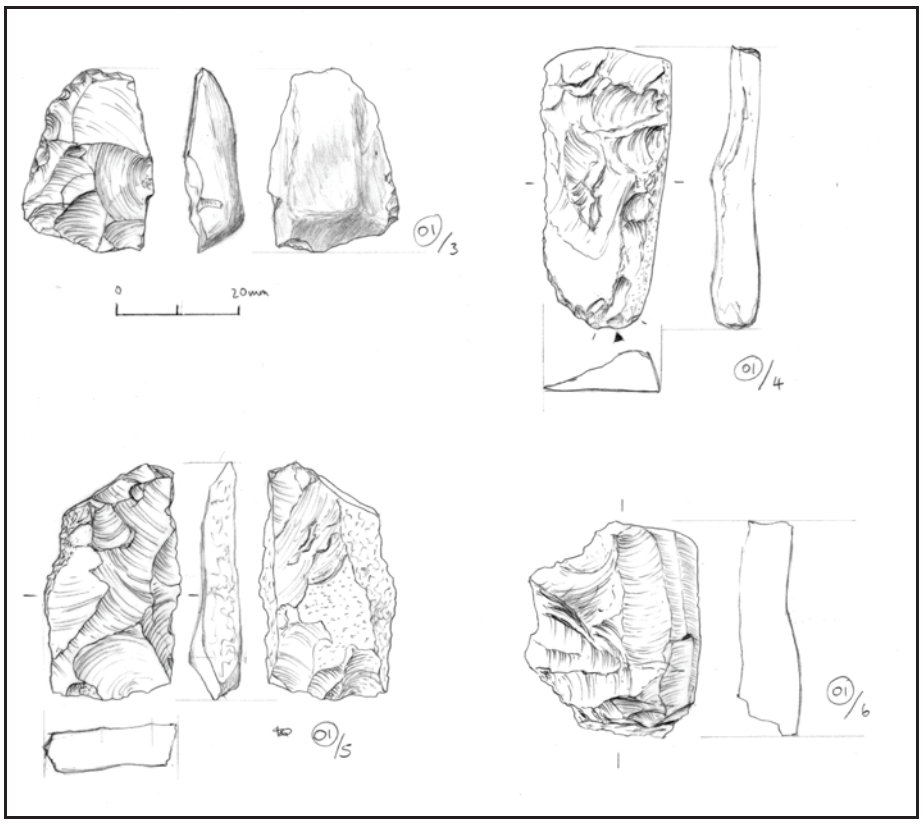
HIGHWAYS DEPOT, HOPPER HILL ROAD, SEAMER CARR, NORTH YORKSHIRE

ARCHAEOLOGICAL RECORDING

Planning Reference: C4/10/01994/CC



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On behalf of

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May 2012

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HOPPER HILL HIGHWAYS DEPOT, SEAMER CARR NORTH YORKSHIRE

ARCHAEOLOGICAL RECORDING

Summary

Archaeological recording in the form of a site strip, map, record and sample excavation was undertaken on the ground works for a new highways depot (Planning Reference C4/10/01994/CC) at the southern end of Hopper Hill Road, Seamer, North Yorkshire (NGR TA 0325 8292). The archaeological recording covered the topsoil strip for the entire site prior to ground reduction.

The archaeological monitoring recorded a series of features across the southern portion of the site, several of which were sited on the crest of a small knoll in the landscape. The chronology of the features reflected repeated visits and activity over a prolonged period of time. The earliest feature was a scatter of c.200 struck flints which included tools and debitage and dated to the late Mesolithic. These flints appear to represent a short lived (possibly single) event of the latter stages of tool manufacture. Artefactual evidence for the Neolithic and Bronze Ages was represented by a background 'noise' of struck flints including several scrapers and a fine early Neolithic leaf shaped projectile point. A small hearth was radiocarbon dated to the middle Bronze Age but unfortunately there were no other features associated with it.

The most substantial features dated to the late Iron Age and consisted of two roundhouse drip trenches and three probably associated, enclosing ditches. Recovered from close to one of the roundhouses and within the drip trench of the other was a significant assemblage of later Iron Age pottery (1st century BC/1st century AD). The assemblage was domestic in nature and of at least relatively local manufacture and represented parts of approximately 11 different vessels. Found alongside, or in close association, with the pottery were several large fragments of iron slag. Analysis of the slag concluded that they were derived from the smelting process. Their presence on the site derives either from the occurrence of a background scatter of slag from a nearby smelting site or from material that has been brought to the site either accidentally or deliberately. Of importance is the absence of smithing slag, the lack of which is supported by the lack of hammerscale present in the environmental samples.

A brief inspection of the landscape to the south of the development area showed that there appears to be a high potential for further archaeological features to be present which probably relate to the ones recorded here.

The Hopper Hill Depot site can be seen to contain a regionally significant level of highly vulnerable archaeological remains covering c.7,000 years of human activity. The ephemeral nature of the Mesolithic flint scatter and Bronze Age hearth at the topsoil/subsoil interface make them particularly prone to accidental damage and loss. As such a more rigorous method of archaeological interventions recommended, prior to the development of surrounding sites, particularly to one to the south.

No other archaeological finds or features were recorded during the ground works.

1.0 INTRODUCTION

1.1 This report presents the results of archaeological recording (strip, map and record) of the groundworks prior to ground reduction for a new highways depot, Planning Reference C4/10/01994/CC. The site lies at the southern end of Hopper Hill Road and to the north of the Scarborough railway line, *c.*1.6km to the south-east of Seamer in Seamer civil parish of Scarborough District (NGR TA 0325 8292) (Figure 1).

1.2 The on-site archaeological works were undertaken by JB Archaeological Services (JBAS) on behalf of Jacobs between 3rd and 15th August, 2011. Due to the significance of the archaeological features recorded by the on-site works, the decision was taken that the results should undergo a programme of post excavation assessment and analysis. This was with the view to the eventual publication of the site in the Yorkshire Archaeological Journal.

2.0 BACKGROUND

Historic Background

2.1 The area lies within the multi-period landscape of the Vale of Pickering which has seen human activity since at least the Upper Palaeolithic period. To the south of the site around Star Carr, sites from the Upper Palaeolithic to Bronze have been recorded including a significant number of Mesolithic sites at around the 25mOD level – e.g. Hopper Hill, No Name Hill and Rabbit Hill. Neolithic sites have been identified at a slightly higher level (*c.*27mOD) – for example at Hopper Hill.

2.2 Gravel extraction in Burton Riggs quarry immediately to the west of the site recorded human activity dating from the late Iron Age into the Anglian periods (MAP, 2000, 4). Archaeological monitoring on the development of the site to the north recorded a number of pits, post-holes and linear features which appear to date from the Neolithic period.

Geology

2.3 The underlying geology of the site is the Corallian, Ampthill and Kimmeridge clays of the Upper Jurassic (British Geological Survey, 2001). Overlying this, the quaternary geology is predominantly one of glacial sands and gravels with boulder clay (British Geological Survey, 1977). The soils, which have developed from these deposits, are classified as the Burlingham 2 association which is a deep, fine loamy soil with slight seasonal water logging (Soil Survey of England and Wales, 1983).

Topography and Land-use

2.4 The site is generally level at a height above sea level of *c.*30mOD with a small ridge of land (up to *c.*2.5m high) running north-south in approximately the centre of the site. The land was unused as it was awaiting development as a highways depot. In the past the surrounding landscape had seen extensive aggregate extraction and after re-instatement is currently part of an industrial estate.

3.0 AIMS AND OBJECTIVES

3.1 The objective of the strip, map and record was to identify, map, record and sample excavate any features of archaeological interest revealed or damaged during the topsoil strip, prior to the ground reduction of the site. The specific aims were to:

- archaeologically record (written, graphic, and photographic records) any archaeological features revealed by the ground works and as the result of any sample excavation
- recover any archaeological artefacts and environmental material exposed by the ground works

3.2 All archaeological works was carried out in accordance with the Institute of Field Archaeologists Code of Conduct for an Archaeological Watching Brief (1999).

4.0 METHODOLOGY

4.1 All of the ground works were undertaken using a tracked 26 tonne mechanical excavator with a toothless bucket under direct archaeological supervision and carried out to a previously prepared WSI (Buglass, 2011). The ground works consisted of topsoil stripping and excavation to the required formation level - a depth of up to 1.80m below current ground level (Figure 2 and Plate 1).

Plate 1. General shot of site during stripping, looking north-west

4.2 During the ground works the exposed ground surfaces were inspected for archaeological features and the resulting topsoil stockpiles were monitored for archaeological artefacts.

5.0 RESULTS

5.1 The archaeological sequences for the various features are described in detail below. In the text the context numbers for each archaeological deposit are given in [] brackets. The site monitoring recorded a series of eight discreet archaeological features across the site. These were predominantly along the southern side of the area and generally confined to the higher ground within the site. All of the features lay directly under the turf/topsoil [01] and were cut into, or were lying on top of the underlying natural [21]. The two features that were not cut into the underlying natural were a spread of pottery [17] and a scatter of worked flints [12]. These two features appear to have originally been deposited directly on an earlier land surface and then had subsequently been compressed into the underlying natural deposits. Unfortunately as none of the features could be stratigraphically related to each other, it was difficult to determine which features were contemporary. However by using a range of dating techniques, it is possible to suggest some relationships and phasing within the site.

5.2 The turf/topsoil layer [01] which covered the whole site varied in depth with the area around the high point being as little as *c.*0.15m thick. The thickness increased markedly towards the east of the site where a combination of hill wash and soil creep from ploughing had resulted in a depth of *c.*0.55m of topsoil developing. The topsoil [01] lay over and directly sealed all of the archaeological features with no obvious evidence of a subsoil.

Ditch [04] (Figures 2 & 3, Plate 2)

5.3 This ditch was located at the highest point of the site (31.55mOD), orientated north-south with the northern end of the ditch starting to curve gently to the north-west. Its line was visible from the edge of the site for *c.*25m running north-westwards. The top of the ditch was 1.90m wide and had a maximum depth of 0.86m (30.51mOD). The ditch had an asymmetric profile with the eastern side being almost vertical whilst the western side was slightly stepped. This asymmetry may be indicative of the need for access for its construction and/or periodic cleaning. The ditch had been cut into the underlying natural drift geology [21] of clay. The primary fill [07] was a 0.2m thick (base at 31.19mOD) stiff, mid brown silty clay with occasional charcoal flecks of which a sample was collected for possible radio-carbon dating but on analysis proved to be a mineral deposit. Apart from the possible charcoal, the deposit was devoid of any artefactual evidence. Directly overlying [07] was context [06] which was a much more compact deposit of mottled, orangey brown clay. This deposit was 0.46m thick with its base at 30.72mOD. Unlike [07], this 0.45m thick sediment contained sandstone pebbles along with some small stones and cobbles. A very small artefactual assemblage was recovered from [06]. This consisted of three fragments of a heat affected stones ('pot boilers'), some small fragments of burnt daub and sherds from two Late Iron Age pottery vessels (one possibly from the rim of a barrel jar). The 'pot boiler' fragments all came from the same stone and two of them were joining fragments. Originally the pot boiler was a water rolled cobble probably retrieved from a local stream for use. Directly above this layer and forming the final fill of the ditch was [05]. This 0.2m thick mid brown clay was very compacted and contained very occasional small sandstone stones. Although the deposit was very clean with few inclusions, six

small fragments of late Iron Age pottery were recovered along with a single flint (see specialist reports below for details).

5.4 The lack of finds from the primary fill of the ditch make dating the feature with any confidence impossible but this lack of material would seem to strongly suggest a prehistoric origin. This would seem to be confirmed by the presence of residual Late Iron Age material in the form of pottery and struck flint in the upper fills.

Plate 2. Ditch [04], looking north, scales 1 and 2m

Ditch [08] (Figures 2 & 4, Plate 3)

5.5 This ditch was located *c.*20m to the west of ditch [04] and was also aligned north-south, possibly suggesting a degree of contemporainity or continuity within the landscape. It was located just off the top of the higher ground and its line was visible from the site boundary for *c.*20m running northwards. The cut for this ditch was much shallower and formed a flattened U shape. Its maximum depth was 0.3m (31.12mOD) and it was 1.4m wide. It contained a single fill [09] which was a medium brown, compacted, silty clay. This contained a small amount of sandstone pebbles/cobbles and flint.

5.6 All of the flint encountered during the excavation was recovered and the analysis of the 11 pieces recovered recorded that seven were natural and two of them had been heat affected. The remaining four pieces had been struck but did not retain any diagnostic features and appear to be residual. As with ditch 04, the lack of dating material from this ditch would seem to suggest a probable prehistoric origin.

Plate 3. Ditch [08], looking north, scales 0.5 & 1 m

Ditch [18] (Figures 2 & 3, Plate 4)

5.7 Ditch [18] was to the north of the area of high ground and was aligned east-west and from its location it could have intersected with either of the other ditches described above. However, extensive investigation could not trace the ditch beyond the small section plotted and, unfortunately, no intersection could be located. The profile of ditch [18] was of a rounded bottomed V with fairly regular sides. It had a maximum depth of 0.6m and a width of 1.2m (30.02mOD). The ditch contained two fills. The primary fill [20] was a 0.45m thick medium brown silty clay with no inclusions from which a single struck flint flake was recovered. Directly above this was a 0.2m thick deposit of a hard mottled mid brown/orangey clay (base at 30.48mOD). No finds were recovered from this deposit.

5.8 The single recovered flint was the proximal end of a blade with evidence of retouch down both sides. The blade is consistent with material found across the site and is late Mesolithic in origin. This, along with the lack of other dateable material, could suggest that the ditch become in-filled earlier in the prehistoric period, possibly pre-Iron Age.

Plate 4. Ditch [18], looking east, scales 0.5 & 1 m

Roundhouse [10] (Figures 2 & 4, Plates 5 & 6)

5.9 Located slightly to the south of the high point of the site were the remains of a small drip trench [10] which appeared to be from a roundhouse. The remains were 0.05m deep (31.17mOD) and 0.18m wide and a *c.*5m long section of the feature survived. The feature had a simple flattened U shape profile and contained a single fill [11]. This fill was a compact, dark brown, silty clay with some small sandstone pebbles. No artefactual material was recovered from this deposit. Enough of the curve of the feature survived to be able to calculate that its radius would originally have been *c.*5m.

Plate 5. Roundhouse drip trench [10] prior to excavation, looking south, scales 1m

Plate 6. Section across drip trench [10], looking south-east, scale 0.5m

Pottery Scatter [17] (Figure 2, Plate 7)

5.10 Approximately 15m to the north of the probable roundhouse [10] at about the highest point of the site, there were the remains of three small areas of badly crushed late Iron Age pots. One of pots was lying in close association (0.15m away) with two large piece of iron slag along with a number of smaller fragments. In addition two struck flints were recovered from the vicinity of the crushed pots, though they did not appear to be directly related to them. The artefactual material had been severely compressed into the underlying natural geology, probably as a result of the tracking of the mechanical excavator during the site strip. It appears that the pots had been deposited directly onto the earlier ground surface. It would seem that this earlier ground surface was at more or less the same level as the underlying natural and that there was little or no topsoil in the vicinity. Subsequently over time the material had become more compressed into the underlying clays, particularly by the action of the mechanical excavator. No other finds or features were associated with this deposit.

5.11 Although very fragmentary it was possible to identify that this pottery assemblage contained the remains of a jar with near vertical, slightly everted rim (Figure 6, no. 3) and a small bevelled rim small jar. Both forms are dated to the later Iron Age. The slag that was recovered from a close association with the pottery was analysed and appears to be from iron smelting. Of the two struck flints, one was an un-diagnostic waste flake whilst the other (drawing 17) was the proximal end of a late Mesolithic blade and as such consistent with the other flints recovered from across the site.

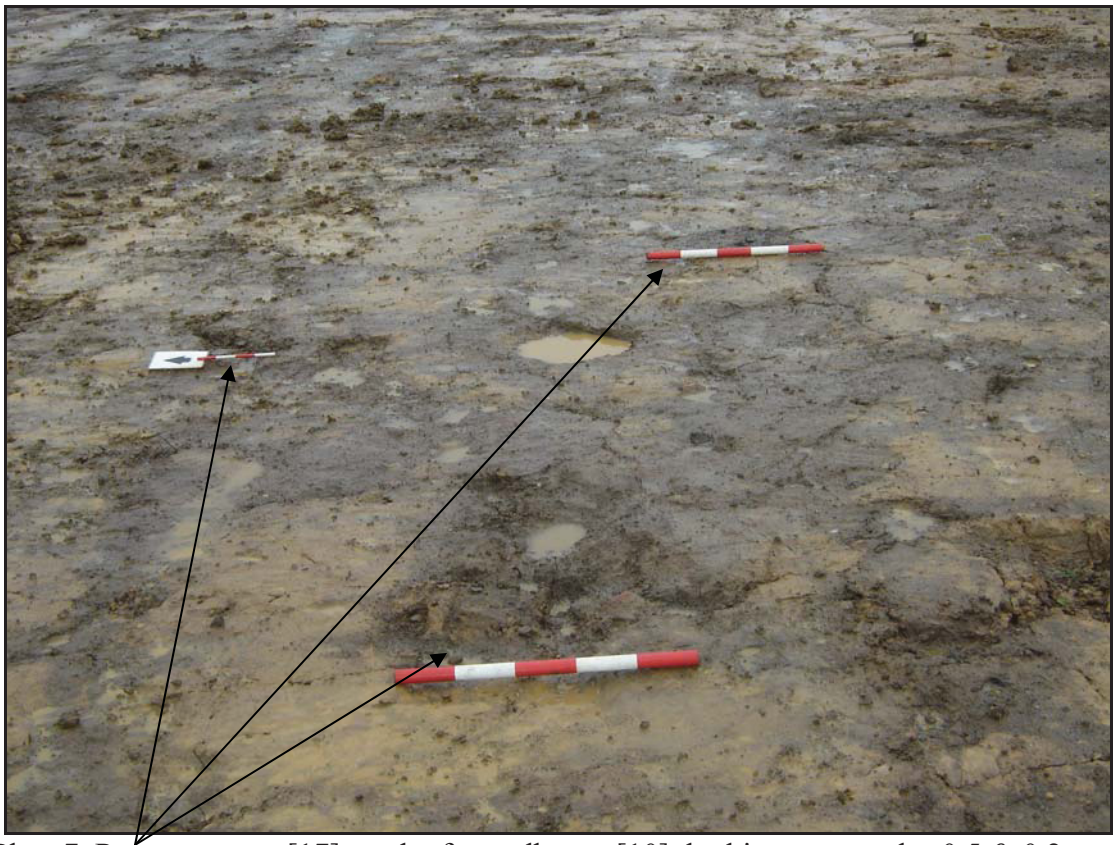


Plate 7. Pottery scatter [17] north of roundhouse [10], looking east, scales 0.5 & 0.2m

Roundhouse [15] (Figures 2 & 4, Plates 8 & 9)

5.12 A second probable roundhouse was recorded, this time towards the eastern side of the site. Significantly more of the drip trench [15] was recorded here, along with a probable terminus at the western end. The radius was calculated to have originally been *c.*4-4.5m. Like the other roundhouse, the remains had been heavily truncated. The drip trench contained a single fill [16] which was a loosely compacted, dark brown to black mixture of soil and silty clay (base at 28.65mOD). As with the feature [10], the fill [16] of this drip trench was 100% excavated. The finds recovered were 25 sherds of late Iron Age pottery along with three fragments of iron slag and one possible piece of furnace lining.

5.13 A significant amount of pottery was recovered from this feature all of which dated to the late Iron Age. The material appears to represent a minimum of seven vessels and was very similar in composition to the material recovered from the pottery scatter [17] already described. Two vessels were of particular note. The first (Figure 6, no. 1) is a jar with an essentially upright, flat-topped rim, thickened internally and dished so as to form a broad lid-seating. The second (Figure. 6, no. 2) is a fragment from an angular jar handle of rectangular cross-section. As well as a strong similarity between the pottery from [16] and [17], the analysis of the metal slag also showed that they were both derived from the smelting process. This would seem to suggest that the two features are contemporary.

5.14 The excavation of the possible terminus did not record any features beyond a simple rounded end to the drip trench and no internal features were observed – probably due to the aforementioned truncation.

Plate 8. Roundhouse [15] prior to excavation, looking west, scales 1 & 2m

Plate 9. Section through drip trench [15], looking west, scale 0.5m

Flint Scatter[12] (Figure 2, Plate 10)

5.15 Lying between the roundhouse [15] and the start of the slope up to the higher ground to the west were the remains of two features. The first of these was a substantial scatter of struck flints [12] covering an area of *c.*1.5x3m. The assemblage contained nearly 200 struck flints which represent several stages of tool manufacture dating to the late Mesolithic (see specialist report below for details). The material was lying both within the topsoil and on the topsoil/natural interface. Careful excavation of the area failed to identify a focus of the material. Also recovered from the vicinity of the flint scatter were two pieces of iron ore.

Plate 10. Area of flint scatter [12] after excavation, looking north-west, scales 1m

Hearth [14] (Figures 2 & 5, Plate 11)

5.16 The second feature was a small hearth [14] which was recorded *c.*2m to the north of the flint scatter. Initially it was thought that the two features may have been related due to their close proximity. However, the radiocarbon dating of two hazel charcoal fragments both returned mid Bronze Age dates for the use of the hearth, spanning BC 1750 to 1520 (2-sigma calibrated). The hearth was a roughly circular feature 0.8m in diameter and had been set into a natural dip (0.7m deep) in the underlying geology. The hearth itself was composed of locally collected naturally rounded stones which had been packed together to form a base. Little heat damage was apparent on the stones and surrounding sediments, which would seem to suggest that the hearth was not used for a prolonged period of time. No artefacts were recorded in association with the feature.

Plate 11. Hearth [14] after excavation, looking west, scales 1 & 0.5m. Note plough damage to western side.

General Observations

5.17 In addition to the various features described above a large number of struck flints (dating from the early Neolithic and Bronze Age) along with a piece of red ochre and a piece of hearth lining were recovered from across the site as a whole. These additional finds came from monitoring the soil stockpiles and the topsoil/subsoil interface. This pattern of distribution shows that there was an extensive general background of archaeological material across the site as a whole. In turn this can be seen to suggest that the site was subject to a much greater level of activity then the relatively small number of cut features would seem to suggest.

6.0 FINDS

The Pottery

Peter Didsbury MPhil FSA

6.1 The site ceramic assemblage consisted of 289 sherds of pottery, weighing 1192 grams. The overall average sherd weight (ASW) of the pottery was 4.1 grams. All diagnostic indications suggest that the material was of Late Iron Age date (see further below).

Fabric terminology

6.2 The broad fabric series adopted for this report makes use of an alpha-numeric code, in which the first element denotes the means of manufacture and the second the main tempering type. In this assemblage, all fabrics present were

coded "H", as having been employed for hand-built pots. In the list below, only the asterisked fabrics were present.

H1 Calcareous temper.
H2 Stone temper.
H2s* Finer, sandy/gritty grades of H2.
H3* Mixed calcareous and non-soluble, or other temper.
H4* Vesicular material, often representing an original H2 fabric.

6.3 It will be seen that the basic structure of this series reflects a basic division of late prehistoric pottery in eastern Yorkshire into calcareous and non-calcareous wares which has been widely discussed elsewhere (cf. Leslie, Middleton and Rigby 2004, 21-22 for a recent summary). A fabric profile for the whole site assemblage is shewn below (Table 1):

Table 1. Fabric profile of the site assemblage

Fabric	% no. of sherds	% weight of sherds (n = 289)	ASW (grams) (n = 1192 grams)
H2s	94.1	93.6	4.1
H3	1.7	2.8	6.6
H4	4.2	3.6	3.6
TOTAL	100.0	100.0	

6.4 As will be seen, the proportion of the assemblage which may once have employed calcareous temper is almost negligible. The overwhelming preponderance of the H2s fabrics probably reflects the Quaternary geology in the area of the site, and the ready availability of tempering materials from within local sands and gravels.

Distribution of the pottery

6.5 Pottery was obtained from three different locations: the primary to tertiary fills of Ditch [4]; the single fill of the drip trench of roundhouse [15]; and pottery scatter [17], to the north of roundhouse [10].

6.6 The fills of Ditch [4] produced a small aggregated assemblage of 20 sherds, weighing 61 grams, and a fragment of possible daub, the latter from tertiary fill [05]. The majority of the material was H2s, and came from secondary fill [6]. It contained a *possible* simple rim fragment, not illustrated, perhaps from a barrel jar. The sherds, which derive from at least two vessels, are in fairly hard fabrics, mainly reduced with brownish surfaces. The "sand" temper typically consists of common angular to sub-rounded clear and coloured quartz grains *c.*1mm, with occasional larger fragments. The sherds are quite worn, and common vesicles probably derive from dislodged non-soluble temper, rather than from original calcareous material.

6.7 Fill [16] of the roundhouse [15] drip trench contained 21 sherds of pottery, weighing 164 grams. Again, the material was preponderantly H2s, not different in any significant respects from that already described, and perhaps representing a minimum of seven vessels. There were also four pieces of fired clay (13 grams), one at least of which had been subjected to very high temperatures and was partially vitrified.

6.8 The assemblage contained three vessels suggestive of a late Iron Age date. The first, not illustrated, is a worn rim fragment from a small H4 jar. Similar vessels in various sizes are widespread in the region and examples may be mentioned from Hawling Road, Market Weighton (Evans with Creighton 1999, illus. 7.16, fabric-form G01-J24) and Costa Beck (Challis and Harding 1975, fig. 52, no. 3). The first of the cited vessels is from an "Iron Age" context while the second is included by the authors in their "La Tène III" material. The vessel could easily be accommodated in the Bead- or Wedge-rim Globular Jar categories of Rigby 2004 (40, and fig. 7). Taken together, these occur in both calcite-tempered and sand-tempered wares. Both are attributed to Rigby's "typological grouping h", dated *c.* 100 BC to AD 100.

6.9 Two further vessels from this context also suggest later Iron Age dates. Both are in H2s. The first (Figure 6, no. 1) is a jar with essentially upright, flat-topped rim, thickened internally and dished so as to form a broad lid-seating. Despite various differences in the treatment of the leading edge of the rim, the vessel invites comparison with such Late Iron Age vessels as Didsbury 2004, fig. 101, no. 8 (from Wharram Percy North Manor) and Challis and Harding 1975, fig. 40, no. 4 (Faxfleet "A"). The second (Figure 6, no. 2) is a fragment from a rather angular jar handle of rectangular cross-section. Although it is difficult to be certain, the handle appears to have been plugged through the vessel wall, in the manner of a late vessel from Thornton Dale (Challis and Harding 1975, fig. 51, no. 4).

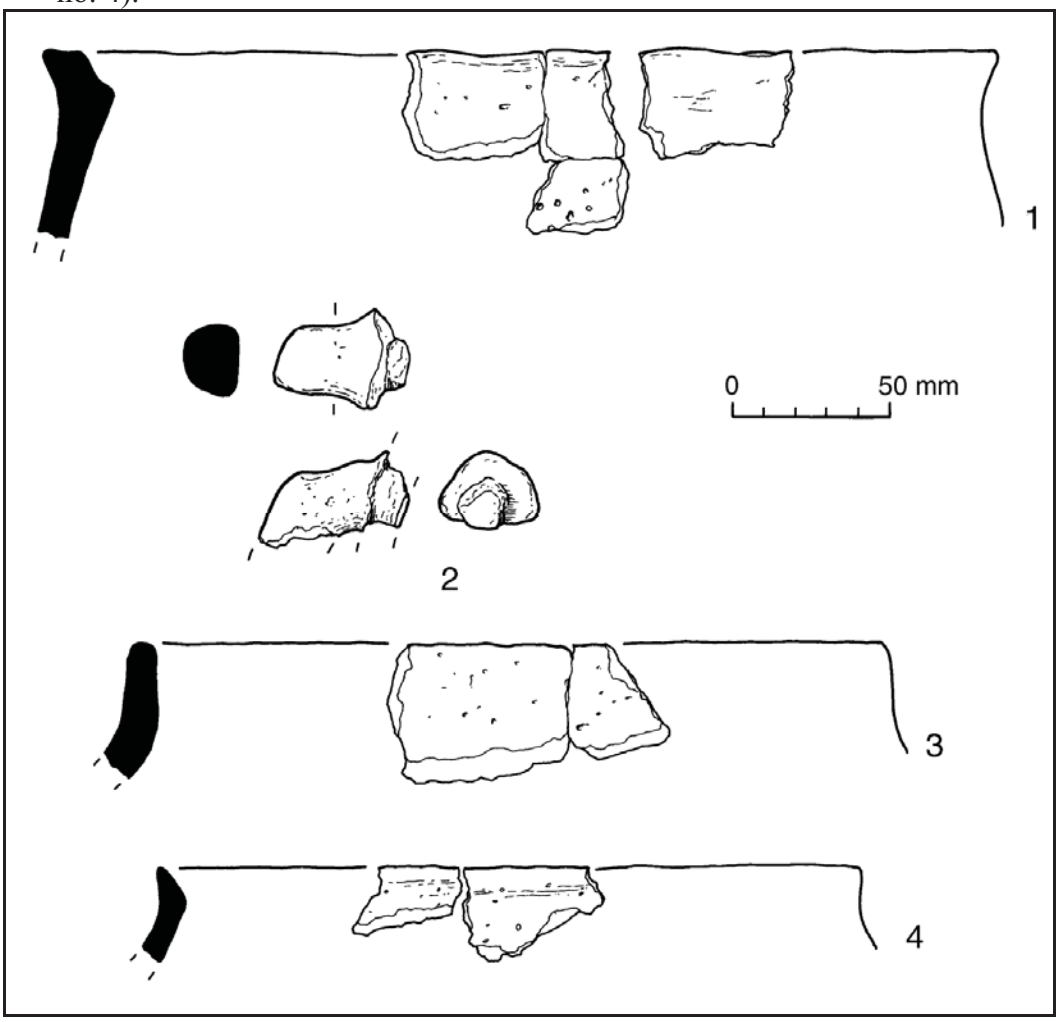


Figure 6. Pottery profiles Illustration L Collet, YAT

6.10 Pottery spread [17] produced the largest single context assemblage, consisting of 248 sherds of H2s, weighing 967 grams. A jar with near vertical, slightly everted rim (Figure 6, no. 3) may be compared to a vessel from a first-century AD context at Hawling Road, Market Weighton (Evans with Creighton 1999, illus. 7.17, fabric-form G096-J02); and a bevelled rim small jar (Figure 6, no. 4) can be paralleled at Danes Graves and Faxfleet "A" (Challis and Harding 1975, fig. 31, no. 1 and fig. 39, no. 3, respectively).

Conclusions

6.11 The material discussed above is probably indicative of domestic, or at least relatively local, manufacture. Moreover, the homogeneity of fabric types across the site is consistent with the excavated features and deposits being broadly contemporary, in the sense of belonging to a coherent ceramic phase. The published parallels cited above suggest the Late Iron Age as the optimum period for these assemblages, with indications that at least some of the material may belong to the first century BC and/or AD.

Lithic Assemblage

Steve Toase BSc MA

6.12 A total of 270 pieces of flint were recovered during the archaeological works. The majority of these (192) were recovered from flint scatter [12] covering an area of 1.5x3m. This scatter of material occurred within the topsoil and on the interface between the topsoil and natural.

6.13 The material within the scatter shows a bias towards the late Mesolithic, blades dominate the assemblage, with a high occurrence of truncated blades. The presence of a leaf shaped arrowhead, recovered as part of the same flint scatter, suggests that activity occurred in the vicinity in the Early Neolithic period. The position and vulnerability of this assemblage has particular implications for further work in the area.

6.14 Surface collection of lithic material across the site produced 59 flints and shows activity continued into the Bronze Age. Flints were also recovered from a number of other features; 11 from context [09], three from context [03], two from [17] and single flint was recovered from [19].

Methodology

6.15 Due to flint not occurring naturally on the Hopper Hill Highways Depot site all flint material recovered during the archaeological works was retained. Once the fieldwork was finished, the material was examined to determine whether it was the result of working or natural processes. This stage was to establish the presence or absence of specific features such as a bulb of percussion, retouch, evidence of burning and whether the flint was broken. During this phase of analysis the flint was also examined to determine a broad type. These will be discussed in more detail below. The detailed catalogue can be found on the accompanying disc.

6.16 The amount of cortex present on the dorsal surface was used to assign each flake to a stage in the reduction process:

Over 50% of the dorsal surface remaining unflaked – primary flake
Some cortex below 50% present on the dorsal surface – secondary flake
No cortex present – tertiary flake

6.17 Following the guidance in the Stone Age Reference Collection blades were defined as flint flakes twice as long as they are wide.

Descriptions

Context [03]

6.18 In total three flints were excavated from [03]. The first two are small broken chunks, probably by-products of the reduction sequence, but not in any way diagnostic. The third flint artefact (drawing 3) is of more interest. This is a complete scraper, 42mm long and 41mm wide, which has been worked from banded, dark grey flint. A large flake with a step terminal has been detached from the dorsal surface, and then the left hand edge has been retouched. There has also been a small amount of retouch on the right hand side, but nowhere near as extensive. There is a possible notch at the proximal end. This may have resulted from subsequent damage but there appear to be a number of flakes detached. This scraper is Neolithic in date.

Context [05]

6.19 Context [05] formed the final fill of ditch [04]. The only lithic artefact recovered from this feature was a small broken flake of translucent flint, with a prepared platform and a step termination. The dorsal surface is weathered and shows evidence of previous opposed removals. The ventral surface is extremely irregular. From the condition of the flint, and the presence of Iron Age pottery within the same context, this flint appears to be residual material.

Context [09]

6.20 In total eleven flints were excavated from [09], fill of ditch [08]. Seven of the flints from this context show no evidence of working, or being part of the reduction sequence. All of the flints from this context are broken, and two display cracking, indicative of burning. One flake of translucent flint ends in a hinge termination. This is indicative of working, but is not diagnostic, and shows no evidence of retouch. One fragment of translucent flint is broken and has evidence of previous removals. This may be a fragment of a microlith but with breaks down both edges it is difficult to determine the original form. Midway down the left hand side, dorsal surface, there appears to be some wear.

6.21 The flints from context [09] appear residual within the ditch backfill rather than a deposit consistent with a lithic working event.

Context [17]

6.22 Two lithics were recovered from the vicinity of pottery scatter [17]. There seems to be little to suggest any stratigraphic association between the flint and the pottery. The first is a secondary flake with a cortical platform and three previous removals on the dorsal surface. This is a waste flake and not diagnostic.

6.23 The second lithic (drawing 17) recovered is of more interest. This is the proximal end of a translucent flint blade, sub-rectangular in profile, with the medial section and distal end removed by abrupt retouch. There is a small

amount of retouch down both edges and a large flake removal scar on the dorsal surface. There is also a small amount of possible retouch along the break. The form is consistent with the late Mesolithic date for other flints recovered across the site.

Context [20]

6.24 Context [20] is the primary ditch fill of ditch [18]. The only lithic recovered is the proximal end of a translucent red blade, triangular in profile. Both the distal and medial sections are absent, removed by abrupt retouch. There is evidence of retouch down both sides. On the dorsal surface one previous removal suggests multi-directional work, but may have resulted from an error in removal during the retouch process. This blade is consistent with material found in other contexts across the site and is late Mesolithic in origin.

Context [12]

6.25 The largest concentration of flints recovered during the works at Hopper Hill Highways Depot site occurred as a scatter of 192 flints, located between the subsoil and the natural. The vulnerable position means it is possible that the extent of the flint scatter was greater than recovered. This has important implications for future work in the vicinity of Hopper Hill Highways Depot site (See Discussion). Of the 192 flints recovered 92 were fragments and chips, most probably resulting from the reduction process. Of these 19 were primary, 23 secondary and 44 tertiary, indicating a slight bias to the latter stage of working. The six not accounted for showed no evidence of being part of the reduction sequence.

6.26 Within the lithic collection 46 of them are defined as flakes, as outlined by Pierpoint (1981) and SARC, with the length less than twice the width. These have resulted from the reduction sequence, and been discarded, rather than used for further tool production. Out of 46 flints identified as flakes 37 are broken.

6.27 The tools from the scatter are dominated by blades, with 30 identified during the analysis. Within these there is again a bias towards broken artefacts. In most cases this seems intentional with a large concentration of truncated blades identified, the product of abrupt retouch (SARC) or snapping, for example 12/18, 12/19, 12/29, 12/6 and 12/8. The truncated blades constitute the largest number of tools recovered, 21 in total. Within these there did not seem to be a particular bias toward proximal, distal and medial, with 8, 8 and 5 respectively. There are examples of both triangular and multiple ridged cross sections.

6.28 There are also a number of narrow blades (For example 12/24, 12/26) which are also diagnostic of the late Mesolithic period.

6.29 In addition to the truncated blades a number of intact blades were also recovered, for example (12/1), a triangular blade of creamy white flint, with some wear down the dorsal right edge.

6.30 Two definite microliths were identified within the flint scatter material. The first (12/5) is a geometric type, pointed oval in plan and triangular in cross section. There has been a small amount of damage to the distal end. On the dorsal side left hand edge there is evidence of retouch, as well as possible wear on the right hand edge.

6.31 The second (12/25) is a creamy white and dark grey intact trapezoidal microlith with a small amount of damage at the distal end.

6.32 The evidence for cores from the flint scatter is limited. One possible pebble core (12/23) was recovered. Following splitting a number of blades have been detached, all from one direction. On one side a flake with a hinge termination has been detached. Alongside this is an area of considerable crushing, indicative of mis-strikes and lack of proper platform preparation. This crushing has resulted from working the pebble in the same direction as the blades mentioned above.

6.33 A possible core fragment shows evidence of firecracking. This is small and off white in colour with fine cracks across the surface. A core rejuvenation flake was also identified (12/22). This flake of opaque yellow brown flint has been snapped on the dorsal left hand edge. There are a number of clear earlier removals visible around the edge of the flake, with an area of cortex visible at the distal end of the dorsal surface.

6.34 Two scrapers were identified during the analysis. The first is a side and end scraper knapped from a dark red flint blade (12/13). There is evidence of retouch around the proximal end and down the left dorsal edge. The scraper is very small and has been broken at the extreme distal end.

6.35 The second is an edge scraper of coarse white grey flint (12/21), with semi abrupt retouch down the dorsal surface left hand edge. There has been some damage to the proximal end.

6.36 Lithic 12 is a fine translucent projectile point. Both edges have been retouched coming to a fine point. The proximal end shows evidence of a prepared platform. On the dorsal surface, at the proximal end, there is evidence of invasive retouch, possibly to aid mounting. Upon examination there are two clear issues. There is little evidence to suggest that the projectile point was ever used. There is no visible damage around the point, with a small amount to the dorsal left hand edge, although this could be post depositional. The second is that the projectile has been created in such a way that the point terminates at a cortex type inclusion within the otherwise very fine, translucent flint. This is later than the other datable material within the flint scatter, its form suggestive of an early Neolithic date.

6.37 Flint is susceptible to alteration through extremes of temperature, causing thermal cracking (Clemente, 1997). These are visible as fine lines criss-crossing the surface of the stone. Ten of the flints from the scatter show evidence of thermal cracking, indicative of heating. It is unclear at what point in the process the flint was exposed to heat, whether this was intentional or occurred post deposition.

Material

6.38 The flint collected as part of the scatter displayed a wide variety of material, with 45 artefacts made of translucent flint. The other 192 ranged from light grey to red brown mottled flint. Flint does not occur naturally on the site and the

varied character suggests that the material is not coming from one established source, but from river gravels or glacial till.

Reduction sequence

6.39 There was a slight bias within the assemblage towards the later stages of reduction, with 29 primary flakes, 55 secondary and 99 tertiary. Focussing on the debitage the character suggests that these came from one or two events rather than the flint scatter being indicative of flint working over a sustained period of time. However the stratigraphic position may have affected this pattern (see below).

Context [01]

6.40 Surface artefact collection is a common strategy for identifying prehistoric sites through the density of artefactual material (see Bowden, 1999). Once the density of lithic material within the site was recognised an informal collection strategy was instigated, retaining any lithic material found. This provides an understanding of the 'background noise' of activity across the Hopper Hill Highways Depot site. While these are not located stratigraphically they are indicative of the wider concentration of lithic activity. As the material collected from [01] covered the whole of the area under investigation there is a wide variety in the material. Some specific artefacts are of interest and worth discussing further.

6.41 A number of truncated blades (01/8, 01/10 and 01/7) were identified among the walkover material. These support the evidence from [12] of late Mesolithic activity within the Hopper Hill Highways site.

6.42 Two unidirectional flake cores were recovered. The first (01/14) had a number of removals. In contrast to many of the artefacts recovered during the excavations the material is very coarse flint, almost chert in character. The platform has been prepared, and shows five removals however the scars present indicate a number of mis-strikes. This core seems to be Early Neolithic in date.

6.43 The second (01/12) is a small, Mesolithic, exhausted handle core of translucent flint, with a distinctive strip of cortex still present. The scars suggest a number of micro blade removals from the front of the core.

6.44 Two other possible small, exhausted cores were collected, however the flint was of such poor quality and very worn that it was not possible to definitively determine whether these were the result of human activity or not.

6.45 The medial section of an invasively retouched artefact (01/5) was recovered during the site walkover. The distinctive appearance was probably the result of pressure flaking. Both the proximal and distal ends have been broken off so it is not possible to determine the original form of the artefact, however the method of working is indicative of the Bronze Age.

6.46 A second artefact with invasive retouch was also recovered (01/4), a translucent flint blade with the distal end absent. There is evidence of direct and indirect retouch around the proximal end, and there is also cortex present down the left

hand edge of the dorsal surface. The technology utilised suggests that this is also Bronze Age in date.

6.47 One thick flake of dark brown, opaque flint (01/11) has seen extensive retouch around the distal end to be utilised as a scraper. The flake terminates in a hinge fracture, as does a scar of a previous removal on the dorsal surface. There are two possible notches toward the proximal end. It is unclear whether the notches intentional or as the result of post depositional damage. This is an unusual piece as the retouch focuses on one corner of the termination, reminiscent of a projectile point. However the flake is too thick and the semi abrupt retouch is not consistent with a projectile.

Discussion

6.48 There is a considerable variety within the range of material which suggests that the flint is not being won from a large consistent source, but is more likely coming from till deposits or river gravels. This discussion will focus on the flint scatter [12], while using the other lithics to place this in the wider context.

6.49 Due to the position of the flint scatter, occurring on the interface between the natural and the topsoil the discussion that follows can only arrive at tentative conclusions regarding the assemblage, particularly the absence of material. Other artefacts may have been removed during the topsoil stripping, and this will have an impact on any totals or densities identified. For example the core rejuvenation flake, 12/22, is a very distinctive opaque yellow brown flint, yet none of the debitage analysed is of the same flint suggesting that this material has been lost due to its vulnerable stratigraphic position.

6.50 There are a number of conclusions that can be drawn from the lithic material recovered. Flint scatter [12] indicates a concentration of late Mesolithic activity, with the assemblage showing an emphasis on blade technology, particularly truncated blades. However there seems to be little evidence of the scatter being the result of sustained tool production onsite. The debitage is limited, even taking into account the potential loss of material, with large amounts of the chunks and chips from the same dark grey flint. While the presence of well produced blades show the occurrence of careful, controlled working at least five of the lithics show signs of crushing, probably as the result of mis-strikes, and attempts to recover the working process. The two microliths recovered are of geometric forms, also indicative of a late Mesolithic date.

6.51 The debitage does not show any definite trends within the reduction sequence. Although there is a bias towards the tertiary phase this might be an artificial pattern due to the topsoil strip. While it has not been possible to carry out any constructive refitting a number of the fragments and chunks do appear, from a visual inspection, to have originated from the same flint. This would suggest that any actual working as part of this scatter resulted from one or two events rather than the site being the location for sustained working, or a place returned to time and again. Taking into account any biases created by the stratigraphic position of the material the overall assemblage is indicative of the initial stages of working being carried out at other locations and the final preparation or rejuvenation occurring at this location.

6.52 The fine leaf shaped projectile point recovered as part of [12] is Early Neolithic, later than the other diagnostic material. The interface position of the scatter means that this later episode of activity has become conflated with the Late Mesolithic material.

6.53 While the flint scatter is focussed, in location and date, the material recovered across the site shows a wider spread of activity. The flint core supports the evidence of the projectile point that activity occurred on the site during the early Neolithic period. This seems fairly dispersed and transitory. Of particular interest is the presence of two invasively retouched implements which supports the presence of Bronze Age activity.

Recommendations

6.54 As both Adams (1996) and Waughman (2006) acknowledge, the Mesolithic is under-represented in the archaeological record for Northern England. On the basis of the flint analysis here Hopper Hill Highways Depot falls into the significant minority of sites with both Neolithic and Bronze Age Material present (19 were identified as part of the North East Yorkshire Phase 1 Report (Waughman, 2006:6)).

6.55 The material in the flint scatter [12] was extremely vulnerable to the machine removal of top-soil, with most of the flint recovered occurring in a slight depression in the natural.

6.56 Due to the high density of lithic material collected across Hopper Hill Highways Depot on future work in the vicinity should be carried out with an awareness of the high potential for flint scatters to be encountered. The likelihood is that this material will be located at the interface between topsoil/subsoil and natural, meaning that machine stripping of the topsoil will damage the integrity and distribution any flint scatters present.

The Daub/Fired Clay

SE Tibbles

6.57 A small quantity of daub/fired clay was recovered during the site investigation. Within the assemblage, burning/heat discolouration was evident. The material may have been utilised within walls of a structure, although, it is more likely to have been used within a smaller free-standing structure (which would be subject to direct exposure to high temperatures) such as an oven or hearth.

Aims and objectives

6.58 This assessment aims to identify the archaeological potential of the daub/fired clay recovered from the archaeological investigation at Hopper Hill Road, Seamer, in keeping with the specific aims of the project and the requirements of MAP2, Phase 3, 'Assessment of potential for analysis' (English Heritage 1991).

Introduction

6.59 A small assemblage of daub/fired clay was recovered from four contexts, including material from the processing of the environmental sample (Table 2).

Methodology

6.60 The material was subject to basic quantification by count and weight. Diagnostic features such as the presence of rod and/or sail impressions and original surfaces were taken into account to aid identification. Non-diagnostic material was determined by the lack of rod and/or sail impressions and original surfaces (featureless).

Condition of the Assemblage

6.61 Although abraded surfaces and the occasional hairline cracks were noted, the condition of the daub/fired clay was fair.

The Assemblage

6.62 The assemblage consisted of approximately eighteen fragments, with a combined weight of 61.2g. All the material was of a similar fabric: moderate fine quartz grains, frequent fine mica flecks and occasional fine black flecks (0.1mm – 0.25mm).

Table 2 The assemblage by context

Context	Quantity	Weight (g)
[05] – Tertiary Fill of ditch [4]	1	5.3
[06] – Secondary Fill of Ditch [4]	5	20.2
[06] – From Environmental Sample	7	14.6
[16] – Fill of Roundhouse Drip Gully [15]	4	13.7
[17] – Pottery Spread	1	7.4
Totals	**18**	**61.2**

Table 3 The assemblage: diagnostic and non-diagnostic material

Context	Diagnostic/ Non-Diagnostic	Notes	Quantity	Wt (g)
[05]	Non-diagnostic	Featureless. Heat discolouration.	1	5.3
[06]	Diagnostic	1 rod/sail impression. Heavily blackened concave surface.	1	10.8
	Diagnostic	1 ‘flattish’ surface. X2 heat discolouration.	3	6.3
	Non-diagnostic	Featureless	1	3.1
[06] Env. Sample	Diagnostic	1 ?concave surface. Heat discolouration.	1	1.5
	Diagnostic	1 ‘flattish’ surface. Heat discolouration.	1	1.0
	Non-diagnostic	Featureless. X1 heat discolouration.	5	12.1
[16]	Diagnostic	1 ‘flattish’ & 1 concave surface. ‘Flattish’ surface partially vitrified.	1	8.3
	Diagnostic	1 concave surface.	1	2.2
	Diagnostic	1 ‘flattish’ surface.	1	2.6
	Non-diagnostic	Featureless. Heat discolouration.	1	0.6
[17]	Diagnostic	1 ‘flattish’ surface.	1	7.4
			18	**61.2**

6.63 The majority of the assemblage (56%) was diagnostic. One ?original surface of a '*flattish'* appearance were noted on six pieces. Two fragments had one ?concave surface and one piece had a concave and a '*flattish'* surface. A single rod or sail impression was evident one the remaining diagnostic piece with a diameter of *c.*13mm. The featureless material, eight fragments, comprised amorphous pieces.

6.64 All of the fragments were affected by exposure to heat. The surface which had been in contact with the rod/sail was heavily blackened from burning. The '*flattish*' surface of one fragment had been subject to intense heat as it was partially vitrified in appearance. Seven pieces bore discolouration indicative of direct heat exposure/burning. No discolouration was noted on the remainder of the material but these fragments had been exposed to indirect heat

Discussion

6.65 Due to its small size, the assemblage of daub/fired clay is of limited archaeological potential. This paucity may be attributed to the heavy truncation of features during later activity.

6.66 The abraded condition of the majority of the fragments does lead to an ambiguous interpretation of use. The heat discolouration/burning noted could indicate high temperature destruction, i.e. if the material was part of a wattle and daub structure such a wall. However it should also be considered that this may have been a result of use within a smaller free-standing structure, e.g. an oven or hearth. Based on the evidence of the remains of hearth [14] within the immediate vicinity of roundhouse [15], the latter use is more likely.

6.67 The assemblage is considered to be of a similar date as the associated pottery.

Recommendations

6.68 No further work is considered necessary. Unless the land owner requests its return, the assemblage should be deposited within the appropriate museum with the remainder of the finds and site archive.

Metal working Slags

Dr G McDonnell

6.69 This assessment report describes the material classified as slag recovered from Seamer Carr. A brief overview of the material from the site is provided, followed by a detailed description and quantification. The significance of the material is discussed and recommendations made for further work. The assessment report follows the guidelines issued by English Heritage (Jones 2001, 7).

Slag Classification

6.70 The slags were visually examined and the classification is based initially solely on morphology. In general they are divided into two broad groups. First are the diagnostic ferrous material which can be attributed to a particular industrial process; these comprise ores and the ironworking slags, i.e. smelting and smithing slags. The second group, are the non-diagnostic slags, which could have been generated by a number of different processes but show no diagnostic

characteristic that can identify the process. In many cases the non-diagnostic residues, e.g. hearth or furnace lining, may be ascribed to a particular process through archaeological association. The residue classifications are defined below. The count and weight of each slag type present in each context was recorded.

Diagnostic Ferrous Slags and Residues

6.71 Smelting?Slag - randomly shaped pieces of iron silicate slag generated by the smithing process. In general slag is described as smithing slag unless there is good evidence to indicate that it derived from the smelting process.

Ore? – fragments of iron ore

Non-Diagnostic Slags and Residues
Hearth or Furnace Lining - the clay lining of an industrial hearth, furnace or kiln that has a vitrified or slag-attacked face. It is not possible to distinguish between furnace and hearth lining.

Fired Clay – fired clay lacks the vitrified surface of hearth or furnace lining.

Results

Overview

6.72 The slag recovered from the site includes probable iron smithing slag and hearth lining.

Description

6.73 Table 1 list the slag types, count and weight present on the site. Both lumps of probable smelting slag in Context 17 have flowed droplets, and appear to have been fully liquid, they are both dense and lack the agglomerated texture of smithing slags. One of the two pieces contains four clear charcoal impressions, two of which are 15mm wide, which again do not normally occur in smithing slags. However charcoal impressions in other Iron Age smelting slags tend to be larger e.g. 40mm long, 20mm across. One of the pieces also has attached clay lining.

6.74 The three slag pieces from Context 16, also display droplets indicative of liquidity. One sample from Context 17 (Lump 1) was analysed twice, and another once (Lump 2), by X-ray Fluorescence to assess the manganese oxide content (see Appendix II for methodology). If the manganese oxide level is high (>1.0%) then the slag almost certainly derives from the smelting process. If an iron ore containing significant manganese oxide is smelted the iron is extracted but the manganese oxide segregates to the slag. It is unlikely that manganese oxide is present in the materials used in the smithing process. However if a low manganese bearing ore was utilised the manganese oxide content of the resulting smelting slag will also be low. Unfortunately (Figure 6 and Table 5) the sample was low in manganese oxide, hence it cannot be used as a discriminant in this case. It is noted that the two analyses of Lump 1 differ significantly indicating sample heterogeneity. However, a sample from one of the slag pieces in Context 16 did show high manganese oxide content (Figure 7, Table 5).

6.75 The possible ore fragment was also analysed and the data (Figure 7 and Table 5) show that it is unviable as the iron oxide content was too low, however that may reflect the area analysed. It also shows a low manganese content.

6.76 The remainder of the material comprised one fragment of vitrified hearth lining (Context 1) and two fragments of fired clay (Contexts 6 and 16), i.e. not vitrified, and could derive from daub or a hearth or furnace structure.

Significance

6.77 The assemblage is very small and may be the result of two processes. Firstly the evidence form Welham Bridge, East Yorkshire, (Halkon and Millet 1999, 75-96) demonstrate that in the Iron Age iron smelting was carried out at the 'fen edge', and similar sites have been identified by Powesland (Pers. Comm.) on the southern side of the Vale of Pickering. In contrast large deposits of smelting slag were recovered from the ditches at North Cave, East Yorkshire (McDonnell 1988). A similar small deposit of smelting slag was recovered from the Iron Age enclosure at Levisham Moor, North Yorkshire Moors (Hayes 1983). The slag may have derive from a smelting area close by, and just be scatter from that area. Alternatively the slag may have been brought either deliberately or by accident from a smelting site further afield. Table 6 present the average of the Seamer Carr (smelting slag?) analyses are compared with the bulk analyses ranges of the Welham Bridge smelting slags (Halkon and Millet, 1999, 89), and the average of the smelting and smithing slags from North Cave (after Bromley 2009). This clearly shows that analyses of the slags in themselves cannot distinguish between slag types and sites. The most significant point is that both Welham Bridge and North Cave smelting slags contain low levels of manganese ore, and probably exploited bog ores which are thought normally to contain elevated level of manganese oxide. The manganese oxide content of the sample from Context 16 at Seamer Carr raises the average Seamer Carr manganese oxide. The Seamer Carr slags are very high in iron oxide and consequently low on other oxides, e.g. silica, however it is noticeable that the phosphorus pentoxide level is also high.

6.78 It is therefore concluded that the Seamer Carr ironworking slags derive from the smelting process. Their presence on the site derives either from the occurrence of a background scatter of slag from a nearby smelting site, which geophysics would locate. Alternatively the small deposits was brought to the site either accidentally of deliberately. The absence of smithing slag is important, which is supported by the lack of hammerscale present in the environmental samples.

Recommendations

6.79 This report constitutes the full report. The material should be retained so that research on the material culture and industrial activity on small scale Iron Age sites in the region can develop.

Context	Smelting? Count	Smelting? Weight	Fired Clay Count	Fired Clay Weight	Hearth Lining Count	Hearth Lining Weight	Ore? Weight
1					1	9	
6			1	10			
12							37
16	3	185	1	80			
17	4	538					
Totals	7	723	2	90	1	9	37

Table 4 Seamer Carr slag listing ordered by context (weight in grams)

	Context 17 smelting? Slag Lump 1	Context 17 smelting? Slag Lump 1 repeat	Context 17 smelting? Slag Lump 2	Context 16 smelting? Slag	Context 12 ore?	Context 12 ore? Repeat
Na_2O	N.D	N.D	N.D	N.D	N.D	N.D
MgO	5.4	n.d.	5.5	n.d.	2.3	n.d.
Al_2O_3	0.9	11.8	1.5	7.8	13.0	14.7
SiO_2	11.0	26.0	8.5	15.8	54.8	58.4
P_2O_5	1.6	3.2	1.2	2.5	n.d.	n.d.
SO_3	0.4	0.4	0.5	0.4	0.2	0.1
K_2O	0.3	0.2	0.4	0.2	0.7	0.1
CaO	1.5	2.7	1.6	3.3	8.0	1.7
TiO_2	n.d.	0.7	0.1	0.4	1.5	1.7
V_2O_5	0.1	0.3	0.1	0.2	0.1	0.1
Cr_2O_3	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
MnO	0.3	0.6	0.3	2.8	0.4	0.6
FeO	78.6	53.8	80.3	66.6	19.0	22.6
CoO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
NiO	n.d.	0.1	n.d.	n.d.	n.d.	n.d.
CuO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

Table 5. Seamer Carr XRF data (weight %)
(n.d.- not detected, below detectable levels; N.D. – Not Determined, i.e. not measured for)

	Seamer Carr Mean	Welham Bridge range	North Cave Smelting Mean	North Cave Smithing Mean
Na_2O	N.D	N.D	0.2	0.2
MgO	2.7	N.D	0.1	0.1
Al_2O_3	5.5	2.1 - 4.9	1.5	1.3
SiO_2	15.3	19.2 - 38.1	20.6	18.3
P_2O_5	2.1	0.4 - 1.7	0.9	0.8
SO_3	0.4	N.D	0.1	0.1
K_2O	0.3	0.3 - 1.2	0.2	0.2
CaO	2.3	0.7 - 1.9	0.8	0.7
TiO_2	0.3	0.1 - 0.4	n.d.	n.d.
V_2O_5	0.2	N.D	n.d.	n.d.
Cr_2O_3	n.d.	N.D	n.d.	n.d.
MnO	1.0	0.4 - 1.7	0.5	0.4
FeO	69.8	50.9 - 72.4	49.7	44.2
CoO	n.d.	N.D	0.4	0.4
NiO	n.d.	N.D	n.d.	n.d.
CuO	n.d.	N.D	n.d.	n.d.

Table 6. Comparison of the Seamer Carr, Welham Bridge (Halkon and Millet, 1999, p89) and North Cave smelting slag analyses with the North Cave smithing average (after Bromley 2009) (weight %)

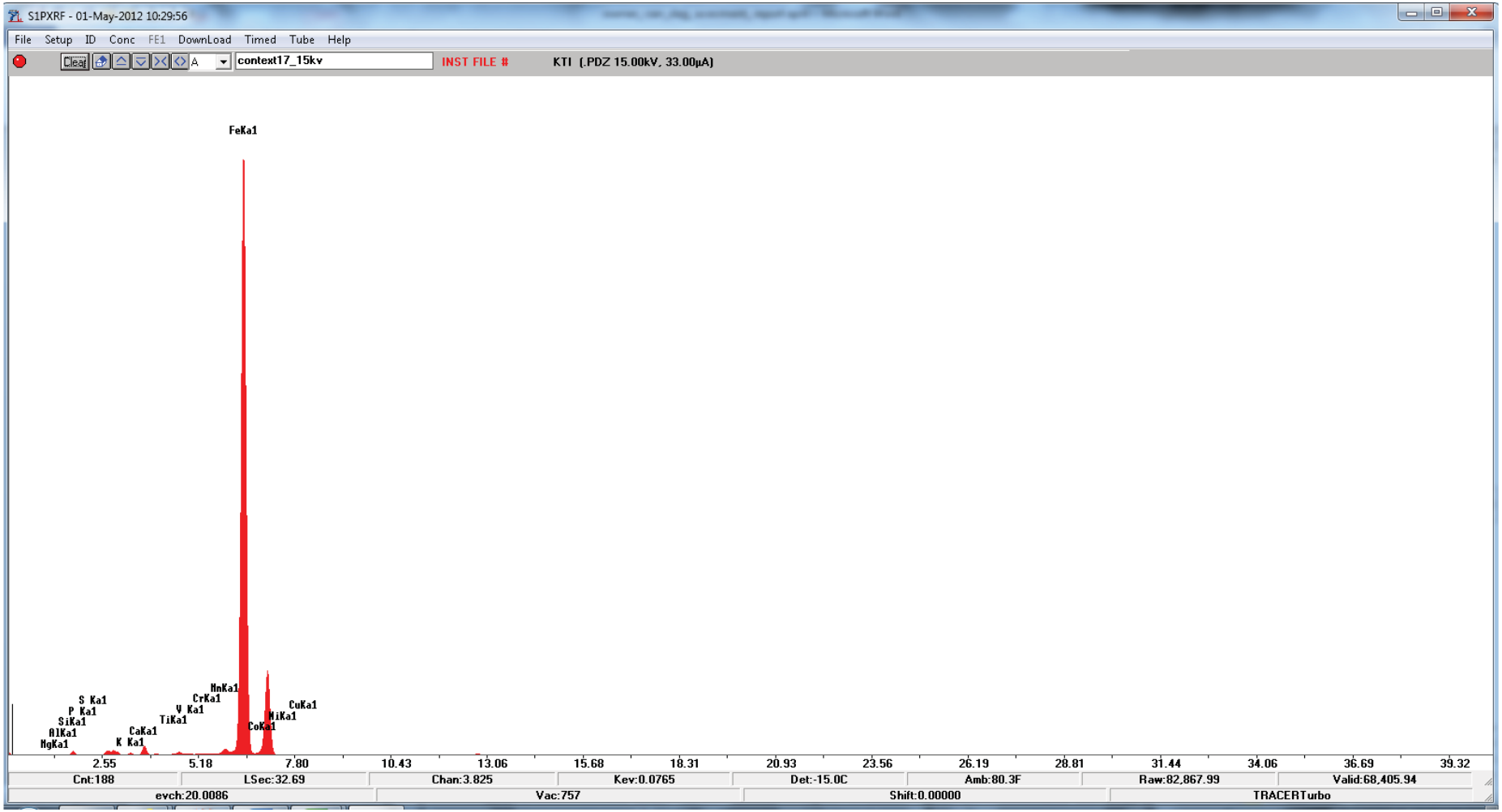


Figure 9. Seamer Carr, Context 17 Possible smelting slag, Lump 1, spectrum

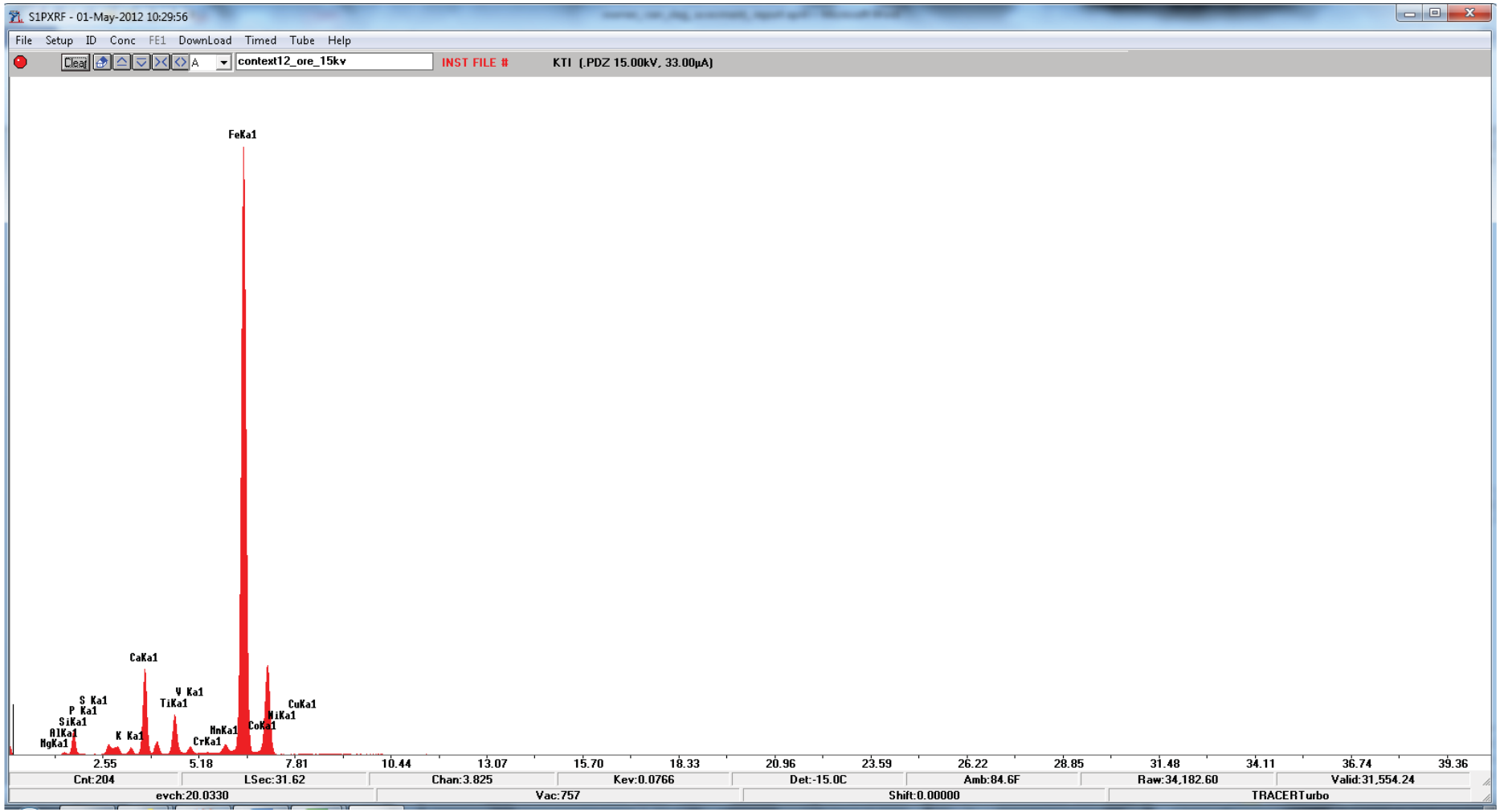


Figure 10. Seamer Carr, Context 12 possible ore sample spectrum

Ochre

Dr G McDonnell

6.80 A sample of possible ochre (Context 01) was submitted for examination to confirm or refute its identification. The sample was morphologically examined and then analysed by X-ray Fluorescence.

Results

6.81 The sample is a small bright red smooth pebble. The streak was red and the specimen is a classic piece of red hematite. The XRF spectrum (Figure 8) shows the dominance of iron in the sample. The semi-quantitative data (Table 7) clearly indicates that the sample is predominantly iron (oxide) and is comparable to analyse of other hematites, e.g. from Cumbria in Percy (1864, 206).

Discussion

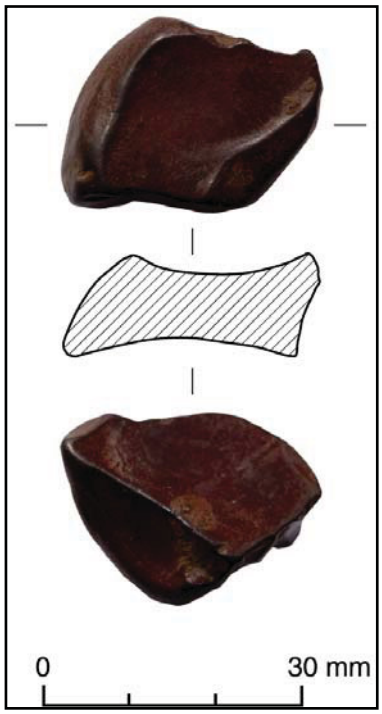
6.82 Hematite nodules were recovered from the excavations at West Heslerton and hence are probably common in the glacial deposits around Lake Pickering. Hematite could be used either as a pigment (ochre) or as burnishers for pottery, or as an iron ore.

Conclusions

6.83 The fragment is a piece of hematite that could occur naturally in the area and be exploited as a pigment.

MgO	0.4	**K_2O**	0.1	**MnO**	0.2
Al_2O_3	3.2	**CaO**	0.7	**Fe_2O_3**	86.2
SiO_2	9.0	**TiO_2**	0.1	**CoO**	n.d.
P_2O_5	n.d.	**V_2O_5**	0.1	**NiO**	n.d.
S	n.d.	**Cr_2O_3**	n.d.	**CuO**	n.d.

Table 7 Semi-quantitative analysis of the ochre sample (n.d. – not detected, weight %)



The fragment of ochre (red hematite) was recovered during the general monitoring of the soil stockpiles and stripped ground surf aces. From its general appearance with the thumb sized concave surfaces it appeared to have possibly been used either as a pigment 'stick' or as burnisher for pottery. Alternatively it could have been collected to be used as a source of iron ore as smelting is know to have occurred nearby. Hematite nodules have been recovered from the excavations at West Heslerton and are probably common in the glacial deposits around Lake Pickering which may mean that this piece is actually only a chance occurrence.

Plate 12. Ochre from Context [01]

Figure 11. XRF spectrum of the ochre sample

Assessment of biological remains

Alison Foster and John Carrott

The full version of this report can be found in Appendix III

Summary

6.84 Six sediment samples and a single 'spot' sample of hand-collected charcoal, recovered from deposits encountered during archaeological recording at Hopper Hill Road, Seamer, Near Scarborough, North Yorkshire, were submitted for an assessment of their bioarchaeological potential. Features encountered during included ditches, the drip trenches of two roundhouses, a small hearth, a pottery spread and a flint scatter. Iron Age pottery was identified within the material recovered from the pottery spread and several of the fills; however, at the time of writing no direct stratigraphical relationship between the different features had been established.

6.85 Biological and artefactual remains were sparse in the sampled deposits and much of the former comprised clearly modern intrusive or contaminant material (e.g. rootlets). Probable ancient organic remains were largely restricted to small amounts of charcoal, most of which was poorly preserved and indeterminate to species, with occasional other charred plant remains including root/rhizome fragments, a few 'seeds' and a single indeterminate cereal grain. These remains were too few for any detailed interpretation of past human activities or natural habitats at the site.

6.86 The spot sample of material thought to be charcoal in the field proved to be shale or low grade coal and, as such, cannot be used for radiocarbon dating. However, occasional fragments of charcoal from the fill of the hearth were rather better preserved than the majority of this material recovered and three fragments identified as hazel could be used for radiocarbon dating; two were selected for submission for dating and both returned mid Bronze Age dates (see Appendix IV for details).

6.87 A little pottery and fired/heat-affected clay was recovered from the secondary fill of a ditch and these materials were forwarded to the appropriate specialists for further consideration. No further study of the biological remains from these deposits is warranted.

7.0 DISCUSSION and CONCLUSIONS

7.1 As already stated there was no direct stratigraphic link between any of the features described in the results above. However, an examination of the results of the excavation and the analysis of the artefactual assemblage would seem to allow some probable relationships to be drawn and a suggestion as to the development of the site to be made. The majority of the activity recorded on the site was concentrated along the southern boundary of the site and probably extends into the undeveloped area to the south. The location of the features was divided between those on the area of higher ground towards the centre of the southern boundary of the site and those to the east of the higher ground. The features towards the eastern boundary would have had some protection from the prevailing wind from the north-west, whilst the features on the higher

ground would tend to be both drier and have a better vantage point to observe the surrounding landscape.

7.2 The earliest dated feature is toward the western side of the site and is the late Mesolithic flint scatter [12]. This scatter of material probably represents the results of a small number of manufacturing events rather than being the site of longer term tool manufacture, or a place of repeated visits. The material from the assemblage is indicative of the later stages of manufacture which suggests that the primary working took place elsewhere, possibly as part of the collection process. This idea could be supported by the diversity of source material that had been used. If this is the case, then it is possible that the scatter recorded here was associated with some form of temporary camp.

7.3 Chronologically the next feature in the sequence is the Bronze Age hearth [14] located just to the north of the Mesolithic flints. As already stated, it was initially thought, not unreasonably, that the two were related. However, the radiocarbon dates show that there are some 5,000 years between the two events, though, like the flint scatter, the hearth appears from the lack of burning to have been probably a short lived event (see Appendix IV for details).

7.3 The last dateable series of features were all from the later Iron Age (1st century BC to 1st century AD). These are the remains of two *c.*5m roundhouses [10 & 15] and a scatter of pottery [17]. The similarity in the nature of the pottery and iron slag recovered from both the pottery scatter [17] and the roundhouse [15] shows that the two features are undoubtedly contemporary. This coupled with the close proximity of the pottery scatter to the roundhouse [10] all point to a well developed settlement of some form. The difference in the location between the two roundhouses may represent a difference in function. Roundhouse [15] was located in the lee of the high ground for shelter from the prevailing winds from the west/north-west. However, roundhouse [10] was positioned to possibly take advantage of the prevailing wind direction. The reason for this is that it may have been associated with metal production and the prevailing wind would have assisted the draw on a furnace.

7.4 The recovery of numerous fragments of burnt daub/fired clay, hearth lining and iron ore from across the site along with smelting slag all point towards there being a metal smelting site very nearby.

7.5 Although the three ditches located towards the western side of the site were effectively undated, it is possible to suggest that they may be contemporary with the Iron Age features. The rationale behind this is that either [04] or [08] could once have intersected with ditch [18] forming one ‘corner’ of an enclosing feature with the other features contained within it. These ditches effectively would have encircled the highest point of the landscape making it a very noticeable feature. The difference between [08] and [04] may reflect different phases of development, with the shallower ditch [08] representing an earlier phase when the ability to dig into the compacted clay was less well developed. It should also be noted that the line of both ditches [04] and [08]

could be traced beyond the southern boundary of the site into the currently undeveloped area to the south suggesting a much larger enclosure.

7.6 A general inspection of the surrounding landscape showed that the area of high ground in the southern portion of the site continued to the south in to the adjacent, currently, undeveloped area. This high ground formed a distinctive knoll rising *c.*2.5m above the surrounding landscape. Further examination of the knoll appeared to show at least one distinctive area of slightly flatter ground that could be a platform of some kind. Further confirmation of possible activity within this area could be seen in the recovery of two struck, but un-diagnostic, flints from around the boggy areas.

7.7 From the results described above it can be seen that the Hopper Hill Depot site contained evidence for sporadic human activity from the later Mesolithic period to the late Iron Age. The evidence was in the form of a series of short term events - flint knapping in the Mesolithic, occasional early Neolithic struck flints, a hearth from the middle Bronze Age and ending with what appears to be an enclosure containing at least two Iron Age round houses, probably associated with iron smelting. After this the landscape appears to become unoccupied, except probably for agriculture use. This would appear to suggest that whatever the reason that had drawn people to the area had changed or disappeared.

7.8 Within the wider landscape the Hopper Hill site can be seen to lie between two broad areas of human activity. To the south of Hopper Hill there are a number of significant Mesolithic occupation sites (Sites 5, 6. 16 and Star Carr – Site 18 on Figure 12) along with the multi-period sites at 23 and 24. These sites are exploiting the varied landscape of what was originally the edge of Lake Flixton. Whilst to the north there is a broad arc of Iron Age/Romano-British sites (Site, 1, 3, 19, 28 and 29) which are located on the higher ground above the elevated levels of the later stages of the lake existence.

7.9 The presence of the Mesolithic flints at the Hopper Hill Depot site and their apparent transitory nature would seem to suggest that the location was possibly used as a ‘stopping off point’ either on the way to or from the occupation areas to the south. This case can be seen to be strengthened by the position of the Depot Site in the landscape. The Hopper Hill Depot is at a sufficient elevation to be able to see directly across the carr lands to all of the Mesolithic sites listed above and as such the small knoll on the site may have acted as a navigation point of some form.

7.10 It is this small knoll that may have also been the underlying reason for attracting the later Iron Age activity to the site. As can be seen from the distribution of the surviving Iron Age features within the Hopper Hill Depot site, some of them are located within the lee of the knoll whilst others are on its summit – perhaps deliberately to make use of the prevailing wind for iron smelting. Another possible reason for there to be iron smelting occurring close to the Depot Site is that it could be exploiting bog ores from the former lake margins along with material gleaned from the glacial gravels – e.g. the

haematite described above. However, it must be stressed that further investigation would be required to support this idea.

7.11 The background of Neolithic and Bronze Age features and artefacts across the Depot Site can be seen to be reflected in the wider landscape with a number of find spots of prehistoric artefacts having been recorded (Table 8 and Figure 11).

7.12 The Hopper Hill Depot site can be seen to contain a regionally significant level of highly vulnerable archaeological remains covering c.7,000 years of human activity. Specifically this is due to the probable close proximity of an Iron Age smelting site and because of its location within a much wider, multi-period prehistoric landscape. It would appear that the presence of the small knoll on the site had acted in the past as a focal point for groups moving through the landscape that had stayed briefly and then moved on. By the time of the later Iron Age, with social groups becoming less mobile, the knoll once again appears to become the focus of attention but for different reasons. The ephemeral nature of the Mesolithic flint scatter and Bronze Age hearth at the topsoil/subsoil interface make them particularly prone to accidental damage and loss and as such a more rigorous method of archaeological intervention prior to the development of surrounding sites, particularly to one to the south, is recommended.

Table 8 Prehistoric Site within 3km of Hopper Hill Road

Site No.	MYCC HER	Description	NGR
1	MNY12599	Find spot Iron Age pottery	TA03018441
2	MNY12591	Find spot possible Mesolithic knife	TA0582
3	MNY12601	Iron Age cart burial at Seamer	TA03298379
4	MNY12604	Find spot Neolithic axe	TA015834
5	MNY12607	Mesolithic cores, axes, picks, microliths, Seamer Landfill	TA03008167
6	MNY12608	Early Iron Age hearth & Mesolithic flints, Manham Hill	TA03808194
7	MNY12611	Mesolithic occupation site	TA03608119
8	MNY12615	Find spot Neolithic axe	TA02348344
9	MNY12617	Find spot Bronze Age knife	TA02128274
10	MNY12618	Find spot flint scraper	TA02168274
11	MNY12620	Seamer Carr Neolithic occupation site	TA02708249
12	MNY12622	Find spot of late Palaeolithic burin at Sourlands	TA03388334
13	MNY12624	Find spot flint scraper	TA03738205
14	MNY12628	Find spot Neolithic axe	TA0381
15	MNY12638	Iron Age/Romano-British beehive quern and pottery	TA04158205
16	MNY12641	Mesolithic occupation site at Flixton Bridge	TA04018137
17	MNY12646	Upper Palaeolithic occupation site, Flixton Carr	TA03568105
18	MNY12647	Star Carr Mesolithic occupation site. SM1401425 Also includes MNY36096, MNY36097 & MNY32032	TA02798100
19	MNY23655	Iron Age/Romano-British occupation site at Crossgates	TA02728349
20	MNY23657	Multi-period occupation site at Crossgates	TA03018376
21	MNY23882	Find spot Neolithic core, Hopper Hill	TA03298302
22	MNY24256	Iron Age/Romano-British kiln etc. Seamer Carr Landfill	TA02378235
23	MNY24257	Late Mesolithic-middle Neolithic flints	TA02718229
24	MNY24258	Late Mesolithic-middle Neolithic flints	TA02918203
25	MNY24259	Find spot Iron Age sword, Seamer Carr	TA03048275
26	MNY24913	Prehistoric site at Crab Lane, Crossgates	TA02658386
27	MNY35942	Neolithic pits and round barrows, Eastfield	TA03848456
28	MNY35943	Late Iron Age/Romano-British enclosures and settlement	TA040846
29	MNY35944	Late Iron Age/Romano-British enclosures and settlement	TA04868476

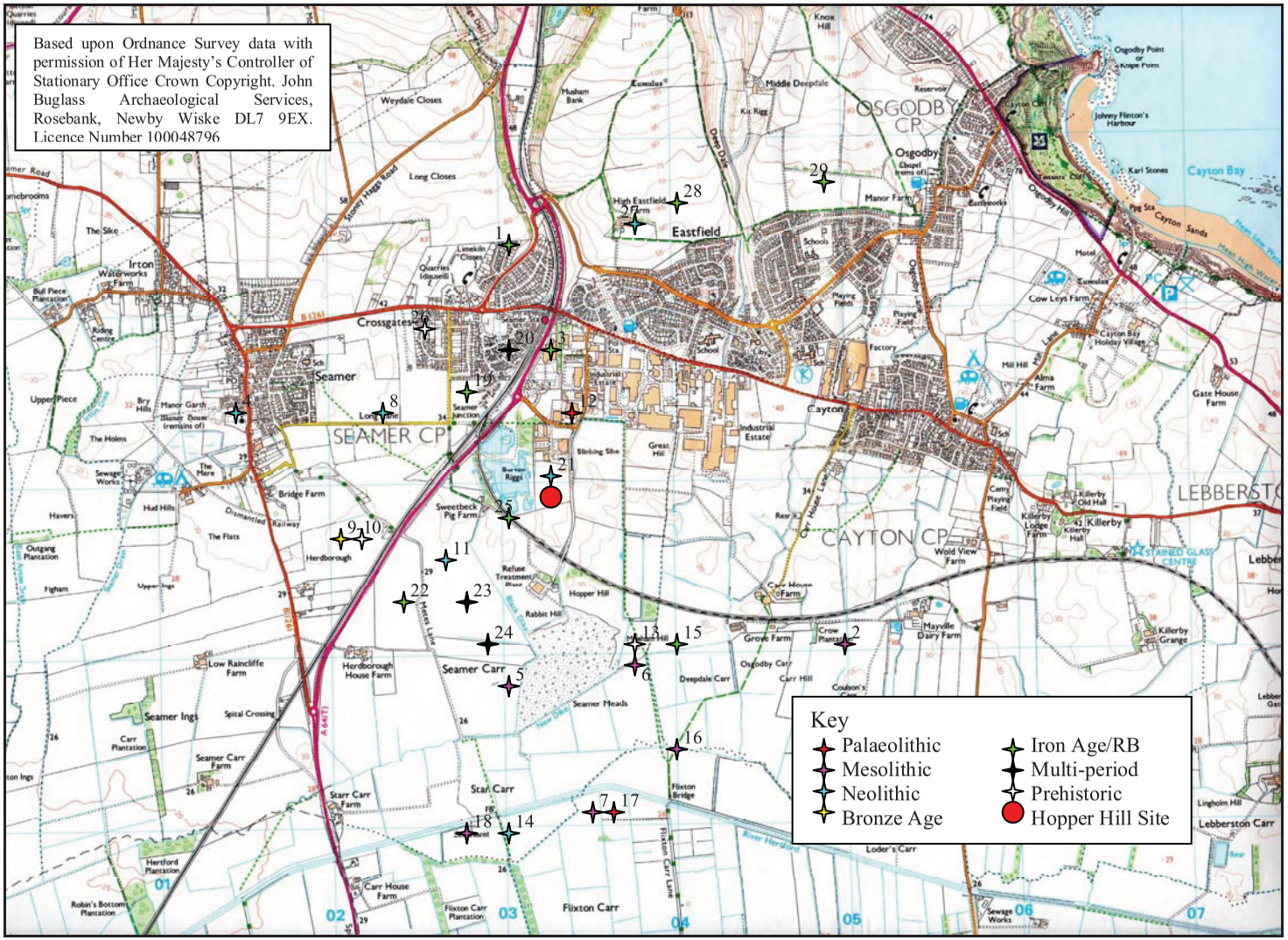


Figure 12. Location of Prehistoric Sites up to 3km from Hopper Hill Road

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Acknowledgements

I would like to thank Kevin Bayliss of Jacobs for inviting me to undertake the project and Guy from Parkinsons for their freely given co-operation in completing the archaeological works. I would also like to thank all of the various specialists for their work on the project. To Lesley Collett of YAT for producing the flint and pottery illustrations.

APPENDIX I

Context Catalogue

01	Topsoil
02	Cut for modern wheel rut – assigned for struck flint collection
03	Fill of cut 02
04	Cut for large ditch
05	Upper fill of ditch 04
06	Middle fill of ditch 04
07	Primary fill of ditch 04
08	Cut for shallow ditch/gulley
09	Primary (and only) fill of 08
10	Cut of small drip gulley for round house (westerly one)
11	Fill of 10
12	Deposit – struck flint scatter
13	Deposit – stone lined hearth
14	Cut of 13 (hearth) – more likely a fortuitous small natural depression
15	Cut for larger drip gulley for round house (easterly one)
16	Fill of 15
17	Three discreet ‘clusters’ of crushed pottery
18	Cut for ditch
19	Upper fill of 18
20	Primary fill of 18
21	Under lying natural geology

APPENDIX II

XRF Methodology

The instrument is a Bruker S1 Turbosdr hand-held XRF instrument operating at 15 and 40kV. A beam of x-rays is generated in the instrument and focussed on the sample, the x-rays interact with the elements present in the sample resulting in the emission of secondary x-rays which are characteristic (in terms of their energy and wavelength) of the elements present in the sample. The energies of the secondary x-rays are measured and a spectrum generated showing a level of background noise with peaks of the elements present superimposed on the background noise. Samples were analysed at both accelerating voltages for 30 live seconds, the spectrum is stored and a normalised composition was determined from the 16kV spectrum using a bespoke Bruker programme specially developed for Gerry McDonnell Archaeometals. The technique is non-destructive.

APPENDIX III

Assessment of biological remains from deposits encountered during archaeological recording at Hopper Hill Road, Seamer, near Scarborough, North Yorkshire (site code: HHH11)

by
Alison Foster and John Carrott

Summary

Six sediment samples and a single 'spot' sample of hand-collected charcoal, recovered from deposits encountered during archaeological recording at Hopper Hill Road, Seamer, Near Scarborough, North Yorkshire, were submitted for an assessment of their bioarchaeological potential. Features encountered during included ditches, the drip trenches of two roundhouses, a small hearth, a pottery spread and a flint scatter. Iron Age pottery was identified within the material recovered from the pottery spread and several of the fills; however, at the time of writing no direct stratigraphical relationship between the different features had been established.

Biological and artefactual remains were sparse in the sampled deposits and much of the former comprised clearly modern intrusive or contaminant material (e.g. rootlets). Probable ancient organic remains were largely restricted to small amounts of charcoal, most of which was poorly preserved and indeterminate to species, with occasional other charred plant remains including root/rhizome fragments, a few 'seeds' and a single indeterminate cereal grain. These remains were too few for any detailed interpretation of past human activities or natural habitats at the site.

The spot sample of material thought to be charcoal in the field proved to be shale or low grade coal and, as such, cannot be used for radiocarbon dating. However, occasional fragments of charcoal from the fill of the hearth were rather better preserved than the majority of this material recovered and three fragments identified as hazel could be used for radiocarbon dating; two were selected for submission for dating and both returned mid Bronze Age dates.

A little pottery and fired/heat-affected clay was recovered from the secondary fill of a ditch and these materials were forwarded to the appropriate specialists for further consideration.

No further study of the biological remains from these deposits is warranted.

KEYWORDS: HOPPER HILL ROAD; SEAMER; SCARBOROUGH; NORTH YORKSHIRE; ASSESSMENT; BRONZE AGE; IRON AGE; PLANT REMAINS; CHARRED PLANT REMAINS; CHARCOAL

Assessment Of Biological Remains From Deposits Encountered During Archaeological Recording At Hopper Hill Road, Seamer, Near Scarborough, North Yorkshire (Site Code: HHH11)

Introduction

Archaeological recording was undertaken by John Buglass Archaeological Services (JBAS) at Hopper Hill Road, Seamer, near Scarborough, North Yorkshire (NGR TA 0325 8292), between the 3rd and the 15th of August 2011. The work was carried out during preparation for groundworks for a new highways depot (Planning Reference C4/10/01994/CC).

Previous excavations carried out at Burton Riggs quarry, to the west of the site, revealed activity from the Iron Age and Anglo-Saxon periods, whilst to the north of the site archaeological monitoring recorded pits, post-holes and linear features which appeared to be Neolithic in date. Features encountered during the 2011 monitoring included ditches, the drip trenches of two roundhouses, a small hearth, a pottery spread and a flint scatter. Iron Age pottery was identified within the material recovered from the pottery spread and several of the fills. However, at the time of writing no direct stratigraphical relationship between the different features had been established.

Six bulk sediment samples ('GBA'/'BS' *sensu* Dobney *et al*. 1992) and a charcoal 'spot' sample, were submitted to Palaeoecology Research Services Limited, Kingston upon Hull, for an assessment of their bioarchaeological potential.

Methods

Sediment samples

The submitted bulk sediment samples were inspected and their lithologies recorded following a standard *pro forma*. Subsamples from each were processed for the recovery of plant and invertebrate macrofossils (after disaggregating in water for at least 24 hours), broadly following the techniques of Kenward *et al*. (1980), producing a washover and a largely mineral residue from each sample.

The washovers did not appear to exhibit waterlogged preservation of organic remains and were recorded dry. All the components were recorded using a five-point semi-quantitative scale (see Key to Table 1); fractions were generally scanned until no new remains were observed and a sense of the abundance of each taxon or component (relative to the processed fraction as a whole) was achieved. The abundance of recovered organic and other remains within the sediment as a whole may be judged by comparing the washover volumes and the quantities of remains recovered from the residues with the size of the processed sediment subsample.

The washovers were examined for macrofossil remains in general, with the remains separated into three fractions (0.3 to 2 mm; 2 to 4 mm; and over 4 mm), where necessary, to facilitate recording. Plant macrofossil remains were identified to the lowest taxon necessary to achieve the aims of the project by comparison with modern reference material (where possible) and the use of published works (e.g. Cappers *et al*. 2006). Nomenclature for plant taxa follows Stace (1997).

The largely mineral residues were also dried prior to the recording of their components. The weights and descriptions of the dry residues were recorded after sorting. Weights and descriptions of inorganic and biological material refer to the larger pieces which have been extracted and reserved; smaller fragments remain in the residues and are not included. Pottery and other ceramic materials were sorted to 10 mm; charcoal was sorted to 4 mm; charred plant remains other than charcoal were sorted to 2 mm. Residue less than 1 mm was retained unsorted. The residue fractions less than 2 mm (including the less than 1 mm fraction) were scanned for magnetic material. Where present, artefactual material was noted and recorded or removed to be returned to the excavator and/or forwarded to appropriate specialists.

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

Charcoal (hand-collected and from samples)
Charcoal identification was attempted for a single hand-collected 'spot' sample but on examination the submitted material proved to be shale or low grade coal. Some identifications were attempted on larger and better preserved charcoal fragments recovered from the sediment sample from Context 13, however. Pieces were broken to give a clean radial cross-sectional surface and the anatomical structures were examined using a low-power binocular microscope (x7 to x45). Basic identification was made by comparison with modern reference material where possible, and with reference to published works (principally Hather 2000 and Schoch *et al*. 2004).

Two fragments of hazel (*Corylus avellana* L.) charcoal recovered from one deposit (Context 13; fill of Hearth 14) were submitted to Beta Analytic Inc., Miami, Florida, USA, for radiocarbon dating via AMS.

Results

Sediment samples
Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers.

Summary details of the plant taxa recorded, together with notes on other components of the washovers are shown in Table 1. Biological and artefactual remains extracted from the mineral residues are summarised in Table 2.

Context 06 [Secondary fill of Ditch 04; finds included pot boilers, daub and possible furnace lining]
Sample -/T (5 kg/4 litres sieved to 300 microns with washover; approximately 0.5 litres of unprocessed sediment remains)

Dry, mid yellow-brown (with patches of burnt red and some grey-black ashy areas), crumbly (working soft with added water), sandy clay silt, with abundant small lumps of clay and occasional small stones (2 to 20 mm). Frequent modern rootlets were also present.

The washover (100 ml, 30 ml of which was modern rootlet) contained abundant silt 'crumb' (< 2 mm) and poorly preserved, indeterminate charcoal (to 20 mm); plant remains from the finer fractions included frequent charred rhizome, rootlet and twig fragments of ?heather (cf. *Calluna vulgaris* (L.) Hull). The only other charred plant remains present were three dock (*Rumex* sp.) achenes. A little coal (to 4 mm) was probably from then local drift and a naturally occurring component of the soil matrix. A ground beetle (Carabidae) pronotum was considered to be a modern contaminant on this occasion.

A small assemblage of pottery (14 sherds) was present in the residue (to 30 mm; 30 g); it is likely that some of the fragments were from the same vessel although no refits were possible (this material was forwarded to the project's pottery specialist). Also recovered were some small lumps (eight pieces) of fired/heat-affected clay (to 27 mm; 15 g – also removed and delivered to the relevant project specialist). The magnetic fraction (2 g) consisted primarily of burnt stone, with a few tiny 'slag-like' pieces and one possible flake of hammerscale. Biological remains extracted from the residue were restricted to a little charcoal (to 8 mm; 0.2 g) which was heavily silted and mineralised.

The sorted residue (984 g) was composed of mixed stones (to 32 mm), some of which were burnt, with abundant mineralised sediment concretions and sand. Frequent small 'crumbs' of pottery and fired/heat-affected clay were also present, together with a few charcoal fragments.

Context 07 [Primary fill of Ditch 04]
Sample 3/T (5 kg/3 litres sieved to 300 microns with washover; approximately 2 litres of unprocessed sediment remain)

Just moist, mid orange-brown to mid grey-brown (with frequent discrete areas of pale grey silty clay and occasional patches of grey-black ?ash and some charcoal fragments), crumbly (working soft and somewhat sticky with added water), slightly sandy clay silt. Stones (2 to 60 mm) were common.

The small washover (20 ml, with very little modern rootlet) was composed primarily of silt 'crumb' with abundant coal (to 16 mm, probably naturally occurring), with a little sand and small stones. Charcoal was sparse, with no fragments over 4 mm recorded. Other charred plant remains were limited to a culm internode (indeterminate ?grass – cf. Poacaeae) and a single 'seed', possibly a stinging nettle (*Urtica dioica* L) achene. Two uncharred 'seeds' (unidentified) were also present.

A single piece of poorly preserved unidentifiable charcoal (to 7 mm; 0.2 g) and a little magnetised burnt stone (0.6 g) were the only remains recovered from the residue.

The sorted residue (1216 g) consisted of pebbles and stones (to 50 mm, some burnt), sand and frequent mineralised sediment concretions (some of which were quite large, to 28 mm).

Context 09 [Single fill of Ditch 08]
Sample 4/T (5 kg/3.5 litres sieved to 300 microns with washover; approximately 1 litre of unprocessed sediment remains)

Just moist, mid yellow-brown to light to mid grey-brown, crumbly (working somewhat soft and slightly sticky with added water), slightly sandy slightly silty clay, with some stones (2 to 20 mm) and modern rootlet present.

The washover was very small (10 ml, 1 ml of which was modern rootlet) and consisted mostly of silt 'crumb' and sand/small stones, with occasional tiny pieces of coal (to 2 mm). Indeterminate, poorly preserved charcoal fragments were abundant but very small, with only one piece over 4 mm recorded (to 8 mm). An indeterminate charred cereal grain was extracted, together with two charred seeds (of corncockle, *Agrostemma githago* L. and/or *Silene*) and a sedge (*Carex*) nutlet.

The sorted residue (734 g) comprised pebbles (to 48 mm) and smaller stones (a few of which were burnt), with abundant sand and some mineralised sediment concretions. One small piece of brick/tile (to 8 mm; <0.1 g) was noted during sorting but not extracted; a few tiny fragments of charcoal were also not removed. A little magnetised stone was present (2.2 g) but the magnetic fraction did not include any slag or hammerscale.

Context 13 [Fill of Hearth 14]
Sample 5/T (5 kg/3 litres sieved to 300 microns with washover; approximately 2.5 litres of unprocessed material remains, most of which is stones)

Moist, mid to dark grey-brown to mid yellow-brown, crumbly (working crumbly and somewhat soft), very slightly clay sandy silt, with abundant stones (2 to over 60 mm, many of which were burnt) and frequent charcoal. Occasional modern rootlets were also present.

The washover (90 ml, with negligible modern rootlet) was dominated by charcoal (to 18 mm). Most of the charcoal was poorly preserved and indeterminate as seen in the other samples but several of the larger fragments present were somewhat better preserved and these included three of hazel (*Corylus avellana* L), together with a fourth from another diffuse-porous species (possibly heather – cf. *Calluna*) and a fifth that was of a ring-porous species. Fragments in the finer fractions contained very little root/rhizome/tuber and consisted mainly of comminuted indeterminate wood charcoal. The remainder of the washover comprised frequent silt 'crumb' and sand/small stones, with a little coal (to 2 mm, probably naturally occurring). A tiny piece of slag (to 3 mm) was also noted. Although modern rootlet was scarce, other modern intrusions/contaminants were present in the form of uncharred 'seeds' (including orache/goosefoot – *Atriplex*/*Chenopodium*, fumitory – *Fumaria*, and several others which were not identified), a number of earthworm egg capsules and a rove beetle (staphylinid) head.

Biological material extracted from the residue consisted solely of silted indeterminate charcoal (to 14 mm; 12 g). A single flake of hammerscale was present in the magnetic fraction (1.6 g) which was otherwise composed of burnt stone.

The sorted residue (2933 g) was dominated by large pieces of burnt sandstone (to 95 mm), with occasional smaller pebbles (to 48 mm). Smaller sandstone and pebbles were also present in the finer fractions, together with abundant silted and mineralised unidentified charcoal fragments. A relatively small amount of sand was also present.

Two of the hazel charcoal fragments were submitted for radiocarbon dating (via AMS). Although the years of wood growth represented could not be determined for either fragment, hazel is a relatively short-lived tree species and so the unknown 'old wood' error in the date returned with regard to the date of the charring event is correspondingly small. Both samples returned 2-sigma calibrated Bronze Age dates of Cal BC 1680 to 1520 (Beta 316567) and Cal BC 1750 to 1620 (Beta 316568); see Table 3 for details.

Context 16 [Single fill of round house drip-trench, with Iron Age pottery, slag and ?furnace lining]
Sample 6/T (5 kg/4 litres sieved to 300 microns with washover; approximately 2 litres of unprocessed sediment remain)

Moist, mid to dark grey-brown, fine 'crumb' texture (working crumbly and somewhat soft), sandy slightly clay silt, with stones (2 to 60 mm) common and a little modern rootlet present.

The washover (40 ml) was mostly modern rootlet (30 ml), with abundant silt 'crumb' and relatively little charcoal (to 8 mm). Tiny coal fragments (probably naturally occurring) were also present and two

pieces of vesicular slag were noted in the less than 4 mm fraction. Charred plant remains other than charcoal were limited to a single seed (?corncockle, cf. *Agrostemma githago*, or *Silene)* and one other unidentified 'seed'. An uncharred orache/goosefoot seed, together with an earthworm egg capsule, were considered to be intrusive/contaminant.

Some poorly preserved, silted, indeterminate charcoal fragments (to 10 mm; 1.7 g) were extracted from the residue, together with a larger piece of material that may be mineralised ?wood (to 18 mm; 0.7 g). The magnetic material (1.3 g) was primarily burnt stone but two flakes of hammerscale were also noted.

The sorted residue (1023 g) was composed of mixed stones (to 56 g), some cracked and burnt, with sand and some mineralised sediment concretions. Occasional charcoal fragments, including tiny pieces of ?ericaceous root, remained after sorting.

Context 19 [Primary fill of Ditch 18]
Sample 7/T (5 kg/3.5 litres sieved to 300 microns with washover; approximately 1.5 litres of unprocessed sediment remain)

Dry, light to mid yellow-brown to light to mid grey-brown (with occasional small areas of mid orange-brown), crumbly (working soft and sticky with added water), sandy clay silt, with occasional stones (2 to 60 mm) and modern rootlet.

The washover (30 ml, with very little modern rootlet) was composed mainly of sand, with abundant silt 'crumb' and some charcoal, most of which was very small (to 9 mm) and indeterminate but which included a few fragments of ?heather root/rhizome. Coal fragments (to 4 mm) were probably derived from the natural drift geology. Three charred 'seeds' (unidentified but possibly identifiable to further study) and an orache/goosefoot seed (also possibly charred) were noted, but no other botanical remains were present.

Biological material extracted from the residue consisted of a little indeterminate charcoal (to 9 mm; 0.3 g). There was no hammerscale or other metalworking debris in the magnetic fraction, which was composed entirely of burnt stone (0.6 g).

The sorted residue (675 g) was primarily sand, with mixed stones and pebbles (to 52 mm) and occasional charcoal fragments.

Hand collected charcoal
No charcoal was present in the 'spot' sample (from Context 07); the material was exclusively shale/low grade coal.

Discussion and statement of potential
Biological and artefactual remains were sparse in the sampled deposits and much of the former comprised clearly modern intrusive or contaminant material (e.g. rootlets). Probable ancient organic remains were largely restricted to small amounts of charcoal, most of which was poorly preserved (mineralised, often with distorted cell structures and sometimes of a rather vitrified appearance) and indeterminate to species, with occasional other charred plant remains including root/rhizome fragments, a few 'seeds' and a single indeterminate cereal grain (from Context 09 – single fill of Ditch 08). These remains were too few for any detailed interpretation of past human activities or natural habitats at the site.

The spot sample of material thought to be charcoal in the field proved to be shale or low grade coal and, as such, cannot be used for radiocarbon dating. Occasional fragments of charcoal from Context 13 (fill of Hearth 14) were rather better preserved than the majority of this material recovered and three fragments identified as hazel

(*Corylus*) were considered suitable for radiocarbon dating, via AMS. Although the age of wood growth represented could not be determined for any of the fragments, hazel is a relatively short-lived tree (typically 60 to 80 years) and so the 'old wood problem' whereby radiocarbon dates returned are artificially early for the charring event (the carbon content of the wood being fixed at the point of formation) is correspondingly relatively minor. The small numbers of charred 'seeds' and the indeterminate charred cereal grain (from Context 09) would also be suitable material for AMS dating but, given the presence of modern rootlet and other intrusive remains (e.g. earthworm egg capsules) within the deposits and the consequent likely bioturbation, it was considered preferable to favour material of larger size from a concentration (albeit small) of remains for dating purposes in this case. Two of the hazel charcoal fragments were selected for submission for AMS dating and both returned mid Bronze Age dates for the use of the hearth spanning BC 1750 to 1520 (2-sigma calibrated; see Table 3).

A little pottery was recovered from Context 06 (secondary fill of Ditch 04) as were a small number of pieces of fired/heat-affected clay; both of these materials have been forwarded to the appropriate specialists for further consideration and the latter may be associated with the possible furnace lining or at least indicative of *in situ* burning/heating. Only traces of flake hammerscale and occasional small 'slag-like' particles (i.e. minimal 'background' levels) were present within the magnetic fractions recovered from the processed sediments; far too little to indicate (ferrous) metalworking at the site.

Recommendations
No further study of the biological remains from the deposits reported here is warranted.

Retention and disposal
All of the remains recovered from the processed sediment subsamples should be retained as part of the physical archive for the site; for the present at least.

Unless required for purposes other than the study of biological remains (possible recovery of additional artefactual material, for example), the remaining unprocessed sediment samples may be discarded.

Archive
All material is currently stored by Palaeoecology Research Services (Unit 4, National Industrial Estate, Bontoft Avenue, Kingston upon Hull), pending return to the excavator, along with paper and electronic records pertaining to the work described here.

Acknowledgements
The authors are grateful to John Buglass (of JBAS) for providing the material and the archaeological information.

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Table 1. Hopper Hill Road, Seamer, near Scarborough, North Yorkshire: Organic remains recovered from the washovers. Key: 'Wt/Vol (kg/l)' = weight/volume of processed sediment subsample in kilograms/litres; 'W/o vol (ml)' = volume of washover in millilitres – the first figure given is the total volume and the second is the volume excluding rootlet; 'C'coal' = charcoal. Abundance scale: 1 – few/rare, up to 3 individuals/items or a trace level component of the whole; 2 – some/present, 4 to 20 items or a minor component; 3 – many/common, 21 to 50 or a significant component; 4 – very many/abundant, 51 to 200 or a major component; and 5 – super-abundant, over 200 items/individuals or a dominant component of the whole.

Context	Sample	Wt/Vol (kg/l)	W/o vol (ml)	C'coal (>4 mm)	C'coal (2-4 mm)	C'coal (<2 mm)	Charred cereal grain	Charred seeds	Notes
06	-	5/4	100/70	3	4	5	-	1	Charred plant: charcoal fragments (including ?heather (cf. *Calluna vulgaris* (L.) Hull) root/rhizome/stem fragments score 5); dock (*Rumex* sp.) achenes score 1 Modern/intrusive material: insect (ground beetle (Carabidae) pronotum; score 1); abundant modern rootlet
07	3	5/3	20/20	-	2	5	-	-	Charred plant: charcoal fragments; ?stinging nettle (cf. *Urtica dioica* L.) achenes score 1; culm internode (indeterminate ?grass – cf. Poaceae) score 1 Modern/intrusive material: uncharred 'seeds' (unidentified) score 1; very occasional modern rootlet
09	4	5/3.5	10/9	1	3	5	1	1	Charred plant remains: charcoal fragments (including ?heather root/rhizome/stem fragments score 3); charred cereal grain (indeterminate) x1; ?corncockle (cf. *Agrostemma githago* L.) or *Silene* seeds score

Context	Sample	Wt/Vol (kg/l)	W/o vol (ml)	C'coal (>4 mm)	C'coal (2-4 mm)	C'coal (<2 mm)	Charred cereal grain	Charred seeds	Notes
									1; sedge (*Carex* sp.) nutlet score 1 Modern/intrusive material: some modern rootlet
13	5	5/3	90/90	5	5	5	-	-	Charred plant: charcoal includes 3x hazel (*Corylus avellana* L.) fragments and charcoal from other taxa including another diffuse porous species (possibly heather) and a ring porous species – single fragments of each Modern/intrusive material: uncharred 'seeds' (orache/goosefoot (*Atriplex*/*Chenopodium*); fumitory (*Fumaria* sp.); other uncharred 'seeds') score 2; invertebrate remains (earthworm egg capsules) score 2); rove beetle sclerite (staphylinid head) score 1; very occasional modern rootlet
16	6	5/4	40/10	1	2	4	-	1	Charred plant remains: charcoal fragments; ?corncockle (cf. *Agrostemma githago* L.) or *Silene* seed score 1; large seed/fruit (unidentified) score 1 Modern/intrusive material: uncharred seeds (orache/goosefoot) score 1; earthworm egg capsules score 1
19	7	5/3.5	30/30	1	2	5	-	1	Charred plant remains: charcoal fragments (including ?heather root/rhizome/stem

Context	Sample	Wt/Vol (kg/l)	W/o vol (ml)	C'coal (>4 mm)	C'coal (2-4 mm)	C'coal (<2 mm)	Charred cereal grain	Charred seeds	Notes
									fragments score 1); 'seeds' (unidentified) score 1 Modern/intrusive material: uncharred seeds (orache/goosefoot) score 1; very occasional modern rootlet

Table 2. Hopper Hill Road, Seamer, near Scarborough, North Yorkshire: Biological and artefactual remains from the sample residues. Key: 'g' = weight in grammes; 's.q.' = semi-quantitative abundance score for residue components (see Key to Table 1 for scale); 'mm' = maximum linear dimension in mm; '#' = number of items; 'h'scale' = number of flakes of hammerscale.

Context	Residue weight (g)	Charcoal s.q/mm/g	Pottery #/mm/g	Fired/heat-affected clay #/mm/g	Magnetic to 4 mm h'scale/g	Notes on remains
06	984	2/8/0.2	14/30/30	8/27/15	?1/2	Some, at least, of the pottery sherds probably from the same vessel; pottery and fired/heat-affected clay forwarded to the appropriate specialists for further consideration
07	1216	1/7/0.2	-	-	-/0.6	-
09	734	-	-	-	-/2.2	-
13	2933	4/14/12	-	-	1/1.6	-
16	1023	3/10/1.7	-	-	2/1.3	Also one piece of ?mineralised ?wood (to 18 mm; 0.7 g)
19	675	2/9/0.3	-	-	-/0.6	-

Table 3. Hopper Hill Road, Seamer, near Scarborough, North Yorkshire: Radiocarbon (AMS) dates returned from two fragments of hazel charcoal recovered from Context 13 (fill of Hearth 14).

Context/Sample	Submitted remains	Beta Analytic laboratory number	2-Sigma calibrated radiocarbon date	Measured radiocarbon age	13C/12C Ratio	Conventional radiocarbon age
13/5	Hazel (*Corylus*) charcoal fragment	316567	Cal BC 1680 to 1520	3350 +/- 30 BP	-27.0 o/oo	3320 +/- 30 BP
13/5	Hazel (*Corylus*) charcoal fragment	316568	Cal BC 1750 to 1620	3460 +/- 30 BP	-28.5 o/oo	3400 +/- 30 BP

APPENDIX IV

Radiocarbon Dating Results

BETA

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Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

February 21, 2012

Dr. John Carrott
Palaeoecology Research Services
National Industrial Estate
Unit 4
Bontoft Avenue
Hull, North Humberside HU5 4HF
United Kingdom

RE: Radiocarbon Dating Results For Samples HHH11135TC1, HHH11135TC2

Dear Dr. Carrott:

Enclosed are the radiocarbon dating results for two samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of the analysis was charged to the MASTERCARD card provided. A receipt is enclosed with the mailed report copy. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

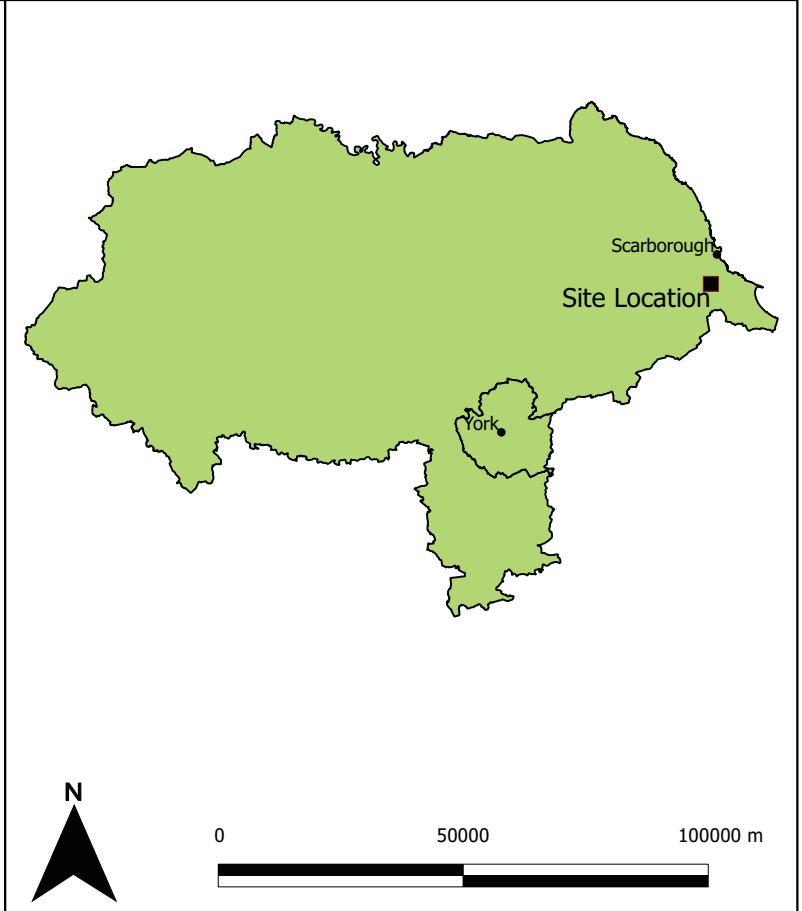
Sincerely,


Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES


Site Location
N
0
100000
200000 m


Scarborough
Site Location
York
N
0
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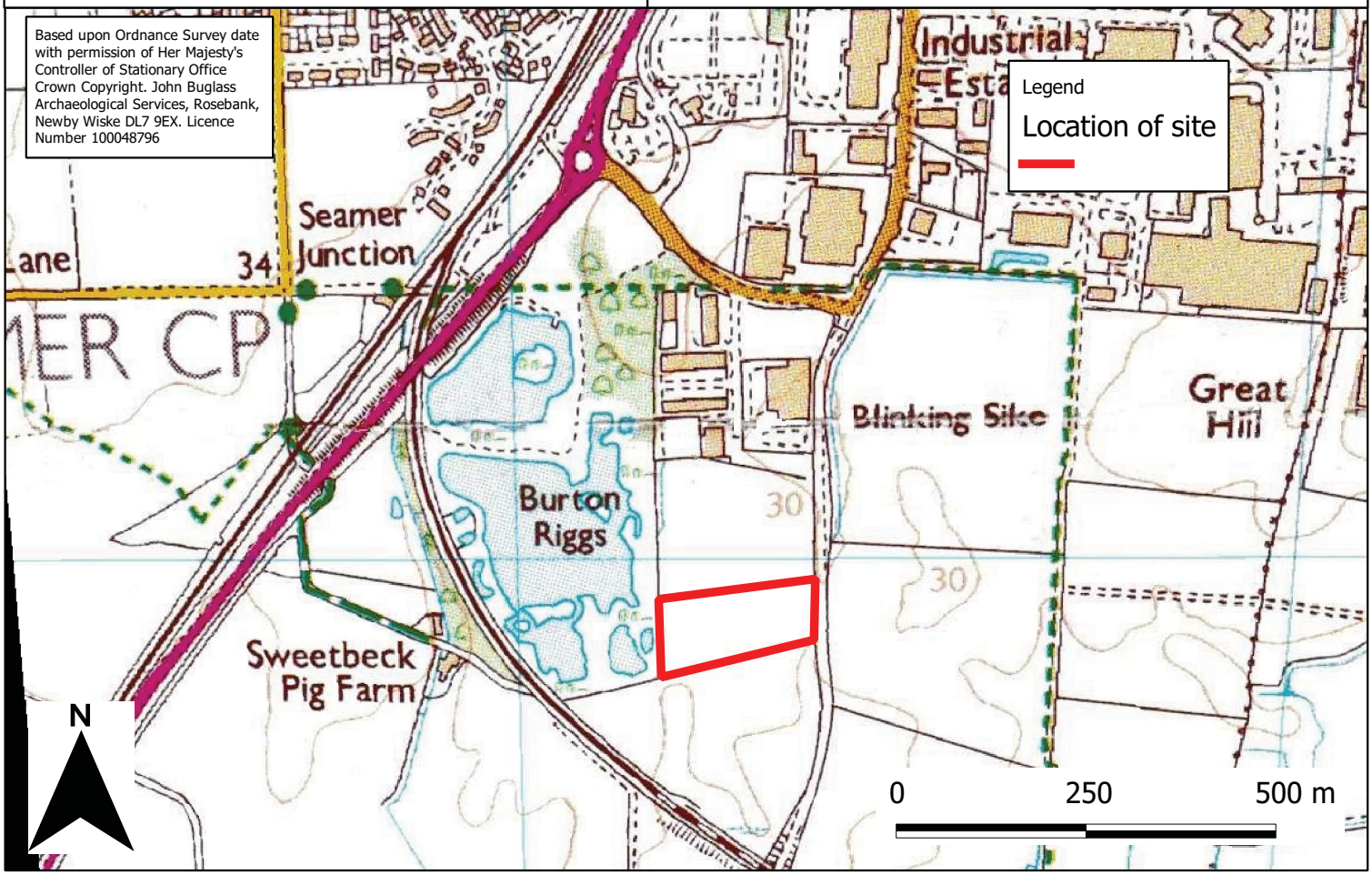
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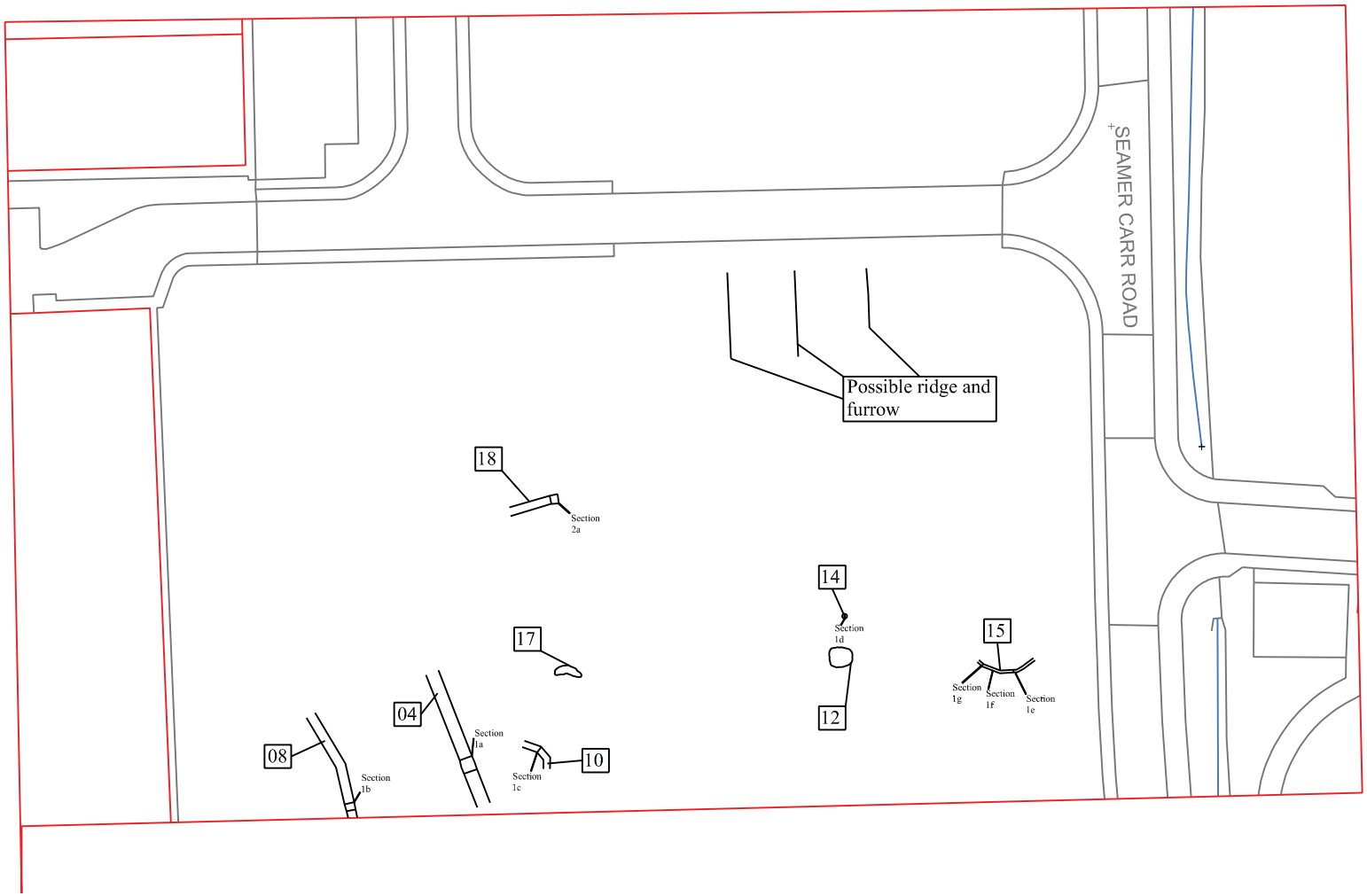
Legend
Location of site
Industrial Esta
Seamer Junction
34
ane
ER CP
Blinking Sike
Great Hill
Burton Riggs
30
30
Sweetbeck Pig Farm
N
0
250
500 m



N

0 25 50m

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Scale 1:100@A4

Figure 2 Site plan showing location of features

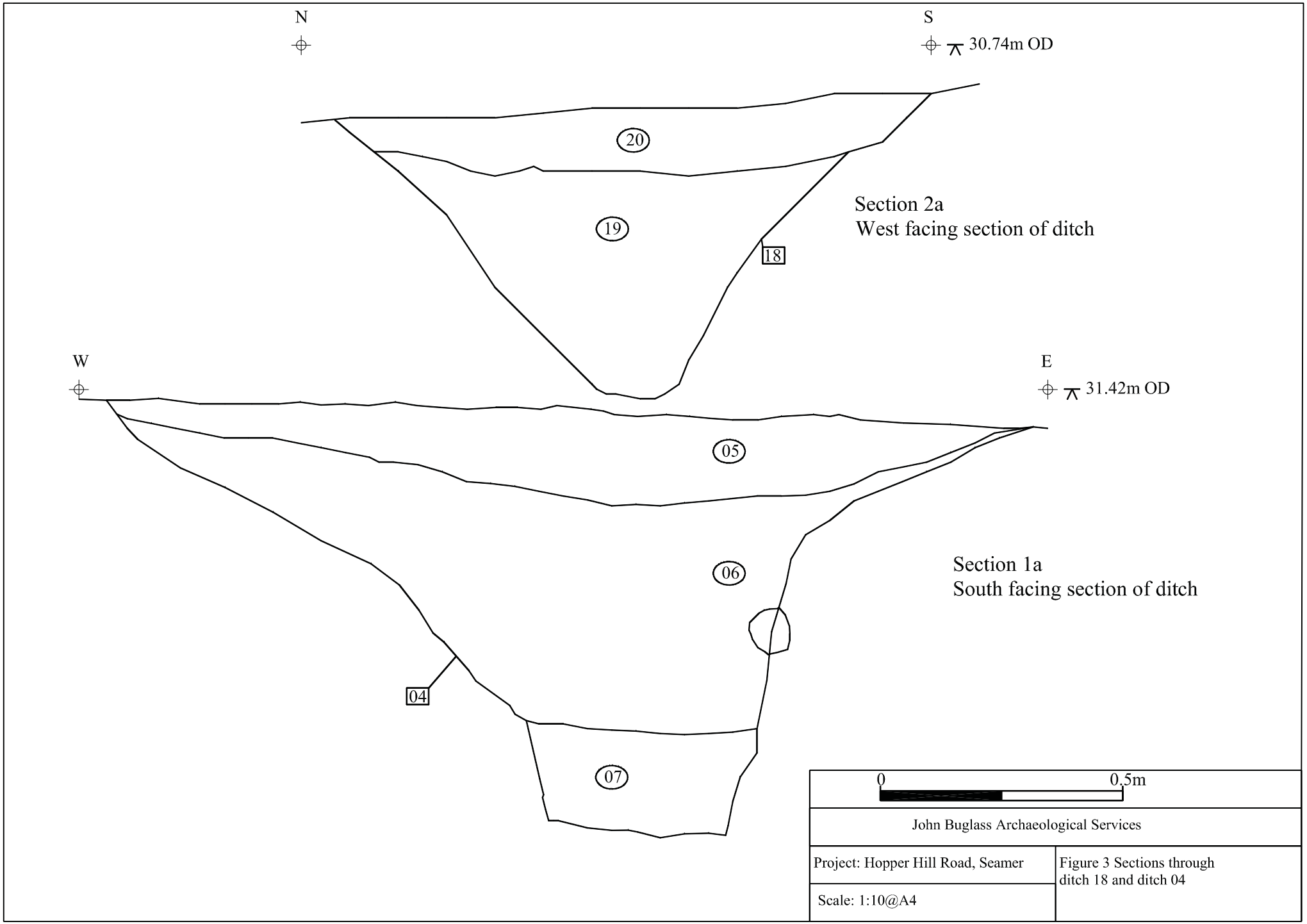
N
S
30.74m OD
20
19
18
Section 2a
West facing section of ditch
W
E
31.42m OD
05
06
04
07
Section 1a
South facing section of ditch
0
0.5m
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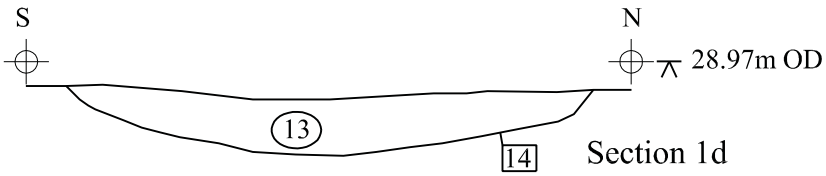
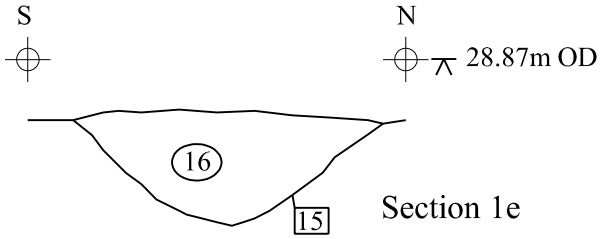
Figure 3 Sections through ditch 18 and ditch 04
Scale: 1:10@A4



Section 1d



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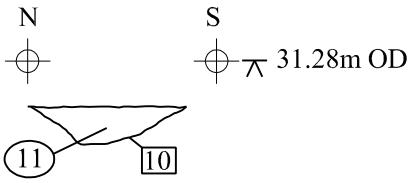

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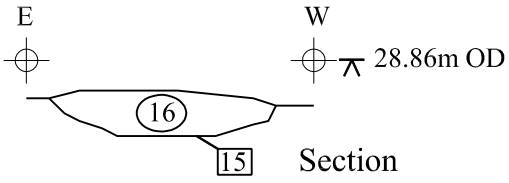

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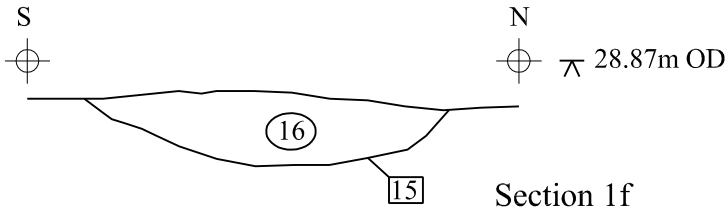

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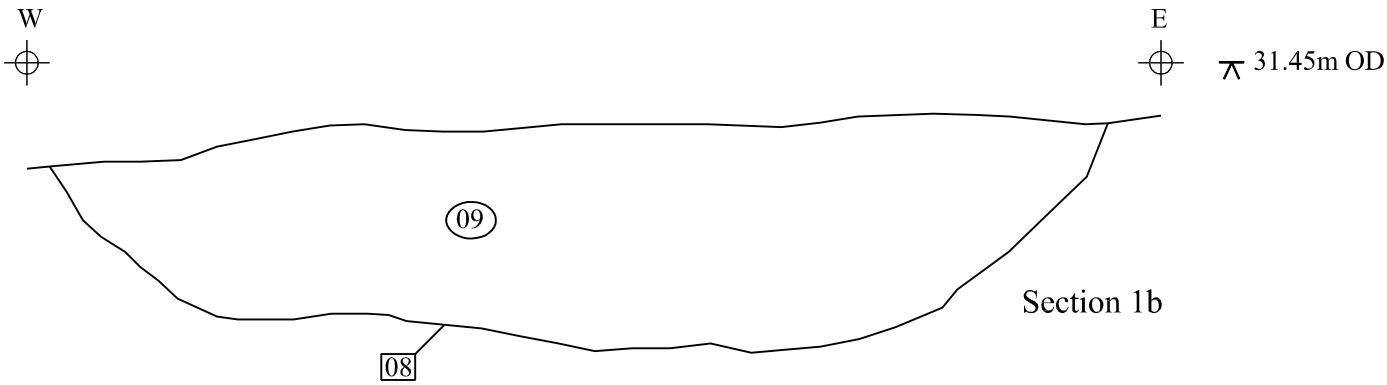

Section 1b

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Figure 4 Sections through features 08, 10, 14 and 15

Scale: 1:10 @ A4

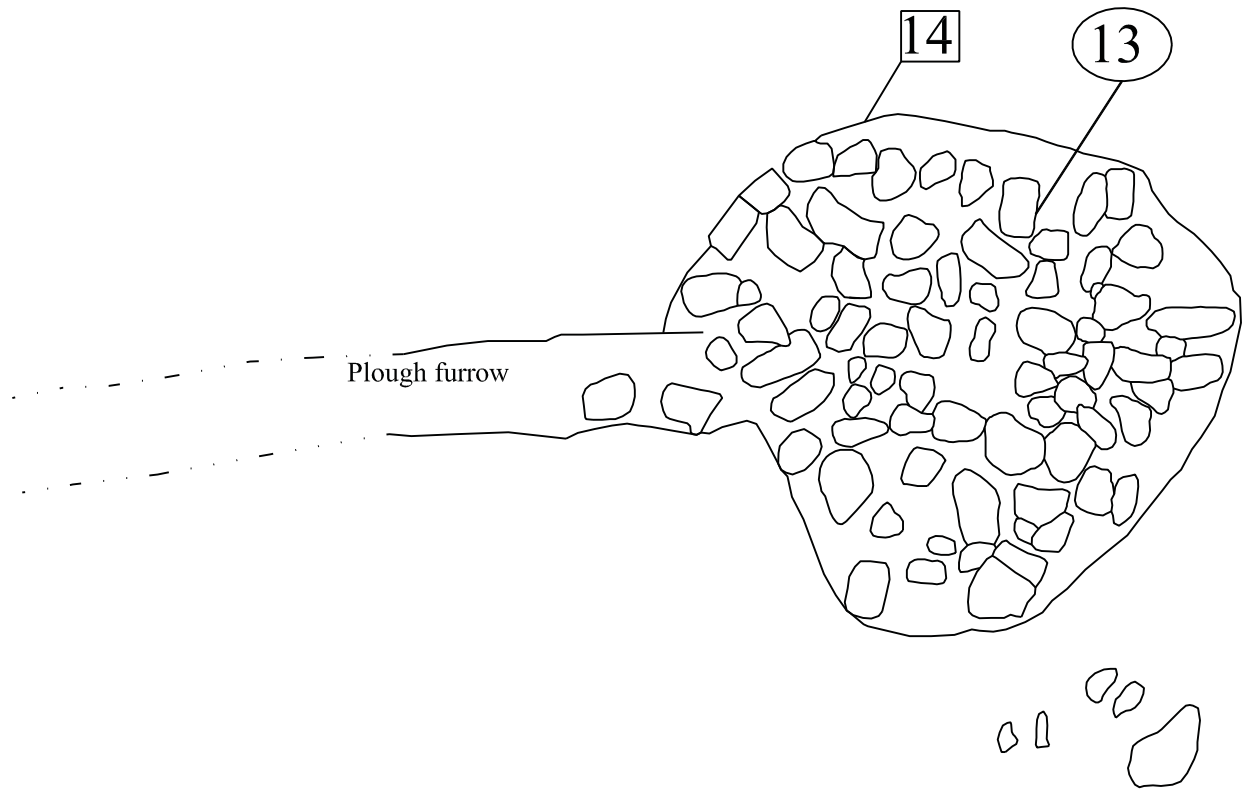

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Figure 5 Plan of hearth 14

Scale: 1:10 @ A4