agricultural activity across these features. The clearance cairn is on the edge of the cultivatable land and so never experienced cord rigg agriculture over it, whilst the linear bank, although somewhat denuded, still survives well as an upstanding feature and its attendant shallow ditch is intact, albeit filled in and buried. In turn, the cord rigg earthworks survive differentially in patches across the site, but as a class of field archaeology is notoriously hard to recognise and delimit, as it often only leaves very vague traces, only some small patches at Bleakmoor Hill survive in a 'good' state while most of it is in poor condition and is likely to have been mutilated by a possible phase of medieval ploughing across the site. More modern impacts such as that caused by historic quarrying, movement of livestock and modern vehicles has also created areas of enhanced truncation (e.g. parts of the palisaded enclosure), whilst features such as the clearance cairn have remained unaffected by these

activities. The condition of this vague cord rigg, missed by the Gates and Ainsworth survey, is very poor when compared with the dozens of well-preserved examples across the Cheviot Hills (see Topping 1989). Preservation of charred organic remains across the site was generally good and did not differ much between features while preservation of unburnt organic material was poor but, again, consistent across each feature type and reflects the acidic conditions on the site.

13.25 Survival of occupation deposits (e.g. floor surfaces, occupation debris) was particularly poor within the palisaded enclosure where there was very little to no evidence of any floor deposits within the ring groove structures surviving due to the later truncation, whilst burials at depth within the ring cairn could survive. The lack of floor deposits within the ring grooves within the palisade, despite them showing as 'upstanding' hut circles, results because of the degree to which they are truncated and not because they are well-preserved. What has been left is such a thin soil cover that all relief below the turf is visible as subtle upstanding remains. The best way to conceptualise this is that the archaeological remains have been heavily reduced and that the thin vestigial soil (resulting from significant net soil loss on the crown of the hill) has been left 'vacuum-packed' around what archaeological remains are left no matter how degraded - like a tight film. This gives the impression that because there is subtle surface visibility of remains they are well-preserved, but the opposite is indeed the case because both the archaeological remains and its 'skin-tight' soil cover have been very heavily reduced and truncated. The excavations showed beyond any doubt that the upstanding remains within the palisade are very heavily truncated with no floor levels left in the houses examined, except for where one small area of paving had slumped into the top of a small pit in roundhouse 1i (Trench 4). In contrast the southernmost portion of the monument that accounts for around 1/5th of its area (where no surface traces exist of internal features and the palisade slot is virtually invisible or completely absent for most of this area), is the area where the best preservation occurs. The remains are still truncated here, but because this part of the enclosure is downslope of the rest of the enclosure and retains a thicker soil cover (due to the bedrock being at greater depth and having experienced some colluvial deposition, ie. net soil gain), here the palisade trench still exists despite its lack of surface visibility as a completely buried feature, as does potential for in situ occupation debris (as evidenced by the survival here of ceramics in Trench 4), and therefore the potential for upstanding roundhouse remains and intact floor deposits. Therefore, the surface visibility of subtle remains can be misleading. This is no better evidenced than at Fawdon Dene 1 where a site with two palisaded enclosures was discovered as parch marks during a hot summer in the early 1990s (Figure 49). Although there is no surface trace of Fawdon Dene 1, on excavation the enclosure revealed multiple stone-built Iron Age roundhouses with areas of standing wall up to 1m high and in-tact paved flooring and organic occupation deposits that included animal bone, botanical macrofossils, querns and other domestic debris. Palisaded sites such as this would score highly for preservation, whilst by comparison the Bleakmoor Hill site is considerably less so.

Figure 49. Aerial Photograph of the Fawdon Dene enclosures (near Ingram) where two ditched/palisaded enclosures left no surface trace but which had well-preserved Iron Age houses and floor deposits (in the case of enclosure 1 – egg-shaped enclosure on the left), despite being overlain by ridge and furrow agriculture, because they had benefitted from the effect of colluvial build up. The opposite is the case across most of the Bleakmoor Hill enclosure where the slight upstanding remains on the crest of the hill (where the bedrock is close to the surface and the soil cover has experienced a net loss due to farming and colluviation) are very poorly preserved despite having surface expression.

13.26 The above is a common occurrence with Cheviot archaeology and it is a key point to note. Not only does this explain and aid understanding of the issues of preservation on this site, but also on other sites in the area. We have referred to the useful comparison with the Fawdon Dene enclosure 1 which was located on a smooth hillside with no surface remains visible at all. This was because the site had been levelled, colluvial material and dying vegetation had built up the soil, and it had been able to be farmed in subsequent centuries with the remains below surviving intact. This contrasts with Bleakmoor Hill which crowns the crest of the hill and has no potential for supply of colluvial material over most of its extent – i.e. it occupies a position experiencing inexorable net soil loss, except for the small downslope area on its southern side referred to above where some limited colluvial build-up has afforded some protection resulting in it leaving no surface trace of the monument. This observation is relevant when considering other upland sites in the region as it is a key observation for the regional upland archaeology of the Cheviots.

What is the significance of each archaeological element on the site?

13.27 The table below uses the 'Principles of Selection for Scheduled Monuments' criteria adopted by Historic England (DCMS 2013) to assess the significance of the Bleakmoor Hill palisaded enclosure and the other heritage assets within its environs. The scoring system follows that used for assessing the condition of preservation above. The judgements have been informed by a consideration of the facts resulting from the suite of evaluation works

undertaken as part of this, and previous studies, on the Bleakmoor Hill enclosure, together with a detailed first-hand knowledge of palisaded sites in the region and placing Bleakmoor Hill in relation to them. The scores arrived at for each criteria reflect the professional judgement and specialist knowledge of the author/s.

13.28 For each assessment criteria the asset has been given a score out of 10: 0 = lowest significance and 10 = highest significance.

The totals can be divided into four quartiles to rank each heritage asset:
0 – 15 = Negligible Significance

15 -30 = Low Significance

31 – 45 = Moderate Significance

46 – 60 = High Significance

Feature	Period	Rarity	Documentation / finds	Group value	Survival/ condition	Fragility/ vulnerability	Diversity	Potential	Overall significance
Palisaded enclosure **Feature 1a**	6	6/7	6	6	5	6	4	6	45-46
Ring cairn **Feature 14**	6	6	4	6	4	7	3	5	41
Clearance cairn **Feature 3**	4	2	3	6	7	7	2	2	33
Linear banks and associated clearance cairns **Features 5, 6 and 7**	5	4	3	6	6	7	2	3	36
Cord rigg earthworks **Feature 32**	5	6	3	6	6	6	3	3	38

Palisaded Enclosure

Period

13.29 The Bleakmoor Hill palisaded enclosure has been dated to the 5th century cal BC built on what appears to have been a small unenclosed settlement that is likely to date to immediately prior to the enclosed phase. It is a common site type for the period in the North East region and Scotland. However, palisaded sites can date from the late Bronze Age through to the Roman Iron Age and so it is not a monument form specific only to the Iron Age. It is a long-lived monument form and therefore it is not a site-type that can be used as

being necessarily diagnostic of the Iron Age – given it has a wider chronological range of use. The site has therefore been awarded a score of 6/10 for its 'period' value.

Rarity

13.30 The Bleakmoor Hill palisaded enclosure is one of potentially 70+ later prehistoric palisaded sites known from the region (Waddington and Brown 2016) with many more having been found both in Northumberland and beyond in the years since the site was first discovered and scheduled. When the site was first discovered there was less than 20 palisaded sites known, and being so scarce all surviving examples were scheduled in line with then and now 'Principles for Selection' (DCMS updated 2013). However, this is no longer the case given subsequent discoveries since the site-type was recognised and it is no longer a 'scarce' monument type in the region or nationally and as the Principles for Selection state, "…in general, however, a selection must be made of those monuments which best portray the typical and commonplace as well as the rare". As discussed in the previous Heritage Assessment for the site (Waddington and Brown 2016), the original monument class description for this scheduled monument type is no longer accurate as there are more palisaded enclosures known about since the monument was scheduled and their dating is also now much broader with date ranges for palisades of this type extending from the late Bronze Age through to the Roman Iron Age. This archaeological evaluation has provided dating evidence to supplement the dating sequence for palisaded enclosures, however it has not brought to light any new information for this class of monument other than by providing detail on a specific site. Therefore the palisaded enclosure on Bleakmoor Hill, although clearly important as an Iron site, is not considered to be rare, on a regional or national level and its condition of preservation is not very good overall, save for the palisade slot itself and a small area of the southern circuit where there is a thin colluvial drape which has removed any surface expression – it is in fact a highly truncated example with only the deeply cut palisade slot confirmed as surviving well. This is a statement of objective fact. The site has therefore been awarded a score of 6/10 - 7/10 for rarity.

Documentation/finds

13.31 The site has not experienced much prior investigation. There was a very simple plan made of the site, primarily from an aerial photograph, produced by Gates and Ainsworth (reproduced in Appendix VI in this document) which has no accompanying text. This is the only prior archaeological work on the monument save for the monument description in the Scheduling documentation held by Historic England. This plan is not as accurate as the survey undertaken as part of this piece of evaluation work (see Figure 2 and Hunter 200) and doesn't add has been superceded by this evaluation work requested by Historic England in order to inform this potential mineral extension application. This earlier work therefore does very little to enhance the significance of this monument. The work documented in this report and its supporting studies as part of the evaluation of the site has assisted in producing a more accurate understanding of the site this has given greater clarity of what and how significant the site is. The work undertaken as part of a previous phase of quarry extension by Tyne and Wear Museum Service did not include or encroach on the palisaded enclosure and consisted of a level 1 survey of the grass-covered features in the area earmarked for the extension and a single evaluation trench with several 'spokes' off it. No significant archaeological remains were found in the evaluation trench and the area investigated has now been removed by quarrying. A plan showing the location of this evaluation is provided in Appendix VII of this document. The results of the evaluation

trenching of the site documented in this report show there to be modest finds remaining on site, consisting of just a couple of tiny sherds of ceramic survival in one small area of the site where there is some colluvial soil cover, two broken quernstones, a small broken glass bead and a small number of residual chipped flints, the latter finds being mostly from unstratified deposits. The Bleakmoor Hill site has therefore been awarded a score of 6/10 for documentation/finds.

Group Value

13.32 The group value of the Bleakmoor Hill archaeological remains does not rest in them being contemporary as the radiocarbon dates and stratigraphic relationships indicate. There is some group value in the various features showing a progression of use of this piece of landscape through time, with evidence for burial, early cultivation, followed by Iron Age settlement and then late Iron Age – Romano-British cultivation. If all these features formed a contemporary pattern of occupation then their group value would be higher as it would reveal a more complete picture of that occupation. The diachronic nature of these remains still lends group value, albeit diminished by the fact that each historic asset represents only a fragment of each phase of activity on the hilltop, and none are particularly well-preserved due to the subsequent truncation that they have all suffered. A better example of a palisade with high group value is Whether Hill where the palisade there overlies a well-preserved hillfort and has a substantial quantity of adjacent cord rigg, together with contemporary boundary banks and clearance cairns and further multi-period remains including a Beaker grave. This site is also much better investigated than Bleakmoor Hill and has much further potential to inform on a longer period of occupation than the Bleakmoor Hill site. At Woden Law, also in the Cheviots, there is again, not only a better-preserved palisaded enclosure, but it has a direct association with large very well-preserved fields of cord rig (Topping 1989, Plate 29). At Trows Law, an oval palisade is clearly overlaid by upstanding cord rig, as is the internal palisade at Hayhope Knowe, whereas contemporaneity between cord rig and palisades is suggested at High Knowes B where cord rig respects the palisade and similar arguments can be made for Fasset Hill, and Greenbrough Hill. There are good associations with Bronze Age metalwork (ie. three bronze swords) at East Brandon Hill, and at sites such as East Brandon Hill, Huckhoe, Hepburn Wood, Fenton Hill, Wether Hill and many more there are stratigraphic relationships with earlier and later defensive developments. In these cases the group value is demonstrably greater in terms of observable relationships, combined preservation and associations. The Bleakmoor Hill site has therefore been awarded a score of 6/10 for group value.

Survival/Condition

13.33 There are better preserved examples of palisaded enclosures elsewhere in the Cheviot Hills (e.g. High Knowes A Alnham - Figure 48; Fawdon Dene 1 – Figure 49, amongst many others) and the surrounding lowlands that are not scheduled, such as the Cheviot site at Fawdon Dene 1 where evaluation excavations revealed in-tact walls of stone-built roundhouses up to 1m high together with preserved floor deposits and underlying stone paving with good preservation of bone and botanical remains as well as the palisade ditches (Frodsham and Waddington 2004) despite there being no surviving surface expression of this monument. Only one structural phase of the palisade itself is evident at Bleakmoor Hill whereas other examples from the region also display only one structural phase, yet others show at least two or more distinct phases (e.g. Wether Hill; Fenton Hill). In this sense, Bleakmoor Hill is typical of small, simple palisaded sites that did not develop further, and for

which there are many other examples such as Shoresdean or Groat Haugh East. In comparison to other palisaded sites the diversity and the potential of Bleakmoor Hill is evidently less, based on what remains are now known to be present, the sequence and longevity of the monument and the high level of truncation it has suffered. The Bleakmoor Hill site has therefore been awarded a score of 5/10 for survival/condition.

Fragility/vulnerability

13.34 The palisaded enclosure has only a very thin soil cover and this has already been heavily truncated. Any remains producing surface expression, such as the subtle rings made by the upcast from the ring groove house slots are now very subdued and only visible on the ground by the experienced eye. If the site were ploughed by modern machinery these features would be destroyed. However, because there is virtually no soil to speak of on this hilltop now there is no prospect of this hilltop ever being realistically ploughed again given there is just a few centimetres of thin acidic turf left. The site has been used as rough pasture for hundreds of years and has not been ploughed or cultivated since medieval times. The possibility of the site being removed due to the need for a rare mineral is a threat to this site, however, this issue has not been included in the scoring for this principle of selection as by doing so would create a circular scoring argument for this study. The Bleakmoor Hill site has therefore been awarded a score of 6/10 for vulnerability given that there is no prospect of it ever being realistically affected by ploughing. It is, however, made clear that the site is vulnerable to mineral extraction because it occupies the crest of the dome where this rare mineral is located and there is no other option available for the quarry site to continue operations other into the area occupied by the palisaded enclosure.

Diversity

13.35 The diversity of the Bleakmoor Hill palisaded enclosure, based on its possession of a combination of high quality features or its having a single important attribute, is low. The enclosure is locally important and is an example of a small, simple, single palisaded enclosure with subtle surface expression. It doesn't have multiple phases of occupation visible, nor does it have a single outstanding important attribute. The Bleakmoor Hill site has therefore been awarded a score of 4/10 for diversity.

Potential

13.36 Aided by this scheme of evaluation work the archaeological potential of the palisaded site can be reasonably anticipated together with the importance of the information. The potential is considered mid-range given that the site is highly truncated and survival of artefactual material appears limited. The evaluation has shown that the remains have the potential to inform on the chronology and phasing of the site, the location and plan of internal structures and information relating to the palaeoecology of the settlement. This information will be of site-specific and regional interest. Should the site be fully recorded prior to removal then the information potential could balance in the other direction of benefiting other similar monuments as by improving the understanding and informing the management, scheduling choices and protection of other palisaded sites in the region, the removal of the site will enhance the potential of other sites. The Bleakmoor Hill site has therefore been awarded a score of 6/10 for potential.

13.37 Overall, the Bleakmoor Hill palisaded enclosure has been awarded a score of 45 – 46 which puts it on the cusp between our categories of 'moderate' significance and 'high significance'. We believe that monuments falling comfortably within the 'high significance' quartile would qualify for consideration for scheduling. As this site is on the cusp between moderate and high significance we believe that if it were being considered for scheduling today the decision on whether to schedule it would be equivocal.

Other Heritage Assets

13.38 The other heritage assets are of varying rarity and period value within their period contexts and this is reflected in their respective scores, the ring cairn and the cord rigg being the next rarest features after the palisaded enclosure. Prior to the evaluation, it was thought that cairn Feature 3 could potentially have been a burial monument, however the evaluation indicates this is highly unlikely and that it is almost certainly a clearance cairn. None of the features produced significant quantities of small finds and the condition of preservation assessment showed that most of the archaeology on Bleakmoor Hill is heavily truncated and the survival of unburnt organic material is very poor. While it could be argued that the site still holds potential for further information gain, the number of finds produced by the evaluation is believed to be an indicative proportion of what could still survive below-ground across the remainder of the site, which is considered to be relatively low. There is, however, further potential for some burnt burial deposits to survive within the ring cairn, although these would have to be in graves cut at depth and the presence of further such graves can only be surmised at this stage. There is no settlement evidence to accompany the Early Bronze Age ring cairn which therefore reduces its group value and, subsequently, its significance.

Scoring Conclusion

13.39 The total scores can be divided into four quartiles and it can be seen that on the basis of this assessment all the heritage assets fall on the cusp of the 'Moderate'-'High' Significance classes with the heritage assets ranked in the following order of importance relative to each other: palisaded enclosure, followed by the ring cairn, then the cord rigg, linear bank & cairns, and the clearance cairn. If any or all of these monuments were being considered for being put forward for scheduling today based on what is now known about them it is our view that it is marginal whether the palisaded enclosure and the ring cairn would be designated, and highly unlikely that the other remains would be. Better-preserved examples of palisaded enclosures are known, some simple and single phase, others with multiple phases of palisade and superimposition, and also with better geochemical environments for the survival of organic material, that would be demonstrably more significant candidates for consideration (e.g. Fawdon Dene 1; Threecorner Wood; Murton High Crags). The Bleakmoor Hill features are all, with the exception of the least significant asset (the clearance cairn), heavily truncated with only the basal remains of more deeply-cut features surviving. The Bleakmoor Hill palisaded enclosure is locally important and is an example of a small, simple, single palisaded enclosure with subtle surface expression resulting from the crest of the hill being highly truncated and experiencing significant soil loss over time. This has meant that the majority of the monument is not well preserved and if it were being considered for scheduling today we conclude that, given the now much-expanded corpus of such sites and with the availability of knowledge provided by this investigation, this site would be a marginal/equivocal candidate for scheduling.

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Appendix I: Context Summary Table

Context number	Description	Feature number
001	Topsoil and turf across the site	
002	Brash	
003	Andesite bedrock	
004	Cut of palisade slot TR1	1a
005	Fill of palisade slot [004] TR1	1a
006	Upper fill of palisade slot TR3	1a
007	Stone packing within palisade slot TR3	1a
008	Secondary fill of palisade slot [009] TR3	1a
009	Cut of palisade slot TR3	1a
010	Primary fill of palisade slot TR3	1a
011	Stone packing of palisade slot TR1	1a
012	Fill of ring gully within [013] TR2	1d
013	Cut of ring gully filled with (012) TR2	1d
014	Fill of pit [015] TR2	1r
015	Cut of pit filled with (014) TR2	1r
016	Orange silt subsoil across site	
017	Cut of ring gully filled with (018) TR3	1e
018	Fill of ring gully [017] TR3	1e
019	Cut of rock cut pit TR3	1t
020	Primary fill of rock-cut pit [019] TR3	1t
021	Upper fill of rock-cut pit [019] TR3	1t
022	VOID	
023	VOID	
024	Stone packing within ring gully [017] TR3	1e
025	Flagstones in top of pit [037] TR2	1s
026	Material beneath and between (025) TR2	1s
027	Stone tumble amongst mid brown silty loam, overlies palisade slot TR4	1a
028	Pale brown subsoil TR4	
029	Fill of palisade slot [058] TR4	1a
030	Fill of ring gully [031] TR2	1p
031	Cut of ring gully filled with (030) TR2	1p
032	Stones of ring bank TR5	14
033	Stones of cairn TR6	3
034	Soil sealed by stones of cairn (033) TR6	3
035	Cut of scooped platform house N-S TR2	1c
036	Cut of scooped platform house E-W TR2	1h
037	Cut of pit with flagstones (025) in top TR2	1s
038	VOID	
039	Stones of linear bank TR7	6
040	Wall tumble TR7	6
041	Stones of mound in centre of ring cairn TR5	14
042	Buried land surface beneath wall tumble (040) TR7	
043	Cut of ditch running parallel with linear bank/wall (039) TR7	6
044	Stones of cairn TR7	7
045	Cut for pit containing broken pottery vessel TR5	31
046	VOID	
047	Fill within pit containing broken pottery vessel [045] TR5	31
048	Cut for cremation cist TR5	31
049	Dark organic upper fill of cremation cist TR5	31
050	Light yellow/brown primary fill of cremation cist TR5	31
051	Cremated bone within cist	31

052	Palaeosol beneath ring cairn TR5	14
053	Cut of pit TR1	1q
054	Fill of pit [054]	1q
055	VOID	
056	VOID	
057	VOID	
058	Cut of palisade slot TR4	1a
059	Corbelled stones of cremation cist TR5	31
060	Late Iron Age – Romano-British cord rigg earthworks	
061	Truncated remains of bank, ring groove 1c	1c
062	Truncated remains of bank, ring groove 1h	1h

Appendix II: Harris Matrices

(001)

Cord rigg earthworks (060)

Disturbed brash (002a)

Tr1 Tr2 Tr3 Tr4 Tr5 Tr6 Tr7

(005)

Palisade slot (011)

[004]

(054)

Pit [053]

Ring groove (012)

[013]

(014)

Pit [015]

(025)

(026)

Pit [037]

House platform [036]

Ring groove (030)

[031]

House platform [035]

(006)

(008)

(007)

Palisade slot (010)

[009]

(021)

(020)

Pit [019]

Ring groove (018)

[017]

Wall tumble (027)

Palisade slot (029)

[058]

Subsoil (028)

Central mound (041)

Ring cairn (032)

(049)

(050)

Cremation cist (051)

[048]

(052)

Shallow scoop containing pottery (047)

[045]

(040)

Ditch [043]

Bank (039)

Clearance cairn (034)

(033)

Subsoil (016)

Brash (002b)

Bedrock (003)

Late Iron Age - Romano-British

Iron Age

Bronze Age

Beaker Period

Appendix III: Written Scheme of Investigation

Written Scheme of Investigation for Archaeological Evaluation Trenching at Bleakmoor Hill Palisaded Site (NHLE no. 1008562), Northumberland

February 2017

The Eco Centre, Windmill Way, Hebburn, Tyne and Wear

www.archaeologicalresearchservices.com

Prepared on behalf of:	Tarmac
Date of compilation:	February 2017
Compiled by:	Philippa Cockburn ACIfA and Clive Waddington MCIfA
Local Authority:	Northumberland National Park Authority and Historic England
Site central NGR:	NT 96006 08859

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1. INTRODUCTION

1.1 Archaeological Research Services Ltd (ARS Ltd) was commissioned by Tarmac to produce a Written Scheme of Investigation (WSI) for an archaeological evaluation at the Bleakmoor Hill Palisaded Enclosure Scheduled Monument (NHLE no. 1008562). The site is centred at NT 96006 08859 and covers an area of *c*.2.2 ha (Figure 1).

1.2 The underlying solid geology of the PDA comprises a 'red porphyritic andesite intrusion' which occurs in the ground as a batholith. No superficial deposits have been recorded (BGS 2016).

1.3 This document comprises a WSI which describes the method of investigation to be used by ARS Ltd for excavating seven, hand-dug, targeted evaluation trenches. It is important to stress that this piece of work is evaluation and not an open area excavation and therefore the following WSI has been written with the specific purpose of evaluation in mind.

2. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 A number of phases of work have been undertaken at the quarry in advance of previous quarry extensions including the production of desk-based assessments, some low-level surface survey and evaluation trenching. This is described in more detail in the 'Preliminary Heritage Statement' produced by Archaeological Research Services Ltd in 2016. Following consultations with the Historic England Inspector and the National Park Historic Environment Officer, it was agreed that systematic close-spaced geophysical survey and earthwork survey is required to inform a programme of evaluation trenching which together can inform discussion and decision-making on the future of the Bleakmoor Hill palisaded enclosure and nearby archaeological features.

2.2 In December 2016, ARS Ltd conducted a phase of geophysics including both a magnetometry survey and a resistivity survey. The magnetometry survey was inconclusive due to a strong response from the underlying bedrock which masked any archaeological features. The resistivity survey identified some of the features that can also be identified on the surface of the ground and it was therefore considered to be reliable within the constraints of an upland environment on challenging geology (Durkin 2016).

2.3 An earthwork survey was carried out by ARS Ltd in December 2016 and identified a total of 42 features. These included the palisaded enclosure construction slot, together with a number of internal features including construction slots for ring groove buildings and pits. Beyond the palisaded enclosure the survey identified a ring bank, a number of linear banks and ditches and some probable clearance cairns. While some of these features had already been identified, the earthwork survey highlighted some new features. Following on-site discussion with Historic England, Northumberland National Park Authority, Tarmac, Wardell Armstrong and Archaeological Research Services Ltd it was concluded that in order to test the

results of the survey, hand-dug evaluation trenches would be the most appropriate approach (see also Cockburn 2016).

3. AIMS AND OBJECTIVES

3.1 The aim of the archaeological evaluation is to:

Provide information on the form, phasing and date of the archaeological remains on Bleakmoor Hill together with information on the condition of preservation of these remains, in order to provide a sound evidence base to inform discussion and decision-making in relation to any potential future mineral development of this area. This work will assist in the preparation of evidence that may ultimately lead to the destruction of a Scheduled Monument and therefore all work will be carried out to exacting archaeological standards.

3.2 The objectives of the evaluation are to:

1 Target specific archaeological features identified by the previous desk-top study, the DBA, the geophysical survey and the walkover survey with archaeological evaluation trenching to obtain information from sub-surface deposits. The locations of the proposed trenches (see Fig. 1) have been agreed based on the information arising from these previous studies and as a result of a site visit and discussion between Tarmac (Matthew Pixton), Historic England (Lee McFarlane), Northumberland National Park Authority (Chris Jones), Wardell Armstrong (Nick Beale) and Archaeological Research Services Ltd (Clive Waddington).

2 Position and establish the size and shape of evaluation trenches so that they ideally provide maximum information based on minimum impact, particularly in relation to the Scheduled Monument (Bleakmoor Hill Palisaded Site).

3 Obtain information on buried features that will help characterise what each of the targeted features is, including structural form, any artefactual associations and associated environmental evidence.

4 Obtain dating samples to inform on the dating and phasing of the various features, and specifically the Bleakmoor Hill Palisaded Enclosure.

5 Provide the necessary information to assess the condition of preservation of the various archaeological remains.

6 Provide the necessary information to assess the significance of each archaeological element on the site and particularly the Scheduled Monument (Bleakmoor Hill Palisaded Site).

3.3 The archaeological evaluation will comprise seven hand-dug evaluation trenches (Fig. 1).

- Trench 1: 6 x 2m running from north-east to south-west across the construction slot and bank on a better-preserved section of the palisade enclosure circuit near to the probable entrance in order to test this better-preserved section of the palisade circuit for its condition of preservation and any information about the structural form of the palisade near to its supposed entrance.
- Trench 2: two 8 x 2m trenches in an 'L' shape running west-south-west to east-north-east to encompass a defined circular reed bed (thought to denote a sub-surface pit or possible well) and the western side of ring groove 1i and the northern side of ring groove 1c. Ring groove 1i is a subtle but slightly more defined example of one of the internal ring grooves – it also is the central ring groove and probably the largest of the possible houses that they are currently thought to denote. 1c appears as a double ring groove and is one of the better-defined examples and so is also considered important to target sample.
- Trench 3: 5 x 2m running from east to west crossing both the western side of the palisaded enclosure construction slot and the western side of ring groove 1e where they are poorly preserved and only barely visible as surface remains to test their condition of preservation and so can be compared with the results from Trenches 1 and 4.
- Trench 4: 9 x 2m running from north to south to locate and test whether the palisade construction slot survives on the southern side of the enclosure where there are no surface traces and use the data to compare with the results of the palisade's survival in Trenches 1 and 3.
- Trench 5: 12 x 2m running from north to south to examine ring bank feature 14 with the intention of establishing what the feature is (e.g. ring bank burial cairn, a shieling, or sheep stell), its date and condition of preservation.
- Trench 6: 5 x 3m across the western portion of feature 3 with the intention of establishing what the feature is (e.g. whether a clearance or burial cairn for example), its date and condition of preservation.
- Trench 7: 3 x 1.5m to examine the width of linear bank feature 6 and also to quarter section possible cairn feature 7 with the intention of establishing what the features are (e.g. field boundary and clearance cairn), their date, any physical relationships and their condition of preservation.

3.4 The archaeological evaluation will contribute to the following Key Research Themes of the North East Regional Research Agenda:

NB.4 Cairns: survey and excavation of groups of cairns in order to understand their form, function and chronology

I1 Chronology: contribute to building a chronology for Bronze Age/Iron Age settlement in the region and to assist in understanding settlement morphology through time

I2 Changing Landscapes: assist in understanding settlements in relation totheir surrounding landscape, integrating archaeological and palaeoenvironmental work, including potentially the topic of upland desertion.

I3 Settlement Function: assist in improving understanding of settlement layout, form and function and in relation to associated field systems

SEiii Chronology: Following appropriate sampling utilise radiocarbon dating supported by Bayesian modelling to help build a chronology for the archaeological features present, and particularly for palisaded enclosures about which very little is yet known in the region

AG7 Origin of Agriculture in the Region: potential to contribute to the evolution of prehistoric field systems and farms, depending on what is encountered during the evaluation

3.5 This evaluation will also contribute to the following parts of the Northumberland National Park's Research Agenda (Young *et al*. Undated):

Research Theme 1 Palaeoenvironmental Research: if well-preserved palaeoenvironmental residues are present on the site, for instance within the possible well in Trench 2, then there is the potential for obtaining information on past environment and land-use in the immediate hinterland of the archaeological remains on Bleakmoor Hill and this would give a window of specific detail that is often unavailable by the study of regional pollen diagrams.

Research Theme 3 Farming Through the Ages: this work has the potential to contribute to understanding expansion into the uplands during the Bronze Age; the analysis of variation in ridge and furrow field systems; and possibly the development and nature of transhumance in medieval and post-medieval times.

Research Theme 4 Death and Burial: if any of the cairns turn out to be burial cairns then this evaluation work will enhance the knowledge base as little is currently known about Neolithic-Early Bronze Age death and burial in the National Park save for that obtained by the relatively recent excavations in the Breamish Valley as part of the BVA Project (Frodsham and Waddington 2004).

4. METHOD STATEMENT

4.1 All elements of the archaeological evaluation will be carried out in accordance with the CIfA *Code of Conduct* (CIfA 2014a) and *Standard and Guidance for an Archaeological Field Evaluation* (CIfA 2014b).

4.2 The trenches will be excavated entirely by hand and cleaned sufficiently to allow the identification and planning of archaeological features.

4.3 Feature Sampling

All identified sealed and stratigraphically secure archaeological features will be sampled to allow their date, nature and degree of survival to be ascertained. All features will be recorded in plan and section and all finds retained for analysis. For sealed and stratigraphically secure fills of post-holes, palisade slots, ring groove slots and pits falling fully within an evaluation trench, 100% of their fill will be excavated. In order to maximise the potential for recovering artefacts, environmental samples and dating samples, once a sample has been taken for pollen analysis (see below), the remaining 100% of such fills will be floated. For any large features encountered, such as substantial linear ditch fills or large pits >2m diameter, then they will be half-sectioned and 50% of the fill retained for flotation, unless they prove particularly rich in containing artefacts and ecofacts and in such circumstances then 100% excavation might be appropriate. Given that it is evaluation trenches that are being excavated it is likely that most sampling will comprise 100% of feature fills. Professional judgement will also be exercised as appropriate, but this will follow the overall aim of maximising sampling and finds and environmental data recovery.

4.4 In the case of waterlogged or anaerobic deposits, such as the possible well defined by the surface reed bed in Trench 2, a minimum sample size of 40L will be taken. If this specific feature appears to be deep then it will also be augered to test its depth and recover a deeper, and ideally, a continuous core sample (if this is practicable - ie. if it is not stone-filled). Samples from this and any other waterlogged or anaerobic deposits will be taken for environmental analysis to test for the presence of, condition of preservation of, and date of, environmental remains within their fills.

4.5 Environmental Sampling

Environmental sampling will typically follow the guidelines issued by Historic England: '*Environmental Archaeology: A Guide to the Theory and Practice Methods, from sampling and recovery to post excavation'* (Campbell *et al*. 2011). As stated above it is anticipated that 100% of all undisturbed and sealed feature fills (excluding the stone component) encountered during the evaluation will be taken for environmental sampling. Given the andesite geology and free-draining character of the site, and what appears to be a very thin soil cover, it is considered unlikely that molluscs, diatoms or ostracods will be represent, or indeed much in the way of anaerobic deposits (with the exception of the possible well in Trench 2). There is greater potential for the survival of charred macrofossils, pollen and bone. Macrofossils will be collected via the flotation of feature fills which will be passed through graduated sieves to maximise recovery of all such material. Samples for pollen will be taken by targeting in situ and sealed feature fills with potential for hosting environmental residues and bagging a minimum 10cl sample from each sampled fill. Should any deposits have the potential to host insect remains then a

minimum 10l sample will be taken or 50% of the total fill if less than this is present. The other 50% would be sampled for pollen and the remainder floated for botanical macrofossils. Given the slight alkaline bias of the andesite bedrock there is greater potential for the survival of bone on the site compared, for example, to the more acidic sandstone uplands of the region and this is supported from previous excavations across the Cheviot Hills, such as the deposits from the houses in the Phase 1 palisaded site excavated at Fawdon Dene (Frodsham and Waddington 2004). 100% of any faunal material present will be collected for analysis. Should in-tact floor deposits or palaeosols be present then these may be suitable for micromorpological analysis. Should this be the case then kubiena tins will be used to collect samples for analysis. Should other types of environmental deposits be encountered, appropriate specialist advice will be sought and an appropriate sampling strategy devised and approved by HE RSA. Samples will be assessed and by a suitable specialist with provision for further analysis as required.

4.6 Hearths, Kilns and Ovens

Should hearths, kilns, or ovens, be encountered during the evaluation then their suitability for archaeo-magnetic dating will be considered and if deemed helpful to achieving the project's aims and for providing an accurate and precise date then dating by a suitable specialist will be undertaken.

4.7 Human Remains

Any human remains encountered will initially be left *in-situ* and, if deemed necessary, they will be archaeologically excavated once a Coroners licence has been obtained, in accordance with the relevant Ministry of Justice regulations. Excavation of human remains will follow discussion with the National Park Historic Environment Officer and the Historic England Inspector of Ancient Monuments as necessary.

4.8 Treasure

Finds of "treasure" will be reported to the Coroner in accordance with the Treasure Act (DCMS 2008). The Portable Antiquities Scheme Finds Liaison Officer will also be notified.

Coroner
17 Church Street
Berwick-Upon-Tweed
Northumberland
TC15 1EE
Tel No: 01289 304318

Finds Liaison Officer
Andrew Agate
Great North Museum
Barras Bridge
Newcastle upon Tyne
NE2 4PT
Tel No: 0191 208 6765

The National Park Historic Environment Officer and Historic England's Inspector of Ancient Monuments will also be notified and, if necessary, a site meeting arranged to determine if further investigation in the vicinity of the find spot is required.

4.9 Scientific Dating

The preferred method of dating will be AMS radiocarbon dating as this gives much greater precision than either OSL or archaeo-magnetic dating and radiocarbon dating is by far the most likely method by which any scientific dating will be achieved on this site. Should suitable archaeological deposits be encountered that could lend themselves to either OSL or archaeo-magnetic dating then they will be considered for dating if there is no scope to date the deposit or its functionally-related human activity by AMS radiocarbon dating. There is considered very low likelihood that OSL would be either possible or instructive on this site given that there is such limited potential for the accumulation of sediments that have not been subsequently disturbed. It is more possible that OSL dating of ceramics may be rlevant but again this would only be considered in the absence of suitable organic material for AMS dating. As with OSL, archaeo-magnetic dating still has very wide standard deviations for many periods, and therefore lacks the precision available from AMS dating. However, should in situ hearths or kilns be encountered then in the absence of any organic material suitable for AMS dating the potential for archaeo-magnetic dating will be considered. Should stratigraphic relationships be encountered between features/layers that can be scientifically dated by any one or more of the above techniques then this will provide for the construction of a Bayesian model for the site as a whole. Throughout the on-site excavation the potential for constructing a Bayesian chronological model will be at the forefront of the approach to the investigations. As the site matrix is constructed careful sampling and targeting of key contexts will occur with a view to obtaining the best-possible samples for dating purposes. Bayesian modelling allows for the combining of dates from the different methodologies mentioned above and therefore if different scientific dates are obtained these will be used to help build any Bayesian model that is possible for the site.

4.10 The Project Director (Dr Clive Waddington) is highly experienced in dating of archaeological sites and has helped pioneer the application of Bayesian modelling on complex prehistoric sites and is well-versed in targeting key features during fieldwork to acquire the necessary dating samples for the construction of Bayesian models (eg. See for example Waddington 2007; Johnson and Waddington 2008; Passmore and Waddington 2012; Waddington 2012; Waddington and Bonsall 2016 – these various studies involved close collaboration with then Historic England staff: Alex Bayliss, Peter Marshall, Derek Hamilton and John Meadows). The Scottish Universities Environmental Research Centre (SUERC) is the specialist organisation that will be supporting the dating work undertaken as part of this evaluation. The direct input of Prof Gordon Cook in relation to the AMS dating and Dr Derek Hamilton in relation to any Bayesian modelling will be on-hand. Should OSL dating be required then Prof. David Sanderson, also at SUERC, will be on-hand for advice and

field sampling. Advice on archaeo-magnetic dating, should this be deemed necessary, will be taken from Cathy Batt (University of Bradford) unless otherwise advised by the Historic England Science Advisor. The dating potential of the site and targeting of features for the construction of a Bayesian model will be discussed with the Historic England Science Advisor during any site monitoring visit/s and during the post-excavation phase.

5. RECORDING

5.1 Site recording will follow standard conventions in accordance with Archaeological Research Services Ltd.'s Site Recording Manual.

5.2 The evaluation trenches will be tied into the National Grid and located on a suitably scaled map of the area.

5.3 The trenches will be planned at an appropriate scale; 1:20 where complex deposits are present. One representative long section of each evaluation trench will be produced, at an appropriate scale. Sections and profiles of each feature identified will be drawn at 1:10 or 1:20, depending on the size of the feature. Spot levels relative to Ordnance Datum will be taken as appropriate and marked on plans.

5.4 A full and proper record (written, graphic and photographic as appropriate) will be made for all work, using pre-printed record sheets with text descriptions appropriate to the work.

5.5 The stratigraphic sequence of the site will be recorded even where no archaeological deposits have been identified.

5.6 A stratigraphic matrix will be compiled for all trenches where superimposed archaeological deposits, features or structures are encountered.

5.7 The heights above sea level will be recorded for all datum lines on feature sections and spot heights included on plans for deposits and features in metres above Ordnance Datum (aOD).

5.8 A full photographic record will be maintained including photographs of all significant features and overall photographs of each trench. All images will be taken in high resolution colour digital format (minimum 7.0 megapixels). A supplementary record of working images will be taken to demonstrate how the site was investigated and what the prevailing conditions were like during excavation.

5.9 All stratified finds will be collected by context or, where appropriate, individually recorded in 3 dimensions. All finds will be retained, the only exception being modern pieces of metal or dumps of farm material.

5.10 All small finds will be recorded 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.

6. FINDS PROCESSING AND STORAGE

6.1 All finds processing, conservation work and storage of finds will be carried out in accordance with the CIfA (2014d) *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* and the UKIC (1990) *Guidelines for the Preparation of Archives for Long-Term Storage.*

6.2 Artefact collection will be appropriate for the defined purpose.

6.3 All finds will be washed and, with the exception of animal bone, placed in marked bags or boxes. Marking and labelling will be indelible and irremovable by abrasion. All finds will be appropriately bagged, boxed and recorded (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. (including controlled storage, correct packaging, and regular monitoring, immediate selection for conservation of vulnerable material). All storage will be secure. This process will be carried out within two days of the small find being excavated.

6.4 Should prehistoric ceramic material be recovered then its potential for residue analysis will be considered as this could inform on the use of the pottery. Any such potential to be discussed with the Historic England Regional Science Advisor once the evaluation has been completed.

6.5 The deposition of artefacts will be agreed with the legal owner and the recipient museum prior to the works taking place. All finds except treasure trove are the property of the landowner.

6.6 All retained artefacts and ecofacts will be cleaned and packaged in accordance with the requirements of the recipient museum (Great North Museum Hancock).

7. MONITORING ARRANGEMENTS

7.1 Archaeological Research Services Ltd will give no less than 10 working days' notice prior to the commencement of fieldwork to the National Park Historic Environment Officer and the Historic England Inspector.

7.2 ARS Ltd will liaise with the National Park Historic Environment Officer and the Historic England Inspector throughout the course of the fieldwork with a view to a site visit being organised towards the end of the fieldwork when there is optimum visibility of the evaluation trenches and their contents. Visits throughout the fieldwork are welcomed.

7.3 The National Park Historic Environment Officer and Historic England Inspector of Ancient Monuments will be notified on completion of fieldwork, with a timetable for reporting and archive deposition to follow within less than one month of fieldwork completion.

8. TIMETABLE, STAFFING AND RESOURCES

8.1 The Project Manager for the fieldwork will be Dr Clive Waddington (MCIfA). The Project Officer will be Philippa Cockburn (ACIfA). Both have experience of working on Scheduled Monuments including: Coupland Henge, Harehaugh Hillfort, Humbleton Hill Hillfort, Fin Cop Hillfort, High Rochester Roman Fort, South Shields Roman Fort, Housesteads Roman Fort, Hadrian's Wall, Farnley Grange Temporary Camps, Harbottle Castle, amongst others. Clive Waddington has directed and published many excavations on complex sites, particularly in northern England and Northumberland in particular. He directed the excavations on the Fawdon Dene palisaded enclosures, also in the Cheviot Hills, and Philippa Cockburn recently excavated and produced the report on one of the earliest Bronze Age palisaded sites so far discovered in Britain at Lochinver near Elgin.

8.2 Post-excavation analysis will be carried out by appropriately qualified specialists as detailed below subject to availability. Any other specialist input will be sourced from established specialists as appropriate.

♦ Flint and prehistoric pottery:	Dr Clive Waddington MCIfA
♦ Romano-British pottery:	Paul Bidwell
♦ Samian Ware:	Paul Bidwell
♦ Medieval and post-medieval pottery:	Dr Chris Cumberpatch/Dr Robin Holgate MCIfA
♦ Medieval and post-medieval glass, metalwork and clay pipes:	Mike Wood MCIfA
♦ Plant macrofossils and charcoals:	Luke Parker
♦ Human and animal bone:	Milena Grzybowska
♦ Radiocarbon dating:	Prof Gordon Cook (SUERC)
♦ Bayesian modelling:	Dr Derek Hamilton (SUERC)
♦ Finds conservation:	Vicky Garlick (Durham University)

9. REPORT

9.1 Following completion of the evaluation, Archaeological Research Services Ltd will produce a report which will include:

- Executive summary
- Introductory statement to include
  - OASIS reference number, Archive reference and an eight figure grid reference
- Aims and purpose of the project
- Methodology (this WSI as an Appendix)
- A location plan showing all excavated areas and any archaeological features with respect to nearby fixed structures and roads

- Illustrations of all archaeological features with appropriately scaled hachured plans and sections
- A narrative and supporting tables describing the results
- Specialist sections based on full analysis for Dating, Small Finds, Environmental Analysis and any other topics as appropriate
- Discussion
- Statement of Preservation comprising description of the extent, depth and condition of preservation of archaeological deposits across the site
- Statement of Significance of the archaeological remains
- Conclusions
- Supporting data – tabulated or in appendices to include:
    - Context list and site matrix
    - Structural and Stratigraphic details including context summary tables
    - Photographs and drawings of selected small finds
- Details of archive location
- References

9.2 One bound copy of the final report with a digital copy of the report in PDF/A format on disk will be deposited with the Client (Tarmac), the Consultant (Wardell Armstrong), Historic England, the Northumberland National Park Authority, Northumberland Historic Environment Record (HER). A digital copy of the report will be uploaded as part of the OASIS record.

9.3 Provision is made for publication of the results of this work in line with the requirements of the NPPF and work on designated monuments. If further work is to take place on the archaeological remains then the results from this evaluation will be integrated with and published with that future work. Should no further work take place then the evaluation results will be published as a standalone piece of work. The primary publication is intended to be a journal article in a peer-reviewed regional or national journal depending on the significance of the results obtained. The archive report will ultimately be made available as a downloadable pdf file available off the internet (OASIS). Opportunities for more popular dissemination, such as an article for Current Archaeology, will be considered as appropriate, but in the light of the sensitivities of this site and in line with need for confidentiality, particularly at this stage.

10. ARCHIVE DEPOSITION

10.1 A digital, paper and artefactual archive, which will consist of all primary written documents, plans, sections, photographs and electronic data, will be produced. The Digital archive will be supplied to ADS and photographs will be

supplied in uncompressed baseline TIFF format. The archive will ultimately be deposited with the Great North Museum Hancock on completion of the project.

10.2 Written confirmation of the archive transfer arrangements will be included as part of the final report.

10.3 At the start of work (immediately before fieldwork commences) an OASIS online record http://ads.ahds.ac.uk/project/oasis/ will be initiated and key fields completed on Details, Location and Creators forms. All parts of the OASIS online form will be completed for submission to the HER. On completion of the works this will include an uploaded .pdf version of the entire report (a paper copy will also be included within the archive).

10.4 The National Park Historic Environment Officer and Historic England's Inspector of Ancient Monuments will be notified of the final deposition of the archive.

11. GENERAL ITEMS

11.1 Health and Safety

11.1.1 All work will be carried out in accordance with The Health and Safety at Work Act 1974. Specific health and safety policies exist for all out workplaces and all staff employed will be made aware of the policy and any relevant issues. The particular risks involved with this project will be assessed, recorded and relevant mitigation measures put in place as part of a full risk assessment, which will be compiled in advance of fieldwork. ARS Ltd retains Citation as its expert health and safety consultants.

11.2 Insurance Cover

11.2.1 ARS Ltd will carry full and up to date insurance cover for employee liability (£10 million) public liability (£5 million), professional indemnity (£2 million) and all-risks cover.

11.3 Changes to the Written Scheme of Investigation

11.3.1 Changes to the approved methodology or programme of works will only be made with prior written approval the National Park Historic Environment Officer and Historic England's Inspector of Ancient Monuments.

11.4 Copyright

11.4.1 Any publicity will be handled by the client. ARS Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988). Licence will be granted for the HER to use the report which may include dissemination to others.

12. REFERENCES

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Figure 1: Evaluation trench plan

Key:

- Evaluation trenches
- Natural slope
- Reed bed possibly indicating buried feature
- Stream bed
- Current extent of Harden Quarry
- Natural stone/placed orthostat
- Archaeological feature
- Projected line of feature mapped from Google Earth imagery
- Broad ridge and furrow mapped from Google Earth imagery

N

0 50m

396000

608850

1 1k 1l 1g 1f 1j 1m 1o 1n 1i 1h 1e 1d 1c 1a 1b 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Trench 1: 6 x 2m
Trench 2: (8 x 2m) x 2 in an 'L' shape
Trench 3: 5 x 2m
Trench 4: 9 x 2m
Trench 5: 12 x 2m
Trench 6: 5 x 3m
Trench 7: 3 x 1.5m

Appendix IV: Oasis Form

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: archaeol5-307831

Project details

Project name	Archaeological Evaluation Trenching at Bleakmoor Hill Palisaded Enclosure and environs, Harden Quarry, Northumberland
Short description of the project	Archaeological Research Services Ltd (ARS Ltd) was commissioned by Tarmac to undertake an archaeological evaluation at the Bleakmoor Hill Palisaded Enclosure Scheduled Monument (NHLE no. 1008562) adjacent to Harden Quarry near Biddlestone, Northumberland. The quarry extracts and processes red porphyritic andesite, known as 'Harden Red', which occurs in the ground as a batholith. A number of phases of work have already been undertaken at the quarry in advance of quarry extraction including the production of desk-based assessments, some low-level surface survey and evaluation trenching. This is described in more detail in the 'Preliminary Heritage Statement' produced by Archaeological Research Services Ltd (2016). The evaluation successfully and reliably dated the palisaded enclosure, and some of its internal features, to the Early Iron Age and provided valuable information on its form and phasing. Furthermore, the evaluation was able to shed light on a number of additional features situated beyond the enclosure including a Beaker period clearance cairn and Beaker period - Early Bronze Age ring cairn. The archaeological evaluation at the Bleakmoor Hill successfully achieved the aims and objectives as set out in the written scheme of investigation (WSI).
Project dates	Start: 21-08-2017 End: 15-09-2017
Previous/future work	Yes / Yes
Type of project	Field evaluation
Monument type	PALISADED ENCLOSURE Iron Age
Monument type	CAIRN Bronze Age
Significant Finds	POTTERY Iron Age
Significant Finds	CREMATION Bronze Age
Methods & techniques	""Targeted Trenches""
Development type	Mineral extraction (e.g. sand, gravel, stone, coal, ore, etc.)
Prompt	SMR enhancement
Position in the planning process	Not known / Not recorded

Project location

Country	England
Site location	NORTHUMBERLAND ALNWICK BIDDLESTONE Bleakmoor Hill

Study area	0.28 Hectares
Site coordinates	NT 96006 08859 55.373673562665 -2.063030121092 55 22 25 N 002 03 46 W Point

Project creators

Name of Organisation	Archaeological Research Services Ltd
Project brief originator	Historic England
Project design originator	Archaeological Research Services Ltd
Project director/manager	Clive Waddington
Project supervisor	Philippa Hunter

Project archives

Physical Archive recipient	Great North Museum
Physical Contents	"Ceramics","Environmental","Glass","Worked stone/lithics"
Digital Archive Exists?	No
Paper Archive recipient	great north museum
Paper Contents	"none"
Paper Media available	"Context sheet","Drawing","Photograph","Plan","Report"

Entered by	Maria Kneafsey (maria@archaeologicalresearchservices.com)
Entered on	20 May 2019

OASIS:

Please e-mail Historic England for OASIS help and advice

Cite only: http://www.oasis.ac.uk/form/print.cfm for this page

Appendix V: Cremated Bone Inventory

Group	Weight (gram)	Fragment size range (mm)
Skull (excluding teeth)	310.1	8-51
Teeth	9.2	2-14
Vertebrae	64.9	5-46
Ribs	38.3	8-35
Clavicle	2.9	21-30
Scapula	11.5	19-45
Humerus	54.0	13-71
Radius	12.4	15-58
Ulna	0.2	14
Carpals	2.4	10-20
Metacarpals	4.1	20-45
Phalanges (hand)	11.6	5-31
Pelvis	35.2	23-41
Femur	36.6	31-61
Patella	0.6	18
Tibia	13.6	30-45
Fibula	9.8	49
Tarsals	6.7	9-26
Metatarsals	2.6	12-45
MTC/MTT	4.3	10-33
Phalanges (foot)	3.5	6-17
Epiphyses	30.2	-
Carpals/tarsals	10.2	-
Long bone shafts	278.5	-

Table 1. Group weights and fragment size range of human bone.

Area of body	Proportion (%)	Normal distribution (%)
Skull	33.5	18.0
Axial (excluding skull)	10.8	21.0
Upper/lower limbs	55.6	61.0

Table 2. Skeletal elements distribution.

Tooth	Side	Tooth development stage	Age range (years)
Upper M1 or M2(fragment)	R	Cr3/4	3.5-7.5 ± 1
Upper PM2	L	Ri	8.5 ± 1

Table 3. Identified teeth development stage (AlQahtani, 2009).

Element	Side	Age indicators	Age (Scheuer and Black, 2000) (years) (Male/Female)
humerus	R	Fused distal	≥15/≥12
1st MTC	L	Fused proximal and distal	≥15/≥12
intermediate phalanges hand	-	Fused proximal	≥15/≥12
1st distal phalanges hand	-	Fused distal	≥15/≥12
distal phalanges hand	-	Fused proximal	≥15/≥12
pelvis	-	Fused acetabulum	≥15/≥14
MTT	-	Fused distal	≥15/≥11
proximal phalanges foot	-	Fused proximal	≥15/≥11
MTT + MTC	-	Fused proximal and distal	≥15/≥12
scapula	L	Fused glenoid	≥16/≥16
radial heads x3	-	Fused proximal	≥16/≥13
femur	L	Fused proximal	≥16/≥14
femur	R	Fused proximal	≥16/≥14
tibia	L	Fused distal	≥16/≥15
radius	R	Fused distal	≥17/≥15
humerus	L	Fused proximal and distal	≥18/≥16
ulna	R	Open distal	≤20/≤18
clavicle	R	Open medial	≤23/≤23
pubis	R	(Phase II - III: Suchey-Brooks)	F mean: 25.0-30.7y
maxilla	L	Alveoli – permanent teeth	≥12.5y ± 6 months (AlQahtani, 2009)

Table 4. Adolescent/Adult age indicators.

Skeletal element (side)	Side	Weight (grams)	Age estimation based on
skull	-	71.3	Size and morphology
frontal	L	0.9	Size and morphology
frontal	L	0.5	Size and morphology: infant/early juvenile
zygomatic	L	0.3	Size and morphology
mandible	R	0.3	Size and morphology
cervical vertebrae	-	3.7	Size and morphology
ribs	-	6.3	Size and morphology: infant/early juvenile

Table 5. Subadult skeletal elements (excluding teeth).

Skeletal element (side)	Sex	Sex indicator
frontal (L)	?F	glabella and orbital margin

frontal (R)	?F	orbital margin
pubis (R)	?F A (Phase II - III: Suchey-Brooks)	subpubic concavity

Table 6. Estimation of sex.

Fragment size (mm)	Weight (gram)	Proportion (%)
>10	1054.1g	48.4
<10>5	605.7g	27.8
<5>2	515.8g	23.7

Table 7. Fragment size, weight and proportion.

Mammal bone: 5.9g

PROPORTION OF THE TOTAL WEIGTH OF FRAGMENTS (IDENTIFIED TO ELEMENT)
Skull: 48.4%
Axial (excluding skull): 15.6%
Upper limbs: 15.0%
Lower limbs: 20.8%

Element	Weight	Size max	Size min	Fragment
scapula R	1.9	45.2	-	spine root
scapula	4.3	-	-	fossa
1st distal phalanges hand	0.6	17	12	1 x complete and 1 distal end
1st MTC L	1.8	39.6	-	complete
1st MTT L	0.8	15	-	distal end
1st proximal phalanx foot	1.3	17.8	-	distal end < 50%
2175.6 - actual				-
4th MTC R	0.8	20.5	-	proximal half
atlas	1.3	25.4	18.3	L upper articulating facet, articulation for dens
calcaneum R	1	15.7		articulation facet for cuboid
carpals and tarsals	10.2	29	8	-
cervical vertebrae	3.7	-	-	3 x body, 2 x sup and inf art facets (1 R , 1 L)
clavicle R	0.8	21.1	-	medial end
clavicle R	2.1	30.4	w	lateral third
cuboid L	0.2	18	-	4th and 5th articulation facet <50%

cuneiform	1.4	14.5	-	-
distal phalanges foot	0.2	8.5	6.4	3 x distal end
distal phalanges hand	0.9	14.9	5.3	6 x complete (incl 2 small), 2 x proximal ends, a1 x distal end
femur	2.4	31	-	intercondylar fossa
femur L	3	32.6	-	lateral condyle posterior part
femur L	6.7	44		lateral condyle
femur L	12.3	56	-	head > 50% and portion of neck
femur R	6.9	39	-	head and neck ,50 %
femur	5.3	61.5	-	linea aspera <505
fibula	9.8	49	39	2 x shaft < 50%
frontal L	0.5	22.9	-	orbit, supraorbital foramen, younger than L frontal orbit suggestive of second child present
frontal L	0.9	25.4	-	orbit, zygomatic process,
frontal L	4.7	37.2	15	orbit, glabella, zygomatic process
frontal R	11.2	51.9	-	zygomatic process, orbit, squama, crest and sulcus
frontal	1.5	28.8		crest and saggital sulcus, < 50% sinis
hamate L	0.4	13.9	-	hamulus complete
humerus L	5.1	26.7	13.8	trochlea and capitulum > 50 %; head > 50 %
humerus R	3.6	45	-	distal end
humerus	45.3	71.2	16.5	shaft fragments
ilium L	1.2	23.3	-	apex of aur surf
ilium R	5.4	30.5		sciatic notch < 505; auric surf < 50 %
intermediate phalanges hand	3	21.7	7	4 x complete, 5 x proximal end
lateral cuneiform L	0.3	9.8	-	dorsal anmd proximal portion
lbs lower leg indet.	28.7	56.8	30.2	-
lbs mammal	0.2	7.2	-	-
lbs indet.	259.6	53.9	9	-
lumbar vertebrae	3			1 x L sup art fac; 2 x R sup and inf art fac
mandible R	3.6	38.7		angle, alveoli
mandible R	0.3	22.7		condyle
mandible	1.5	-	-	alveoli
maxilla L	4.8	33	25.2	2 x left palate not fused medially and alveoli, and 1 x frontal process
maxilla or/and mandible	1.4	13.4	11.4	alveoli
MTC	1.5	45.3	-	shaft
MTT + MTC	4.3	33.6	10.2	shafts, distal ends (fused), proximal ends
MTT	1.8	45	12.3	2 x shaft > 50 %, and 1x distal end

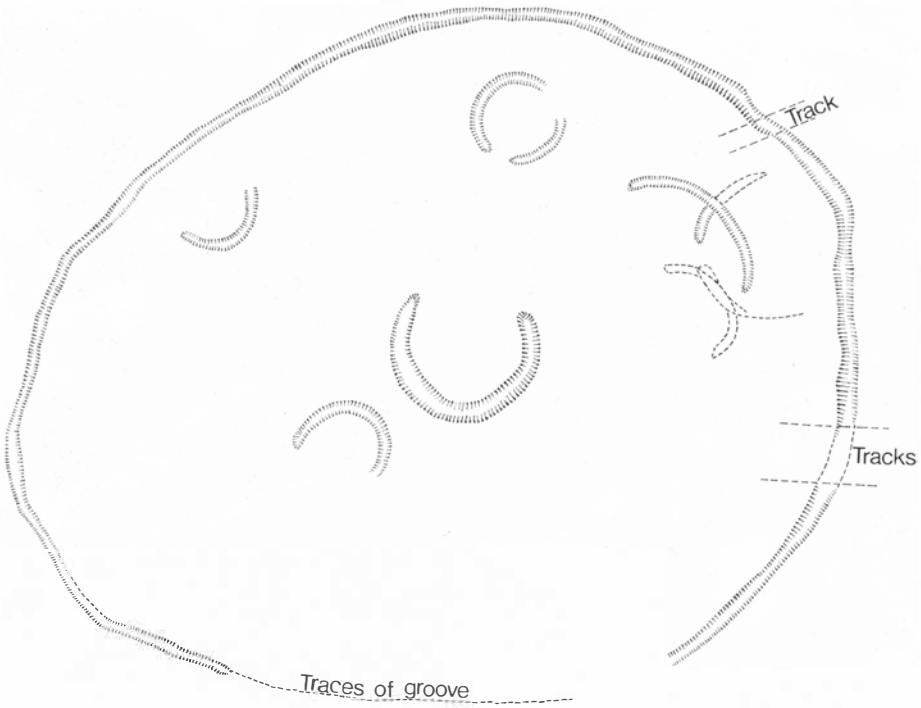
navicular L	1.1	24	-	dorsal portion
occipital L	1.1	27.7	-	< 50 % of condyle
patella L	0.6	18.8	-	supero-lateral portion
pelvis	26.4	41.3	32.8	incl. acetabulum > 50 %; auric surf < 50 %
petrous part	0.7	13.7	9.6	3 x cochlea
petrous part L	5.5	34.9	27.8	2 x
petrous part R	3.9	30.9	27.9	2 x
phalanges hand	7.1	31	9	x 16 distal ends with shafts
pisiform L	0.1	10.8	-	complete
pisiform R	0.3	13.6	-	> 50 %
pisiform R	0.1	10.9	-	complete
proximal or inetrmediate phalax foot u	0.2	16.2	-	shaft and distal end > 50 %
proximal phalanges foot	1.7	12.5	7.3	7 x proximal end - palmar aspect >50%
pubis R	2.2	23.6	-	dorsal inferior portion of pubic symphysis (total pubis <50%, acetabulum and ilio-pubic ramus <50 %
radial heads	2	17.4	15.9	3 x >50 % head with <50 % neck
radii + ulnae	18.9	48.6	18.3	shaft framgents
radius R	0.8	25.4	-	posterior aspect of distal end > 50 %
radius	0.8	26	-	radial tuberosity complete
radius	8.8	58.3	-	shaft
ribs	26.4	37	10	shafts, distal ends (fused), proximal ends
ribs L	2	31.1	20.5	3 x shafts with tuberlce, 1 shaft
ribs R	3.6	35.8	22.6	3 x shafts with tubercles, 2 x shafts
ribs R + L	6.3	21	8	over 40 fragments of shafts and 2 L ribs with tubercles
sacrum	2.8	46.1	-	ala and lumbar artic <50 %
scaphoid R	0.5	20.3	-	articulation for capitate >50 %
scapula L	2.8	38.2	19	glenoid > 50 % and coracodi > 50%
scapula R	2.5	44.8	-	spine root
sesamoid	0.1	8.8	8.1	2 x complete - foot
skull	0.7	18.5	8.5	-
skull	71.3	36.5	8.5	-
skull	189.3	39.7	9.8	all sutures open
sphenoid R	2	39.2	14.3	greater wing and foramen spinosum
talus L	2.7	26.7	-	trochlea
teeth	9.2			
temporal L	1.6	28.5	-	< 50% mandibular fossa
temporal R	2.3	28.6	21.7	2 xzygomatic process > 50 %, squama <50 %
thoracic vertebrae	4.2			3 x R sup art factesa and 3 x left sup art fac

tibia L	11.1	45.5	-	medial malleolus and articular surtface
tibia	2.5	30.7	-	interosseus crest < 50 5
trapezium R	0.4	17.6	-	>50%
trapezoi R	0.3	13.3	-	copmplete
triquetral R	0.3	14.4	-	complete
ulna R	0.2	14.7	-	distal epiphysis complete
unfused indet ends	6.2	21.6	10.8	possible clavicle , sternum and pubic symphysis
unid epiphysis hum	24			27 apices: 7 single root, 3 multi root; 2 mutli rooted deciduous teeth, 3 multirooted permanent teeth; 5 permanent single rooted teeth, 4 fragments of unerupted forming possibly perm teeth grey-blueish grey and 2 unerupted permanent teeth as below:
unid human	101.2	42	5	-
unid separate	1075.6			L maxilla: pm loss: 1,2,3,4, 6,7,no bone, 5: root in alveoli
vertebrae TOTAL	60.8	25.9	5.1	pedicles, facets, bodies (fused), 4 x spines (fused)
zygomatic L	0.3	16.7	-	frontal process
zygomatic L	0.9	23.3	-	frontal process
zygomatic R	0.8	27.3	-	frontal process

Table 8. Inventory of identified cremated remains.

Appendix VI: Survey of Bleakmoor Hill Palisaded Enclosure by Gates and Ainsworth, 1979

BLEAKMOOR HILL
BIDDLESTONE



N

SCALE 1:500

0 10 20 30 40 50m

SURVEYED TG:SA 1. 6. 1979

PRN 877

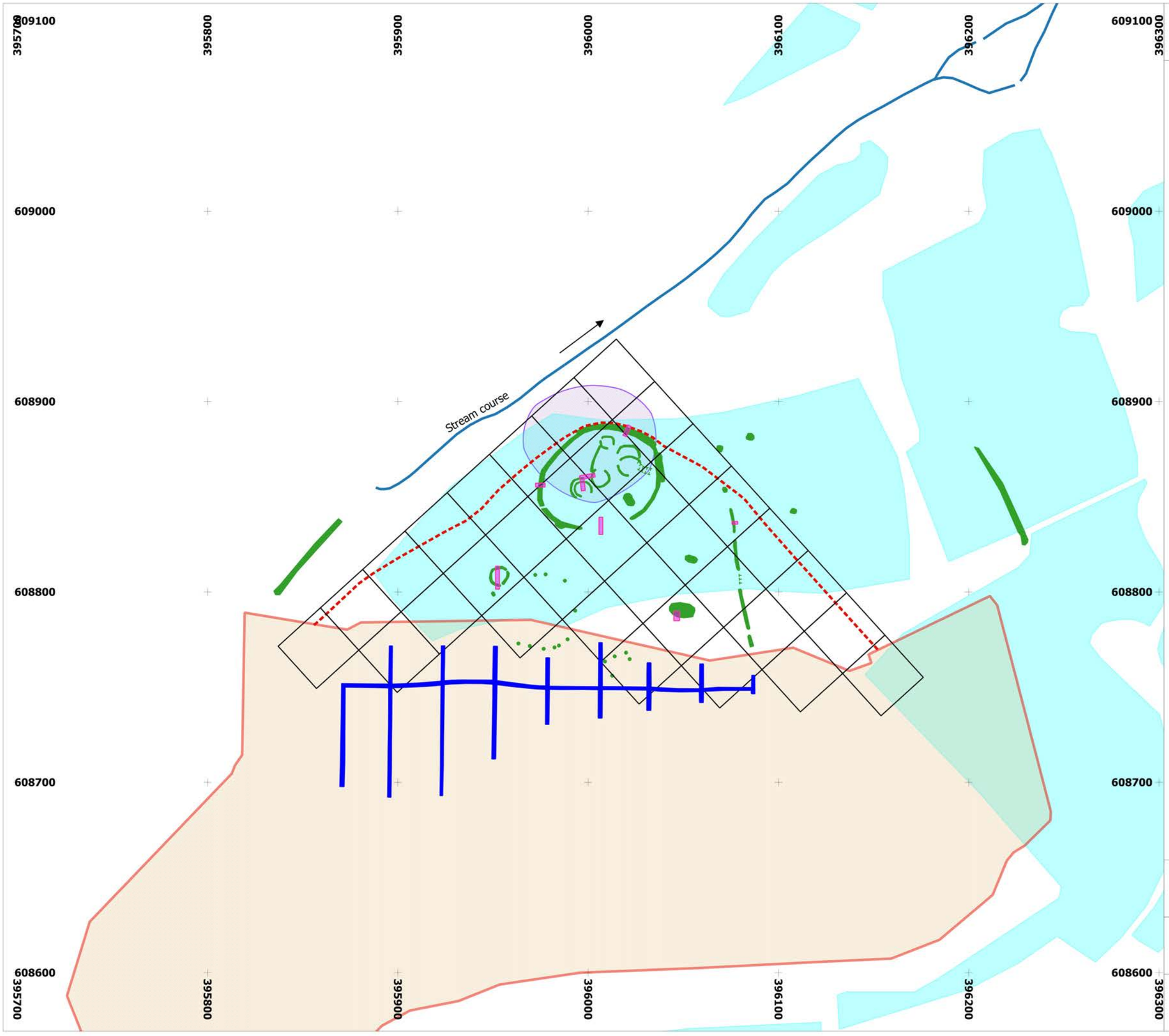
GAT01/01/001

COLL 1098425

Site name: Harden Quarry Date: April 2019 Drawn by: AB Scale: NTS	N	**Archaeological Research Services Ltd** Angel House Portland Square Bakewell Derbyshire DE45 1HB Tel: 0114 2750140 www.archaeologicalresearchservices.com
Survey drawing: GAT01: 1:500 plan of Bleakmoor Hill, Biddlestone (PRN877) 	**Appendix VI:** **Plan of Bleakmoor Hill Palisaded Enclosure by Gates and Ainsworth 1979**	

Appendix VII: Plan of Harden Quarry showing location of archaeological remains and interventions (GAT01/01/001 1:500 plan of Bleakmoor Hill, Biddlestone (old ref: PRN877))

Appendix VII:
Plan of Harden Quarry showing location of archaeological remains and interventions



- Possible extent of mineral reserve (to be confirmed by drilliing)
- Current edge of quarry
- Known archaeology and suspected remains
- Rig and furrow
- Area of Scheduled Monument mapping
- Stream course
- Geophysical survey grids
- 1996 trench
- 2017 trenches

0 20 40 60 80 100 m

N

Site name: Harden Quarry
Date: March 2019
Drawn by: AB
Scale: 1:2000 @ A3

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