Furnace Hill,West Bar, Sheffield,

South Yorkshire

Archaeological Excavation Assessment Report

Oxford Archaeology North

November 2015

Ladson Group

Issue No: 2009-10/972
OA North Job No: L9985
NGR: SK 3524 8784

Document Title: **FURNACE HILL, WEST BAR, SHEFFIELD, SOUTH YORKSHIRE**

Document Type: **Excavation Assessment Report**

Client Name: Ladson Group

Issue Number: **2009-10/972**
OA Job Number: L9985
Museum Accession Number: **SHEFM:2008.20**
OASIS Number: **OXFORDAR2-231961**

National Grid Reference: **SK 3524 8784**

Prepared by:	Claire Gardner and Andrew Frudd	
Position:	Site Supervisors	
Date:	May 2008	
Checked by:	Richard Gregory	Signed……
Position:	Editor	
Date:	September 2009	
Approved by:	Rachel Newman	Signed……
Position:	Senior Executive Officer: Research and Publication	
Date:	November 2015	

Oxford Archaeology North
Mill 3, Moor Lane Mills
Moor Lane
Lancaster
LA1 1QD
t: (0044) 01524 541000
f: (0044) 01524 848606

w: www.oxfordarch.co.uk
e: info@oxfordarch.co.uk

© Oxford Archaeological Unit Ltd (2015)
Janus House
Osney Mead
Oxford
OX2 0EA
t: (0044) 01865 263800
f: (0044) 01865 793496

Oxford Archaeological Unit Limited is a Registered Charity No: 285627

CONTENTS

PLATES

TABLES

SUMMARY

Esharoth UK Ltd secured planning permission (06/04556/FUL) in 2006 to redevelop a site and construct residential apartments at the corner of Furnace Hill and Gibraltar Street in the West Bar area of Sheffield city centre (centred on NGR SK 3524 8784). Until then, the site housed a twentieth-century office and warehouse building, occupied by Sheffield Wholesale Linoleum Co Ltd. An archaeological desk-based assessment of the site was undertaken by Archaeological Research and Consultancy at the University of Sheffield (ARCUS) in June 2006, which concluded that potential below-ground remains of high local/regional significance might survive within the redevelopment area. The South Yorkshire Archaeology Service therefore recommended that a programme of intrusive archaeological investigation was implemented in advance of redevelopment.

On behalf of Esharoth UK Ltd, CgMs Consulting commissioned Oxford Archaeology North (OA North) to conduct the archaeological investigation prior to redevelopment. The overriding aims of this excavation were to provide a detailed record of below-ground remains and, in turn, to allow informed decisions to be made to the scope and form of any further archaeological work required at this site. Following the completion of on-site works, the development fell into abeyance, until the site was recently acquired by Ladson Group, which has commissioned the completion of this report.

The earliest archaeological remains uncovered during the excavation dated to the eighteenth century and were associated with a steel works owned by Samuel Shore, which is known to have occupied the site during this period. These remains were very fragmentary, but included a boundary wall, a cobbled yard, and the vestiges of brick walling. Although these remains were located, no structural features associated with Samuel Shore's cementation furnaces survived within the excavated area, although such features are known to have been present at this early steel works.

The majority of the remains uncovered by the excavation dated to the nineteenth century and included walling, flooring, and yard areas, which can be equated with features on nineteenth-century mapping. Of greatest significance was the discovery of a crucible furnace, which probably dated to the early to mid-nineteenth century. The main working elements of this furnace survived, comprising a furnace chamber, a chimney, flue system and ash pits, and a vaulted cellar allowing ash to be cleared from the furnace following firing. This furnace also contained a deposit of process residues, which have both archaeological and archaeometallurgical significance. Assessment of these residues has concluded that they merit further analysis; the outcome of the analysis will also enable recommendations to be made on the curation and possible future research potential of the residues recovered.

Following this analysis, and its reporting, it is also recommended that a short academic article is produced for publication in an appropriate academic journal. This article would detail the significant archaeological remains discovered at the site, present the results of the residue analysis, and place the excavated remains within their local and regional setting.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Paul Gajos, of CgMs Consulting, for commissioning and supporting the project on behalf of Esharoth UK Ltd, and also Ashley Ladson of Ladson Group, and Scott Hornby of ADS Structural Ltd. Thanks are also due to Dinah Saich and Jim McNeil of the South Yorkshire Archaeology Service (SYAS). Special thanks are expressed to Dr Rod Mackenzie for providing specialist advice on crucible furnace technology.

The archaeological excavation was undertaken by Andrew Frudd and Claire Gardner, assisted by Claire Burke, Matthew Weightman and Chris Wild. The report was compiled by Claire Gardner and Andrew Frudd, and the illustrations were produced by Marie Rowland. The assessment of the industrial process residues was undertaken by Rod Mackenzie, the finds have been reviewed and revised by Christine Howard-Davis, Finds Manager at OA North, and the environmental assessment was completed by Elizabeth Huckerby. The report was edited by Richard Gregory and Ian Miller, who was also responsible for project management, and quality assurance was provided by Rachel Newman.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 Esharoth UK Ltd proposed the redevelopment of a site at the corner of Furnace Hill and West Bar in Sheffield (centred on NGR SK 3524 8784). The archaeological significance of this area was highlighted in a desk-based assessment prepared in 2006 by Archaeological Research and Consultancy at the University of Sheffield (May 2006). This assessment concluded that there was moderate to high potential for below-ground remains of archaeological significance to survive on this site. In particular, it was considered that the buried remains of early eighteenth-century steel cementation furnaces may survive within the redevelopment area, which were probably the first such furnaces to be constructed within Sheffield.

1.1.2 In view of the results of the desk-based assessment, the South Yorkshire Archaeology Service (SYAS), in its capacity as archaeological advisor to the Local Planning Authority of Sheffield City Council, advised that any redevelopment should be accompanied by a programme of archaeological investigation. It was recommended that, in the first instance, the removal of the hard-surfacing and floor slab associated with the twentieth-century buildings on the site should be carried out under close archaeological supervision, and that the site should then be subject to a programme of archaeological stripping and subsequent recording.

1.1.3 In March 2008, CgMs Consulting produced a project specification, in consultation with SYAS (*Appendix 1*), detailing the exact requirements of the archaeological work. Oxford Archaeology North (OA North) was then invited to submit a fee proposal to undertake this work. Following the acceptance of the fee proposal, OA North was commissioned to carry out the work, which was completed between April and May 2008.

1.1.4 The development subsequently fell into abeyance, until the site was acquired by Ladson Group. This has triggered the completion of this report.

2. METHODOLOGY

2.1 PROJECT SPECIFICATION

2.1.1 A project specification was devised by CgMs Consulting, in consultation with SYAS, for an appropriate programme of archaeological investigation in advance of the proposed redevelopment (*Appendix 1*). The fieldwork undertaken followed the methodology outlined in the project specification, and was consistent with the relevant standards and procedures provided by the Institute of Field Archaeologists (now the Chartered Institute for Archaeologists) and their code of conduct (CIfA 2014a; 2014b).

2.2 AIMS AND OBJECTIVES

2.2.1 The main aim of the archaeological project was to characterise the level of preservation and significance of any archaeological remains surviving on the site, and to provide a good understanding of their potential. The specific objectives of the work were:

- to ensure, following the demolition of the above-ground structures, that the removal of hard-surfacing/floor slabs was conducted in a way that facilitated an archaeological investigation of the site;
- to assess the survival of any below-ground remains relating to the early cementation furnace so as to inform a decision on its full mitigation;
- to preserve by record any other significant archaeological remains within the proposed development area;
- to ensure the long-term preservation of the archaeological information by production and deposition of a report and an ordered project archive;
- to identify the range of industrial activities on the site pertinent to Sheffield's steel industry, particularly the production of steel using the cementation process, and the refining of steel using the crucible process;
- to identify the nature of any associated small-scale industrial activities, such as tool, blade and handle making;
- to place the site in a wider context through comparison with similar sites, both in Sheffield and further afield.

2.3 WATCHING BRIEF

2.3.1 Prior to formal excavation, an archaeological watching brief was maintained across the redevelopment area during the removal of the twentieth-century hard-surfacing and floor slab. The aim of the watching brief was to ensure that

no archaeologically sensitive deposits, or structures, were damaged during the final stage of the demolition work.

2.4 EXCAVATION

2.4.1 During the watching brief, the twentieth-century hard-surfacing and floor slab were removed using a mechanical excavator fitted with a toothless ditching bucket, operating under archaeological supervision. With the discovery of archaeological remains beneath these surfaces, the same machine was then used carefully to define the extent of any surviving walls, foundations, and other remains. Following this phase of mechanical excavation, all subsequent excavation proceeded manually. After consultation with SYAS, the structures recorded within this initial phase of excavation were removed, to allow for the excavation and recording of any earlier, underlying, archaeological remains.

2.4.2 All information was recorded stratigraphically on OA North *pro-forma* recording sheets, with accompanying plans and sections drawn at an appropriate scale. A photographic record, both of individual contexts and overall site shots from standard viewpoints, was undertaken with digital and 35mm SLR cameras on archivable black-and-white print film, as well as colour transparency. All of the photographs included a visible, graduated metric scale, and digital photography was also used extensively for presentation purposes throughout the course of the fieldwork.

2.4.3 The precise location of the trenches, and the position of all archaeological structures encountered, was surveyed by EDM tacheometry using a total station, linked to a pen map computer data-logger. This process generated scaled plans and sections which could be exported to AutoCAD, enabling manual survey enhancement. The drawings were generated at an accuracy appropriate for a 1:20 scale, and all information was tied into heights above Ordnance Datum (AOD).

2.5 FINDS

2.5.1 The recovery of finds was carried out in accordance with best practice, following current Institute of Field Archaeologists (IFA; now CIfA) guidelines (CIfA 2014c), and was subject to expert advice in order to minimise deterioration. Artefacts were principally collected by hand from archaeological deposits. Industrial residues and other finds, within the topsoil, were also collected and 100% of the slag was retained. Recovery and sampling programmes were in accordance with best practice, following current Historic England guidelines (English Heritage 2011), and were subject to expert advice.

2.6 ARCHIVE

2.6.1 A full professional archive has been compiled in accordance with the project specification (*Appendix 1*), and in accordance with current CIfA and Historic England guidelines (CIfA 2014d; English Heritage 1991; 2006). The paper and digital archive will be deposited with Museums Sheffield on completion

of the project, with a synthesis (in the form of an index to the archive and the report) deposited with the South Yorkshire Historic Environment Record. The archive has been prepared for long-term storage following the guidelines set out in *Environmental standards for the permanent storage of excavated material from archaeological sites* (UKIC 1984, Conservation Guidelines 3), and *Guidelines for the preparation of excavation archives for long-term storage* (Walker 1990).

2.6.2 It has been agreed with the recipient museum that the archive will be deposited with the following:

Museums Sheffield
Weston Park Museum
Western Bank
Sheffield
S10 2TP

2.6.3 Arrangements were made with the Museum prior to the commencement of the excavations for the deposition of the complete site archive, and the Museum Curator has acknowledged her willingness to accept the archive. An appropriate discard policy is to be agreed with the curator prior to deposition.

3. BACKGROUND

3.1 INTRODUCTION

3.1.1 An understanding of the archaeological and historical background of a site provides the local and regional context within which the extant structures and buried remains can be assessed archaeologically. The following section provides an outline of the natural setting of the redevelopment area, and summarises the historical development of Sheffield and its steel industry. A chronological account of the historical development of the study area is also included, which considers the evolving use of the site and concomitant patterns of occupancy.

3.2 LOCATION AND TOPOGRAPHY

3.2.1 The study area (centred on NGR SK 3524 8784; Plate 1) lies a short distance north of Sheffield city centre, on the south side of Furnace Hill at its junction with Gibraltar Street, in the West Bar area (Fig 1). The site is within an area of Sheffield which, historically, contained numerous steel furnaces and metal manufacturers, and upstanding buildings associated with several of these former sites are still evident, particular street names also revealing a link with this aspect of Sheffield's historic manufacturing base (May 2006). Indeed, one notable example is found in the street name 'Furnace Hill', which skirts the northern edge of the redevelopment site. This is thought to have taken its name from a cementation furnace that in the eighteenth century was located directly within the study area.

Plate 1: Aerial view of the site

3.2.2 Geologically, the bedrock within the redevelopment area is sandstone, laminated with thin bands of silkstone rock (Capita Symonds 2008). The topography slopes down towards River Don, to the east. Prior to the excavation, the redevelopment area contained a mid-twentieth-century office and warehouse.

3.3 THE DEVELOPMENT OF SHEFFIELD

3.3.1 There is minimal evidence for prehistoric and Roman remains within the boundaries of Sheffield, and hence it is difficult to determine the pattern and extent of prehistoric and Roman activity in this part of South Yorkshire (May 2006, 6). It would, however, be unlikely that any such material would be found on the site.

3.3.2 The town of Sheffield was founded in the twelfth century, forming part of the lordship of Hallamshire. Its form appears typical of other medieval settlements in the area, being dominated by a castle and church, around which the market town developed (*ibid*).

3.3.3 By the sixteenth century, Sheffield had expanded in size and was a major centre of cutlery production. By 1600, its reputation for the manufacture of cutlery was on a par with London, whilst by the mid-seventeenth century, the parish registers for this area indicate that three out of five men were employed as cutlers (Binfield and Hey 1997).

3.3.4 During the eighteenth century, the population of Sheffield increased dramatically in size, and there was an associated increase in industrial activity (Jones 1956a, 155). Roads were also improved during this period, and the River Don was made navigable, which facilitated a growth in trade. A further boost to cutlery manufacturing came in *c* 1750 with the invention of the crucible furnace, which enabled the production of higher-quality steel (Tweedale 1995). Unlike other industries, however, the growth in industrial activity did not lead to large-scale factories, as the cutlery trade remained in the hands of small firms.

3.3.5 Sheffield expanded considerably in the nineteenth century, and the town continued as a dominant centre of cutlery production. However, during this period, like other industrial cities in Northern England, it was an unsanitary settlement with a large, impoverished working-class population, which predominantly inhabited insalubrious and cramped living quarters. As a result, disease was commonplace and, in 1832, an outbreak of cholera killed 402 people (May 2006).

3.3.6 Over the course of the twentieth century, there was a general decline in heavy industry within Sheffield, which also saw a move away from manufacturing and a large-scale reduction in the production of cutlery. However, although these industries gradually declined, there was a concerted attempt to improve living conditions for the general population, particularly with the clearance of back-to-back slums in the early and mid-twentieth century. The latter part of the twentieth century and the twenty-first century have witnessed continuing attempts at redeveloping and regenerating large portions of the former industrial city (*ibid*).

3.4 SHEFFIELD'S STEEL INDUSTRY

3.4.1 Although production of steel did not begin in Sheffield until the introduction of cementation furnaces, just after 1700, the town had developed as a centre of cutlery production by the sixteenth century (Hey 2005). During this formative stage, steel was imported from Continental blast furnaces, such as those found in Spain, Germany and Sweden (Cranstone 1997). The proximity to waterpower and suitable millstone grit, which could be utilised as grinding stones, also allowed this trade to expand (Jones 1956b, 149), as did the economic absorption of associated transportation costs into the selling price of the products (Hey 2005).

3.4.2 With the introduction of the cementation furnace, it became possible to convert wrought iron into 'blister', or cementation, steel. This process involved the carburising of wrought iron, by sealing it in a stone chest with a carbon-rich mixture, largely charcoal, and heating it in a coal-fired cementation furnace (Jones 1956a, 155; Cossons 1987, 126). This process was normally undertaken over an extended period of time, with the furnace heated to 1000^{o}C, and maintained at this heat for approximately one week. After a week, the fire was extinguished and the furnace was left to cool for several days. Following the removal of a vitrified crust, known colloquially as 'crozzle', the metal bars were then removed. This protracted process resulted in the absorption of carbon into the surface of the bar, creating steel 'blisters' which, in turn, gave rise to the term 'blister steel' (Cranstone 1997). However, although, through cementation, the surface of the bar contained a high carbon content, its interior remained unaltered and was still composed of wrought iron. A further enhancement process was therefore required, whereby 'blister steel' bars were bundled, heated and then struck by a forge hammer, which welded the bars together to produce 'shear steel' (Jones 1956a, 155). If higher-quality steel was required, this process could be repeated to produce 'double shear steel' (Cossons 1987, 126). The forging process was facilitated through the use of tilt hammers, which were often water powered, and this valuable source of power was also used to drive the grinding wheels associated with the manufacturing of steel tools and other implements (Tweedale 1995). However, the majority of craftsmen engaged in these processes during this period worked as independent small-scale producers, and large-scale production was not generally the norm (Jones 1956a, 155).

3.4.3 Cementation proved extremely successful, and by the Victorian period Sheffield had approximately 260 operational cementation furnaces (Hey 2005). These furnaces were distinctive in form and were characterised by a bottle-shaped cone superstructure. The cementation furnace typically contained two chests, arranged on either side of a fire hole, which enabled one furnace to be heated, whilst the other cooled and was reloaded, thereby doubling production at any one time (Tweedale 1995).

3.4.4 The discovery of the crucible method of making steel dates to *c* 1750, and is attributed to the Doncaster clockmaker Benjamin Huntsman, who required high-quality steel in order to produce small clock springs (Tweedale 1995).

Initially, this process involved the breaking of 'blister steel' bars into small pieces, which were often mixed with iron and scrap. These fragments were then mixed with various fluxes and melted in a small closed clay crucible, which was heated by coke contained within the crucible furnace (Jones 1956a, 156; Cranstone 1997). Structurally, this type of furnace usually consisted of a chamber lined with refractory brick, whilst the top of the furnace was also sealed by refractory bricks, which were 'level with the floor of the melting house' (Cossons 1987, 128). Apart from the chamber, a vaulted cellar was also often associated with the furnace, which allowed access to the ash pits, and facilitated a through-draught. The resultant steel produced by this technique had a high carbon content and, when molten, could be poured from the crucible to form ingots, which could then be hammered or rolled (Barraclough 1976).

3.4.5 The crucible method proved so effective that it remained the dominant form of steel production until the Bessemer process of steel manufacturing became widespread in the late nineteenth century (Hey 2005). Steel produced by the Bessemer process became widely used in the railway and ship-building industries (Jones 1956a, 157), though crucible steel was still produced well into the 1950s for specialist uses, particularly those associated with the production of armaments (Tweedale 1995).

3.5 SITE HISTORY

3.5.1 Prior to the eighteenth century, the study area probably lay within a swathe of agricultural land surrounding the post-medieval town of Sheffield; a survey of the manor of Sheffield of 1637 suggests the site fell within a meadow lying to the west of West Green Bar (May 2006, 7).

3.5.2 However, by the time of the publication of Gosling's map of Sheffield, in 1736, it is apparent that a building had been constructed within the study area. Documentary sources indicate that this was likely to have been Samuel Shore's 'steele (*sic*) house', which had been established by 1716 and probably contained the first cementation furnace to be built in Sheffield (May 2006). This is confirmed by the account of an early eighteenth-century Swedish engineer, who visited Sheffield in 1720, and noted that there were two steel-production sites in the town, one of which was run by Shore (Barraclough 1984, 69-80). Moreover, the location of Shore's production site can be seen on a 1737 illustration of Sheffield, which shows two bottle-shaped furnaces positioned within the redevelopment area (May 2006, 7). It is also possible, based on documentary evidence, that the site was expanded in the 1750s and possibly also the 1760s, with the construction of additional furnaces (*op cit*, 9).

3.5.3 In 1775, a detailed plan of the 'Steel furnace and yard belonging to Sam Shore Esq' was produced, which shows its position adjacent to West Bar and an intended street, which would later be named Furnace Hill (Williams 2003, 84). This plan plots the position of an L-shaped building fronting West Bar, with the furnaces presumably located within a long range at the back of this building. At the north of this structure, the plan also plots the positions of four

possible buttresses, which may have supported the conical shells of the furnaces.

3.5.4 A map of Sheffield dated 1808 demonstrates that Furnace Hill had been established by that date and, within the study area, this street was probably lined with a series of late eighteenth- or early nineteenth-century properties. However, it is likely that by this date steel production at Shore's site had ceased, particularly as there are no documentary references to the furnaces from 1779 onwards (May 2006, 9). The steel works had certainly fallen into disuse by 1828, as a plan of the site contained in a document of sale prepared by Parker, Shores and Co, which was in the process of selling the site to Thomas Gatley, indicates that the furnaces had been demolished (*ibid*). Following demolition, the vacant plot was redeveloped in the mid-nineteenth century, the form of this redevelopment being depicted on the Ordnance Survey (OS) map of 1853. This map shows that a series of properties had been constructed fronting West Bar, which contemporary trade directories indicate functioned both as domestic dwellings and commercial concerns (May 2006, 10). The 1853 map also plots the position of a yard, and several smaller buildings occupying this yard, which may have formed workshops or dwellings (*ibid*). A public house, named The Grapes Inn, was also constructed in the 1830s, which stood at the north-western corner of the study area (*ibid*).

3.5.5 By the time the 1905 OS map was compiled, West Bar had been widened for tram access, which resulted in the demolition of the buildings fronting West Bar (May 2006). Further demolition of the nineteenth-century buildings occurred between 1905 and 1923, though the Grapes Inn remained into the 1970s. During the late 1950s, an office and warehouse for 'Sheffield Wholesale Linoleum Co Ltd' were constructed (*ibid*), which were demolished immediately prior to the archaeological excavation.

4. FIELDWORK RESULTS

4.1 INTRODUCTION

4.1.1 The excavation revealed well-preserved archaeological deposits, extending to a maximum depth of 3.51m, which represented a sequence of structural remains dating from the eighteenth to twentieth centuries. This structural sequence was invariably complex, particularly as those remains dating to later phases of activity often obscured and, in many places, destroyed those remains forming elements relevant to the early history of the site.

4.1.2 The archaeological investigation initially aimed to 'strip and record' the entire area of the site (*c* 770m^2; Fig 2), but due to the presence of a modern building immediately adjacent, it was not possible to examine the western extent of the redevelopment area. The archaeological remains relating to the early nineteenth-century public house (*Section 3.5.4*) had also been destroyed during the insertion of a twentieth-century lift shaft and fuel tank.

4.1.3 Given these circumstances, the archaeological investigation concentrated on an area measuring some 420m^2 in the central part of the site. However, whilst archaeological remains were present in this area, large numbers of twentieth-century concrete stanchions, beams and reinforced concrete walls inhibited excavation in certain places.

4.2 EXCAVATION RESULTS

4.2.1 The excavation uncovered three main phases of activity within the redevelopment area, which fit comfortably with the known history of the site, as discerned from the cartographic and documentary sources (*Section 3.5*). The *in-situ* archaeological remains were characterised by: brick and stone walls, forming the remains of buildings; boundary walls and subterranean vaults; floor and yard surfaces composed of cobbles, stone setts and flags; and also the truncated remains of a nineteenth-century crucible furnace.

4.3 PHASE 1: EIGHTEENTH-CENTURY ACTIVITY

4.3.1 The earliest archaeological remains encountered during the excavation dated to the eighteenth century, and relate to a wider process of industrial expansion and urban growth in Sheffield, which characterises this period (*Section 3.3.4*). The remains dating to this phase, although fragmentary and infrequent, included the vestiges of a yard associated with Samuel Shore's steel works, brick walls, and a sandstone boundary wall.

4.3.2 A sandstone wall (***157***; Fig 3) was discovered at the northern edge of the excavation trench, which survived to a maximum height of 0.8m, and was *c* 5.5m long and *c* 0.5m wide. The stones used to construct the wall were roughly hewn, varied in size, and were bonded with a brownish-yellow mortar. The position of this wall can be matched to a boundary wall depicted on the

1775 plan (*Section 3.5.3*), which clearly formed part of Shore's steel works. To the west, another wall (***165***) seems to have formed the western return. This boundary wall later became incorporated into the design of the nineteenth-century structures that were constructed on this part of the site.

4.3.3 To the south of this wall, the patchy, and heavily disturbed, remains of an eighteenth-century yard (***189***, ***201*** and ***235***) were discovered (Plate 2), which were originally also part of Samuel Shore's works. Only small areas of this yard survived, which together covered approximately 2.98m^2. The yard was identified at a height of 52.19m above Ordnance Datum (aOD), and was composed of variously sized river cobbles.

*Plate 2: Eighteenth-century cobble surface (***235***) (foreground), which was cut by Room* **231** *(background)*

4.3.4 Two brick walls (***135*** and ***136***) were also discovered close to the southern margins of the excavation trench, which stratigraphically appeared to date to the eighteenth century; the positions of these walls also do not correspond closely to any of the walls plotted on the nineteenth-century mapping. Walls ***135*** and ***136*** were both two courses thick, and were constructed of handmade brick bonded with a lime-based mortar, typical of eighteenth-century construction. No remains that could be identified firmly as structural evidence for Shore's cementation furnaces were encountered, however.

4.4 PHASE 2: NINETEENTH-CENTURY ACTIVITY (POST-1828)

4.4.1 The cartographic and documentary sources suggest that the eighteenth-century steel works had been demolished by 1828, and the area of land given over to the construction of several nineteenth-century buildings and structures (*Section 3.5.4*). Many of the walls and surfaces associated with these features were uncovered during the excavation, since their positions correspond closely to the buildings plotted on the 1853 (Plate 3) and 1890 (Plate 4) OS maps. These nineteenth-century remains have been subdivided, on the basis of function, into a number of categories.

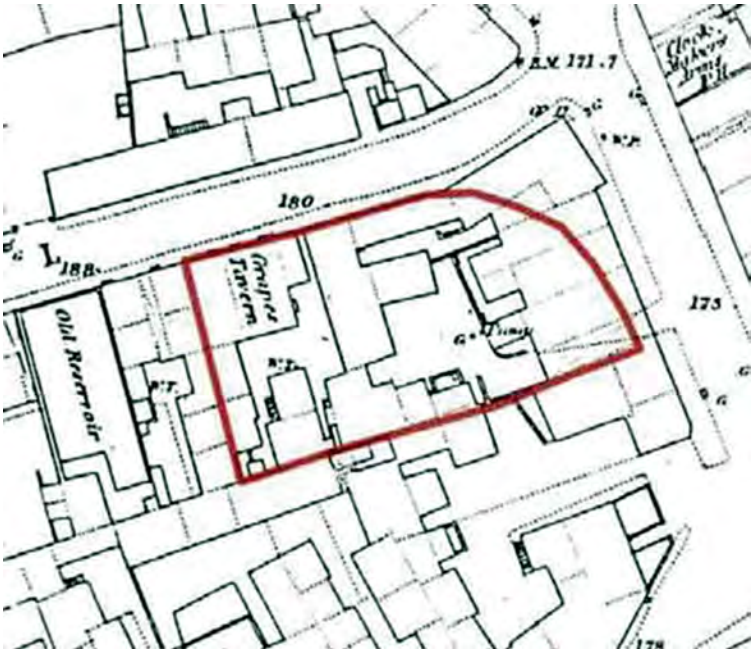

Plate 3: Extract from the 1853 OS map, showing the development of the site

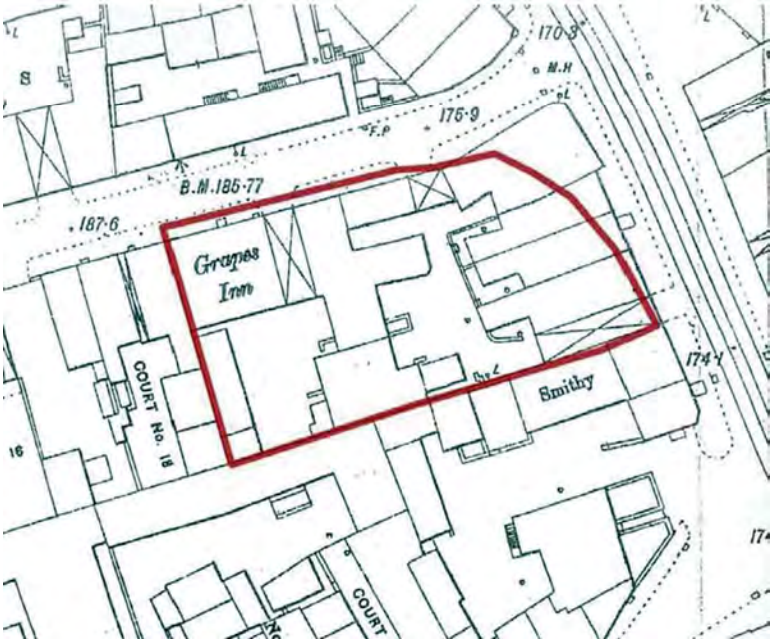

Plate 4: Extract from the 1890 OS map, showing the development of the site since 1853

4.4.2 The remains of a crucible furnace were discovered in the south-west part of the excavation trench. Significantly, the existence of this furnace was unknown prior to the excavation. Although this structure had been heavily disturbed at its western and southern ends, the elements which survived characterised the form and workings of this type of furnace (Plate 5). These elements included a brick-lined chamber, ash pits, a chimney stack (***173***), and a vaulted cellar (***180***), which allowed access to the ash pits (Fig 4).

Plate 5: The nineteenth-century crucible furnace after initial cleaning, the flagstones marking the positions of the ash pits

4.4.3 The surviving chamber of this furnace was 1m wide, and was defined on its southern side by the chimney (***173***) and on its northern side by a wall (***169***) constructed of refractory brick, which at its eastern end was two courses thick, widening to three courses in thickness to the west. The base (***172***) of the chamber was also built of refractory bricks, and contained three ash pits (***220***), spaced *c* 0.4m apart. Although one of these, on the western side of the furnace, had been disturbed, the remaining two each measured *c* 0.4 x *c* 0.8m. After the final firing of the furnace, these pits had all been capped with stone flags. The capping stones were all stained with soot on their undersides, which suggests that the slabs were placed above the ash pits when the furnace still contained hot ash.

4.4.4 The chimney stack (***173***), of which only a portion of the base survived, was found immediately south of the furnace chamber, which defined its northern edge (Plate 6). This chimney was constructed of refractory bricks, and the northern face, which formed the southern side of the furnace chamber, was heat-affected, particularly in two areas which aligned with the ash pits, and the surviving chimney flues (Plate 7). Indeed, these vitrified patches appear to have been caused by a heat source located above the ash pits. There were two

flues (***273*** and ***174***) visible in the chimney stack, which were each *c* 0.4m^2, and were aligned on the two complete ash pits discovered within the furnace chamber. It was found that flue ***273*** was filled with red/purple degraded brick and lumps of fuel slag, whilst flue ***174*** had been blocked with consolidated fuel slag and badly degraded lumps of refractory brick, which would probably have rendered the flue unusable.

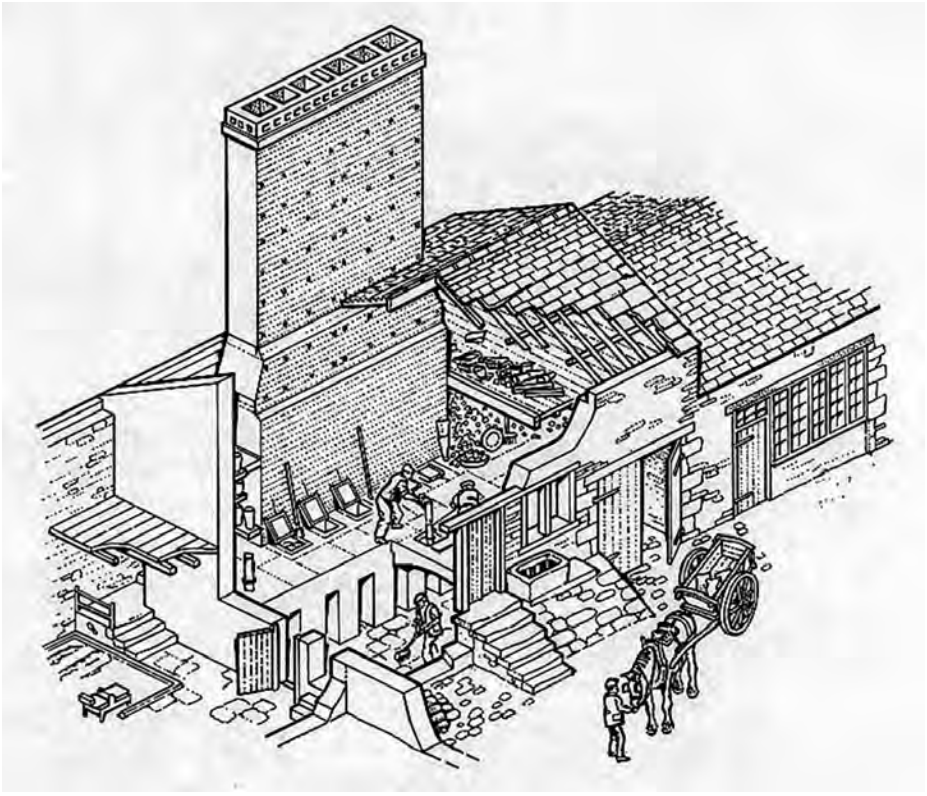

Plate 6: Reconstruction of the crucible furnace at Abbeydale Industrial Hamlet, Sheffield (© English Heritage)

Plate 7: South-facing view of the furnace chamber, with chimney stack **173** *behind, and vitrified brickwork*

4.4.5 Cellar ***180*** lay beneath the furnace and could be accessed through a doorway in east wall ***170***, which was supported by an iron lintel. The chamber had been cut into the natural bedrock and had a barrel-vaulted brick ceiling sprung in a north-south direction. The ceiling of the vault had been badly damaged and was unstable, so it was impossible to excavate its interior completely. The function of this chamber was to enable the removal of the ash from the furnace and it would also, along with the chimney, allow air to draw through the furnace.

4.4.6 Immediately to the north of the ash pits, beneath a flag surface (***166***; Fig 5), a brick wall (***253***) was excavated in the position of a wall of a building plotted on the nineteenth-century OS maps (Plates 3 and 4). This formed part of an L-shaped building, which clearly housed the crucible furnace, and this can now be interpreted as having been engaged in steel production. A surface of stone setts (***167***) was also found beneath later surface ***166***, which butted against, and was probably contemporary with, wall ***253***.

4.4.7 Room ***181*** adjoined the L-shaped building to the east, though its interior could not be fully excavated due to the presence of a twentieth-century concrete raft and stanchion. The room was 2.9 x 3.3m internally, defined by walls of handmade brick (***170*** and ***176***) and stone (***178*** and ***179***) and had been cut into the natural bedrock. Its function was not obvious, but it may be tentatively interpreted as a 'puddling room', where clay could be 'puddled' in order to make the crucibles, which could then be placed within the furnace. This might, in turn, explain the natural stone being used to floor this room.

4.4.8 Adjoining Room ***181*** to the east was a series of fragmentary two-course-high brick walls (***124***, ***125***, ***126***, ***128***, and ***130***), which matched the outline of another building plotted on the nineteenth-century OS maps (Plates 3 and 4). Although, from the excavated remains, it was not possible to discern the function of this room, these features defined its exterior walls and also formed the remains of at least two internal dividing walls. The remains of a flagged stone floor were also located within it (***129***).

4.4.9 Other excavated structures of significance, which date to this phase, but the position of which is not plotted on nineteenth-century mapping, include three subterranean brick-built vaults. One of these (Room ***200***; Fig 3) lay beneath a flag surface (***118*** and ***161***; Fig 5), *c* 2.2 x *c* 3.4m in plan, and was constructed of two-course-thick walling (***192***, ***246***, and ***249***), which supported a barrel-vaulted roof (***193***) (Fig 3; Plate 8). The visible brickwork also indicated that at some stage the western side of this structure had been rebuilt (rebuilds ***247*** and ***248***), whilst the eastern side of the vault was capped with stone (***191***). Internally, both the walls and the floor of the vault had been rendered with concrete. Although there was no access into the vault, a small square opening (***140***), 0.38m wide, was discovered in the flags overlying the vault. Moreover, the 1853 OS plan plots the position of a water pump in this position (Plate 3), which may suggest that the underlying vault functioned as a water cistern, supplying water to the adjacent houses. A curved brick wall (***123***; Fig 5) was located to the south of the vault, which is also identifiable on both the 1853 and 1890 OS maps (Plates 3 and 4), and this perhaps related to drainage in this part of the yard.

Plate 8: The barrel-vaulted chamber (Room **200***) after excavation*

4.4.10 Two other subterranean vaults were also found during the course of the excavation (Rooms ***190*** and ***231***; Fig 3). One of these (Room ***190***) was located beneath a cobbled yard within the central part of the excavation trench. It had similar dimensions to the putative water cistern (Room ***200***), *c* 2.2 x *c* 3.4m, and was constructed of two-course-thick brick walling (***202***, ***205***, ***206*** and ***209***), though very little of the barrel-vaulted roof of this structure remained intact. Based on its locational and structural similarities with the other vault found in this part of the site, it is possible this also functioned as a water cistern.

4.4.11 The third vault was located close to the western margins of the excavation trench (Room ***231;*** Fig 3; Plate 9). Again, this structure was constructed of two-course-thick brick walling (***233***) supporting a brick vault (***232***), and nineteenth-century OS mapping indicates that it was positioned within a T-shaped building. As only a small portion of this vault was exposed, however, it was impossible to determine its full dimensions or, indeed, its function, particularly as the interior of the vault had been filled with concrete.

Plate 9: Vault (Room **231***) with the roof and wall partially removed to reveal its concrete filling*

4.4.12 Apart from the three vaults a stone-lined drain (***187***/***188***), capped with flagstones, was also found to lie beneath the cobbled yard in the central part of the excavation trench (Fig 3). This drain was *c* 1m wide and was sandwiched between the two vaults which may have functioned as water cisterns (Rooms ***200*** and ***190***). Its diverging alignment suggests that it served properties fronting West Bar, and its relationship with Room ***200*** indicates that it was inserted prior to the construction of that structure. At a later date, the drain appears to have been refurbished, as a ceramic drain (***184*** and ***185***) was inserted along its course. A second, comparable, stone-lined drain (***102/113***; Fig 5), which perhaps linked to drain ***187/188*** in the yard area, was also discovered close to the south-eastern corner of the trench.

4.4.13 Two adjacent cellars (***100*** and ***101***) were excavated along the eastern edge of the site, which originally lay beneath the early-mid-nineteenth-century properties fronting West Bar (Fig 5). It is known from nineteenth-century trade directories that these properties acted as commercial concerns housing a pawnbroker, currier and ironmonger from the 1840s until the beginning of the twentieth century (May 2006, 10, appendix 2). However, no evidence that could have related to these professions was associated with these cellars and it was clear that the structures were levelled by the turn of the twentieth century, and backfilled with furnace waste from steel making.

4.4.14 Both of the cellars (***100*** to the north and ***101*** to the south) were found to be very similar in design and construction (Plate 10). They were both defined by

c 0.5m-thick sandstone walls (***104***, ***106***, and ***110***), cut into bedrock, and each had a barrel-vaulted brick-built roof. Although the vaulting in both cellars had been destroyed, it was evident that the vault originally sprang 1.24m above the floor of the cellars. This floor (***107***) was composed of sandstone flags and the interior of the cellars had been painted with a white/grey limewash.

Plate 10: Cellar **100***, with staining visible on the wall*

4.4.15 Access to the cellars was also gained in a similar way, via a flight of stairs in the north-western corner of each basement room. The stairwell to cellar ***100*** was rectangular, with a width of 0.75m, and was constructed from handmade bricks and five triangular stone steps (***105***), with a rectangular slab at the top of the flight. The entrance to cellar ***101*** was wider, measuring 1m across, and had a curved structure, with seven steps. The building materials employed to construct these stairs were identical to those used in the adjacent cellar.

4.4.16 The full extent of the cellars was not be excavated, as the eastern portion was beneath a modern pavement flanking the site. The excavation did, however, indicate that cellar ***101*** had an internal width of 4.35m, whilst cellar ***100*** was narrower, with an internal width of 3.75m.

4.4.17 Several internal features were also present within the cellars. In cellar ***100*** these included a partition wall aligned north/south (***132***), with a *c* 0.7m-wide doorway. This partition wall created a *c* 5.4 x 3.75m basement room at the rear of the property fronting West Bar. In cellar ***101***, two largely demolished walls protruded from the southern wall (***110***), which may have acted as supporting buttresses. A stained patch was also observed at the centre of the western wall of cellar ***100***. Although it is not entirely clear what this staining may represent, it is possible that it might mark the position of a coal chute.

4.4.18 To the west, immediately behind the early-mid-nineteenth-century buildings fronting West Bar, a small area of setts, flags, cobbles, and brick walling was exposed (Plate 11), which probably formed the remains of outshuts and an enclosed yard associated with these buildings. The positions of these features can be seen on both the 1853 and 1890 OS maps (Plates 3 and 4), but the features exposed by the excavation only covered an area of 8.25 x 2.3m, since much had been destroyed by later activity. This later phase of activity also obscured the relationship between the cellars and the outshuts. Only a small portion of brick walling (***159***), forming the western end of two of the outshuts, was present and, within the interior of these structures, a stone-flagged floor (***160***) was discovered.

Plate 11: Yards and outshuts to the rear of the buildings fronting West Bar

4.4.19 To the west of the outshuts, a two-course-thick brick wall (***192***) was identified, which enclosed the yards at the rear of the buildings fronting West Bar (Plate 8). This yard was composed of stone flags and setts (***118*** and ***161***).

4.4.20 The 1853 (Plate 3) and 1890 (Plate 4) OS maps also depict a communal yard situated to the rear of, and between, the nineteenth-century buildings. The excavation exposed a 9 x 7.5m swathe of cobbles (***116***; Plate 12), which had been laid on a black ashy bedding deposit. Other surviving parts of this yard were composed of stone setts (***117***), whilst one small portion of the yard was constructed of stone flags (***152***). Several *in situ* kerbstones were also associated with this flagged surface, indicating that a walkway had been constructed to the rear of the buildings fronting West Bar.

Plate 12: The central yard

4.5 PHASE 3: TWENTIETH-CENTURY ACTIVITY

4.5.1 In the 1950s, an office and a warehouse had been constructed within the redevelopment area (May 2006). These buildings were not considered to be of archaeological significance and hence their demolition had occurred prior to the archaeological investigation. During the excavation, a large concrete slab forming the floor of these buildings was removed under archaeological supervision, and it became clear that these buildings had destroyed much of the earlier below-ground remains within the western part of site. A modern drain, incorporating the eighteenth/nineteenth-century drainage system, was, however, encountered towards the north-east of site. The location of this modern feature was noted.

5. FINDS

5.1 INTRODUCTION

5.1.1 In total, 1490 artefacts and ecofacts were recovered from the excavation (Table 1). The finds generally derived from dumps of material which had been deposited at different stages in the site's development, although the date range of the material, predominantly in the early nineteenth and twentieth centuries, with very few earlier fragments, suggests that this particular area was not occupied prior to the construction of Shore's steel works (*Section 3.5.2*) and little material culture was deposited during its lifetime. The majority of the finds were recovered from disturbed deposits, for example demolition material, and in particular the backfills of vaulted structures such as room ***200*** (fill ***251***) and the furnace (eg ***269***, in ash pit ***220***), which produced, *c* 60% (892 fragments) of the total finds assemblage. The remaining 40% was recovered from levelling layers, and from the backfill of wall- and construction trenches. A summary catalogue of the finds is appended as *Appendix 3*.

Material type	***Personal***	***Domestic***	***Industrial***	***Unidentified***	***Quantity***
Pottery		871	1		872
Clay tobacco pipe	50				50
Copper alloy	3	2	6	5	16
Iron		8	4	21	33
Lead				9	9
Glass - window		9			9
Glass - vessel		201			201
Industrial residue			107		107
Furnace furniture			21		21
Ceramic pipe		19			19
Ceramic building material		6	1		7
Other building material		4			4
Worked bone	1				1
Leather	12				12
Animal bone		109			109
Shell		22			22
Total	***66***	***1251***	***138***	***35***	***1490***

Table 1: Quantities of material types

5.2 POTTERY

5.2.1 In total, 872 fragments of pottery, dating from the eighteenth to the early twentieth century, were recovered from the site. The assemblage was dominated by utilitarian dark-glazed red-earthenware coarseware vessels, such as pancheons, storage jars, bowls, dishes, and a single jug, with, in addition, large numbers of grey-bodied stoneware jars, and there were also significant

quantities of both plain and transfer-printed white earthenwares, coming particularly from backfill ***251*** in Room ***200*** and the fill (***269***) of the furnace ash pits.

5.2.2 Earlier eighteenth-century pottery was not common on the site, there being four small body fragments from blackware tablewares, and a single badly abraded fragment from a slip-trailed dish, its red body suggesting that it is possibly a South Yorkshire product (Cumberpatch 2004), although the local sources for such pottery produced during the eighteenth century remain poorly understood (*ibid*) and it could be from further afield. All were from drain ***187***, fill ***197***. The later eighteenth- or early nineteenth-century is represented, in the same context, by sherds of creamware, and Derbyshire-type brown stonewares. A single thumbed rim-fragment from a dark-glazed storage vessel, probably residual in demolition layer ***145,*** could be of late seventeenth- or more likely, early eighteenth-century date, although, again, the local sources for such fabrics are poorly understood (*ibid*).

5.2.3 The remainder of the assemblage is dominated by mid-to-later nineteenth- and twentieth-century fabrics. Perhaps the most frequently represented of these are modern stonewares (produced *c* 1830 – *c* 1940; Cotter 2011), principally the grey- and light brown-bodied straight-sided jars widely used, amongst other things, for jams and pickles. Most from the site are of 1lb size, and many bear the name of WP Hartley, a well-known jam manufacturer. Bases bear the words 'WP Hartley', and 'Aintree' about a lighthouse, and below the lighthouse, 'Trade Mark regd' (Plate 13). Hartley opened his Aintree factory in 1881, and production continued there until *c* 1920 (www.thepotteries.org), although after 1900 the jars bore the words 'Liverpool and London' rather than Aintree (Cotter 2011). Other Hartley's jars bear the statement 'Not genuine unless bearing WP Hartley's label', current throughout the same period. There is a single white earthenware 2lb jar, from backfill ***251***, printed with the name Castell and Brown, a London-based marmalade manufacturer, extant by 1844, when it was advertising its products in *The Lancet*, but it was bought out by Charles Cocks & Co of Reading in the 1880s (Corley 1979-80). Other modern stonewares from the site include small numbers of small bottles, jugs of various sizes, and a range of pie dishes and cooking pots (see especially backfill ***251***). A small, wide-necked bottle from ***251*** may have contained charcoal dust, used for cleaning moulds in foundries (Ure 1842, 522).

Plate 13: Base mark from a Hartley's jam jar from backfill **269**

5.2.4 Refined white earthenwares, often underglaze transfer-printed, comprise another well-represented fabric in the assemblage. Backfills ***251*** and ***269***, especially, produced a large number of fragments, mainly tablewares, bearing blue and black transfer-printed designs, all of which seem most likely to date after the middle of the nineteenth century. Several are marked; a plate in the pattern Lucerne, produced by JWP & Co (JW Pankhurst, in production 1850-82 (www.thepotteries.org)), came from ***251*** (Plate 14). A plate, stamped Ironstone, with the backstamp TGG, from the construction trench (***222***; fill ***223***) for wall ***178***, has been tentatively identified as a product of TG Green & Co Ltd, a South Derbyshire producer, 1864-2001 (www.gresleypottery.uk). A creamware vessel, perhaps a gravy boat, is stamped Minton, and can be dated to 1862-71, the restricted period when this stamp was used (www.thepotteries.org/mark/m/minton). A vessel from ***269***, manufactured by GM or CM, and decorated with a pattern called Poonah, has not been attributed to a recognised maker, but it is likely to be of similar date. The fragment of stamped 'ironstone' is in a fabric patented by Mason in 1813 (Coysh and Henrywood 1982), but as the piece also has a printed mark, it is probably appreciably more recent. A fragment by the maker Dunn Bennett and Co, naming the place of production as Burslem, can be dated to after 1887, and is probably far more recent, the company remaining in production until 1983 (www.thepotteries.org/mark/d/dunnbenn).

Plate 14: Transfer-printed pottery from backfill **251** *in the Lucerne pattern*

5.2.5 Forms represented amongst the transfer-printed whitewares include plates, bowls, dishes and mugs, along with chamber pots, in a variety of patterns, including Asiatic Pheasants (popular in the second half of the nineteenth century; Coysh and Henrywood 1982; Plate 15), Willow (widely used from the early nineteenth century; *ibid*), Broseley, and Sea Leaf, in addition to several more unusual designs. A few fragments show the use of the 'flow blue' technique, introduced in the second quarter of the nineteenth century (Snyder nd). Other fine tablewares include small amounts of English porcelain, black basaltes, and an elaborate but poorly finished 'clobbered' black transfer-printed jug, with a chinoiserie-influenced pattern, and a handle in the form of a stylised dragon. There were also appreciable quantities of late industrial slipwares, mainly cups and bowls, and late yellow wares (also popular in the later nineteenth century; Cotter 2011).

Plate 15: Transfer-printed pottery from backfill **251** *in the popular pattern 'Asiatic Pheasants'*

5.3 CLAY TOBACCO PIPES

5.3.1 In total, 50 fragments of clay tobacco pipe were recovered from the site. These included only 11 bowls, of which five were decorated and one stamped. All were examined with reference to White 2004.

5.3.2 Seventeenth- and early eighteenth-century pipes are comparatively rare in Sheffield (White 2008, 37), and this excavation proved no exception, the earliest datable examples being of late eighteenth-century date at the earliest. Two spurred bowls, both with leaf-decorated seams, came from construction trench ***222*** (fill ***223***) for wall ***178***. Leaf-decorated seams are very common from the late eighteenth century on (Higgins 2009) and these examples can be compared with examples from Riverside Exchange, Sheffield (White 2015, fig 14, nos 25, 27), dated *c* 1810-50). A very poorly moulded bowl from backfill ***260*** is possibly of similar date, but the design is so poorly formed that it is effectively unintelligible.

5.3.3 An undecorated bowl from ***260*** is probably also of late eighteenth- or early nineteenth-century date. The four undecorated bowls from backfill ***251*** are generally dated to the second half of the nineteenth century, and reflect the trend towards shorter stems (cutty-style pipes) from about 1850 onwards (Higgins 2009, 43). The only stamped bowl, also from ***251***, is in the Irish style, stamped Dublin, in an oval border facing the smoker (see for instance White 2015, fig 15, no 37, dated *c* 1840-1910). A decorated bowl from backfill ***269*** is of nineteenth-century date, as is an undecorated example from the same context.

5.3.4 The stems were all undecorated, and narrow-bored fragments outnumbered medium- and large-bored examples. This suggests that narrow-bored pipes were being used during the lifetime of the crucible furnace.

5.4 COPPER-ALLOY OBJECTS

5.4.1 In total, 16 copper-alloy objects were recovered. The material was generally in a reasonable condition, although two objects remained unidentified as a result of heavy corrosion. Of the identified objects, five were pieces of amorphous scrap, such as fragments of pipe, nails, and wire, which might have derived from the crucible furnace, or, more likely, were amongst material dumped on the site at a later date. The remainder comprised a small buckle, a bicycle-bell cover, and internal components of a clockwork mechanism, which all probably dated to the later nineteenth or early twentieth century.

5.5 IRON OBJECTS

5.5.1 In total, 33 fragments of iron were recovered. Of these, four were too fragmentary and heavily corroded for identification; the lack of diagnostic features established that there was little to be gained from x-raying them. The identifiable objects were mostly fragmentary structural items, and tools deriving from the backfills of furnace-related contexts such as the ash pits

(***269***), vaulted room ***200*** (***251***), and the backfill of a brick structure (***153***) that may have been associated with the crucible furnace. They included a gas meter from chimney flue ***273***, components from a fire surround, several heavy bars, a clamp, a square-sectioned ring, brace, rods, a curved strip, nails, cast-iron pipe and a chisel. In addition, a single horseshoe was recovered from ash pit fill ***269***.

5.6 LEAD

5.6.1 In total, nine pieces of lead were recovered. These comprised a section of water pipe, cable coating, sections of roof flashing, and a 200mm-long rod. The small assemblage is undiagnostic in composition and adds little to the interpretation of the site, although the rod is likely to have been associated with an industrial process.

5.7 GLASS

5.7.1 In total, nine fragments of window glass, two cast stoppers, and 199 fragments of blown or moulded vessel glass were recovered from the excavation. They were dominated by mould-blown bottles, which represent more than 60% of the assemblage. There was a range of bottles present, most of them intended for beer or mineral water, and many bearing embossed legends. There were, in addition, pharmaceutical bottles, sauce bottles, ink bottles, and a single shoe-gloss container, as well as many where the contents are not identified. Despite the large amount of late pottery tablewares from the site, glass tablewares, for instance drinking glasses, were effectively absent, although there was a single screw-top salt or pepper shaker from demolition layer ***229***. There was, in addition a single fragment from a large engraved vessel, possibly an ornamental vase, and several fragments from lamp globes.

5.7.2 al Codd bottles were noted, for instance three from the fill (***153***) of feature ***151***. Hiram Codd first patented the design in 1870 (www.sha.org), and this type of bottle continued to be produced in the UK until the 1920s-30s when the surviving bottle manufacturing machinery was shipped to India (where they are still produced; www.sha.com). Many of the bottles identify Sheffield brewers and mineral-water manufacturers and also bear the maker's marks of local glassworks. Identifiable makers include the Conisborough works of Kilner Brothers (KCB), active 1873-1937 (www.gracesguide) and represented by at least four bottles from the site; one was stamped Dan Rylands Ltd, Barnsley, who was using this mark 1888-97, the bottle also being embossed 1893; another was stamped JW Dobson, Barnsley; and others were stamped P Waddington & Sons, Mexboro (*sic*), a firm that specialised in making Codd/Hamilton-type flat-bottomed bottles. Trade directories (such as White 1901) list the company as based at the New Don Glass Works in Mexborough.

5.7.3 Local breweries, vintners, and other purveyors represented by individual bottles include: John Marples & Company, a wine and spirit merchants based in Market Street, in the 1880s; JS & T Birks, a wine, spirit and tea merchants established in 1860, based at 69 Market Place, and listed in 1881 as having premises on 33 Wicker, Sheffield (Kelly 1881); the Don Brewery, a long-

standing company which was in business from 1832 until 1958, having been taken over by Tennants in 1916 (Richmond and Turton 1990, 323); Joseph Crofts Brothwell, at the Britannia Works, based at Langsett Road, (listed in White 1901; 1905, although the firm is absent in the 1911 directory); and GW Waugh Ltd, of Bromley Street, Sheffield. Local brewer Thos Berry & Company Limited, was listed in early nineteenth-century trade directories (White 1901; 1905) as being based at the Moorhead Brewery. Other local beer firms included Combe & Company, an ale- and porter-bottler and merchant, at Savile Street, which was later affiliated with London-based firm Watney, Reid, and Delafield in 1898 (Yenne 2014, 26).

5.7.4 Bottles used for liquids other than beverages included one for shoe-gloss, manufactured in the USA by a company formed by Charles L Hauthaway in 1852 (McDermott 1920). The sauce bottles included those of Leeds-based firm Goodall Backhouse & Co, Yorkshire Relish, which was producing the sauce from 1837, and a Titbits sauce bottle dating to the early twentieth century (Byles 1912).

5.8 INDUSTRIAL RESIDUES

5.8.1 A basic identification of a sub-sample of slag residues was carried out to assess their archaeological potential. As no microscopic or chemical analysis has been carried out as part of this assessment, the results should be regarded as provisional.

5.8.2 During excavation of the site, approximately 100kg of slag and associated residues were recovered from the backfill of the demolished crucible furnace. A representative sub-sample of 10% of this material has been assessed.

5.8.3 ***Description of the material:*** the sub-sample is largely composed of fragments of dense graphite-grey slag, individual fragments ranging in weight from approximately 10g to 1000g. There is some variation in colour and texture of individual pieces; some are darker grey or black in colour, are less dense, and have a more vesicular glassy fracture surface. Some fragments have a ropey flow-like surface texture, and a few also have fragments of firebrick attached on a parallel 'inner' surface. The fragments with both original 'inner' and 'outer' surfaces have a slag layer of approximately 100-110mm thick. Many fragments have small localised areas of relatively high magnetism, suggesting localised areas of iron/iron oxides.

5.8.4 ***Initial interpretation:*** although there is some variation in the colour, density and texture of the slag, initial inspection suggests that it is all fuel-ash slag, possibly from the inside of the crucible furnace chimney.

5.8.5 ***Potential:*** the nature of the material and its context mean that it is of considerable potential archaeological and archaeometallurgical significance. Archive examples of slag relating to crucible steelmaking are rare, especially when compared to those of earlier iron-making processes. There do not seem to be any published analyses, or archive examples, of fuel-ash slag from crucible steelmaking furnaces.

5.8.6 Further analysis of the slag will be able to confirm whether it is actually fuel-ash slag. If the slag is found to relate to another type of production process, it could provide information relating to made-ground at the site. The results of analysis would also be an important resource for the identification of slags from similar excavations.

5.8.7 ***Recommendations:*** it is recommended that all the material in the sub-sample assessed is retained for the site archive. It is also recommended that a representative sample of the slag is chemically analysed to confirm whether it is fuel-ash slag. The outcome of the analysis will also enable recommendations to be made on the curation and possible future research potential of the residues recovered.

5.8.8 The analysis should aim to characterise the slag and to suggest how it relates to the structural features on the site. Any further analysis should include an interpretation and short written report on its findings.

5.9 FURNACE FURNITURE

5.9.1 An appreciable number of industry-linked artefacts were recovered. These included crucibles and crucible lids, together with ingot moulds. The crucibles, all from the backfill of cistern ***190*** (***199***; Plate 16), were largely fragmentary, but one complete example was recovered, standing *c* 470mm high. It tapers outwards slightly from a base with a diameter of *c* 140mm, to a mouth of *c* 170mm. It was badly affected by heat, being extensively blistered and partially vitrified, but the lip survived largely undistorted, giving an original wall thickness of *c* 10mm. Fragments of at least two other crucibles, probably of similar dimensions, were also amongst the assemblage. There was, in addition, a sample of three crucible lids, retained from an original group of 12. All are now distorted, but have an original diameter of *c* 150mm. They were probably originally discoidal, but use had caused some distortion, giving them a slightly domed cross-section. Other materials recovered included gannister and chunks of vitrified furnace lining (from flue ***174***), which incorporated fuel slags.

Plate 16: Complete crucible from backfill **199**

5.10 CERAMIC BUILDING MATERIAL/BUILDING MATERIAL

5.10.1 ***Ceramic building material***; this category was represented by six brick samples removed from structural components on the site. These included two mid-orange wire-cut types taken from wall ***253*** (measuring 9 x 5 x 2.5"; 220 x 130 x 60mm), which retained traces of grey-speckled mortar, suggesting a late nineteenth-century date), a handmade orange sample removed from wall ***168*** of the furnace (measuring 10 x 4 x 2.5"; 250 x 100 x 60mm), with lime mortar attached, perhaps suggesting an eighteenth-century date, and an incomplete deep red sample taken from chimney stack ***173***, of unknown date.

5.10.2 ***Building material***; this comprised lime mortar and wall plaster removed from late levelling deposit ***144***. The deposit contained abundant amounts of nineteenth-century waste material, suggesting a dump.

5.11 LEATHER

5.11.1 In total, 12 leather shoe fragments, and a belt, were recovered from furnace backfill deposits (***252*** and ***269***). All the leather was recovered from dry conditions and as such survived in varying states of preservation.

5.11.2 There were three fragmentary shoes or boots with only one retaining any of the uppers, and substantial parts of the wooden sole and leather uppers of a child's clog (Plate 17). It is to be assumed that these were contemporary with the deposits in which they were found.

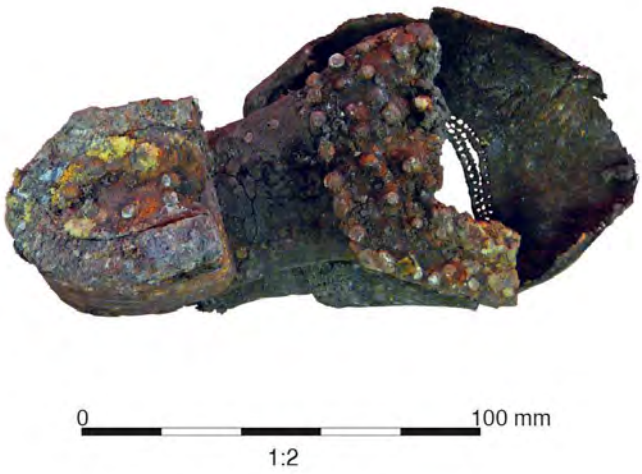

Plate 17: Child's clog from backfill **269**

5.12 ANIMAL BONE

5.12.1 A sample of animal bones (Number of Identified Specimens (NISP=24) was recovered by hand collection; other bones were highly comminuted. The sample of bones was rapidly scanned and found to comprise the remains of cattle (*Bos taurus* – four), sheep (*Ovis aries* – one), pig (*Sus domesticus* – four), chicken (*Gallus gallus* – two), goose (*Anser* sp – one), and rat (*Rattus* sp – one). Whilst the sample is small, there is no indication that whole carcasses are represented and estimates of minimum numbers of individuals appear inappropriate. This small group appears largely to relate to post-medieval individual joints of meat and butchery waste.

5.12.2 ***Results***: 13 fragments were identified to species. Two other fragments comprise a medium mammal long-bone shaft (possibly pig) and a rib fragment (possibly sheep). Five smaller fragments (including one sawn) remain unidentified, although three of these are possibly sheep-sized rib fragments. Four smaller fragments appear largely to relate to ongoing fragmentation of some brittle material. Much of the material is well preserved, although one of the pig scapulae is brittle and fragmenting. The cattle metatarsal differs in colour and preservation state to the rest of the material.

5.12.2 The pig remains consist of three scapulae (these may relate to 'fore-ham' or 'shoulder' joints. One of these bears sawing marks that suggest recent (1900s) butchery methods. Plausibly, this butchery evidence relates to the separation of the scapula (or 'bladebone') and adjacent 'fore-ham' parts from the 'back'. One sheep ulna was recovered. This is unfused at the proximal end and sawn across the mid-shaft; it clearly represents another joint prepared by a butcher. Its fusion state and size and the nature of the butchery again suggest a relatively recent date.

5.12.3 The goose pelvis bone consists of a partial acetabulum and parts surrounding the foramen ischiadicum. The chicken bones are complete left and right

tarsometatarsi, most plausibly from the same bird (and clearly a cockerel, since large spurs are present).

5.12.4 The cattle bones include a partial cervical vertebral centra, unfused at both anterior and posterior and split or sawn longitudinally, and one other vertebral fragment. There is also a cattle rib and the distal part of a metatarsal. The latter is transverse-sawn across the shaft above the distal foramen. This metatarsal might possibly relate to the preparation of blanks for bone working. The state of preservation of the metatarsal differs (it has much surface damage and is notably heavy) from much of the material. The other cattle bones are clearly waste from joints of beef.

5.12.5 There is a single rat (*Rattus* sp) bone present (a left-hand-side femur). This is of interest in that several of the bones (including the sawn pig scapula) are affected by rodent gnawing. The rat femur itself was clearly also gnawed by a rodent.

5.13 ENVIRONMENTAL MATERIAL

5.13.1 One 30 litre environmental bulk sample was taken from the secondary fill (***115***) of a nineteenth-century drain (***113***) for the assessment of charred and waterlogged plant remains. The sample was hand-floated, the flot being collected on a 250µm mesh and air dried. The flot was scanned with a Leica MZ6 stereo-microscope, and the plant material was recorded and provisionally identified. The components of the matrix were also noted.

5.13.2 ***Results:*** a few waterlogged plant remains (WPR) were recorded, including quite large numbers of blackberry pips (*Rubus fruticosus* agg). No charred plant remains except for charcoal fragments were noted. The matrix included wood fragments, mammal bone, fish bone, cinder, coal, fibres and root fragments (Table 2).

Context	Flot volume ml	Flot description	Plant remains	Potential
115	290	Charcoal >2mm (three), wood (one), mammal bone (one), cinder (four), coal (three), fish bone (one), spun fibres (two), root fragments (four), insect remains (three)	WPR (three) *Rubus fructicosus, Chenopodium album*	None

Plants scored on a scale of 1-4, where 1 is rare (up to five items) and 4 is abundant (>100 items). WPR = Waterlogged plant remains

Table 2: Assessment of charred and waterlogged plant remains

5.13.3 ***Discussion:*** if an assemblage of waterlogged plant remains in a sample is restricted to woody seeds only, such as blackberry pips, these may result from either differential preservation of contemporary material or from modern contamination. At West Bar, the taphonomy of the blackberry pips is inconclusive, although the presence of some fragments of mammal- and fish bone, together with insect remains, suggests that the secondary fill (***115***) of drain (***113***) may have contained some cess material.

6. DISCUSSION

6.1 INTRODUCTION

6.1.1 The following section presents a summary of the development of the site, based on the results of the archaeological investigation.

6.2 PHASE 1: EIGHTEENTH-CENTURY ACTIVITY

6.2.1 The earliest archaeological remains uncovered during the excavation were associated with Samuel Shore's steel works, which, importantly, contained Sheffield's first cementation furnace, used to convert wrought iron into steel. Although the exact date for the construction of Shore's works is not known, documentary evidence indicates that it had been established in the early part of the eighteenth century and certainly by 1716, and an illustration dating to 1737 indicates it contained a pair of bottle-shaped furnaces (*Section 3.5.2*; May 2006, 7).

6.2.2 Although the cementation technique had been introduced into England in the early seventeenth century, with the earliest furnaces being at Coalbrookdale, Shropshire, the type and style of furnace which was employed in this steel-making process was fully developed, and standardised, in Sheffield during the eighteenth century (Belford and Ross 2007). It is therefore possible, given the early date of Shore's works, that this process of formalisation was partially developed at the Furnace Hill site. This said, no actual structural remains of Shore's cementation furnaces survived within the excavated area, and hence, aside from their classic bottle-shaped superstructure, apparent on the 1737 illustration (*see above*), other details, such as their internal arrangements, are presently unknown. Moreover, the excavation indicated that, across the area examined, the majority of the below-ground remains associated with the early steel works had been destroyed by nineteenth-century development. Indeed, the only structural remains that could be confidently associated with the early eighteenth-century steel works were a sandstone wall and fragmentary sections of handmade-brick walling (*Section 4.3.2*). Of these features, the sandstone wall is depicted on a 1775 plan (*Section 3.5.3*) and it is evident that it lay to the north and west of the eighteenth-century furnaces. In addition, this map indicates that it enclosed a yard, and the excavation indicated that this yard area was surfaced with river cobbles (*Section 4.3.3*).

6.3 PHASE 2: NINETEENTH-CENTURY ACTIVITY

6.3.1 The majority of the remains uncovered by the excavation dated to the nineteenth century and included walling, flooring, and yard areas which are plotted on nineteenth-century OS mapping (1853; 1890). The excavation also indicated that early-mid-nineteenth-century domestic/commercial properties fronting West Bar had been provided with cellars, whilst several additional structures were discovered, which are not depicted on the available mapping.

These included: three subterranean vaults, two of which probably functioned as water cisterns; a system of drains; and, more significantly, the truncated remains of a crucible furnace, which probably dates to the early-mid-nineteenth century. This furnace had been constructed within an L-shaped building, the position of which is plotted on the nineteenth-century OS maps, and its presence clearly indicates that steel manufacturing recommenced at the site following the demise of Samuel Shore's steel works in the late eighteenth century (*Section 3.5.4*).

6.3.2 More generally, crucible furnaces were an integral element of Sheffield's nineteenth-century steel industry. Although Benjamin Huntsman first experimented in the 1740s in Doncaster, he invented crucible steel after his move to Sheffield, and furnaces to make such steel were widely adopted in the last decades of the eighteenth century, being used continually throughout the nineteenth and early twentieth centuries (Craddock and Wayman 2000). Significantly, at the Furnace Hill site, the major structural elements of the furnace survived and, as such, it represents an excellent example of a crucible furnace associated with Sheffield's early-/mid-nineteenth-century steel-manufacturing industry. These elements comprised a furnace chamber, a chimney, flue system and ash pits, and a vaulted cellar. This latter feature aided in the clearance of ash from the furnace following firing and also, along with the chimney, allowed air to draw through the furnace, enabling it to attain the temperature (1400^{o}C) required to melt high-carbon steel.

6.3.3 Apart from the actual structural elements of the crucible furnace, an associated assemblage of furnace furniture was also recovered (*Section 5.9*). This material included other significant elements relating to the production of crucible steel, including crucible fragments and ingot moulds. The former items would have held broken-up cementation bars, which were then melted within the furnace, whilst the latter were used to cast homogeneous steel ingots (Historic England 2015, 32). In addition, the furnace also contained a deposit of fuel-ash slag, which potentially holds both archaeological and archaeometallurgical significance (*Section 5.4*).

6.4 PHASE 3: TWENTIETH-CENTURY ACTIVITY

6.4.1 During the twentieth century, the nineteenth-century buildings that were exposed by the excavation were demolished and in the 1950s an office and warehouse were constructed on the site. These were demolished prior to the excavation and, although they had no inherent archaeological significance, their foundations were seen and recorded in the excavated areas.

7. SIGNIFICANCE AND RECOMMENDATIONS

7.1 SIGNIFICANCE

7.1.1 The most significant remains identified during the Furnace Hill excavation were those elements relating to the early-mid-nineteenth-century crucible furnace. Such furnaces formed an integral and widespread element of Sheffield's nineteenth-century steel-manufacturing industry, and during recent developer-funded archaeological excavation of various brownfield sites across the city the remains of several comparable examples have been recorded (*cf* Symonds *et al* 2006). As at the Furnace Hill site, these furnaces are normally defined by flues, a chimney stack, a cellar, and ash pits, which were originally situated beneath a melt hole, where the steel was melted in crucibles (Reeves 2011, 61).

7.1.2 Those examples that have been recently published, and that date to the first half of the nineteenth century, include two crucible furnaces that were recorded during an archaeological excavation at Hoyle Street. One of these was contained in William Hoole's steel works, which had been built by 1816, and another was associated with the Hoyle Street Works, which had probably been established by 1832 (Powell 2014). In addition, three other crucible furnaces were discovered during the Hoyle Street excavation, although these related to late nineteenth- and early twentieth-century steel working (*ibid*). Another example comprises a crucible furnace that was excavated at the Savile House site, on Savile Street adjacent to the River Don (Reeves 2011). This furnace was within the crucible shop at the Savile Works and was probably similar in date to the Furnace Hill example, in that it appears to have been established between the mid-1830s and late 1840s (*op cit*, 62).

7.1.3 Set in the context of these sites, the crucible furnace at the West Bar site represents a valuable addition to the growing body of archaeological evidence relating to these structures, which were an important component of Sheffield's nineteenth-century steel industry. Furthermore, the West Bar crucible furnace represents a comparatively early example, which may have been established just before, or during the early stages of, the rapid expansion of the Sheffield steel industry that dates to the mid-nineteenth-century (*op cit*, 58). Moreover, it also appears to form a relatively small example, employed in a small-scale, workshop-based, steel-working setting, as opposed to those large crucible furnaces that were established within Sheffield's larger factory-based steel works, and as such represents a significant comparator.

7.1.4 Aside from the structural remains, the West Bar crucible furnace also holds additional significance, in that it was associated with an assemblage of slag residues. This assemblage holds particular archaeological importance in that examples of slag relating to crucible steelmaking are rare, especially when compared to earlier iron-making processes. Also, as indicated in the assessment of the industrial residues (*Section 5.8.5*), there are no published analyses, or archive examples, of fuel-ash slag from crucible steelmaking

furnaces, and rapid analysis would act as an important resource for the identification of slags recovered from similar excavations.

7.2 RECOMMENDATIONS

7.2.1 Given the significance of the slag residues, associated with the early-mid-nineteenth-century crucible furnace, it is recommended that a representative sample of the slag is chemically analysed to confirm whether it is fuel-ash slag. The outcome of the analysis will also enable recommendations to be made on the curation and possible future research potential of the residues recovered. The other material does not warrant further work.

7.2.2 Following this analysis, and its reporting, it is however, recommended that a short academic article is produced for an appropriate academic journal. This article would detail the significant archaeological remains discovered at the site, specifically those associated with the early-mid-nineteenth-century crucible furnace, present the results of the residue analysis, and place the remains within their local and regional setting. More specifically, in terms of Sheffield's former steel-manufacturing industries, this would, as with other more recent archaeological investigations, form an essential element for 'understanding the complexities of growth, development and diversity of these industries' (Reeves 2011, 58).

7.2.3 The production of this article would also, in turn, satisfy one of the high-priority initiatives formulated by the *Historical Metallurgy Society* (Bayley *et al* 2008, 69). This priority is 'to record adequately and fully publish all metallurgically important sites whose preservation cannot be guaranteed'.

BIBLIOGRAPHY

CARTOGRAPHIC SOURCES

Gosling, R, 1736 Map of Sheffield

Ordnance Survey (OS), 1853 1:1,056 map sheet Sheffield 20

Ordnance Survey (OS), 1890 1:500 map sheet Yorkshire 294.8.11

Ordnance Survey (OS), 1905 1:2,500 map sheet Yorkshire 294.8

Ordnance Survey (OS), 1995 1:1,250 map sheet SK 3587 NW

WEBSITES

www.gracesguide (accessed October 2015)

www.gresleypottery.uk (accessed October 2015)

www.sha.org (accessed October 2015)

www.thepotteries.org (accessed October 2015)

TRADE DIRECTORIES

Byles, W, 1912 *Post Office Bradford Directory*, Bradford

Kelly and Co, 1881 *Directory of West Riding of Yorkshire* (Part 3: Court and Trade Directories), London

White, W, 1901 *Directory of Sheffield and Rotherham*, London

White, W, 1905 *Directory of Sheffield and Rotherham*, London

White, W, 1911 *Directory of Sheffield and Rotherham*, London

SECONDARY SOURCES

Barraclough, K C, 1976 *Benjamin Huntsman, 1704-6*, Sheffield

Barraclough, K C, 1984 *Steelmaking before Bessemer. Blister steel: the birth of an industry*, London

Bayley, J, Crossley, D, and Ponting, M, 2008 *Metals and metalworking: a research framework for archaeometallurgy*, Hist Metall Soc Occ Pap, **6**, London

Belford, P, and Ross, R A, 2007 English steelmaking in the seventeenth century: the excavation of two cementation furnaces at Coalbrookdale, *Hist Metall*, **41**(2), 105-23

Binfield, C, and Hey, D, 1997 *Mesters to masters: a history of the Company of Cutlers in Hallamshire*, Oxford

Capita Symonds, 2008 *Borehole report*, unpubl rep

CifA, 2014a *Code of conduct*, Reading

CifA, 2014b *Standard and guidance for archaeological excavation*, Reading

CifA, 2014c *Standard and guidance for the collection, documentation, conservation, and research of archaeological materials*, Reading

CifA, 2014d *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives*, Reading

Corley, T A B, 1979-80 The celebrated Reading Sauce: Charles Cocks and Co Ltd 1789-1962, *Berkshire Archaeol J*, **70**, 97-106

Cossons, N, 1987 *The BP book of industrial archaeology*, 2nd rev edn, Newton Abbot

Cotter, J, 2011 Combe Down Mines, Bath: the pottery (CODOM 01) Oxford Archaeology (South) (2012) *Combe Down Stone Mines* [dataset]. York: Archaeology Data Service [distributor] (doi:10.5284/1020245)

Coysh, A W, and Henrywood, R K, 1982 *The dictionary of blue and white printed pottery 1780-1880*, **1**, Woodbridge

Craddock, P T, and Wayman, M L, 2000 The development of European ferrous metallurgy, in M L Wayman (ed), *The ferrous metallurgy of early clocks and watches: studies in post-medieval steel*, London, 13-27

Cranstone, D, 1997 *Derwentcote steel furnace: an industrial monument in County Durham*, Lancaster Imprints, **6**, Lancaster

Cumberpatch, CG, 2004 *The South Yorkshire and north Derbyshire regional ceramics reference collection database handbook*,
http://archaeologydataservice.ac.uk/archiveDS/
archiveDownload?t=arch-384-
1/dissemination/pdf/handbook/Database_handbook_final.pdf (accessed October 2015)

English Heritage, 1991 *Management of archaeology projects*, 2nd edn, London

English Heritage, 2006 *Management of research projects in the historic environment (MoRPHE)*, London

English Heritage, 2011 *Environmental archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation*, 2nd edn, Swindon

Hey, D, 2005 The South Yorkshire steel industry and the Industrial Revolution, *Northern Hist*, **152**(1), 91-6

Higgins, D A, 2009 Part 1: national clay pipe summaries, *J Academie Internationale de la Pipe*, **2**, 41-50

Historic England, 2015 *Archaeometallurgy: guidelines for best practice*, London

Jones, G P, 1956a Industrial Revolution, in D L Linton (ed), *Sheffield and its region: a scientific and historical survey*, Sheffield, 155-60

Jones, G P, 1956b Early industrial development, in D L Linton (ed), *Sheffield and its region: a scientific and historical survey*, Sheffield, 146-54

McDermott, C H, 1920 *A history of the shoe and leather industries of the United States, together with industrial and biographical notices*, **2**, New York

May, R, 2006 *Archaeological desk-based assessment of 137 West Bar, Sheffield*, ARCUS Rep, **1037.**1, unpubl rep

Powell, A, 2014 *Steelworks, crucible furnaces and workers' housing: archaeological investigations at Hoyle Street, Sheffield*, Salisbury

Reeves, B, 2011 The Don Steel Works and Savile Works: charting the growth of the small Sheffield steel firm, *Ind Archaeol Rev*, **33**(1), 58-73

Richmond, L, and Turton, A, 1990 *The brewing industry: a guide to historical records*, Manchester

Snyder, JB, nd Flow blue ceramics: Victorian tableware and collectors' passion, *New England Antiques J*,: www.antiquesjournal.com/pages04/archives/flowblue.html (accessed October 2015)

Symonds, J, O'Neil, R, and Jessop, O, 2006 What can we learn from the excavation and building recording of cutlery sites in Sheffield?, *Post-Medieval Archaeol*, **40**(1), 214-18

Tweedale, G, 1995 *Steel city: entrepeurship, strategy, and technology in Sheffield 1743-1993*, Oxford

United Kingdom Institute for Conservation (UKIC), 1984 *Environmental standards for the permanent storage of material from archaeological sites*, Conservation Guidelines, **3**, London

Ure, A, 1842 *A dictionary of arts, manufactures and mines, containing a clear exposition of their principles and practice*, New York

Walker, K, 1990 *Guidelines for the preparation of excavation archives for long term storage*, London

White, S D, 2004 *The dynamics of regionalisation and trade: Yorkshire clay tobacco pipes c1600-1800*, BAR Brit Ser, **374**, Oxford

White, S D, 2008 Analysis of the clay tobacco pipe, in K Baker and S Baker, *Archaeological works at the Upper Chapel, Norfolk Street, Sheffield*, ARCUS **732f.3(1)**, unpubl rep

White, S D, 2015 Clay tobacco pipes, in P Andrews, *Riverside Exchange, Sheffield: investigations on the site of the town mill, Cutlers' Wheel, Marshall's steelworks and the Naylor Vickers works*, Wessex Archaeol, 20-30

Williams, A, 2003 *The typology of industrial buildings with reference to the steel trades in Sheffield, 1750-1900*, unpubl PhD Thesis, Univ Sheffield

Yenne, B, 2014 *Beer: the ultimate world tour*, New York

APPENDIX 1: PROJECT DESIGN:

SPECIFICATION FOR PROGRAMME OF ARCHAEOLOGICAL MITIGATION AT 137 WEST BAR, SHEFFIELD

1 SUMMARY

1.1 Esharoth UK Ltd have obtained planning permission (ref: 06/04556/FUL) for demolition and subsequent redevelopment of land at 137 West Bar, Sheffield. The site is located at the corner of West Bar and Furnace Hill, Sheffield (NGR SK 3524 8784).

1.2 A desk-based assessment (ARCUS 2006) has concluded that the site has high potential to contain remains associated with a late eighteenth/early nineteenth-century public house and nineteenth-century shops and out-buildings. The site is also considered to have moderate potential to contain remains of an early eighteenth-century cementation furnace (possibly the first built in Sheffield).

1.3 This document sets out the proposed methodology for the scheme of archaeological mitigation required to discharge the planning condition and is subject to approval by SYAS. In summary, it allows for the developer to demolish existing structures on site to the ground slab without archaeological involvement. Removal of the hard surfacing/ground slab will be carried out under archaeological supervision and there will be no grubbing up of foundations until the archaeological work is complete. The site is to be subject to a programme of archaeological strip and record. Should remains of the early furnaces be encountered they will be cleaned and recorded, following which an assessment will be made as to what further mitigation will be required. Depending upon the extent and state of survival of the remains they may require preservation *in situ* or excavation.

2 INTRODUCTION

2.1 Esharoth UK Ltd have obtained planning permission (ref: 06/04556/FUL) for demolition and subsequent redevelopment of land at 137 West Bar, Sheffield. The site is located on the corner of West Bar and Furnace Hill, Sheffield (NGR SK 3524 8784). Conditions 20 and 21 of the permission relate to archaeology and state that;

> *20 - No development work, including ground clearance and demolition work, shall take place unless and until the developer, their agent or their successor in title has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation that has been submitted to and approved in writing by the Local Planning Authority.*
>
> *To ensure that any archaeological remains present, whether standing or buried, are preserved – either by being left* in situ *or recorded and removed in accordance with an agreed method, before they are damaged or destroyed.*

> *21 - Prior to commencement of any work on site, a detailed scheme for the foundation design and all new ground works shall be submitted to and approved in writing by the Local Planning Authority and the development shall be carried out in accordance with the approved details.*
>
> *To ensure that ground disturbance is restricted to a minimum and is carried out in the agreed manner to preserve archaeological remains* in situ.

2.2 A desk-based assessment has been produced (Arcus 1037.1 2006) which identified the archaeological potential of the site. Following submission of the desk-based assessment to SYAS, discussions were held with Dinah Saich of SYAS, during which requirements for a scheme of archaeological mitigation were established, the detail of which is set out below.

2.3 The underlying geology is of the Lower Coal Measures Group (BGS 1974).

3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND AND ASSESSMENT

3.1 A full archaeological and historical background to the site is presented in the desk-based assessment (ARCUS, 2006). The following briefly summarises the findings of that report.

3.2 *Prehistoric/Roman Activity*

3.2.1 Prehistoric finds are known from the wider vicinity of the site, indicating that the general area was being used in the prehistoric period. However, no settlement activity has yet been identified in the vicinity of the site. There are no records of any Roman finds from the vicinity of the site.

3.3 *Medieval Activity*

3.3.1 The medieval town of Sheffield was concentrated around the church and castle located to the south-east of the site. West Bar was mentioned in a document of 1555, the name referring to a gate on the route out of town heading towards Penistone to the west. The area of the site is likely to have been part of the Town Field at that date.

3.4 *Post-medieval Activity (1540-present)*

3.4.1 The site probably remained as a field through the early part of the post-medieval period although some buildings are recorded in the area in the sixteenth and seventeenth centuries. A pair of steel cementation furnaces, for the production of blister steel, had been constructed on the West Bar frontage of the site by 1775, and were probably the furnaces of Samuel Shore, shown on a 1737 illustration of Sheffield. Shore's furnaces were first recorded in 1716 and were probably the first built in the town. The furnaces were in operation through most of the eighteenth century and may have been enlarged in the 1750s. The last documentary reference to the furnaces was in 1779, implying that they went out of use shortly after this date.

3.4.2 It is believed that a small crucible furnace was in operation on the site, belonging to Thomas Gatley who acquired land here in or around 1828 (D Saitch *pers comm*).

3.4.3 The Furnace Hill frontage of the site was developed in the late eighteenth or early nineteenth century, with a public house at the western end of the development site, known as The Grapes Inn. The functions of other buildings shown within the site are not known. The West Bar frontage was redeveloped in the 1830s, the furnaces having been demolished prior to 1828. The new development consisted of shops and housing. These buildings were demolished at the end of the nineteenth century, in association with the widening of West Bar. The eastern part of the site remained vacant until the 1950s when the current warehouse and offices were constructed. The former Grapes Inn was demolished between 1963 and 1976, and its site is now covered by a loading ramp.

4 PROJECT AIMS

4.1 The general aims of this project are:-

- To ensure that subsequent to the demolition of the above-ground structures that the removal of hard-surfacing/floor slabs is conducted in a way that facilitates an archaeological investigation of the site;
- To assess the survival of any remains relating to the early cementation furnace so as to inform a decision on its full mitigation;
- To preserve by record any other significant archaeological remains within the proposed development area;
- To ensure the long-term preservation of the archaeological information by production and deposition of a report and an ordered project archive.

4.2 The more specific research objectives are:-

- To clarify the use of space within the site (commercial/domestic/industrial) within a chronological framework;
- To identify the range of industrial activities on the site relating to Sheffield's steel industry, particularly the production of steel using the cementation process and the refining of steel using the crucible process;
- To identify the nature of any associated small-scale industrial activities, such as tool, blade and handle making;
- To place the site in context by comparison with similar sites, both in Sheffield and further afield.

4.3 The features of chief archaeological interest known to have been present within the proposed development area are the early cementation furnaces located within the southern part of the site. Should remains of these furnaces be found to survive in good condition it is likely that they will be considered worthy of preservation *in situ*.

4.4 This specification conforms to the requirements of *Planning Policy Guidance: Archaeology and Planning* (DoE 1990) (PPG16). It has been designed in

accordance with current best archaeological practice and the appropriate national standards and guidelines including:

- *Management of Archaeological Projects* (English Heritage 1991);
- *Standard and Guidance for an Archaeological Watching Brief* (Institute of Field Archaeologists 2001);
- *Model Briefs and Specifications for Archaeological Assessments and Field Evaluations* (Association of County Archaeological Officers 1994);
- *Code of Conduct* (Institute of Field Archaeologists 2000).

5 METHODOLOGY

5.1 Archaeological attendance to site will commence once the above-ground structures have been demolished.

5.2 A minimum of two weeks' notice will be given to the archaeological fieldwork contractor of the start date to remove the hard-surfacing and floor slab from within the proposed development area. When the fieldwork contractor has been appointed this will be confirmed with SYAS and the contractor will also notify the receiving museum of the intention to deposit an archive in due course and complete the required proforma sheets. In order to meet the programme requirements and following discussion with SYAS, the fieldwork contractor will supply a team sufficient to clean, map and to begin to sample the stripped area, as appropriate during the stripping phase. A meeting will be convened with Dinah Saich before any hand excavation, other than initial characterisation of features/deposits is carried out.

5.3 The proposed development area will be stripped, under constant archaeological supervision, using a 360° mechanical excavator fitted with a range of buckets as appropriate. A toothless ditching bucket should be used to achieve the final surface where significant features and or deposits are exposed. Mechanical excavation will be undertaken to the top of the first significant archaeological horizon or undisturbed natural deposits. Every effort should be made to avoid rutting or other direct or indirect impacts onto the archaeological surface. Haul routes will also need to be established to ensure that overburden that is removed is carried off the excavation area and stockpiled as required by the developer, without this traffic impacting upon the archaeological horizon. Should the Site Supervisor feel that either methods of stripping or movement of plant taking material off site were resulting in the archaeology being compromised, then stripping should be halted until these issues can be resolved.

5.4 Priority will be given to the cleaning of the exposed surface as required to produce a pre-excavation site plan, during and immediately subsequent to the stripping. Plans will normally be drawn at 1:100; more complex features will be recorded as appropriate (1:10 or 1:20). The site grid will be established relative to the Ordnance Survey National Grid and all levels taken will be relative to Ordnance Datum. In association with the production of this plan, sample excavation will commence, looking to investigate a representative sample of any archaeology exposed to characterise the nature of the resource

present. Early in this process, a meeting will be convened between the CgMs Project Manager, Dinah Saich of SYAS and the appointed fieldwork contractor to establish a more formal sampling strategy.

5.5 It is hoped that the site investigation can be conducted as an iterative process, such that instead of excavating by set percentage sample sizes, the approach can be driven by considering how excavation can meet the stated and evolving research aims (see section 4.0 above). As a minimum, the stratigraphic relationships between all significant intercutting features will be established, but once this is complete and a representative sample of any archaeological deposits has been investigated, the excavation process will be targeted. Features will be targeted that appear to be unusual or important (*eg* relating to specific craft or industries). Contexts that have the potential to provide important artefactual or ecofactual assemblages or that inform the research aims of the project will be prioritised. Should remains of the early cementation furnaces be encountered, these will be cleaned and recorded with minimal disturbance so as to allow an assessment of their survival and condition to be made. Any further treatment of the furnace remains will then be agreed with SYAS. This reflexive approach will be sustained by regular site meetings between all relevant parties and specialists as appropriate.

5.6 The recording system will be based on the Museum of London's *Archaeological Site Manual* (1994). This involves allocating numbers to individual contexts, which are then described and interpreted on proforma context sheets.

5.7 A photographic record will be maintained during the course of the evaluation (in back and white and colour print and digital (where the camera will have field of at least 5MP and images archived as uncompressed TIFFs)) and will include:

i. the site prior to commencement of fieldwork;

ii. the site during work, showing specific stages of fieldwork;

iii. the layout of archaeological features within the excavation area;

iv. individual features and, where appropriate, their sections;

v. groups of features where their relationship is important.

5.8 All artefacts will be treated in accordance with UKIC guidelines, *First Aid for Finds* (1998). All finds will be bagged and labelled according to the individual deposit from which they were recovered, ready for later cleaning and analysis.

5.9 The English Heritage Regional Science Advisor will be consulted by the appointed fieldwork contractor for advice, and appropriate specialists will be employed as required throughout the project to advise as necessary. These specialists will conduct or commission, as appropriate, programmes of scientific investigation in conjunction with the fieldwork, the results of which will be presented in the final report. They will also ensure that the strategy evolves on site by seeking to ensure that bulk samples taken in the initial stages of the project are processed quickly and the results fed back to inform the excavation strategy. This approach is broadly consistent with *The Management of Archaeological Projects* (English Heritage 1991). All work

undertaken will also be in accordance with English Heritage *Guidelines for Environmental Archaeology* (2001).

5.10 The strategy for palaeoenvironmental sampling will be developed on site, in consultation with appropriate specialists, as necessary. The environmental sampling strategy will therefore evolve from discussion between those specialists and the field team and will be in accordance with current best practice.

5.11 Forty litre samples would usually be taken from securely dated deposits containing the following:-

- charred plant remains;
- large quantities of molluscs;
- large quantities of bone;
- hearths and other burnt features;
- other domestic features.

5.12 The above list is not exhaustive, however, and it may be necessary to take larger sample sizes from deposits with large amounts of bone (up to 100 litres) and samples should also be taken from pit deposits which do not contain visible ecofacts. Sampling of ditches should normally target dumped/artefact-rich deposits. Column samples may be required to establish the changing environment through time, if appropriate sequences are observed.

5.13 Should evidence for industrial activity be exposed, then macroscopic technological residues (or a sample of them) will be collected by hand. Separate *c* 10ml samples will be collected for micro-slags (hammerscale and spherical droplets). The specialist appointed to assess such deposits would be agreed in advance of their employment with Dinah Saich of SYAS and would be expected to be familiar with Archaeometallurgy in archaeological projects (English Heritage/Historical Metallurgy Society 1995) and Hammerscale (Starley 1995).

5.14 Any human remains encountered will be cleaned with minimal disturbance, recorded and left *in situ*, and only removed if necessary. The contractor will comply with all statutory consents and licences under the Disused Burial Grounds (Amendment) Act, 1981 or other Burial Acts regarding the exhumation and interment of human remains. The archaeological contractor will comply with all reasonable requests of interested parties as to the method of removal, re-interment or disposal of the remains or associated items. Every effort will be made, at all times, not to cause offence to any interested parties.

5.15 Dinah Saich of SYAS will be given notice of when work is due to commence and will be free to visit the site by prior arrangement. Should any significant remains be found it may be necessary, in liaison with Dinah Saich of SYAS, to formulate a strategy for their further treatment or preservation *in situ*.

5.16 Archaeological staff and visitors will respect Health and Safety provisions and site-specific safety regulations.

5.17 It may be necessary to agree the phased handback of areas of the site to the developer. This will require the explicit authorisation of Dinah Saich of SYAS.

5.18 An illustrated notice board to be displayed on the site hoardings, explaining what work is being carried out and why, will be produced by the appointed fieldwork contractor.

6 POST-EXCAVATION

6.1 Post excavation work will comprise the following:

i. checking of drawn and written records during and on completion of fieldwork;

ii. production of a stratigraphic matrix of the archaeological deposits and features present on the site, if appropriate;

iii. cataloguing of photographic material and labelling of slides which will be mounted on appropriate hangers;

iv. cleaning, marking, bagging and labelling of finds according to the individual deposits from which they were recovered. Any finds requiring specialist treatment and conservation will be sent to an appropriate Conservation Laboratory. Finds will be identified and dated by appropriate specialists;

iv. assessment of all artefacts, biological samples and soils recovered from the site. X-rays will be taken of an appropriate selection of iron objects and a selection of non-ferrous (including all coins). Consideration will be given to possible investigative procedures such as pottery residue analysis and glass composition;

v. waterlogged materials will be dealt with as outlined in *Guidelines for the care of waterlogged archaeological leather* (English Heritage Archaeological Leather Group 1995) and *Waterlogged wood: the recording, sampling, conservation and curation of structural wood* (Brunning 1996);

vi. assessment of any technological residues recovered will be undertaken;

vii. samples taken for scientific dating will be sent, promptly, to appropriate laboratories and agreement reached on appropriate turn-around times with all parties;

viii. bulk samples and geoarchaeological samples recovered will be processed and assessed by the appropriate specialists.

6.2 Following completion of the fieldwork, consideration will be given to the appropriate manner of publication. It is anticipated that a formal post-excavation assessment phase will be required unless it is agreed with SYAS that the results do not warrant further analysis. Formal analysis and publication requirements will be discussed by means of a formal review meeting with the Curator, following the completion of fieldwork and consideration of the site archive. A copy of any completed reports will be submitted, once approved by the client, to SYAS. The text of the report will

also be submitted as a rich-text file; any illustrations and photographs contained within the report will be submitted in digital form (preferably tiff) and any CAD drawings will also be submitted.

6.3 The report will include the following as a minimum:-

i. a title page detailing site address, site code and accession number, NGR, author/originating body, client's name and address;

ii. full content's listing;

iii. a non-technical summary of the findings of the fieldwork;

iv. a description of the archaeological background;

v. a description of the topography and geology, soils and drainage of the development area;

vi. a description of the methodologies used during the fieldwork;

vii. a description of the findings of the fieldwork;

viii. plans of each of the trenches/areas showing the archaeological features exposed;

ix. an overall phased plan with sections of the excavated archaeological features;

x. interpretation of the archaeological features exposed and their context within the surrounding landscape;

xi. specialist reports on the artefactual/ecofactual/industrial remains from the site;

xii. appropriate photographs of specific archaeological features;

xiii. appropriate artefact illustrations;

xiii. a consideration of the importance of the archaeological remains present on the site in local, regional and national terms;

xiv. a detailed context index and index to the archive;

xv. completion of the Online Access to the Index of archaeological investigations (OASIS) form for the project (http://ads.ac.uk/projects/oasis).

6.4 The site archive will be prepared according to guidelines set down in appendix 3 of the *Management of Archaeological Projects* (English Heritage 1991), the *Guidelines for the Preparation of Excavation Archives for Long-term Storage* (Walker, 1990) and *Standards in the Museum Care of Archaeological Collections* (Museum and Art Galleries Commission 1992). Finds and the paper archive will be deposited with Sheffield Museum, subject to appropriate permissions. It will be prepared in accordance with the procedures set-out by the Museums Service. If finds are made of gold or silver, these will if possible be archaeologically excavated and removed to a safe place. Such finds will also be immediately reported to the local Coroner (within 14 days, in accordance with the 1997 Treasure Act). Should it not be possible to remove the finds that day, suitable security will be provided.

6.5 Notes or articles describing the results of the fieldwork will be submitted for publication in an appropriate local, regional or national journal (depending upon the significance of the results). A copy of any such works will be sent to SYAS. Consideration will be given to publication of all of the information gained from the fieldwork as a single text. Provision will be made for publication of the results of the fieldwork locally. Discussions will be had with the client about the desirability of press releases and the appointed sub-contractor will be encouraged to present the results (if appropriate) to the South Yorkshire Archaeology Day and local societies. A summary of the results will be submitted to the SYAS annual review *Archaeology in South Yorkshire*. Text will be submitted in ASCII format and any images in .tif form.

7 MONITORING

7.1 The aims of monitoring are to ensure that the archaeological works are undertaken within the limits set by the project design and to the satisfaction of the Local Planning Authority.

7.2 The archaeological aspects of the project will be managed for Esharoth UK Ltd by Paul Gajos, with assistance from other CgMs Project Managers as required.

7.3 SYAS will be given at least five days' notice of when work is due to commence and will be free to visit the site by prior arrangement with the project director.

8 TIMETABLE AND PERSONNEL

8.1 It is understood that there are uncertainties involved in any archaeological project at least until the archaeological horizon is revealed and the archaeology has been characterised. It is anticipated that the initial site strip and cleaning will take in the region of two weeks. After the initial strip and clean, a timetable for the full mitigation of the site will be agreed.

8.2 The appointed sub-contractor should therefore ensure that they are geared up rapidly to plan and characterise the resource present during the stripping, such that a complete site plan is available within two days of completion of the site strip. A site meeting will then be convened which will agree an appropriate mitigation strategy for the remains exposed.

9 INSURANCE

9.1 The archaeological contractors will produce evidence of Public Liability Insurance to the minimum value of £5m and Professional Indemnity Insurance to the minimum of £2m.

10 HEALTH AND SAFETY

10.1 It is the policy of CgMs ('the Employer') to conform fully with the requirements of the Health and Safety at Work Etc Act (1974).

10.2 It is accepted that it is the duty of the Employer to ensure, so far as is reasonably practical, the health and safety of all his employees at work.

10.3 The employer also has a duty to ensure that his employees are aware of their responsibility for their own health and safety, and for the health and safety of others, including the general public, who might be affected by their work.

10.4 Where employees are temporarily engaged at other workplaces, they are to respect relevant local regulations, both statutory and as imposed by other employers within the Health and Safety at Work etc Act (1974).

10.5 In furtherance of the duty of care imposed by the Health and Safety at Work etc Act (1974), the Employer shall make available to his employees whatever reasonable facilities are required by particular circumstances, *eg* appropriate protective clothing, safety equipment, rest breaks for specialised tasks, etc.

10.6 Attention is paid to the requirements of more recent legislation including the provision and use of *Work Equipment Regulations* 1992, the *Management of Health and Safety at Work Regulations* 1992 and the *Construction (Design and Management) Regulations* 1994. A risk assessment is undertaken, a CDM coordinator will be appointed by Esharoth UK Ltd (the developer), and all aspects of health and safety noted during work.

APPENDIX 2: CONTEXT INDEX

Context	Feature	Description	Phase
100	/	Northern cellar	2
101	/	Southern cellar	2
102	/	Drain cut	2
103	***100***	West wall of cellar	2
104	***100***	North wall of cellar	2
105	***100***	Steps into cellar	2
106	***100/101***	Dividing wall between cellars	2
107	***100***	Flagstone floor within cellar	2
108	***101***	West wall of cellar	2
109	***101***	Steps into cellar	2
110	***101***	South wall of cellar	2
111	***101***	Flag floor within cellar	2
112	***/***	Sandstone and clay - natural geology	/
113	***102***	Stone lining of drain	2
114	***102***	Primary fill of drain	2
115	***102***	Secondary fill of drain	2/3
116	***119***	Cobble surface	2
117	***119***	Sett surface	2
118	***200***	Flag surface	2
119	***119***	Courtyard	3
120	***122***	Flag surface above ***122***	3
121	***119***	Square brick feature	3
122	***/***	Structure to south of site	2
123	***200***	Curved brick wall	2

Context	Feature	Description	Phase
124	***122***	North/south internal wall	2
125	***122***	West wall	2
126	***122***	East curved wall	2
127	***122***	North wall	2
128	***122***	East/west internal wall	2
129	***122***	Flag floor	2
130	***122***	Internal buttress wall	2
131	***122***	Internal buttress wall	2
132	***100***	North/south wall within cellar	2
133	***101***	North/south wall within cellar	3
134	/	Backfill/demolition layer	3/4
135	/	Curved wall	1
136	/	South-east/north-west wall	1
137	/	Drain cut	2
138	/	Drain cut, probable continuation/modification of ***137***	2
139	***137***	Brick 'inspection hatch'	2/3
140	***200***	Square opening/position of pump?	2
141	***138***	Loose stone column	2
142	***136***	Construction cut for wall	2
143	/	Not used	/
144	/	Clay levelling deposit	3
145	/	Backfill/demolition layer	3
146	***137***	Stone capping of drain	2
147	***137***	Mixed fill of drain	2/3
148	***138***	Mixed fill of drain	2/3

Context	Feature	Description	Phase
149	/	Mixed fill of drain	2/3
150	***151***	Brick wall on sandstone plinth at west of ***151***	3
151	/	Rectangular brick feature within yard ***119***	3
152	/	Flag surface to east of ***151***	2
153	***151***	Cinder and slag fill of ***151***	3
154	***119***	Brick-lined stone-capped drain	3
155	***119***	Sett surface to east of yard	3
156	/	Stone-lined drain	2
157	/	East-west stone-built wall defining northern edge of steel works	1
158	/	Drain cut with ceramic pipe	3
159	***160***	Brick wall surrounding flags ***160***	2
160	/	Flagstone surface	2
161	/	Sett and flag surface	2
162	***154***	Fill of drain	3
163	/	Brick wall abutting ***161***	3
164	***156***	Fill of drain	2
165	/	North-south stone wall defining the western edge of Samuel Shore's steel works	1
166	/	Raised flagstone surface	3
167	/	Sett surface below ***166***	2
168	***180***	East-west vaulted passage	2
169	***180***	East-west refractory wall	2
170	***180***	Handmade brick wall forming east side of furnace	2
171	***180***	Brick pillar, possibly continuation of wall ***170***	2
172	***180***	Brick surface, crucible-working area	2
173	***180***	Brick chimney stack	2

Context	Feature	Description	Phase
174	***180***	Flue system for furnace	2
175	***180***	South-east-north-west brick feature to east of ***174***	2
176	***181***	South brick wall to east of furnace	2
177	***121***	Slag fill of brick feature ***121***	3
178	***181***	East stone wall to east of furnace	2
179	***181***	North stone wall to east of furnace	2
180	/	Crucible furnace	2
181	/	Room to east of furnace	2
182	/	Cobbled surface	3
183	***180***	North-south wall, possible continuation of ***170***	2
184	/	North-south ceramic drain joining drain ***185***	3
185	/	East-west ceramic drain, diverted around cistern ***200***	3
186	/	Brick-lined stone-capped drain	3
187	/	Stone-lined drain reused by ***184*** and ***185***	2
188	/	Stone-lined drain, ***187*** runs into it	2
189	/	Cobbled surface	1
190	/	Brick-built subterranean vaulted room	2
191	***200***	Stone-capping above cistern	2
192	***200***	West brick wall of cistern	2
193	***200***	Brick- and slate-vaulted roof	2
194	***184***	Fill of drain	3
195	***185***	Fill of drain	3
196	***186***	Fill of drain	3
197	***187***	Fill of drain	3
198	***188***	Fill of drain	2/3

Context	Feature	Description	Phase
199	***190***	Backfill deposit	3
200	***/***	Brick-built subterranean vaulted cistern	2
201	***/***	Cobbled surface	1
202	***190***	Brick wall above northern wall of vaulted room	2
203	***/***	Brick wall	3
204	***/***	Brick wall	3
205	***190***	Western wall of ?cistern	2
206	***190***	Eastern wall of ?cistern	2
207	***190***	Southern wall of ?cistern	2
208	***190***	Northern wall of ?cistern	2
209	***190***	East/west wall in ?cistern	2
210	***190***	North/south internal wall in ?cistern	2
211	***190***	Cobbled surface within vaulted room	2
212	***/***	Stone wall abutting room ***181***	2/3
213	***/***	Stone wall	3
214	***/***	Ceramic drain	3
215	***190***	Demolition layer above roof of ?cistern	3/4
216	***190***	Cut for room ?cistern	2
217	***188***	Cut for drain	2
218	***184***	Cut for drain	3
219	***186***	Cut for drain	3
220	***180***	Ash pits in furnace	2
221	***/***	Drain cut	2
222	***180***	Construction cut for wall ***178***	2
223	***180***	Backfill of cut ***222***	2

Context	Feature	Description	Phase
224	***221***	Fill of drain	2
225	***/***	East/west brick wall	3
226	***/***	Brick structure	3
227	***185***	Cut for drain	3
228	***187***	Cut for drain	2
229	***231***	Demolition layer above roof of Room ***231***	3
230	***231***	Deposit within room	2
231	***/***	Barrel-vaulted brick-built subterranean room	2
232	***231***	Barrel-vaulted brick roof	2
233	***231***	Northern wall of subterranean room	2
234	***235***	Compact deposit over cobbled surface	2/3
235	***/***	Cobbled surface north of Room ***231***	1
236	***/***	Modern construction cut	4
237	***236***	Backfill of cut	4
238	***190***	Cut for wall ***205***	2
239	***190***	Cut for wall ***206***	2
240	***190***	Backfill of ***238***	2
241	***190***	Backfill of ***239***	2
242	***190***	Cut for wall ***207***	2
243	***190***	Backfill of ***242***	2
244	***231***	Cut for wall ***233***	2
245	***231***	Backfill of ***244***	2
246	***200***	Northern wall of cistern	2
247	***200***	Rebuilt western wall of cistern	2b
248	***200***	Upper rebuild of western wall of cistern	2b

Context	Feature	Description	Phase
249	***200***	Southern wall of cistern	2
250	/	East/west wall	2
251	***200***	Backfill of cistern ***200***	3/4
252	/	North/south stone wall	2
253	/	East/west brick wall	2/3
254	***259***	Cut for wall	2/3
255	***259***	Backfill of ***254***	2/3
256	***258***	Cut for wall	2/3
257	***258***	Backfill of ***256***	2/3
258	/	East/west stone wall	2/3
259	/	East/west stone wall	2/3
260	/	Backfill deposit	2/3
261	***200***	Floor of cistern	2
262	/	Backfill deposit	3
263	***200***	Construction cut for cistern	2
264	***180***	Arched doorway in furnace	2
265	/	Not used	/
266	/	Not used	/
267	***189***	Levelling deposit for cobbled surface	1
268	***201***	Levelling deposit for cobbled surface	1
269	***180***	Backfill of ash pit in furnace	3
270	***180***	Slag deposit in flue ***174***	2
271	***180***	Slag deposit in flue ***273***	2
272	***180***	Demolition backfill overlying furnace	3/4
273	***180***	Eastern flue of furnace	2
274	***180***	Western flue of furnace	2

APPENDIX 3: FINDS CATALOGUE

Context	Object no	Quantity	Material	Description	Period
	1043	1	Ceramic Building Material	Brick sample 17 (9 x 5 x 2.5") - vitrified	Eighteenth/nineteenth century
134	-	1	Iron/Enamel	Sign	Nineteenth century?
134	10161	5	Iron	Chisel, bars (two), heavy square-sectioned ring	Late eighteenth/nineteenth century?
134	1025	3	Glass	Bottles: THO's BERRY & CO. LTD MOORHEAD BREWERY (brown); PEERLESS GLOSS HAUTHAWAYS MADE IN USA (colourless); small colourless	Nineteenth/early twentieth century
134	10089	1	Ceramic	Stoneware, industrial function	Eighteenth/nineteenth century
134	1026	6	Ceramic	Grey stoneware (four), glazed white earthenware, Dark-glazed red earthenware	Nineteenth century
134	10096	3	Animal Bone	Fragments	Not closely datable
144	1029	1	Leather	Belt fragment	Nineteenth century
144	10200	4	Building Material	Mortar (lime), wall plaster	Eighteenth/nineteenth century
144	10203	3	Industrial Residue	Furnace slag	Nineteenth century
144	10174	1	Animal Bone/Copper Alloy	Brush	Nineteenth century?
144	10176	2	Shell	Mussel	Not closely datable
144	10098	5	Animal Bone	Fragments	Not closely datable
144	10194	24	Ceramic	Dark-glazed red earthenware (three), unglazed red earthenware (six), light brown Derbyshire-type stoneware (two), transfer-printed white earthenwares (eight), glazed white earthenware (three), porcelain lid	Nineteenth century
144	10178	31	Animal Bone	Fragments	Not closely datable
144	10199	3	Ceramic	Drain pipe	Nineteenth century
144	10167	1	Glass	Vessel fragment	Nineteenth century
144		1	Glass	Vessel fragment	Nineteenth century
144	10111	3	Ceramic	Dark-glazed red earthenware, blue transfer-printed ware, creamware	Nineteenth century
144	10179	3	Clay Tobacco Pipe	Stems (narrow and medium)	Nineteenth century
144	10182	1	Iron	Nail	Nineteenth century?
144	10183	4	Copper Alloy	Object	Nineteenth century?
144	10201	2	Industrial Residue	Furnace bottom	Nineteenth century
114	-	1	Iron	Pipe	Nineteenth century
145	1008	1	Animal Bone	Fragment	Not closely datable
145	1006	6	Shell	Mussel	Not closely datable
145	1005	18	Ceramic	Dark-glazed red earthenware (four), unglazed red earthenware, Industrial slipware, glazed white earthenware (five), transfer-printed earthenware (two)	Nineteenth century
145	1007	1	Copper Alloy	Object	Nineteenth century?
147	10166	7	Industrial	Furnace slag	Nineteenth century?

Context	Object no	Quantity	Material	Description	Period
			Residue		
147	10154	1	Clay Tobacco Pipe	Stem	Nineteenth century
147	10141	9	Ceramic	Dark-glazed red earthenware (six), mid-brown stoneware bowl, transfer-printed and blackware cup	Nineteenth century
147	10148	5	Glass	Vessel fragments (painted opaque white)	Nineteenth century
147	10206	8	Ceramic	Sewer pipe	Nineteenth century?
147	10144	1	Lead	Rod	Nineteenth century?
147	10140	7	Ceramic	Sewer pipe	Nineteenth century
147	10209	6	Industrial Residue	Furnace slag	Nineteenth century?
147	10190	4	Ceramic	Dark-glazed red earthenware (coarse)	Nineteenth century
148	10087	1	Clay Tobacco Pipe	Stem	Nineteenth century
148	10119	8	Industrial Residue	Furnace slag	Nineteenth century?
148	10086	9	Ceramic	Dark-glazed red earthenware (three), stoneware (two), glazed white earthenware	Nineteenth century
148		1	Glass	Vessel fragment	Nineteenth century
149	10137	2	Industrial Residue	Coal	Not closely datable
149	10122	1	Clay tobacco pipe	Stem (narrow)	Nineteenth century
149	10123	3	Ceramic	Glazed white earthenware	Nineteenth century
149	10163	1	Copper Alloy	Buckle	Nineteenth century?
149	10126	1	Animal Bone	Fragment	Not closely datable
153	1011	8	Animal Bone	Fragments	Not closely datable
153	10164	2	Copper Alloy	Embossed furniture fitting, strip	Nineteenth century?
153	1010	7	Glass	Beer bottle fragments (two), with makers' mark RD & FENE, decanter fragments (three), engraved-glass bowl fragments (three)	Nineteenth century
153	1012	10	Ceramic	Dark-glazed red earthenware, black transfer-print, blue shell-edge plate, creamware gravy jug (Minton), grey stoneware, annular ware (two), glazed white earthenware (two)	Nineteenth century
153	10162	1	Lead	Pipe	Not closely datable
153	10127	3	Glass	Mineral-water bottles (complete): THE SHEFFIELD BOTTLING COMPANY LIMITED, bottle made by P. WADDINGTON & SONS MEXBORO; J.C. BROTHWELL BRITANNIA WORKS SHEFFIELD; G.W. WAUGH LTD, BROMLEY STREET SHEFFIELD	Nineteenth/twentieth century
153	-	1	Clay Tobacco Pipe	Stem	Nineteenth century
153	10114	1	Rubber	Bottle top	Twentieth century
153	10158	3	Iron	Curved strip, L-shaped object, and unidentified object	Not closely datable
168	10145	1	Ceramic Building Material	Brick sample (10 x 4 x 2.5") with lime mortar attached	Eighteenth/nineteenth century
173	1038	2	Ceramic Building	Bricks; deep red (sample 13), incomplete	Late nineteenth century

Context	Object no	Quantity	Material	Description	Period
			Material		
174	1045	4	Industrial Residue	Furnace slag	Nineteenth century?
174	-	1	Ceramic Building Material	Fuel slag fused onto refractory brick	Nineteenth century
195	10204	2	Ceramic Building Material		Nineteenth century
195	-	1	Fired Clay	Crucible fragment	Nineteenth century
195	10157	1	Copper Alloy	Wire	Not closely datable
195	10160	4	Iron	Pipe (three), object	Not closely datable
195	10146	1	Copper Alloy	Cylinder	Nineteenth century?
195	10139	1	Industrial Residue	Furnace slag	Nineteenth century?
195	10193	13	Ceramic	Dark-glazed red earthenware (two), creamware, porcelain, industrial slipware, blue shell-edge plate, brown stoneware (two), glazed white earthenware, transfer-printed ware	Nineteenth century
195	10170	3	Glass	Straight-walled vessel fragments	Nineteenth century
195	10159	1	Lead	Strip	Not closely datable
197	10108	24	Ceramic	Dark-glazed red earthenware (two), stoneware (two), light-brown glazed earthenware, creamware (two), white earthenware (11), blackware, trailed slipware, unglazed red earthenware	Eighteenth-nineteenth century
197	10091	3	Clay Tobacco Pipe	Stems (narrow)	Nineteenth century
197	10118	1	Industrial Residue	Furnace slag	Nineteenth century?
197	-	4	Clay Tobacco Pipe	Stems	Nineteenth century
197	10097	1	Animal Bone	Fragment	Not closely datable
197	10090	22	Ceramic	Dark-glazed red earthenware (ten), salt-glazed stoneware (two), creamware (four), blue transfer-printed wares (two), industrial slipware, blackware	Nineteenth century
198	10175	1	Stone	Ball	Not closely dateable
199	1042	3	Fire Clay	Crucible lids	Nineteenth century?
199	1040	1	Fired Clay	Crucible	Nineteenth century?
199	10088	16	Ceramic	Black transfer-printed plates (two vessels) decorated with Chinese men and pagoda	Eighteenth/nineteenth century
199	1044	2	Ceramic	Crucibles	Nineteenth century?
223	1002	1	Glass	Blue flask fragment, multifaceted octagonal perfume bottle	Nineteenth century
223	1015	28	Ceramic	Dark-glazed red earthenware (five), brown stoneware bottle (two), brown and blue annular ware tableware (three), glazed white earthenware (four), blue transfer-patterned plates (11), black basalt butter dish	Eighteenth/nineteenth century
223	-	3	Clay Tobacco Pipe	Stems	Eighteenth/nineteenth century
223	10135	15	Ceramic	Dark-glazed red earthenware (black and brown nine), Derbyshire-type stoneware (two), grey thick-walled stoneware, blue	Eighteenth/nineteenth century

Context	Object no	Quantity	Material	Description	Period
				transfer-printed ware (three)	
223	1017	1	Glass	Colourless vessel	Nineteenth century?
223	10117	1	Industrial debris	Furnace slag fused onto crucible fragment	Nineteenth century?
223	10143	1	Iron	Object	Not closely dateable
223	1016	3	Animal Bone	Fragment	Not closely datable
223	10082	22	Ceramic	Dark-glazed red earthenware (13), yellow-glazed red earthenware, industrial slipware, glazed white earthenware (two), blue transfer-printed wares (five)	Nineteenth century
223	-	1	Clay Tobacco Pipe	Stem	Nineteenth century
223	1001	17	Ceramic	Dark-glazed red earthenware (four), unglazed red earthenware, Industrial slipware (three), glazed white earthenware (three), transfer-printed ware (seven)	Nineteenth century
223	10149	2	Shell	Cockle	Not closely datable
223	10186	29	Ceramic	Dark-glazed red earthenware (nine), unglazed red earthenware, large stoneware demijohn, yellow-glazed red earthenware, glazed white earthenware, including transfer-printed pudding bowl, serving dishes, plates	Nineteenth century
223	10081	1	Shell	Oyster	Not closely datable
223	1003	1	Shell	Oyster	Not closely datable
223	10153	19	Ceramic	Dark-glazed red earthenware (four), glazed white earthenware saucer (two), transfer-printed plates (three), Industrial slipware (four), gold-lustred hand-painted over-glaze transfer ware	Nineteenth century
223	10112	2	Clay Tobacco Pipe	Moulded leaf seam, decorated bowls	Nineteenth century
223	-	1	Glass	Square blue perfume bottle base	Nineteenth century
223	-	2	Industrial Residue	Furnace slag	Nineteenth century?
223	10120	1	Industrial Residue	Furnace slag - smelting	Nineteenth century?
223	10155	1	Clay tobacco pipe	Stem (narrow)	Nineteenth century
223	10147	1	Glass	Vessel fragment	Nineteenth century
223	10165	1	Glass	Bottle: GOODALL BACKHOUSE & CO. YORKSHIRE RELISH	1837-1922
223	10156	2	Stone	Fragments	
224	10121	6	Ceramic	Unglazed red earthenware (sooted), blue transfer chinoiserie-printed dish (four), light-brown glazed bowl	Nineteenth century
229	10128	12	Glass	Mineral-water bottle fragments (two), TITBITS SAUCE bottle, square sauce bottle, bottle necks (two), salt or pepper shaker, stoppers (two)	Nineteenth/twentieth century
229	10145	1	Copper Alloy	Crimp	Not closely datable
229	10056	14	Ceramic	Porcelain saucer, glazed white earthenware (two, includes a Burslem product), industrial slipware (four), late brown stoneware (two), dark-glazed red earthenware (four)	Nineteenth century
234	10079	1	Shell	Cockle	Not closely datable

Context	Object no	Quantity	Material	Description	Period
234	10080	10	Clay Tobacco Pipe	Stems (narrow)	Nineteenth century
234	10078	19	Ceramic	Lustre ware, industrial slipware, blue transfer-printed wares, blackware, dark-glazed red earthenware (three coarse, one fine), Derbyshire-type stoneware (five), glazed white earthenware (three), creamware	Nineteenth century
237	10051	1	Copper Alloy	Clock fittings	Nineteenth century?
241	10205	2	Industrial Residue	Furnace slag	Nineteenth century
241	10173	1	Animal Bone		Nineteenth century
241	10191	3	Clay Tobacco Pipe		Nineteenth century
241	10189	11	Ceramic	Blackware, dark-glazed red earthenware (coarse two, fine two), glazed white earthenware (two), Derbyshire-type stoneware (three)	Nineteenth century
251	10092	11	Ceramic	Pearlware, glazed white earthenware (four), rectangular-shaped black transfer-printed bowl and plate, willow-patterned dish, sponge-printed bowl	Nineteenth century
251	10187	11	Ceramic	Dark-glazed red earthenware fragments	Nineteenth century
251	10188	18	Ceramic	Stoneware (two), black-glazed white ware (two), glazed white earthenware including transfer-printed bowl, plates and saucers	Nineteenth century
251	10213	24	Animal Bone	Fragments	Not closely datable
251	10106	11	Ceramic	Glazed white earthenware bowl (six), large blue transfer-printed platter, Asiatic Pheasant-patterned black transfer plate	Nineteenth century
251	10105	1	Ceramic	Dark-glazed red earthenware pancheon	Eighteenth/nineteenth century
251	10102	7	Clay Tobacco Pipe	Bowls (five, undecorated) and two stems	Nineteenth century
251	10110	7	Ceramic	Glazed white earthenware bowl (three), black transfer-patterned plate, blue transfer-printed bowl	Nineteenth century
251	10198	14	Ceramic	Dark-glazed red earthenware	Nineteenth century
251	10212	1	Glass	Vessel fragment	Nineteenth century
251	10129	10	Glass	Sheet glass, large flask, beer and small bottle necks (two), small square colourless bottle, square indented, thick-walled vessel	Nineteenth century
251	1014	1	Ceramic	Grey stoneware jar	Nineteenth century
251	10152	4	Ceramic	Large stoneware dish	Nineteenth century
251	10150	19	Ceramic	Dark-glazed red earthenware (five), glazed white earthenware bowl, stoneware dish, transfer-printed bowl, white earthenware marmalade jar labelled]ell & Brown Finest Orange Marmalade	Nineteenth century
251	10104	7	Ceramic	Dark-glazed red earthenware vessel	Nineteenth century
251	10196	12	Ceramic	Glazed white earthenware (six), light-brown stoneware almost complete rectangular-shaped roasting dish (two), dark brown stoneware lid, grey stoneware jar	Nineteenth century
251	10125	11	Glass	Textured sheet window (two), colourless square bottle, green bottle, two), large	Nineteenth century

Context	Object no	Quantity	Material	Description	Period
				colourless wine bottle base, mineral water bottle fragments (two) JS & T BIRKS 69 MARKET PLACE, and 33 WICKER SHEFFIELD (established 1860)	
251	10177	8	Leather	Shoes: sole and heel fragments	Nineteenth century?
251	10172	2	Glass	Window fragments	Nineteenth century
251	10095	29	Animal Bone	Fragments	Not closely datable
251	1024	18	Ceramic	Grey stoneware jug (17 fragments from more than one vessel), industrial slipware	Nineteenth century
251	10094	1	Cork	Bottle top	Nineteenth/twentieth century
251	10093	9	Shell	Oyster	Not closely datable
251	1023	1	Animal Bone	Fragment	Not closely datable
251	10202	1	Ceramic Building Material	Brick fragment	Eighteenth/nineteenth century?
251	10208	1	Industrial Residue/Glass	Slag fused with glass bottle fragments	Nineteenth century?
251	1004	16	Ceramic	Grey stoneware jars (15 fragments from one vessel), glazed white earthenware	Eighteenth/nineteenth century
251	10207	36	Industrial Residue	Furnace bottom and slag	Nineteenth century?
251	10115	29	Industrial Residue/Iron	Furnace slag/iron bar	Nineteenth century?
251	10197	14	Ceramic	Large Derbyshire-type stoneware (casserole) dish lid, grey stoneware jar, black and blue transfer-printed dish (two) and plate, black-glazed (Jasper?) whiteware bowl (eight)	Eighteenth/nineteenth century
251	10168	1	Glass	Window fragment	Nineteenth century
251	10130	27	Glass	Window (grooved two), octagonal flask, small perfume bottle neck, green and brown bottles (two)	Nineteenth century
251	10210	10	Ceramic	Annular bowl (blue and white striped), hand-painted glazed white earthenware square-shaped bowl, transfer-printed plate and cup	Eighteenth/nineteenth century
251	10211	30	Ceramic	Lustre teapot, dark-glazed red earthenware, Castleford Orange Marmalade, London, Two Pounds Jar, light-brown stoneware blacking bottle, grey stoneware (five), brown stoneware bottle, sponge-printed bowl, teapot handle, industrial slipware (three), porcelain cup and brown china	Eighteenth/nineteenth century
251	10132	15	Ceramic	Dark-glazed red earthenware (coarse and fine)	Eighteenth/nineteenth century
251	10195	11	Ceramic	Glazed white earthenware jam jar and large rectangular bowl, porcelain saucer	Nineteenth century
251	10151	11	Ceramic	Light-brown stoneware; large bowl and small rectangular dish (three), porcelain saucer, glazed white earthenware saucer (two) and food mixing bowl, blue transfer-printed plate and chamber pot	Eighteenth/nineteenth century
251	10171	1	Glass	Window fragment	Nineteenth century
251		1	Glass	Window fragment	Nineteenth century
251	10134	9	Ceramic	Dark-glazed red earthenware (coarse)	Eighteenth/nineteenth century

Context	Object no	Quantity	Material	Description	Period
251	10180	1	Lead	Flashing strip	Nineteenth century?
251	10184	1	Copper Alloy	Cover of bicycle bell	After *c* 1870
251	1013	26	Glass	Beer and mineral-water bottle fragments (12), colourless bottle fragments (three), square bottle with indented sides, base fragments (ten)	Nineteenth century
251	1019	12	Glass	Bottles: Don Brewery Sheffield (two), colourless bottle and fragments, beer bottle and two necks	Nineteenth/twentieth century
251	1021	19	Glass	Colourless bottles (six): JW DOBSON Makers; beer bottle fragments (three); COMBE & ..; square flask fragments (ten)	Nineteenth/twentieth century
251	10185	6	Iron	Bars (two), strips (two), knife and unidentifiable object	Nineteenth century?
251	1020	12	Glass	Beer and spirit bottle fragments: Don Brewery Sheffield John Marples & Co 2 Market Street Sheffield; colourless bottle marked Market Street Sheffield	Nineteenth/twentieth century
253	1039	1	Ceramic Building Material	Brick sample 20 (9 x 5 x 2.5"), with grey speckled mortar attached	Late nineteenth century?
260	10113	1	Stone	Furnace furniture (vitrified), ganister?	Nineteenth century
260	10116	6	Fired Clay	Furnace furniture/crucible fragment	Nineteenth century?
260	1041	1	Industrial Residue	Furnace furniture; blister furnace seal	Nineteenth century?
260	10076	8	Ceramic	Dark-glazed red earthenware (five brown, two black), blue transfer-printed ware plate	Eighteenth/nineteenth century
260	10103	2	Clay Tobacco Pipe	Undecorated bowl and stem	Eighteenth/nineteenth century
260	10109	12	Ceramic	Dark-glazed red earthenware (coarse and fine), blackware bowl	Nineteenth century
260	10107	5	Ceramic	Dark-glazed red earthenware (three), brown stoneware, glazed white earthenware	Nineteenth century
260	10099	13	Ceramic	Dark-glazed red earthenware (fine three and coarse one), glazed white earthenware (four), light-brown stoneware (two), brown-glazed earthenware, blue shell-edged plate	Nineteenth century
260	10101	1	Clay Tobacco Pipe	Bowl (decorated)	Nineteenth century
262	10136	6	Ceramic	Stoneware jar, pearlware, dark-glazed red earthenware (two), flow-blue transfer-printed plate, earthenware with white slip, with moulded panels	Nineteenth century
262	10169	4	Glass	Square cough-mixture bottle embossed with (WO) RLD FAMOUS .O.R MIXTURE (two), vessel fragments	Nineteenth century
262	10124	3	Clay Tobacco Pipe	Nineteenth century	Nineteenth century
262	10131	1	Glass	Veno's Lightning Cough Cure, green aqua bottle	Early twentieth century
267	10192	8	Ceramic	Dark-glazed red earthenware (coarse)	Nineteenth century
269	10066	3	ClayTobacco Pipe	Bowls, one stem	Nineteenth century
269	10062	18	Ceramic	Glazed white earthenware saucers and	Eighteenth/nineteenth

Context	Object no	Quantity	Material	Description	Period
				plates	century
269	10074	9	Ceramic	Dark-glazed red earthenware (black and brown coarse, with fabric attached to the exterior	Nineteenth century
269	-	10	Ceramic	Dark-glazed red earthenware (brown)	Nineteenth century
269	10053	21	Glass	Beer/wine bottle fragments (six brown, one blue), blue square flask (two), small bottle necks (four), unidentified bottle fragments (two), vessel fragments (five), tumbler	Nineteenth/twentieth century
269	10138	1	Industrial Residue	Furnace furniture	Nineteenth century
269	10077	4	Ceramic	Dark-glazed red earthenware (three black, one brown)	Nineteenth century
269	10072	3	Ceramic	Stoneware jars grey, produced for WP Hartley, at Aintree	After 1886
269	10049	3	Copper Alloy	Pipe, cylinder, wire	Not closely datable
269	1009	5	Ceramic	Dark-glazed red earthenware, light-brown stoneware bowl, glazed white earthenware (three), hand-painted china	Eighteenth/nineteenth century
269	10057	8	Ceramic	Black transfer-printed bowl patterned with a stately home picnic scene	Eighteenth/nineteenth century
269	10045	6	Iron	Brace, horseshoe, strip, hinge, bar components of probable fire surround	Eighteenth/nineteenth century?
269	10050	3	Lead	Coated cable	Nineteenth century?
269	10073	10	Ceramic	Dark-glazed red earthenware (brown), almost complete pancheon	Nineteenth century
269	10071	10	Ceramic	Stoneware jars, grey and light brown (four vessels)	Nineteenth century
269	10052	18	Glass	Bottles (milk/beer), lamp globe fragments (two), square colourless flask (two), medicine bottle, bowl (three fragments), colourless bottle	Nineteenth/twentieth century
269	10069	10	Ceramic	Stoneware jars, grey (three vessels) produced for W P Hartley	After 1886
269	10133	1	Ceramic	Hand-painted transfer-printed decorated jug, with a stylised zoomorphic handle, chinoiserie-style decoration	Nineteenth century
269	1030	3	Leather	Shoes, including child's clog	Nineteenth century
269	10054	1	Glass	Ink bottle, octagonal	Nineteenth century
269	10060	22	Ceramic	Hollow ware (light-brown glazed jug, (six), industrial slipware (eight), black transfer-printed jug, blue-edged plate, blue transfer-printed teacup	Eighteenth/nineteenth century
269	10058	8	Ceramic	Black transfer-printed ?chamber pot, single vessel (design marked Poonah)	Nineteenth century
269	10055	1	Animal Bone	Fragment	Not closely datable
269	10063	25	Ceramic	Blue transfer-print with a floral pattern, bowls and dishes	Nineteenth century
269	1028	1	Glass	Mineral water bottle: GEORGE TAYLOR, ATTERCLIFFE SHEFFIELD 1893, manufactured by, DAN RYLANDS LTD BARNSLEY	Nineteenth century
269	1027	11	Ceramic	Dark-glazed red earthenware (brown), late nineteenth century grey-bodied stoneware (four), glazed white earthenware (two), industrial slipware, blue and black transfer-printed wares, including a mug	Nineteenth century

Context	Object no	Quantity	Material	Description	Period
269	1018	5	Ceramic	Dark-glazed red earthenware (three), transfer-printed white earthenware lid (two)	Nineteenth century
269	10068	14	Ceramic	Dark-glazed red earthenware (two), Derbyshire-type stoneware bowl (four), yellow-glazed red earthenware, stoneware jar (four), small brown stoneware jar, glazed white earthenware	Nineteenth century
269	10067	12	Ceramic	Stoneware jar (four vessels), large handled stoneware vessel	Nineteenth century
269	10065	2	Ceramic	Stoneware jars, grey (complete vessel) produced for W P Hartley, stoneware light brown jar with label traces reading (PL)..UM Jam?)	After 1886
269	10070	15	Ceramic	Stoneware jars, grey (four vessels) produced for W P Hartley	After 1886
269	10064	22	Ceramic	Glazed white earthenware transfer-printed with floral decoration, serving bowl with foot ring, pudding bowl and fruit bowl	Nineteenth century
269	10059	21	Ceramic	Green transfer-printed plate, cobalt blue transfer-printed square-handled mug in a floral-style pattern, black transfer-printed floral-patterned jar, polychrome hand-painted white earthenware thick-walled jug	Nineteenth century
269	1022	13	Ceramic	Dark-glazed red earthenware, glazed white earthenware (eight), blue and black transfer-printed wares, industrial slipware	Nineteenth century
269	1006	26	Ceramic	Glazed white earthenware, pearlware, porcelain tablewares	Nineteenth century
272	1046	1	Industrial Residue	Furnace component	Nineteenth century?
273	10047	3	Iron	Gas meter	Nineteenth century
7665	10083	1	Iron	Clamp	Not closely datable
7690	10084	1	Iron	Rod	Not closely datable
7690	10085	2	Lead	Flashing	Not closely datable

ILLUSTRATIONS

FIGURES

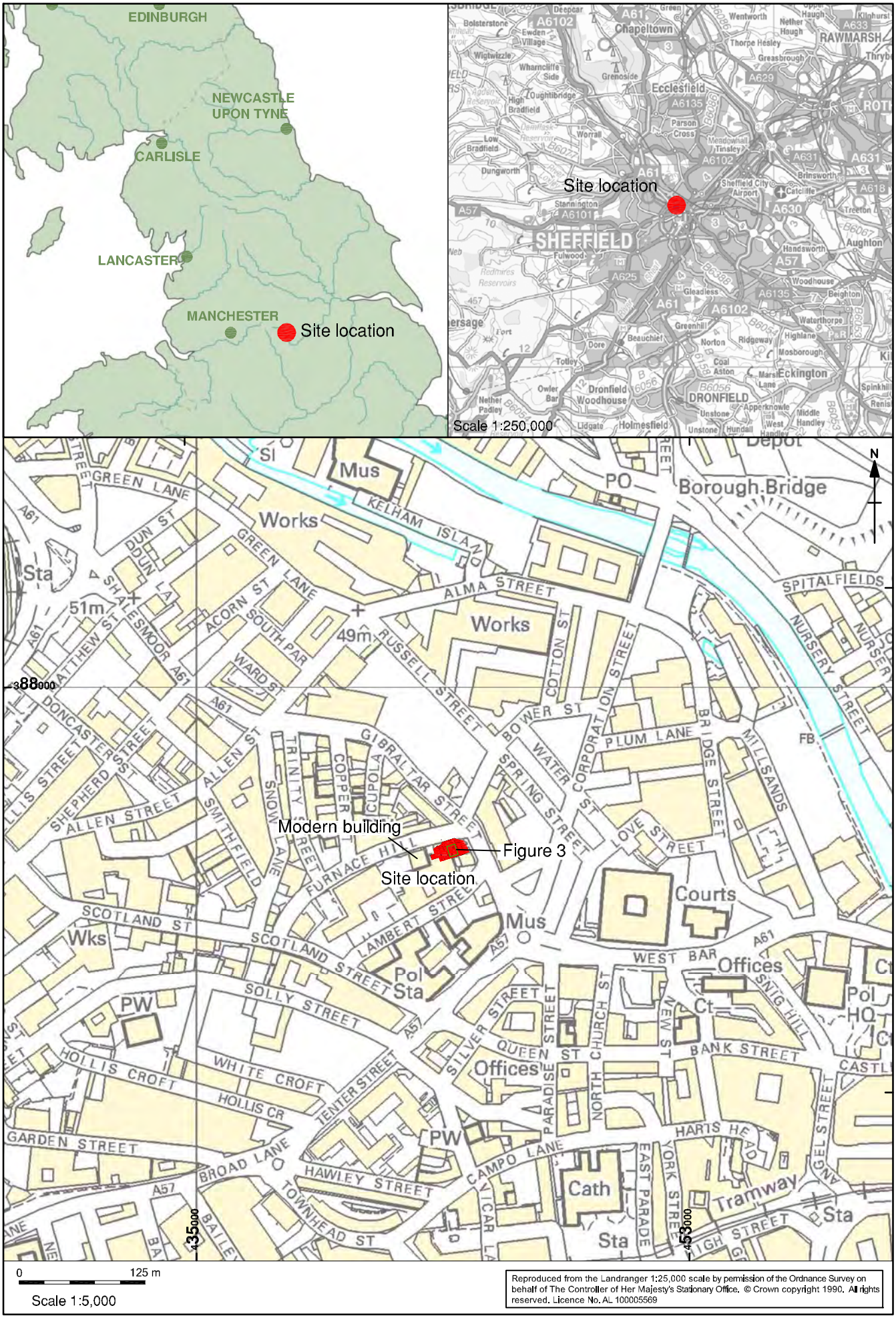

Figure 1: Site location

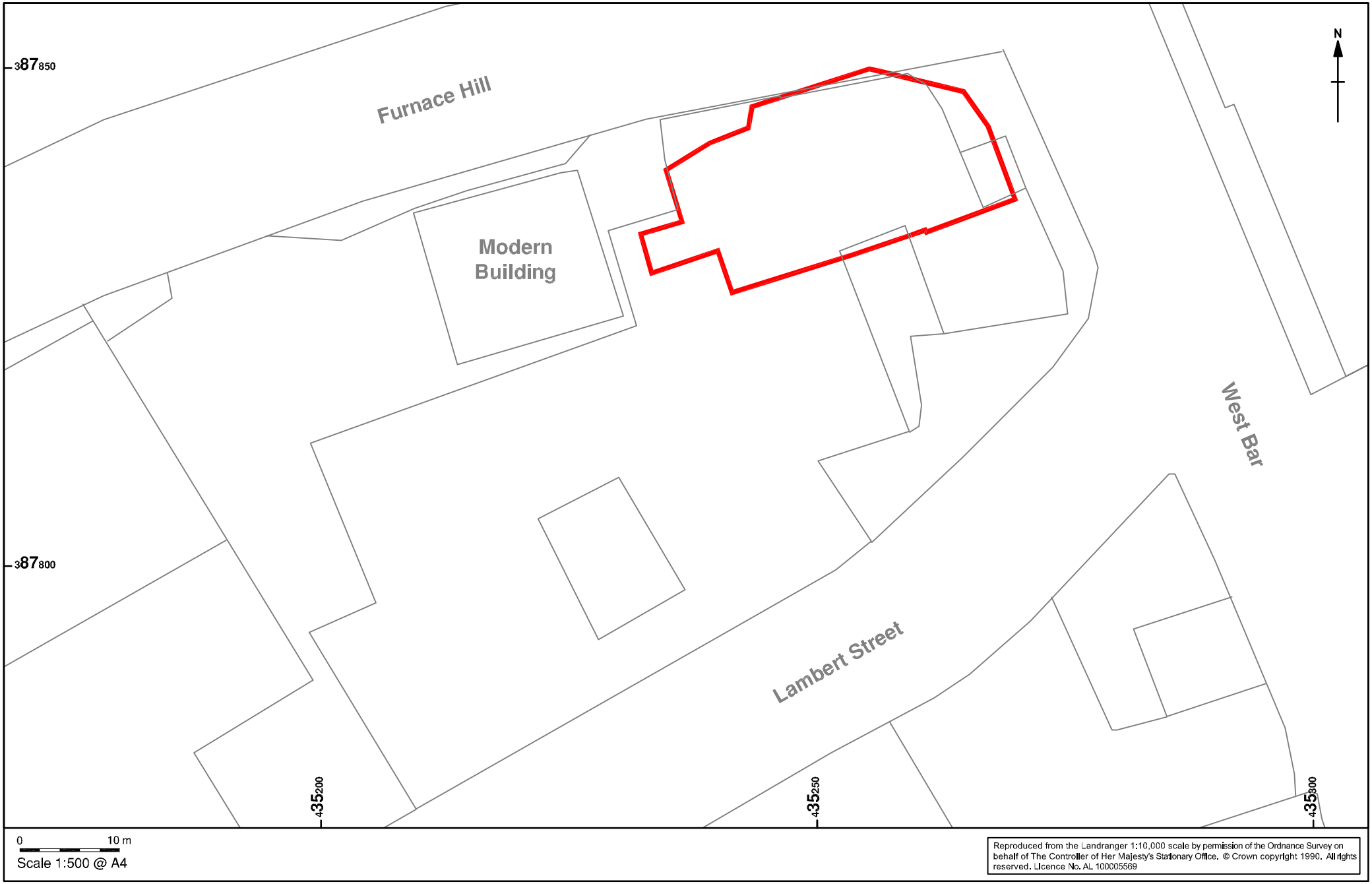

Figure 2: Location of excavation area

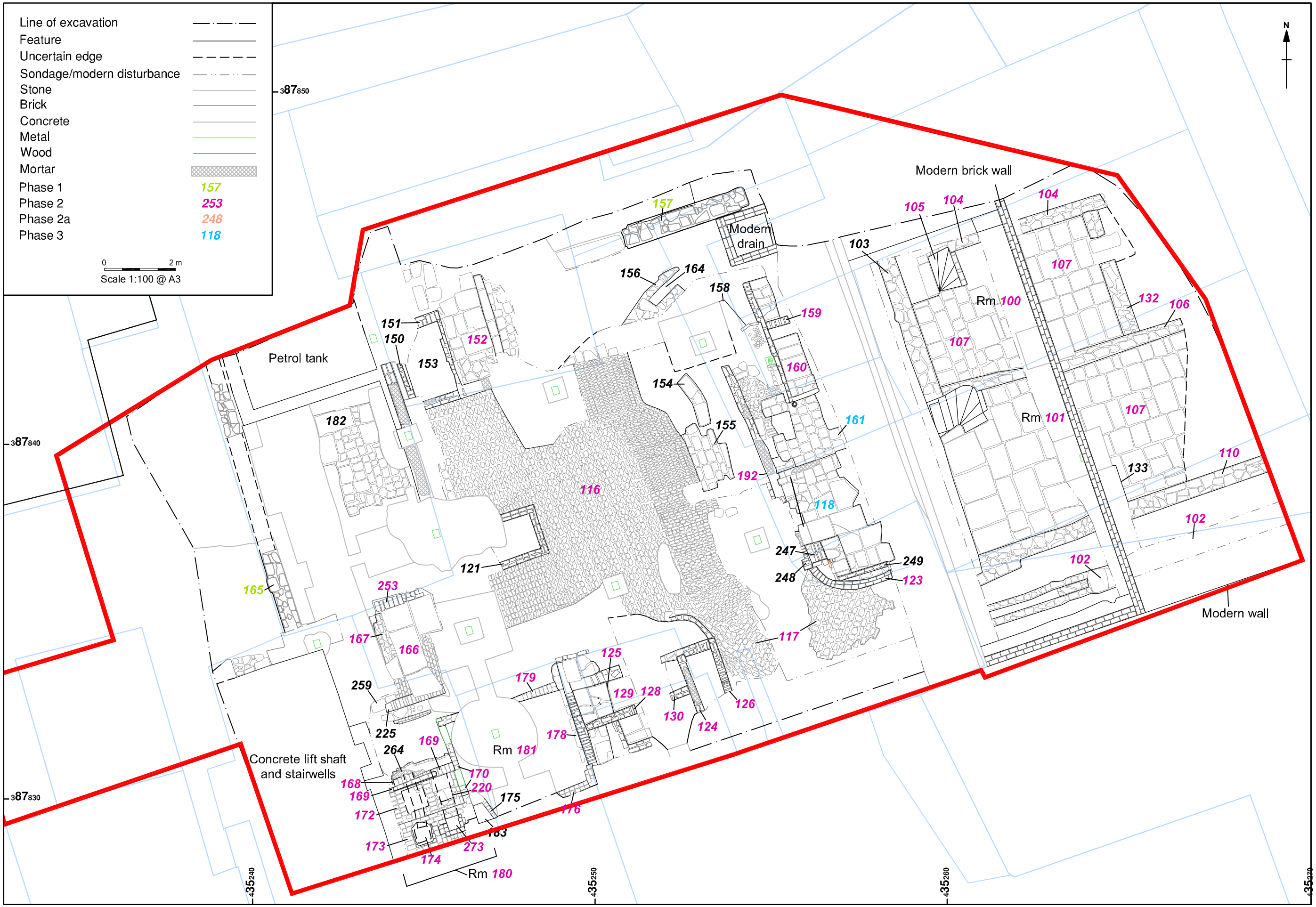

Figure 3: Excavated remains superimposed on the 1853 Ordnance Survey map (in blue)

Line of excavation
Feature
Uncertain edge
Sondage/modern disturbance
Stone
Brick
Concrete
Metal
Wood
Mortar
Phase 2 253

0 1 m
Scale 1:50 @ A3

N

387850
387840
387830
435240
435250
435260

Vaulted passage 168
Ash pit 220
refractory wall 169
Furnace east wall 170
Location of third disturbed ash pit
brick surface/crucible working area 172
Rm 180 underneath
Flue 273
Flue 174
Chimney stack 173

Figure 4: The crucible furnace

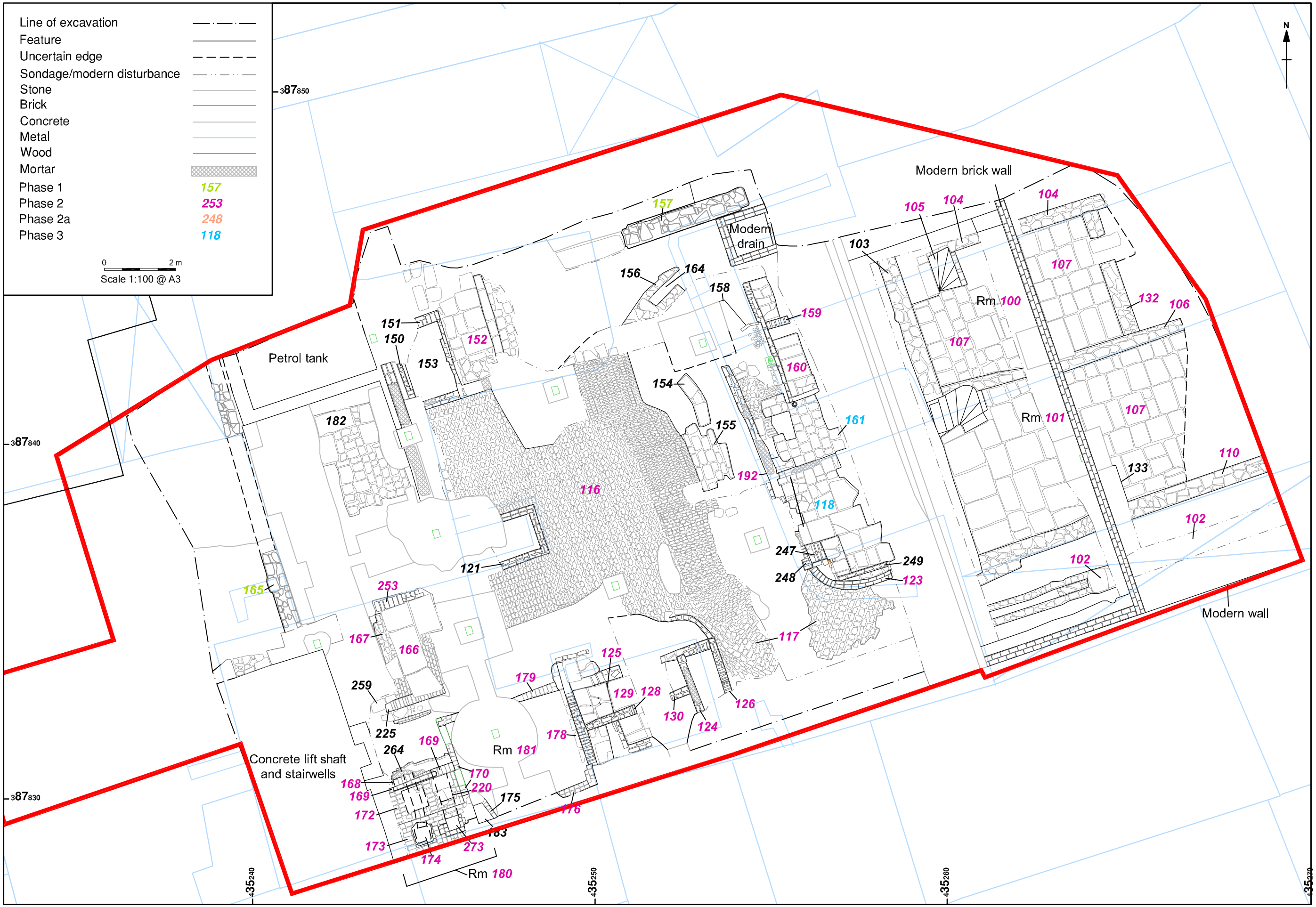

Figure 5: Excavated remains superimposed on the 1890 Ordnance Survey map (in blue)

Oxford Archaeology North
Mill 3
Moor Lane Mills
Moor Lane
Lancaster
LA1 1QD
t: (01524 541000
f: (01524) 848606
e: oanorth@oxfordarch.co.uk
w: www.oxfordarch.co.uk

Director and Chief Executive:
Gill Hey BA PhD MIfA FSA

Private Limited Company Number: 1618597

Registered Charity Number: 285627

Registered Office: Oxford Archaeology Ltd.
Janus House, Osney Mead, Oxford, OX2 0ES