



PHASE 2

POST-EXCAVATION ASSESSMENT
REPORT

DALTON LANE
BARROW-IN-FURNESS
CUMBRIA

prepared for
Oakmere Homes (North-West) Ltd.

NAA 21/85
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Location Dalton Lane, Barrow-in-Furness, Cumbria LA14 4HT
District Barrow-in-Furness
Planning Ref B07/2015/0707
Grid Ref SD 2150 7240
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Dates of Fieldwork April-July 2021

DALTON LANE, BARROW-IN-FURNESS, CUMBRIA

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PHASE 2

POST-EXCAVATION ASSESSMENT REPORT

Summary

A programme of archaeological monitoring and excavation was conducted on land at Dalton Lane, Barrow-in-Furness, Cumbria (NGR SD 2150 7240). The work was undertaken by Northern Archaeological Associates Ltd on behalf of Oakmere Homes (North-West) Ltd intermittently between April and July 2021.

The mitigation strategy was informed by the results of an extensive development wide evaluation, and subsequent strip, map and record excavation undertaken in the Phase 1 zone of the development during 2019. The evaluation demonstrated the presence of archaeological remains across all Phases of the development site and highlighted a focus of archaeological interest within the north-western part of the Phase 2 area.

Archaeological works during Phase 2 exposed a number of pits. Their morphology was similar to Early Bronze Age pits investigated within the Phase 1 area, but in this case the features lacked dateable artefacts or charcoal considered suitable for radiocarbon dating. Therefore, the date of the features remains unknown. It is recommended that the results of the Phase 2 investigations are incorporated into final analysis and publication of the site as a whole and once all phases of construction are concluded. The function of the features investigated during Phase 2 may become clearer when set in their wider settlement or landscape context.

Parts of the Phase 2 development were soil stripped without archaeological supervision. This resulted in a large part of the Phase 2 development, including much of the area of strip, map and record being damaged to such an extent that very little new information could be identified.

No further study of the metal production residues or palaeoenvironmental remains recovered during the Phase 2 excavations is warranted and the material should be discarded. Once all phases of construction at Dalton Lane are completed, it is anticipated that the full physical and digital archive resulting from the archaeological investigations will be deposited with Tullie House Museum and/or Archaeology Data Service (ADS). The repository for the final project archive will be reviewed upon completion of all Phases of development and once the character of the overall archive has been determined.

1.0 INTRODUCTION

- 1.1 This document presents the results of archaeological investigation and monitoring relating to Phase 2 of a residential development at Dalton Lane, Barrow-in-Furness, Cumbria (NGR SD 2150 7240; Fig. 1). It has been prepared by Northern Archaeological Associates Ltd (NAA) on behalf of Oakmere Homes (North-West) Ltd. The Phase 2 archaeological works were undertaken intermittently between April and July 2021.
- 1.2 The works comprised a 'strip, map and record' investigation of part of the area and monitoring ('a watching brief') across the remainder of the Phase 2 development area.
- 1.3 Full planning permission (Planning Ref: B07/2015/0707) was granted for a proposed residential development of up to 142 units, associated open space and landscaping, with all matters reserved except for access. Following the results of a desk-based assessment and geophysical survey (NAA 2015; PSI 2016), a condition attached to the planning consent required a programme of archaeological works. The first part of these works was a programme of archaeological evaluation including further geophysical survey and trial trenching, which was undertaken in May 2019 by NAA. This was followed by strip, map and record excavation of the Phase 1 development area.
- 1.4 As a result of the extensive evaluation of the site and Phase 1 strip, map and record (NAA 2019) it became apparent that the main focus of archaeological interest was within the north-western part of the Phase 2 development area and to the north-east of the Phase 1 strip, map and record excavation. Following discussion with Cumbria County Council Historic Environment Service (CCCHES), the agreed archaeological mitigation strategy as set out in a Written Scheme of Investigation (WSI) was to investigate an area extending to c.7,156m² by strip, map and record excavation. The remainder of the area (c.16,743m²) would be subject to monitoring (a 'watching brief') during soil stripping and other intrusive excavation such as laying of services (NAA 2021).
- 1.5 During spring 2021 construction activity including soil stripping and the installation of a temporary haul road was undertaken without archaeological supervision. This resulted in a large part of the Phase 2 development, including much of the area of strip, map and record, being damaged to such an extent that very little new information could be recovered.

2.0 LOCATION, TOPOGRAPHY AND GEOLOGY

Location

- 2.1 Dalton Lane is situated approximately 2.8km north from the centre of Barrow-in-Furness (centred at NGR SD 2150 7240), 1km north-east from the centre of Hawcoat village, and 1.8km south-west from Dalton-in-Furness (Fig.1). The Phase 2 area comprised a sub-triangular block of land extending to 23,899m².

Topography

- 2.2 The site comprised undulating arable land, with pasture at the western edge. It lies at approximately 51m AOD at its southern edge, increasing in elevation to 65m AOD to the north.

Geology

- 2.3 The solid geology of the site is comprised of sandstone of the Sherwood Sandstone Group, overlain by superficial deposits of Devensian glaciofluvial-derived tills (British Geological Society 2021).

3.0 SUMMARY ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 3.1 The site was subject to an extensive Desk Based Assessment (DBA), which identified heritage assets relating to the early prehistoric and medieval periods, and the Second World War within the local landscape (NAA 2015).
- 3.2 Moderately sized lithic assemblages have previously been recovered to the immediate east of the development site at Breast Mill Beck, and to the south at Manor Park, comprising 89 and 138 lithic fragments respectively. A fragment of jet bangle was also identified within the Manor Park assemblage. The frequency of flint cores and waste are suggestive of in situ flint working. Cropmarks of putative Neolithic settlements have been recorded in the area of the site at Hawcoat, Rakesmoor Lane and Millwood Bridge.
- 3.3 The site at Dalton Lane is located 60m to the north-west of the medieval remains of Furness Abbey, which include the upstanding and buried remains of both the original Savignac house dating to 1127-47 and the considerably more extensive upstanding and buried remains of the subsequent Cistercian monastery. As a result of its considerable capital, the Abbey eventually became one the most powerful ecclesiastical centres in northern England (after Fountains Abbey in North Yorkshire), holding lands across Furness, Lancaster, Lonsdale, Craven, the Isle of Man and even extending to the

southern and midland counties of Ireland, creating an extensive trading network. Within the grounds of the Abbey, watching briefs and an archaeological evaluation have identified archaeological remains associated with the medieval and later post-dissolution occupation of the site.

- 3.4 It is assumed that the development area remained in agricultural use following the dissolution of the Abbey in 1537. In c.1944, a military camp (Dane Ghyll Camp) was established on the site. Constructed by the Ministry of Works and Planning, a detailed survey plan of the site shows an extensive complex of structures serviced by overhead electric cables and a water/drainage system. The primary use of the encampment during the war years is unclear, though the camp's plan indicates extensive space for military officers, administration as well as NAAFI (Navy, Army and Air Force Institutes) staff suggesting the presence of a British military unit. It may have served as a military transit depot as an advance party from 187 Field Ambulance unit are recorded as going to it in late 1942.
- 3.5 In 1946 following the end of the war, Dane Ghyll Camp was requisitioned by the Polish Resettlement Corps and became a resettlement camp for those Polish Armed Forces who did not wish to return to Soviet-occupied Poland. The primary aim of these encampments was to transition occupants into the wider British community, or to aid in their emigration to the USA, Canada, Australia and New Zealand. It is believed that the 'Battalion Wart. A 400' unit was stationed at the site, though it is also possible that members of other units, as well as Polish civilian refugees were residents. These encampments were largely disbanded by 1948, and there is no evidence for the encampment by 1956.

Previous archaeological investigations

Geophysical survey

- 3.6 The site was subject to two phases of geophysical survey, which were undertaken by Phase Site Investigations (PSI) in 2016 and NAA in 2018. The only significant features identified in the western part were the remains of Dane Ghyll Camp and linear anomalies thought likely to represent agricultural features (PSI 2016). The results suggested that high levels of magnetic disturbance in these fields, likely due to material derived from the demolished camp, may have masked underlying features. In eastern part of the site, all geophysical anomalies were considered to be either modern, agricultural or geological/pedological in origin (NAA 2018).

Evaluation trenching

- 3.7 Forty-five trial trenches were excavated across the development area in May and June of 2019 (NAA 2019). Trenches were positioned to target the remains of Dane Ghyll Camp, geophysical anomalies, and areas appearing as 'blank' in the surveys across the main residential development area.
- 3.8 The remains of Dane Ghyll Camp were recorded in the south-western part of the residential development area (Trenches 1.1-1.3, 2.1, 2.3, 2.8, 2.11, 3.1 and 4.1).
- 3.9 Fourteen pits of probable prehistoric date were found across Fields 2 and 4, in Trenches 2.5, 2.7, 2.17, 2.18, 2.21, 2.23 and 4.9. Most were devoid of diagnostic finds although a pit in Trench 2.5 produced a large assemblage of pottery, either Late Neolithic Grooved Ware or Early Bronze Age Food Vessel Urn, together with a fragment from a polished stone axe, worked flints, burnt stones and an assemblage of charred plant remains and charcoal.
- 3.10 Twelve ditches and gullies were recorded across Fields 2 and 4 (Trenches 2.2, 2.6, 2.7, 2.15, 2.22-2.24, 4.1, 4.2, 4.8, 4.10 and 4.11) and possibly represented a prehistoric field system. They ran oblique to the modern field boundaries and were mostly oriented north-west to south-east, but with two aligned from south-west to north-east. None produced dateable artefacts, although in some cases there was evidence for deliberately backfilling and several contained dumps of burnt soil or charcoal.
- 3.11 A north-south oriented hollow-way with a metalled surface in the base crossed the eastern end of Trench 2.2. The centre of Trench 4.8 was crossed by a trackway comprising a poorly preserved stone surface and an adjacent trackside gully along its western side. Three east-west oriented shallow linear features recorded in Trench 4.6 were interpreted as furrow-bases from a medieval or post-medieval ridge-and-furrow system.

Phase 1 Watching brief/excavation

- 3.12 Since the results of the evaluation suggested that significant archaeological remains would be impacted by the first phase of construction in the south-western part of the development site, further mitigation in the form of a watching brief/limited excavation ('strip, map and record') was carried out during soil-stripping across an area measuring c.2650m².

- 3.13 Archaeological features recorded during this work included three more pits of probable prehistoric date, one of which contained fragments of hand-built pottery.
- 3.14 The truncated remains of a ditched enclosure extended from the northern edge of the area to the south-east before being truncated by later features and modern ploughing. A large entrance break approximately 15m wide was defined by two terminals which had been recut at least once. Although undated the enclosure came early in the stratigraphic sequence and was therefore presumably prehistoric or medieval in date. Two postholes cut by the southern part of the enclosure ditch possibly represented an early iteration of the same boundary, while two other postholes possibly related to the same phase of activity.
- 3.15 The metalled hollow-way previously identified in Trenches 2.2 and 2.8 crossed the excavation area running from north to south over an observed length of 70m. No dating evidence was recovered but it is likely to have been medieval or earlier in date. After it had become infilled its line was crossed by the later trackway previously recorded in Trench 2.8. From the southern edge of Phase 1 the trackway surface ran north-west for 40m before becoming truncated. It was comprised of small stones pressed into a layer of disturbed natural which sat within a shallow hollow and was flanked on its western side by a small drainage ditch. The trackway was undated but had been cut by a series of furrows, so it presumably dated to no later than the early post-medieval period.
- 3.16 The only archaeological feature not cut by the furrows was a rectangular structure located in the north-western part of the area. This measured 7.50m long and 5.50m wide and was defined by a continuous rectilinear beam slot. This presumably represented a post-medieval agricultural building, or a structure associated with the Second World War period Dane Ghyll camp. A pit and posthole a short distance to the north contained 20th-century rubbish. Twelve more postholes in the south-western part of the area were of modern date and some had been backfilled with demolition material from Dane Ghyll camp.

Known archaeological features within the Phase 2 area

- 3.17 The Phase 2 area of the development encompasses the location of Trial Trenches 2.5, 2.6, 2.17 and 2.18. Features found in this area included one certainly prehistoric pit (Trench 2.5) and six other probable prehistoric pits (Trenches 2.5, 2.17 and 2.18). An undated but possibly prehistoric enclosure ditch was found in Trench 2.6.

- 3.18 Trenches in the area proposed for the watching brief identified a further seven pits (Trenches 2.7, 2.25, 2.16, 2.21, 2.23 and 2.24), indicating that such features have a wide distribution across the development area. Undated, but possibly prehistoric, ditches and gullies were also found in several trenches in this part of the area (Trenches 2.15, 2.22, 2.23 and 2.24).

4.0 AIMS AND OBJECTIVES

- 4.1 The aim of the archaeological monitoring (both the 'strip, map and record' and the 'watching brief' elements) was to identify the presence and location of archaeological remains within the area of development that may be adversely impacted by construction of the development. The main purpose of the archaeological excavations was to investigate and record any archaeological remains in order to achieve their 'preservation by record'.

- 4.2 The main objectives were to:

- provide a detailed record of the archaeological remains that may be present within the area of the development in advance of their loss through the proposed works;
- recover and assess any associated structural, artefactual and environmental evidence;
- carry out post-excavation assessment, to make the results of the archaeological works accessible via an illustrated report and, if appropriate, to undertake further analysis and publish the results in a local, regional or national journal;
- deposit the results of the work with the CCC HER, the receiving museum, Tullie House Carlisle and the Archaeology Data Service; and
- undertake a scheme of work that meets national and regional standards (HE 2015; ClfA 2014a; 2014b; 2014c; 2014d).

5.0 METHODOLOGY

Machine Excavation

Strip, map and record area

- 5.1 The WSI (NAA 2021) stated that initial site works would comprise the stripping of overburden (topsoil and subsoil) across the area. Due to the unmonitored soil stripping and construction of a haul road, only c.1,800m² of the proposed c.7,156m² of strip, map and record was undertaken. This reduced area of monitoring and excavation was

located at the northern limit the strip, map and record area and adjacent to the Phase 2 boundary (Fig. 2).

- 5.2 In this area, overburden was removed by a back-acting mechanical excavator fitted with a toothless bucket only. All soil removal within the reduced strip, map and record area was conducted under archaeological supervision. Stripped areas remained un-trafficked until released to contractors upon completion of archaeological investigation.
- 5.3 Overburden was removed down to natural subsoil deposits. Mechanical excavation ceased in any areas where archaeological remains deemed to be significant by the monitoring archaeologist were identified. Thereafter, sample excavation by hand and recording of all visible archaeological features and deposits was undertaken.
- 5.4 The WSI stated that following initial stripping of the strip, map and record area, a measured survey would be made of the archaeological features visible. Once this survey had been carried out, NAA would supply initial site plans of the archaeology to the client and CCCHES in order to determine at an early stage whether any variation to the proposed excavation strategy was likely to be necessary. Due to the substantial reduction of the strip, map and record area and the resulting modest number of archaeological features, the measured survey was carried out after these had been sample excavated and recorded.

Watching brief area

- 5.5 The WSI stated that archaeological monitoring was to be carried out during intrusive construction works in the watching brief area. This included any soil stripping and excavation for roadways, drainage, services, etc.
- 5.6 This strategy was followed during the excavation of the footprint of a residential street undertaken April 26th–27th and June 14th, 2021, and during the excavation of a drain trench on June 16th, 2021. Due to the severe ground reduction and subsequent damage by plant traffic in the majority of the watching brief area, the decision to cease archaeological monitoring during excavation of the house foundations was made during an on-site meeting with the client and CCCHES.

Hand excavation

- 5.7 Where structures, finds, soil features or layers of archaeological interest were exposed, the archaeologist cleaned, assessed, excavated by hand, sampled and recorded the

features as appropriate. Hand excavation of archaeological features was carried out to characterise the archaeology and ensure recovery of artefactual and environmental evidence. The aim of this was to record all significant archaeological features on the site and to undertake sufficient intrusive excavation to enable the date, character, form and stratigraphic relationships to be understood.

Recording

- 5.8 Archaeological remains were located using a GPS and information transferred to AutoCAD software and reproduced for incorporation within this report. All levels were tied into Ordnance Datum.
- 5.9 A drawn record of all archaeological features was made at an appropriate scale. Sections/profiles were drawn at a scale of 1:10 and their location accurately identified on the appropriate plan. Plans were drawn at a scale of 1:20. Drawings include appropriate data on levels relative to Ordnance Datum.
- 5.10 Written descriptions of archaeological features/deposits were recorded on pro forma context sheets, which employ standard archaeological recording conventions.
- 5.11 A photographic record of the site was taken using digital photography at a minimum resolution of 10 megapixels. Photographs include a north arrow and standard scales.

Environmental sampling

- 5.12 Bulk palaeoenvironmental samples were taken from appropriate deposits and submitted to the named environmental specialist for assessment of the environmental potential. Recovery and sampling of environmental remains was in accordance with published guidelines (Campbell *et al.* 2011; HE 2015).

6.0 RESULTS

Watching brief

- 6.1 Monitoring of the excavation in advance of construction of a residential street was undertaken 26–27 April and 14 June 2021 (Fig. 2, which illustrates the nature of the proposed development; plate 1). The main street section was aligned north-east to south-west and continued a previously completed section at its south end. A branch street running south-east projected from the north end of Phase 2 section of the street. The soil strip associated with the road was 6m wide and totalled c.150m in length. After

the removal of a c.2.5m deep soil storage bund (Plate 1), the footprint of the street was stripped of a 0.3m deep layer of topsoil (**1101**), which directly overlay the brown-pink sandy clay natural (**1103**). One ovoid pit (**1104**; Fig. 3) measured 1.2m by 0.7m with a depth of 0.5m was excavated at the junction between the main section and the branching street. It contained a single fill of pink-brown sandy silt with ash and other indeterminate charcoal inclusions (**1105**).



Plate 1: Street footprint excavated through 2.5m overburden, looking south-west

- 6.2 The excavation of structural foundation trenches was monitored on May 18th–19th, 25th–26th and June 10th, 2021 (Fig. 2). The foundation trenches measured 0.6m wide and were excavated to a depth varying between 0.2m–0.7m. Occasional thin lenses (0.05m) of topsoil were observed during the trenching. However, the majority of the house foundations were excavated into exposed and truncated natural clay that had been soil stripped without archaeological monitoring and no archaeological features were observed in either foundation trench.
- 6.3 The excavation of the trench for a drain running along the eastern site boundary was monitored on June 16th, 2021 (Fig. 2). The drain was orientated north to south and commenced at the eastern end of the previously excavated street footprint. It ended

c.5m north of a concrete structure in the south-east corner of the site. The trench measured c.3m wide and varied in depth from 0.4m to 1.4m north to south, due to the varying depths of made ground overlying the topsoil, put in place to counteract the natural slope of the site. The topsoil overlay a 0.2m thick layer of colluvial subsoil in the south part of the trench. No archaeological features were observed.

Strip, map and record

- 6.4 The stripping of topsoil and excavation of features within the reduced strip, map and record area was undertaken on July 22nd–23rd, and July 26th–28th, 2021 (Plate 2).
- 6.5 The topsoil in the area was 0.3m deep and was stripped from west to east. A deposit of clayey silt subsoil was present in the western quarter of the area but petered out towards the east. Disturbance and localised heavy truncation of the natural clay caused by backfilling of evaluation Trench 2.5 and more recent plant movement was visible along the south edge of the area.



Plate 2: Strip, map and record area, looking east

- 6.6 Archaeological features in the form of six pits were investigated within the strip, map and record area (Fig. 3). Two intercutting ovoid pits (**1106** and **1108**) were excavated in

the central area. Pit **1106** was aligned north to south. It was 1.3m long, 0.55m wide and measured 0.25m in depth. Pit **1106** was filled by an initial deposit of yellow-pink clayey sand with charcoal inclusions (**1110**) overlain by a grey-brown sandy clay fill (**1107**). Pit **1106** had been cut by east to west elongated pit **1108**. Pit **1108** measured 0.9m in length, 0.55m in width and was 0.3m deep. The single fill comprised a yellow-grey sandy clay (**1109/1120**) which contained oak charcoal and two fragments of hammerslag.

- 6.7 Pit **1111** was located in the west part of the area. It was circular in plan with a diameter of 0.6m and a depth of 0.15m (Plate 3). The pit had a flat base and was filled with a brown-grey silty clay containing occasional charcoal and seven fragments of hammerslag (**1112**).



*Plate 3: East-facing section of pit **1111***

- 6.8 Pits **1113** and **1117** were located in the central area. Pit **1113** was oval in plan and measured 0.55m by 0.4m with a depth of 0.2m. It was filled with a deposit of brown-yellow sandy clay with occasional charcoal and frequent stone inclusions (**1114**). Pit **1117** was circular in plan with a diameter of 0.45m and was 0.25m deep. It was filled with a deposit of brown-grey clayey silt containing occasional charcoal (**1118**).

- 6.9 Ovoid pit **1115** was located in the east part of the strip, map and record area. It was 1.2m long, 0.8m wide and 0.15m deep with a flat base. The single fill comprised a brown-yellow sandy clay with oak charcoal inclusions (**1116**).

7.0 DISCUSSION

- 7.1 Archaeological features in the form of pits were recorded during the investigations. These were mainly located within the western and central parts of the strip, map and record area but without any discernible form as a group. Their morphology was similar to the pits investigated during Phase 1, but all appeared to have been left to silt up naturally, with only trace elements of charcoal and no charred grains or seeds identified within the deposits.

- 7.2 Fragments of hammerslag within three pit fills suggests that these features did not pre-date the late Prehistoric period. However, small quantities of metal production residue were recorded alongside the Early Bronze Age pottery found in pit **1003** during the Phase 1 watching brief (NAA 2019), where the material was interpreted as intrusive. This may also be the case in this instance.

8.0 SPECIALIST FINDS AND ENVIRONMENTAL ASSESSMENTS

Metal production residue (Roderick Mackenzie)

Archaeological potential

- 8.1 The assemblage consisted of a small volume of magnetic micro-residues recovered from three secondary contexts. The modest quantity of micro-residues and lack of macro-residues suggest that metal working had only been carried out on a very infrequent basis, perhaps by an itinerant blacksmith or farrier.
- 8.2 Another explanation could be that the micro-residues had originated in a forge that had been located just outside the excavated area, with small amounts being redistributed into pit-fills over time

Recommendations

- 8.3 There is no potential for further analysis of the micro-residues in the assemblage and the material should be discarded.

Palaeoenvironmental remains (John Carrott)

Archaeological potential

- 8.4 Very modest quantities of charcoal were recovered from seven sediment samples. All of the identified charcoal was of native British species, presumably derived from locally available trees and representing trace/background levels of fuel waste within the deposits. The remains were too few and often too poorly preserved to be of any further interpretative value.

Recommendations

- 8.5 The trace levels of charcoal recovered from the pit-fills may be discarded as they are of no further interpretative value and, unfortunately, did not include any fragments considered suitable for submission for radiocarbon dating of the deposits. No further study of the material is warranted.

9.0 STATEMENT OF POTENTIAL

- 9.1 No dateable artefacts were recovered from the features excavated during the different phases of work. The palaeoenvironmental and metal production residues appeared in small quantities within secondary contexts and may be intrusive, and as such do not add to the interpretation of the recorded features or their landscape context.

10.0 CONCLUSIONS AND RECOMMENDATIONS

- 10.1 The archaeological features recorded during the Phase 2 investigations were morphologically similar to the Early Bronze Age features excavated during Phase 1 but lacked dateable artefacts, or charcoal considered suitable for radiocarbon dating. Therefore, the pits exposed during Phase 2 archaeological works remain undated. Analysis of feature function based on distribution across the site was not possible due to the large-scale truncation caused by construction activities.
- 10.2 Further archaeological mitigation will be required in relation to additional phases of construction in the overall development area, subject to consultation between Oakmere Homes (North-West) Ltd and CCCHES. Therefore, it is recommended that the results of the Phase 2 investigations are incorporated into the final analysis and publication of the project as a whole and following conclusion of all phases of development. The function of the features investigated during Phase 2 may become clearer when set in their wider settlement or landscape context.

- 10.3 Once all phases of construction are completed, it is anticipated that the full archive from the archaeological investigations, including finds, documentary records, drawings, photographs and digital data will be deposited with Tullie House Museum and/or Archaeology Data Service (ADS). The repository for the final project archive will be reviewed upon completion of all Phases of development and once the character of the overall archive has been determined.

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APPENDIX A

CONTEXT CATALOGUE

Context	Interpretative description	Relationships	Notes	Finds and sample information
1101	Topsoil			
1102	Subsoil			
1103	Natural			
1104	Cut of pit			
1105	Fill of pit 1104			Charcoal; <i>Fraxinus</i>
1106	Cut of pit	Cut by 1108		
1107	Primary fill of pit 1106			
1108	Cut of pit	Cuts 1106		
1109	Fill of pit 1108			Hammerslag, charcoal; <i>Quercus</i>
1110	Secondary fill of pit 1106			Charcoal; indet.
1111	Cut of pit			
1112	Fill of pit 1111			Hammerslag, hammerscale, charcoal; <i>Alnus/Betula/Corylus</i>
1113	Cut of pit			
1114	Fill of pit 1113			Charcoal; <i>Fraxinus</i>
1115	Cut of pit			
1116	Fill of pit 1115			Charcoal; <i>Quercus</i>
1117	Cut of pit			
1118	Fill of pit 1117			Charcoal; <i>Alnus/Betula/Corylus</i>
1119	Fill of pit 1106			
1120	Fill of pit 1108			

APPENDIX B

METAL PRODUCTION RESIDUE ASSESSMENT

Roderick Mackenzie

OUTLINE OF THE ASSEMBLAGE

The assemblage consists of a small volume of magnetic micro-residues recovered from three contexts. All of the fragments are less than approximately 3mm in diameter. The fragments from each context were spread out and viewed under a magnifying lens to identify and quantify any residues relating to metal-production.

Two pieces of spheroidal hammerslag (<1mm diameter) were found in the micro-residues from deposit **1109**. Seven pieces of spheroidal hammerslag (<1.5mm diameter) and one possible fragment of hammerscale was found in the micro-residues from deposit **1112**. No metal production residues were found in the material from context **1118**.

DISCUSSION

The metal production micro-residues in the assemblage are by-products of ferrous metal working (smithing). To the authors knowledge, no macro-residues relating to metal working were recovered from the site, and the diagnostic micro-residues in the assemblage were found in secondary contexts.

The small amount of micro-residues and lack of macro-residues suggest that metal working had only been carried out on a very infrequent basis, perhaps by an itinerant blacksmith or farrier.

Another explanation could be that the micro-residues had originated in a forge that had been located just outside the excavated area, with small amounts being redistributed on the soles of muddy footwear or horses hooves, etc.

RECOMMENDATIONS

There is no potential for further analysis of the micro-residues in the assemblage and they can be discarded.

APPENDIX C

PALAEOENVIRONMENTAL ASSESSMENT

John Carrott

INTRODUCTION

Small quantities of charcoal sorted from the residues from seven bulk sediment samples ('GBA'/'BS' sensu Dobney *et al.* 1992) were submitted to Palaeoecology Research Services Limited, Kingston upon Hull (PRS), for an assessment of their bioarchaeological potential. All of the submitted material was recovered from the fills of the seven pits encountered during the 2021 watching brief and strip, map and record exercises.

METHOD

The samples were processed by NAA following their standard methodology. Samples were processed in-house using a 'Siraf' style flotation tank (Williams 1973), with 500 microns mesh employed for the retention of both the residue and the flot.

The charcoal recovered from the sample residues was quantified (weights were provided by NAA) and identifications were attempted for a number of larger fragments (all over 4 mm). The fragments were broken to give clean cross-sectional surfaces and the anatomical structures were initially examined using a low-power binocular microscope (x7 to x45) and subsequently (where necessary) at higher magnifications (x60 to x600). Identifications were attempted by comparison with modern reference material where possible, and with reference to published works (principally Hather 2000 and Schoch *et al.* 2004).

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

OUTLINE AND PROVENANCE OF ASSEMBLAGE

The results of the investigations of the submitted material are presented below in context number order. Archaeological information, provided by NAA, is given in brackets – descriptions for the sediment matrix of each deposit were also provided by NAA. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in brackets) after the sample designator.

Context 1105 (Fill of pit 1104)

Sample AA (10 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Pink-brown sandy silt with moderate charcoal and occasional stone inclusions.

One hundred and six fragments of charcoal (to 14 mm; 4.3 g) sorted from the sample residue by NAA were submitted. All of the fragments were rectilinear and rather heavily sediment encrusted. The largest was ash (*Fraxinus*) as were five additional fragments; there was also one vitrified fragment more tentatively identified as ash. None of the other 18 fragments examined could be identified to species but eight were ring-porous (as is ash) and six of these were vitrified, one was

vitrified but indeterminate, and the remaining nine were extremely fragile, crumbled when identification was attempted and remained wholly indeterminate.

Context 1109 (Fill of pit 1108)

Sample AA (20 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Yellow-grey sandy clay.

A single fragment of slightly sediment encrusted, rectilinear charcoal (to 6 mm; 0.1 g) sorted from the sample residue by NAA was submitted and identified as oak (*Quercus*).

Context 1110 (Secondary fill of pit 1106)

Sample AA (10 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Yellow-pink clayey sand.

Eight fragments of charcoal (to 9 mm; 0.1 g) sorted from the sample residue by NAA were submitted; a ninth was a small stone (to 6 mm). All of the charcoal fragments were rectilinear and slightly sediment encrusted. The three largest were partially identified as of a diffuse-porous species but could not be determined more closely; the five other fragments were all less than 4 mm in all linear dimensions and identifications were not attempted.

Context 1112 (Fill of pit 1111)

Sample AA (20 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Brown-grey silty clay.

Thirteen fragments of charcoal (to 9 mm; 0.7 g) sorted from the sample residue by NAA were submitted. All of the fragments were rectilinear and all but one were slightly sediment encrusted; the exception being more heavily so – sediment encrustation recorded as moderate. The largest was slightly vitrified and ring-porous, two were vitrified and diffuse-porous, two were diffuse-porous (but not vitrified) and one of these was provisionally identified as alder/birch/hazel (*Alnus/Betula/Corylus*), and two crumbled when identification was attempted and remained wholly indeterminate. The six other fragments were all less than 4 mm in all linear dimensions and identifications were not attempted.

Context 1114 (Fill of pit 1113)

Sample AA (10 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Brown-yellow sandy clay with frequent stone inclusions.

A single fragment of rather heavily sediment encrusted, rectilinear charcoal (to 9 mm; 0.1 g) sorted from the sample residue by NAA was submitted and provisionally identified as slightly vitrified ash.

Context 1116 (Fill of pit 1115)

Sample AA (20 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Brown-yellow sandy clay.

Seven fragments of charcoal (to 5 mm; 0.1 g) sorted from the sample residue by NAA were submitted. All of the fragments were rectilinear and slightly sediment encrusted. The largest crumbled when identification was attempted and remained wholly indeterminate but the second largest was identified as vitrified oak. The five other fragments were all less than 4 mm in all linear dimensions and identifications were not attempted.

Context 1118 (Fill of pit 1117)

Sample AA (10 litres sieved to 500 microns with flot; no unprocessed sediment remains)

Sediment matrix: Brown-grey clayey silt.

A single fragment of slightly sediment encrusted charcoal (to 7 mm; 0.1 g) sorted from the sample residue by NAA was submitted. The fragment was partial roundwood (diameter to 3 mm) but, with no bark or waney edge in evidence, could only be said to represent one or more years of wood growth. It was slightly vitrified and certainly of a diffuse-porous species – perhaps alder/birch/hazel.

DISCUSSION

Only very small quantities of charcoal were recovered from the sediment samples – even the largest amounting to no more than 106 fragments (to 14 mm; 4.3 g) from a 10-litre sample from context **1105**. Preservation was rather poor with all of the fragments being sediment encrusted to some degree and, of 40 fragments examined, 14 were vitrified and only eight could be positively identified to species – six fragments of ash (*Fraxinus*) from context **1105** and two of oak (*Quercus*), one from each of contexts **1109** and context **1116**; the latter vitrified. Other partial/tentative identifications were of one fragment of alder/birch/hazel (*Alnus/Betula/Corylus*) from context **1112** and alder/birch/hazel from context **1118**; the single fragment from this deposit and the only roundwood fragment recorded and ash (one additional fragment from context **1105** and the single fragment from context **1114** – both vitrified). All of the other fragments examined were either very fragile (12 fragments crumbled, nine of which were from context **1105** – wholly indeterminate) or could only be identified as diffuse-porous (six fragments – three from each of contexts **1110** and **1112**) or ring-porous (eight fragments all from context **1105**).

In the past, a vitrified appearance to charcoal (as seen in some fragments from contexts **1105**, **1112**, **1114**, **1116** and **1118**) has been interpreted as indicative of high temperature burning (in excess of 1000 degrees Centigrade) but experimental work by McParland *et al.* (2010) suggested it is likely to reflect a more moderate charring temperature of 310-530 degrees Centigrade; easily achievable within a small domestic/campfire.

All of the identified charcoal was of native British species, presumably derived from locally available trees and representing trace/'background' levels of fuel waste within the deposits. The remains were too few and often too poorly preserved to be of any further interpretative value.

There were no remains recovered considered suitable for submission for radiocarbon dating of the deposits. The single piece of roundwood charcoal (from context **1118**) did not come from a concentration of charred material and this isolated fragment may well have been disturbed from its original point of deposition (by bioturbation, for example) so that any date returned could not be confidently extended to the deposit as a whole. The same is true of the small quantities of charcoal from the other six deposits and there would be the additional uncertainty caused by

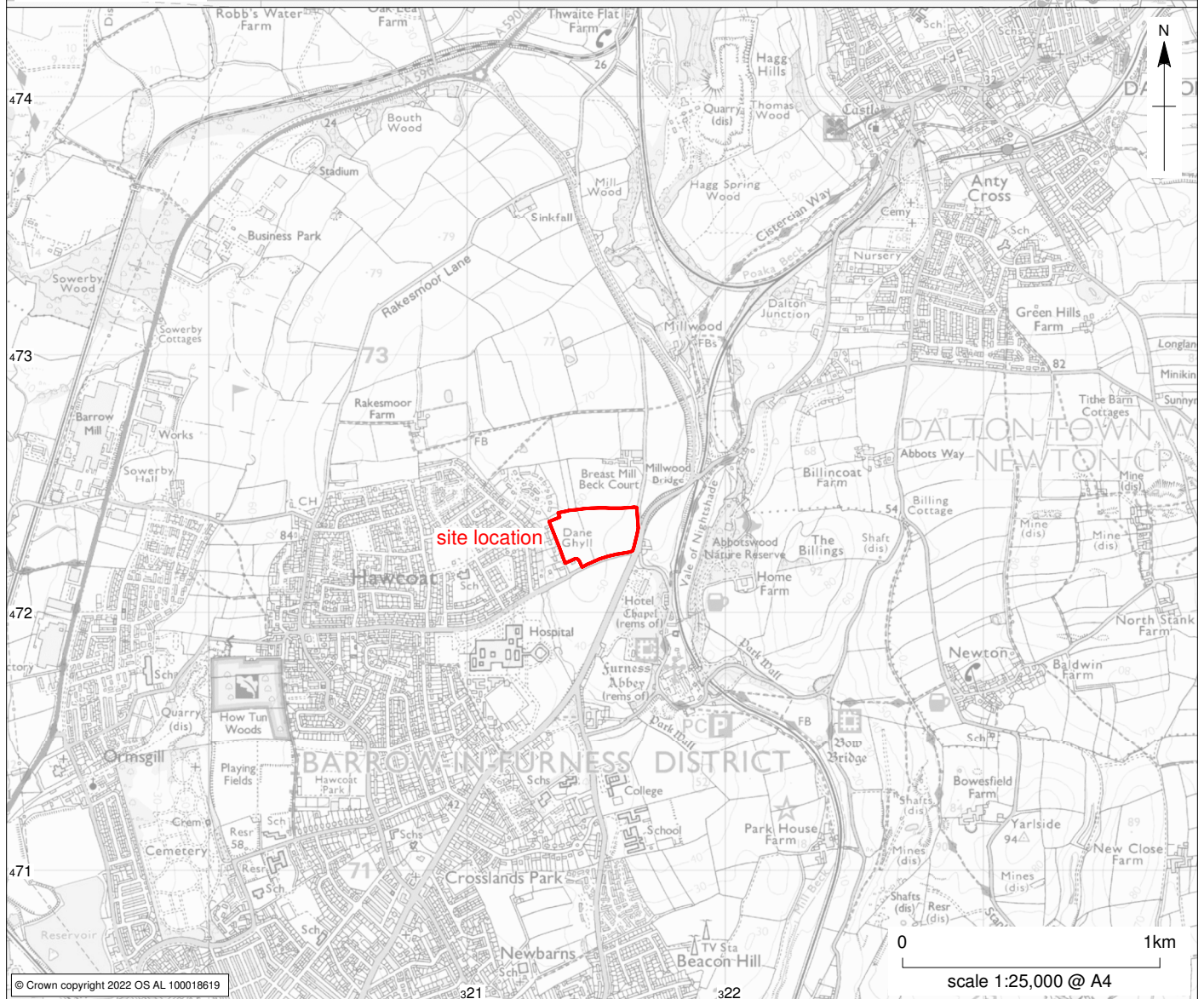
'old wood' problems – for example, the number of years of wood growth represented cannot be determined for rectilinear fragments which would mean that any radiocarbon date returned could be earlier than the date of deposition by an unknown number of years (potentially several hundreds in the case of long-lived tree species such as oak) as the carbon content is fixed at the time of the wood's growth not when it became charred.

RECOMMENDATIONS

The trace levels of charcoal recovered from the pit fills may be discarded as they are of no further interpretative value and, unfortunately, did not include any fragments considered suitable for submission for radiocarbon dating of the deposits. No further study of the charcoal reported here is warranted.

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Dalton Lane, Barrow-in-Furness: site location

Figure 1

