Sheffield Castle
Sheffield

Archaeological Evaluation Assessment Report

Ref: 210540.04
July 2019

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Document Information

Document title	Sheffield Castle, Sheffield
Document subtitle	Archaeological Evaluation Post-Excavation Assessment Report
Document reference	201540.03
Client name	Sheffield City Council
Address	Howden House 1 Union Street Sheffield South Yorkshire S1 2SH
Site location	Castlegate, Sheffield
County	South Yorkshire
National grid reference (NGR)	435805, 387684 (SK 35805 87684)
Statutory designations	National Heritage List for England nos 1254808, 1254809, 1254810; IOE nos 458126, 458127 and 458129)
Planning authority	Sheffield City Council
Museum name	Museums Sheffield
Museum accession code	TBD
WA project name	Sheffield Castle
WA project code	201540
Dates of fieldwork	13 August 2018 to 19 October 2018
Fieldwork directed by	Ashley Tuck
Project management by	Milica Rajic
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Graphics by	Rob Goller based on work by Ian Atkins

Quality Assurance

Issue number	and date	Status	Author	Approved by
1	7 Feb 2019	Draft	AWT	
2	19 July 2019	Final	AWT	

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Summary

Wessex Archaeology were commissioned by Sheffield City Council (SCC) to undertake an archaeological evaluation and borehole survey at the site of Sheffield Castle, Castlegate, Sheffield, centred on NGR 435805, 387684 (**Fig. 1**). The main aim of the project was to provide SCC with information about the archaeological deposits and areas of archaeological potential within the Castle Markets site.

Assessment of a borehole survey undertaken alongside the trial trenching had not yet been completed. It is anticipated that this will be released in a separate report. The two strands of reporting will be united during the production of a final archive report.

It is hoped that the interpretation of the potentially earliest remains identified during the evaluation will be enhanced by proposed scientific dating. These remains comprise chiefly a palimpsest of five sub-phases of cut features at the base of trench 6.

A series of clean clay redeposited alluvium deposits in trench 2 may represent an earthwork such as a motte. Again, the results of scientific dating are awaited.

Nearby, in trench 3, redeposited alluvial clay containing charcoal with probably some mixed-in soils formed a 13th-century *glacis* or similar earthwork. A stone foundation (3064) likely indicates that the castle of the de Lovetots' was not exclusively constructed of timber.

Destruction contexts overlying the remains of stone foundation 3064 appear to relate to the destruction of the castle during the Second Baron's War in 1266. In the aftermath of this destruction, the castle site was likely levelled and landscaped in preparation for rebuilding by de Furnival from 1270.

The outer clay bank of the moat was recorded in trench 10; this was an unexpected result as the moat was assumed to have been rock-cut throughout. The bank of the moat contained 13th- to 15th-century pottery. The rock-cut moat was recorded in trench 9. Athough excavation in trench 11 was not deep enough to reach the moat; there is high potential for the moat to exist in this general area.

The cobblestone courtyard surface of the castle was encountered in both trenches 5 and 1. Medieval slag recovered from trenches 1, 5 and 6 may be evidence for medieval ironworking within or associated with Sheffield Castle. The slag may have been used to repair or replace the earlier cobblestone surface. A further late medieval (15th-/early-16th-century) cobblestone surface was also recorded in trench 1.

Evidence connected to the destruction of the castle in the 17th century was limited to backfilling of the moat in trench 10 and a single small deposit in trench 1. In trench 10, large lumps of masonry tumble derived from the castle structures were identified in the fills of the moat.

The 18th century saw levelling activity across many parts of the site (trenches 1, 2, 4, 5, 10, 11 and probably also 6). The boundary wall of a bowling green known from historic maps was recorded in trenches 1 and 5. A visually impressive structure incorporating retaining walls and a staircase was recorded in trench 6. A range of slaughterhouses were recorded in trench 11.

By the 19th century, the slaughterhouses had expanded to trench 10. Steelworks had colonised the centre of the site (trenches 1, 2, 3, 4 and 5); some of these were later repurposed. The road surface of Castle Hill road and associated drains were recorded in trench 3.

In the 20th century, the site was redeveloped as a Co-operative Store and council market, before the markets expanded and the Co-operative Store was redeveloped and incorporated into the market complex. Across most of castle hill (trenches 1–5 and the north part of 6), and in the east of the site (trenches 10 and 11), the impact of 20th-century development on archaeological remains was generally low or moderate and preservation was good. Some deeper drains and foundations were present in these areas; these were generally shallower than 1.2 m and primarily impacted 19th-century contexts. Where these deeper impacts were present they were intermittent and did not significantly impede interpretation of the remains. However, in the south of trench 6, late-20th-century redevelopment had removed all archaeological remains to a depth of at least 4 m. Development in the 19th-century had also had an impact on medieval remains, for example in trench 3 where a 19th-century weighbridge had had a deep impact. In the west/south-west of the site, 20th-century impacts were greater, removing all post-medieval and medieval strata and truncating the bedrock. However, there is still potential for archaeological remains to survive in this area as demonstrated by the survival of the moat in trench 9.

Artefacts include a medieval pottery assemblage and a copper alloy toilet item. A range of post-medieval artefacts were also recovered.

The medieval environmental assemblage has potential to build a picture of the changing environment. Cereal grains were present throughout the medieval period and there is evidence for wild food exploitation (blackberry, raspberry, hazel nut etc.).

The updated project design included within this assessment report recommends analysis of the significant artefact categories (pottery, clay pipe, metal, slag, leather, wood and animal bone) and analysis of environmental material (charred and waterlogged plant material and wood). Scientific dating has been recommended. The results will be published as part of a book in production by The University of Sheffield. A final archive report will be produced containing full discussion and interpretation of the results and analysis.

The archive is currently held at the offices of Wessex Archaeology in Sheffield, under the project code 201540. In due course, the archive will be deposited with Museums Sheffield under an accession number to be determined. An OASIS form, wessexar1-322479 has been completed for this project and will be finalised at the time of deposition.

Acknowledgements

Wessex Archaeology would like to thank Sheffield City Council for commissioning the archaeological evaluation. Wessex Archaeology is also grateful for the advice of Dinah Saich and all at the South Yorkshire Archaeological Service, who monitored the project on behalf of Sheffield City Council and were supported by Samantha Stein, Assistant Science Advisor (Yorkshire) at Historic England. The assistance of The University of Sheffield is greatly appreciated, particularly that of John Moreland, Dawn Hadley, Gareth Dean, Glynis Jones, Ellen Simmons, Mark Bateman and Caitlin Buck. The University of Sheffield provided bursaries for four students to work on this project. Wessex Archaeology acknowledges the work of the Friends of Sheffield Castle in helping to bring this project to fruition and for their friendly assistance. We are grateful for the assistance of Westmoreland Plant Hire and HB Tunnelling in providing plant and specialist deep excavation equipment and expertise.

The trial trench excavation was directed by Ashley Tuck, with the assistance of Amy Derrick and Sam Birchall and The University of Sheffield students Isabelle Sherriff, Paul Harrison, Georgina Goodison and James Chapman. Wessex Archaeology staff Ciaran O'Neill, Jake Dyson, Stuart Pierson, Otis Gilbert, Rob Jones, Karen Austin, John Whitmore and The University of Sheffield student Erina Mamenda also made contributions to the excavation. A large team of volunteers undertook work, with particular thanks to Paul Rowland and the Harthill with Woodall Archaeology Group and also to Michael Clark and Alan Stewart amongst many other significant contributors. The borehole survey was undertaken by Richard Payne and Liz Chambers and is being reported on by Alex Brown. The environmental samples were processed by Liz Chambers, Fiona Eaglesham, Morgan Windle, Chris Warburton, Gwen Naylor and Kate Fitzpatrick.

This report was written by Ashley Tuck and edited by Milica Rajic, with specialist contributions from Chris Cumberpatch and Jane Young (pottery), SD White and DA Higgins (clay tobacco pipes), Rod Mackenzie (industrial material), Peter Ryder (architectural stone), Phil Andrews (slag), Lucy Allott and Erica Macey-Bracken (wood), Morgan Windle (animal bone), Alvaro Mora-Ottomano (additional information about CBM), Lorraine Mepham (other finds), Ellen Simmons and Glynis Jones (environmental samples), Liz Chambers (geoarchaeological evidence), Mark Bateman (luminescence dating) and Caitlin Buck (statistical analysis). Illustrations were by Rob Goller based on the work of Ian Atkins.

The project was managed by Milica Rajic on behalf of Wessex Archaeology.

Sheffield Castle, Sheffield

Archaeological Evaluation Post-Excavation Assessment Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Sheffield City Council, to undertake evaluation trial trenching and borehole survey on the site of Sheffield Castle (formerly Castle Markets), Sheffield, South Yorkshire, S1 2AF. The site was centred on NGR 435805 387684 (**Fig. 1**).

1.1.2 A written scheme of investigation (WSI) was prepared by Wessex Archaeology (2018) in accordance with industry best practice and guidance (CIfA 2014a–c, Historic England 2015a) and was submitted for approval to Dinah Saich of the South Yorkshire Archaeology Service (SYAS), advisors to Sheffield City Council, prior to the commencement of fieldwork.

1.1.3 Eleven trenches were excavated between 13 August 2018 and 12 October 2018 and were up to 7 m wide and up to 20 m long (**Fig. 2, 3**). A borehole survey was also undertaken between 15 and 19 October 2018.

1.2 Site designations

1.2.1 Three areas of masonry, formerly part of the castle's structure, survive within the former markets complex, and are Listed as Buildings of Special Architectural or Historic Interest (Grade II); under National Heritage List for England nos 1254808, 1254809 and 1254810 and IOE nos 458126, 458127 and 458128.

1.3 Previous reporting

1.3.1 This report, which forms a Post-Excavation Assessment as outlined in the paragraph below, is based on an Interim Report (Wessex Archaeology 2019) with revisions (particularly in light of pottery spot dates) and additional sections including assessment of specialist data categories (finds and samples) and an updated project design.

1.4 Scope of the report

1.4.1 The purpose of this report is to provide the provisional results of the evaluation, and to assess the potential of the results to address the research aims outlined in the WSI. Where appropriate, the report will recommend a programme of further analysis work, and outline the resources needed, to achieve the aims (including the revised research aims arising from this assessment), leading to dissemination of the archaeological results via publication and the curation of the archive.

1.5 Borehole report

1.5.1 Assessment of the borehole survey conducted as part of the evaluation works has not been completed yet and it will be presents in a separate report.

1.6 Location, topography and geology

1.6.1 The site, covering an area of approximately 1.34 hectares, is in Sheffield City centre, bounded to the north by Castlegate, to the west by Waingate and to the south and south-east by Exchange Street (**Fig. 1**).

1.6.2 The site was formerly occupied by the 20th century development of Castle Markets. The majority of buildings relating to the former Castle Markets complex have been demolished to ground level with the exception of a limited number of supporting or retaining walls necessary to preserve the topography of the site. In addition, structures housing two areas of surviving castle-related masonry survive on site. The site is overlaid by concrete slab relating to the recently demolished market.

1.6.3 The site lies between 49 m and 56 m above Ordnance Datum (aOD).

1.6.4 The underlying geology is mapped as an outcrop of Silkstone Rock, a type of sandstone within the Lower Coal Measures (British Geological Survey online viewer). Superficial alluvial deposits are recorded close to the site, associated with the rivers Don and Sheaf.

1.7 Outreach

1.7.1 Outreach which formed a major part of the evaluation project, as Sheffield Castle is prominent in the imagination of the Sheffield public was addressed by a raft of community engagements. These included volunteer placements, five with the on-site excavation team and five with the finds processing team at Wessex Archaeology's offices in Sheffield. Additional on-site volunteering from local heritage groups and schools was facilitated. Weekend and week day site tours were provided, both bookable by the public and for stakeholders, schools, youth groups and local history groups. Public talks were given both during and after the on-site works, with more public talks planned. Wessex Archaeology conducted social media interactions (Twitter, Facebook, Youtube, blog) which, on average, reached and engaged more than 1200 people per week. **Fig. 23** outlines some outreach statistics.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

2.1.1 The following section comprises a summary of information as presented in the WSI (Wessex Archaeology 2018), which was derived from an existing evaluation specification (SYAS 2017). This in turn was an edited version of an earlier specification (Dennison and Richardson 2014), which drew heavily on a desk-based assessment (McCoy and Stenton 2009).

2.2 Previous investigations

Observations (early 20th century)

2.2.1 In the 1920s, the construction of the Brightside and Carbroook Co-operative Society building and of the first Castle Market building was observed by AL Armstrong and JB Himsworth for the Hunter Archaeological Society and Society of Antiquities. Himsworth recorded his observations in an unpublished diary, whilst Armstrong published his results in the Hunter Society's *Transactions* (Armstrong 1930). Their work identified remains of the stone-built castle and some evidence of a timber predecessor. Some of these remains were incorporated into the basements of the buildings being constructed. Himsworth also mentioned the workers demolishing the remains of a furnace, presumably from the Castle Hill Steel Works.

2.2.2 Post war reconstruction of the site was observed by Leslie Butcher who interpreted the gatehouse results, monitored stanchion pits and identified a section of wall (later Grade II listed) near to the south-west corner of the original market building and the sinking of a shaft through the 'sticky black sludge' of the moat.

Survey (1994)

2.2.3 In 1994, the South Yorkshire Archaeology Field and Research Unit surveyed the standing remains of the preserved courtyard building, beneath the 1920s market building, as part of planned re-consolidation works. This work concluded that the original surviving structure was in good condition (Latham and Atkinson 1994).

Evaluation trenching (1999 and 2001)

2.2.4 Three trial trenches opened by Archaeological Research and Consultancy at the The University of Sheffield (ARCUS) in 1999 and 2001 (Davies 2000; Davies and Symonds 2002) uncovered part of the moat and a series of deposits within it dating from the medieval to post-medieval period as well as well-preserved castle remains which include part of a courtyard building. In addition, a pit containing late-13th-century pottery was excavated.

Ground radar survey (2013)

2.2.5 In 2013, Met Geo Environmental carried out a geophysical survey as part of works commissioned by Sheffield City Council. The survey identified the two previous ARCUS evaluation trenches along with two anomalies: one perhaps delineating a distinct change in ground composition, and the second to the west, marking a linear area of north-south alignment, possibly caused by a wall or foundation feature.

2.3 Archaeological and historical context

Prehistoric and Romano-British

2.3.1 Due to the extensive development of the area, evidence of prehistoric and Romano-British activity is limited to a small number of documented finds which are now presumed lost or destroyed. (Belford 1998; McCoy and Stenton 2009). However, the site of the castle lies between the suggested course of two Roman roads, at Bridgehouses to the north-west and Cricket Inn Road to the north-east.

Early medieval period (5th to 10th century)

2.3.2 The status and use of the castle site during the early medieval period is speculative. There is no unambiguous evidence to associate the castle site with any named individual and there is similar uncertainty surrounding suggested archaeological evidence for Saxon activity at the castle site.

Medieval period (11th to 15th century)

<u>11th and 12th century</u>

2.3.3 Suggested dates for the construction of the first Sheffield castle, which was probably of earth and timber, are typically given as *c*.1100 or *c*.1150 (Davies and Constable 2004-05), although there is no direct evidence to support either. As there are no documented examples of mottes being constructed in England after the accession of Henry II in 1154 (Pounds 1990), the presence or absence of a motte may help to determine if Sheffield Castle was constructed during the early 12th century. Prior to the recent evaluation, no archaeological evidence for a motte had been identified within the castle site (McCoy and Stenton 2009).

2.3.4 Sheffield Castle is thought to have been extensively damaged by fire in 1184–85.

2.3.5 There is a suggestion that in 1187–98 a professional garrison was present within the castle which would have required quarters within the castle precinct, likely to have been located within the bailey, along with other important ancillary structures such as a chapel and, perhaps, a prison or dungeon. The latter is likely to have been located within one of the castle's towers.

2.3.6 From the late 11th to the mid-12th centuries, the focus of a castle's defences was probably the seigneurial dwelling or keep. However, by the second half of the 12th century, stronger perimeter defences, such as a stone curtain wall that enclosed the site, may have become the primary focus of a castle's defence.

13th and 14th century

2.3.7 In 1266 John de Eyvill led rebel forces into South Yorkshire and attacked Sheffield. It is often stated that during the attack the castle was 'burned to the ground', but the extent of the damage incurred is unknown.

2.3.8 A royal licence to rebuild the castle in stone was obtained four years later by Thomas de Furnival. The intention to construct a stone castle may imply that the first Sheffield castle fell due to the firing of its timber structures. However, during this period the symbolic aspects of castles became increasingly prominent and the emphasis on masonry may have included elements of display and defiance.

2.3.9 Halls, rather than keeps, were the prevailing form of seigneurial residence within castles of this period, and there are numerous references to a great hall. Documentary sources suggest that a chapel was possibly located either close to the upper end of the hall or between the hall and the gate. A great tower was recorded at the site in 1442 (Thomas 1920, 71) and, while it is possible that this feature was a keep, it may have been merely the largest of the four mural towers which are postulated to have stood along the castle's north wall. Archaeological evidence (Armstrong 1930) has demonstrated that the principal entrance was in the south-eastern part of the site and incorporated a gate and drawbridge, with large circular bastion towers set immediately east and west of the entrance as part of the gatehouse. A large curtain wall appears to have been constructed as part of the castle possibly made of stone derived from quarries at Handsworth. Evidence for ancillary buildings at Sheffield has been recorded through archaeological investigation, and there was also evidence that modifications were made to the defences at the entrance during the 14th century, with a rectangular structure constructed to perhaps protect the drawbridge mechanism and to strengthen the immediate approach to the gate.

15th century

2.3.10 Documentary evidence records several structures or features that were present within Sheffield Castle during this period, along with indications of their inter-relationships. These included the great hall, the great tower, the great gate, a bakehouse, a kitchen, a prison and a *hospiteum*, where itinerant workers and less salubrious guests were lodged. The majority of these structures faced into the castle's inner courtyard, with the subsidiary buildings being arranged around the wall of the inner bailey. Documentary sources also indicate that a stone and cinder path ran from the hall to the gate during the 15th century (Thomas 1920, 71). A 'hedge' (a possible timber palisade) apparently ran from the great tower to the bakehouse and between the castle wall and the river.

2.3.11 A further tower was recorded next to the chapel in 1445-46. The stone was sourced from the Roche Abbey quarries indicating that the new tower is likely to have been constructed from limestone.

2.3.12 During the 1440s, work was carried out on the gutters and in making a lead pipe for bringing water into the castle. Several structures (the exchequer chamber, stone and timber grange, a cowhouse, stables and a tower) were specifically described as being outside the castle. All these buildings are likely to have been situated within the outer bailey, which stood to the south of the castle's inner court.

2.3.13 There was also a chapel associated with the bridge, the 'Chapel of our Blessed Lady on the Bridge', which was probably built at around the same time. It is unlikely to have actually stood on the bridge and it might possibly have occupied a site between the south end of the bridge and the castle's ditch.

Early post-medieval

2.3.14 In 1570, Elizabeth I committed Mary Queen of Scots to the custody of George Talbot, the 6th Earl of Shrewsbury, and Mary was held prisoner in Sheffield Castle until 1584. Elizabeth's concerns that Mary might escape were addressed by the earl in a letter written in 1573, in which Talbot said that he had stationed guards permanently 'under her windows and over her chamber'. This suggests something of the layout of the building. In 1571, Talbot stated that Mary was unable to exercise as he was 'loathe to let her out of the gates' of the castle, but that 'I do suffer her to walk upon the kads here in the open air in my large dining chamber and also in this courtyard' (quoted in Hunter 1819, 67). This describes Mary walking on the flat roof (the 'kads') of the earl's dining room, which is likely to have been part of the great hall.

2.3.15 In 1575, Talbot wrote to Lord Burghley, revealing that on 24 February Sheffield had been hit by an earthquake which shook the castle walls. In a letter to the Queen, the earl revealed that the shock 'so sunk chiefly her chamber', indicating that Mary's apartments had been the part of the castle most affected by the earthquake. Following her removal to Tutbury (Staffordshire) in 1584, the castle continued in one of its medieval roles as a manorial prison.

Early 17th century

2.3.16 Documentary evidence indicates that development and remedial works were undertaken in the early 17th century. Works included a new building, repairs including glass repairs, plumbing, and the creation of a coachway between Hallam Head and the gatehouse. The principal structure within the site was described as a manor or mansion house and the castle contained a variety of buildings, both official and residential, within the inner bailey, and that the latter was demarcated by a moat. Beyond the moat, the castle had on outer bailey containing an armoury, granary, barns, stables and other buildings. A great stable was also mentioned.

English Civil War and the later 17th century

2.3.17 During the English Civil War, in 1642, the contents of the castle armoury, including four cannons, had been removed and were in use by the Royalist army elsewhere. The approach of a Royalist army in the following year led the Parliamentarians to retreat which was followed by the re-taking of the castle for the Crown. Eight cannons and two mortars were brought back (McCoy and Stenton 2009).

2.3.18 A description of the siege of Sheffield Castle, published anonymously as a pamphlet in 1644, reveals that '[they] found it to be of very considerable strength' in terms of its defensive position and its built defences. During the same siege deep water was found present in the east and west ditches, described as being 'slackered on all sides' which indicates a system of sluice gates. A 'strong fort before the gate pallisado'd' was probably a Civil War defensive feature constructed on the south side of the ditch, protecting the approach to the castle's drawbridge. Bombardment of the castle by cannon was said to have included a direct strike to what is likely to have been the quarters occupied at that time by the castle's governor. Its location within the layout of the castle is unknown.

2.3.19 An examination of the castle's defences carried out in 1644 described a little tower that appears to have been a mural tower at the north-east corner of the castle. A further tower on the west side of the castle is said to have partially collapsed following a minor breach of the wall. Archaeological evidence of artillery damage seen at the castle gates is therefore likely to have been sustained at this time.

2.3.20 Several resolutions were passed in the House of Commons in order to render Sheffield Castle indefensible, beginning with an order on 30th April 1646 to make the castle untenable with no garrison kept or maintained in it. However, no work was apparently undertaken in response to this decision, and on 13 July 1647 a second resolution was passed ordering the castle and all new works associated with it to be dismantled. A bill sent to Sheffield summarising these orders on 27 February 1648 indicated that the process was being carried out. It is not clear at what date the demolition of the castle commenced. An account of 23 January 1648 suggests that much of the castle was dismantled to allow various materials to be sold off. Slates from the hall were sold, suggesting the seigneurial building was a hall, and indicating the type of roofing material of the castle's principal structure. Further details were revealed by the sale of the roof timber and the pavers and steps of the hall, along with the stone of a square room at the hall end. Named structures were also revealed including Middleton's chamber and Nic. Speedeman's chamber (Hunter 1819, 113-115) a new bakehouse, old kitchen (with lead from the roof), a round tower, a square tower and a sentry house. Timber was removed from the walls of the castle. The lead pipes were also removed. These are unlikely to have been the plumbing installed 1633 but may have been lead pipes recorded in 1442. A building of at least two storeys stood at the south end of the castle and parts of the outer bailey were also fortified. Various items held at other locations are often claimed to have come from Sheffield Castle, including boards and plaster taken to Bishop's House and an ornate wooden bed.

2.3.21 Work was continuing on the castle in 1649 when the orders to stop the demolition were issued, noting that the remaining part of Sheffield Castle is still standing and was in part tenable (McCoy and Stenton 2009). Nevell highlights that to maximise the symbolic power of slighting it was 'important not just to leave the castle useless as a fortification but to show publicly that it had been done' (2019, 26).

2.3.22 Further material was removed from the castle site during the third quarter of the 17th century. The Earls of Arundel retained ownership of the castle site, which was referred to in a mortgage of 1677. By 1706 Sheffield had passed to the Duke of Norfolk, who began to sell off the land for redevelopment (McCoy and Stenton 2009).

18th century

2.3.23 An early 20th-century reconstruction of the castle in *c*.1700 by Thomas Winder depicts several detached structures set around the former castle courtyard, part of which had been converted into a bowling green. Sections of curtain wall appeared to remain extant

at the north-east corner. The moat appears to have been filled to level the ground prior to the onset of redevelopment. Several roads around the castle site, (Castle Folds, Waingate and Exchange Street), appear to have developed along the courses of the former castle ditches. Castle Folds seems to have lain within the former outer bailey and may have developed along or immediately adjacent to the south ditch. Waingate appears to follow the line of the castle's western defences. It is unclear what sources Thomas Winder used to compile his reconstruction.

2.3.24 Ralph Gosling's 1736 map of Sheffield (which is the earliest known surviving plan of the castle site) depicts general development to the west and south of the castle site, with a large house in the north-west corner. Castle Hill shows a number of sharp right-angled turns along its route, two of which took it along the south and west sides of a large square bowling green. This green lay to the north of centre of the castle site, and there were smaller, rectangular plots or enclosures to the north and east, running to the banks of the Don and Sheaf. A narrow strip of development was indicated on the east frontage of Castle Hill and Castle Fold, again with smaller empty rectangular plots to the rear running as far as the bank of the Sheaf. Their depiction on the map is reminiscent of garden or yard enclosures to the rear of individual properties. Gosling's plan does not depict the outcrop or precipice on the north edge of the castle site which appears on later maps, nor did he indicate any surviving features associated with the castle. Archaeological evidence suggests that the bowling green may have been defined by a series of stone posts connected by iron railings, as a 3 m long iron rail attached to a sandstone pillar was recovered from the site of the green in 1928.

2.3.25 In *c*.1760 (**Fig. 4**), the bowling green was substantially larger in proportion to its surroundings than suggested by Gosling in 1736. Structures were attached to the north-west and south-east corners of the green, with a precipice indicated to the north immediately above the Don. The composite map of *c*.1760 appears to show two distinct areas to the castle site. The inner area was formed by the bowling green and a narrow strip around the outside with a curvilinear boundary, containing properties, two of which at the south-west corner are joined by a strip marked 'Castle Wall' on a map of 1782. The main access to the inner area was at the south-east corner, along the street Castle Hill marked in 1736. In *c*.1760 this was flanked by street frontage properties on either side, but it continued along the south and west sides of the bowling green as an unenclosed track. The outer area comprised a wide band between the inner area and Waingate to the west and Castle Folds to the south, which contained a number of sub-divisions that radiate outward from the edge of the inner area probably laid out in advance of actual development. The width of the outer area decreases markedly to the east of the road Castle Hill, and its curve is delineated by a pair of parallel boundaries, apparently a narrow access leading to an enclosure at the confluence of the Don and Sheaf. The building within the outer area at the junction of Waingate and Castle Folds became the Reindeer Inn in 1779, later changing its name to the Royal Exchange. To the south, the area between Castle Folds and Dixon Lane was filled with tenements built during the third quarter of the 18th century.

2.3.26 A 1768 Fairbank field book sketch of Castle Hill marks a substantial wall along the north-east boundary of the outcrop. Its scale and location may suggest that a substantial section of the perimeter wall overlooking the river Sheaf remained extant in 1768. Archaeological evidence indicates that several metres of imported material had been brought to the site in order to raise the ground level above the remains of the castle, and in 1764 it was reported that no traces of the castle remained visible. However, a later 1771 Fairbank sketch of the south and west parts of the castle site depicted a section of wall marked 'ruins of the castle.'

2.3.27 Industrial premises were also established within the former castle precincts. These included a variety of tool and cutlery workshops, a cementation steel furnace of Thomas Clegg and a cupola furnace of R&J Smith Brothers.

2.3.28 Following a 1784 Act of Parliament, calling for general improvements in market accommodation and capacity, much of the property on Castle Hill was demolished. The whole of the bowling green had disappeared (although John Waite's house remained at the south-east corner), and the precipice to the north was now occupied by two parallel lines of slaughterhouses. Most of the buildings formerly to the south of the bowling green had been demolished to create a new right-angled and wide access from Castle Folds, replacing the earlier access along Castle Hill from the south-east although the name was retained for the new alignment. Only the western part of the outer area described above escaped major demolition, with some of the radiating sub-divisions surviving. The narrow curving track noted in *c*.1760 also partly survived as a boundary, although it had lost its function as a track.

19th and early 20th century

2.3.29 During first half of the 19th century much development occurred on the castle site, with many of the structures that had survived in *c*.1800 being demolished. Much of this redevelopment was associated with the Sheffield and Tinsley Navigation, which had reached Sheffield in 1819. Nelson and Company also constructed a small steel and tool works within the castle site, which was taken over in the mid-1820s by Furniss, Cutler and Company. By the mid-19th century, John Youle's Phoenix Steel Works was also present on Castle Hill, manufacturing saws, files and other tools. Cementation and crucible furnaces, warehouses, and tool and cutlery workshops were constructed subsequently around the works, on ground around the angled route of Castle Hill laid out in the late 18th century. To the east of Castle Hill, Shambles Lane was created to link the slaughter houses to Castle Folds.

2.3.30 The effects of these early 19th century changes are clearly visible on the Ordnance Survey map from 1853 (**Fig. 6**). 'Sheffield Castle (Site of)' is marked, with the 'Castle Hill Works (Steel)', the 'Phoenix Works (Steel)' and 'Castle Hill Steel Works' occupying much of the central area of the castle site. Former open areas shown in *c*.1800 had now been infilled, creating 'Castle Folds' Court' to the east. Only the western edge of the castle site retained anything approaching its pre-late-18th-century plan form, although part of the narrow lane shown in the later 18th century and suggested to mark the line of the castle's eastern defences was still visible, branching off Shambles Lane.

2.3.31 In 1881, the Sheaf was culverted to the south of Exchange Street, while Exchange Street itself was extended west along the southern edge of the castle site, joining the south end of Waingate. By the time that the Ordnance Survey 1892 map was published (**Fig. 7**), Shambles Lane had been re-named 'Castle Folds Lane.' The western edge of the former castle site, and the narrow lane to the east of Castle Folds Lane, remained largely unchanged in overall plan form. The site was similarly depicted by the Ordnance Survey in 1905.

20th century

2.3.32 An undated detailed plan of the Castle Hill area, almost certainly drawn in the late 1920s (probably *c*.1927) gives an idea of the layout and shows little had changed from the late 19th century. From north to south, the Bull and Mouth Hotel, the Anvil Inn and the Rose and Crown Inn all fronted onto the east side of Waingate, with enclosed yards to the rear. The Royal Hotel stood at the junction of Waingate and Exchange Street with the New

Market Inn flanking the entrance to Castle Hill from Exchange Street and the Rotherham Inn flanking that to Castle Folds Lane. The layout of industrial premises around Castle Hill was also broadly similar to the late 19th century plan, with the narrow unnamed curving lane still visible to the east of Castle Folds Lane, running towards the Sheaf weir. The northern edge and north-east part of the area were still occupied by slaughterhouses.

2.3.33 A north to south aligned section across the Castle Hill and its surroundings area drawn in the first half of the 20th century (held by Museums Sheffield) indicated that, prior to redevelopment, the majority of the central part of the Castle Hill area was probably formed by a relatively level plateau. This plateau extended south and south-west towards Exchange Street and Waingate, but it had been radically altered by the construction of slaughter houses adjacent to the Don.

2.3.34 In September 1928 photographs show the nature and the construction of the slaughterhouse buildings (brick buildings with slate roofs), the tall wall fronting the Don acting as a screen wall for the slaughterhouses and raised, beehive-like structures in connection with the caption 'Sewer Manholes for New Road.'

2.3.35 The properties on the east side of Waingate reflected the line of the road (ie they were laid out fronting onto the road and then running back from it), which was itself influenced by the line of the western moat. Notes accompanying some of the photographs suggest that some of the modern buildings used walls connected with Sheffield Castle as their foundations; the reliability of this statement is unknown. Photographs also depict a tall, curving rubble structure, containing a possible window, a doorway with quoined jambs and a massive, monolithic lintel as well as several other walls composed of stone, part dressed and part rubble, set in lime mortar.

1927-1929 Co-Operative Society stores

2.3.36 In 1915, the Brightside and Carbrook Co-operative Society purchased a block of land on the corner of Exchange Street and Waingate. On the pre-1915 plan, the area of the Co-operative Stores was delineated in red, demonstrating that both Exchange Street and Waingate were to be widened. The entrance to Castle Folds Lane off Exchange Street remained in approximately the same position but was also moved further north; it was flanked to the east by the Rotherham House public house. The plan of the building included a basement over the whole area with the foundation trenches cut for all four walls, with an extension at the north-west corner linked to either services or drains. Foundation plans show lines of stanchions extending an average of 3 ft 9 ins (1.14 m) below the foundation level.

2.3.37 A plan dating from 1958-61 shows that some of the earlier foundations were to be removed to make way for the foundations for a new structure. Shortly before the Second World War, a new rear access (so presumably from the north side) was made to the Co-operative Stores' basement.

2.3.38 Above the basement, the Co-operative Stores initially comprised only a single storey building above ground, which in 1936 was raised to three storeys. There were two arcades, each 20 ft (6.09 m) wide, on the ground floor, giving access to the Castle Market to the rear.

2.3.39 The store received a direct hit from a bomb on the night of 12th/13th December 1940 and was largely destroyed; an adjacent property on Waingate to the south-west was also damaged. Bailey bridges had to be erected to allow the Castle Hill Market to continue trading, although the market itself largely escaped damage.

1928–1930 Castle Hill market

2.3.40 Plans of the Castle Hill market constructed at around the same time as the Co-operative Stores show grids of 4ft (1.22 m) square steel and concrete piles supporting 28 cast-iron columns. Further piles were present along the east external side of the market.

2.3.41 The main approach from Castle Hill (off Waingate) had twin vehicle and pedestrian entrances; the vehicle entrance had offices over, and a large plaque reading 'Castle Hill Market.' The Castle Hill entrance was flanked by a heating chamber and fuel store to the north, and more plant rooms to the south, although depths of these structures are unknown. The vehicle entrance snaked around the west and north sides of the market to a loading bay; a manhole/inspection chamber just beyond the vehicle entrance was also marked.

2.3.42 Built to be fire-proof with reinforced concrete floor carried on concrete piles (in some places 25ft or 7.62 m deep) and foundations with raised loading platforms, the market was laid out on symmetrical lines with the principal entrance from Castle Hill, the approach being through the two archways, for goods and pedestrians respectively. The outer walls were built in brickwork and lined with plaster and terrazzo slabs. The roof of the market was carried on cast-iron columns which supported the steel roof trusses. The north side of the roof comprised patent glazing and the remainder slated. Flat roofs were positioned over the shops, each having an opening roof light. Portions of excavated walling had been enclosed in a basement under the market hall.

1929-1930 The construction of Castlegate

2.3.43 A new street (Castlegate) was also constructed between Castle Hill and the Don, linking Waingate and Blonk Street Bridge. This had a radical and significant effect on the local topography. The eastern return of the steep slope to Castlegate never appears to have been finished off properly. A 1930s aerial photograph shows the area at the base to be roughly fenced off, with rubbish from the market tipped behind. As late as *c*.1961, photographs show the eastern return to be bricks that may have been a remnant of the north end of Castle Folds Lane.

2.3.44 The effects of all this re-development are visible on the 1935 Ordnance Survey 6-inch map and a 1930s aerial photograph. The Castle Hill Market occupied the centre of the Castle Hill area and was located on a level plateau. The north loading dock area is clearly visible, set above a steep slope to Castlegate. To the north-west, the ground level dropped off markedly to properties on Waingate including the Bull and Mouth Inn. To the immediate east of the market building, the ground level also fell away significantly. The area nearest Castlegate had been levelled to form car parking, but to the south, there was a piece of rough ground which sloped up towards the truncated remnant of the alley between the Market Tavern and Mudfords Building. It is not certain if this rough ground was formed by ground untouched by the 1927–30 works, or if in fact it comprised spoil resulting from these works. Further east, a wide street marked the course of the culverted river Sheaf, and then there was a further small block of buildings at the Exchange Street/Castlegate junction.

Mid- and late 20th century

2.3.45 The Co-operative Stores were destroyed during an air-raid in December 1940, and lay derelict until 1958 when Sheffield Corporation started the construction of Castle Market.

2.3.46 As part of the works, the 1930s Castle Hill Market building was retained, and appears to have been largely unaltered, although comparison between aerial photographs suggests

that the southernmost bay of the market (that originally next to the Cooperative Stores) was rebuilt across the entire east-west length of the market.

2.3.47 To the immediate south of the existing building, a two storey lower market and upper market (the New Market Block) was built. South of this, there was a five-storey block (the Low Block) with basement and sub-basement, facing onto Exchange Street, on the site of the former Co-operative Stores. The upper floors were occupied by offices, with an arcade and shops to the ground floor. The basement floor level was set at approximately the same level as that of the new building to the north, with the sub-basement comprising a service duct. To the west of the 1930 Castle Hill Market building, an eight-storey block (the High Block) was built, with a concrete tower rising above the southern end.

2.3.48 All parts of the re-development are assumed to have been based around reinforced concrete frames, supported by piles or foundations. The foundation plan also has the approximate line of the castle moat depicted on it.

2.3.49 Beneath the access passage or subway which runs along the south and west sides of the basement of the New Market Block and Low Block, there was a concrete ventilation/heating duct, with an offshoot running to plant positioned to the south of the subway. This duct takes the form of a concrete tunnel or passage, which was 1.57 m deep and up to around 3 m wide.

2.3.50 Within the High Block, there were two north-south aligned lines of foundations, each line being of six pads, and all broadly of the same dimensions (2.44 m square and 0.91 m deep). Along the redevelopment fronting Waingate (presumably within the High Block), column foundations located within the moat were piled and not excavated, and the foundation for the ventilation tower of the High Block was excavated to a depth of 43.89 m. Excavations were also made for supports for inserted beams under the south wall of the original Castle Hill Market and the adjacent ‘Styring’ property (precise location unknown), for sewers and ventilation ducts, and a large crane on a ‘peninsula of unexcavated ground’.

2.3.51 As part of the same works, the East Loading Dock was created to the immediate east of the original Castle Hill Market building. Two new service roads were created to access the loading dock, one at the northwest corner and the other at the south-east. Also at the north end, the foundations for the supports of an elevated or spiral ramp were laid, although the ramp itself was not to be built until later. Both the ramp, and the area of the loading dock to the south had piled foundations only; their depths were not recorded.

2.3.52 To the immediate east of the spiral ramp, the former Sheffield Transport canteen single storey flat-roofed brick building faced onto the east end of Castlegate.

2.3.53 The structure forming the southern rectangle of the canteen is visible on the mid-1960s aerial photograph, and it is assumed that the rest of the building was also there by that date. The ground floor level of the canteen building appears to have been set at the same level as Castlegate, but it is set below the level of the southern part of the area to the east of the East Loading Dock. To the south of the spiral ramp, there was an area of storage for the Sheffield Transport canteen, measuring around 12 m square. The entrance to this storage area was from beneath the south side of the spiral ramp. The base of the storage was set at approximately the same level as Castlegate, with the roof covered over by the area to the east of the East Loading Dock. Outdoor market stalls were located in this area during the 1990s.

2.3.54 As a last phase of this re-development, a turf accountant's premises were built adjacent to the Bull and Mouth public house at the west end of Castlegate.

2.3.55 An extension to the Castle Market was completed in 1964. The foundations for this extension formed six east-west lines, grouped in three pairs across the north, central and south parts of the building.

2.3.56 By 1972, the paving covering the steep north-facing slope to Castlegate which was in a poor condition was replaced by a vertical concrete retaining wall.

2.3.57 To the immediate north of the extension to the Castle Market, there was another building, formerly a carpet and furniture warehouse (no. 30 Waingate). The building is of 1970s rather than 1960s appearance, and is of a low two storeys in height, probably constructed largely in concrete. It is not known if it has a basement or what form its foundations take. A single storey brick toilet block was also built at the north-west corner of the Castle Hill Market building during the 1980s. Piles were driven into the ground for an unknown depth for this development (this evaluation revealed disturbance to a depth of at least 4 m, see below), and then capped to form a foundation for the horizontal concrete beams supporting the structure's walls.

2.3.58 Finally, during the 1990s, a modern concrete floor in the Castle Hill Market building was taken up, revealing the original terrazzo beneath. In a few places, this terrazzo was taken up as well, to reveal intermittent voids up to around 1.50 m deep beneath the floor.

'Tunnels'

2.3.59 In the late 1860s a main sewer was driven through the northern part of Castle Hill, on a line from approximately just above the Sheaf weir towards Bridge Street. This sewer was apparently blasted through solid rock, and so avoided any archaeological deposits above, although two shafts were sunk to aid the work. The shaft encountered what was described as a rock-cut passage, running in an approximate south-west direction, and at least 1.20 m in height.

2.3.60 This may or may not be part of the same tunnel referred to in 1946 which was discovered during the construction of an air-raid shelter for Sheffield Transport Department in 1939. The tunnel was followed as far as the western boundary of TB and W Cockayne's premises. The function and age of the tunnel is unknown.

2.3.61 Met Geo Environmental suggest that one of the tunnels lay close to the north side of the gatehouse fragment chamber, but that the feature had been impacted by the 1958-61 works. The lower part of the tunnel may partly survive beneath this area of the market. It is also possible that either the Co-operative Stores or the Castle Hill Market could have been provided with a tunnel-type air-raid shelter for employees, and this would accord with the late 1930s date of construction, however there are no known records of such a feature being built.

3 AIMS AND OBJECTIVES

3.1 Project aims

3.1.1 The aims (or purpose) of the survey, in compliance with the CIfA *Standard and guidance for archaeological field evaluation* (CIfA 2014a), were:

- *to gather sufficient information to establish the presence/absence, nature, date, quality of survival and importance of any archaeological deposits associated with the former Sheffield Castle and of later industrial, residential and commercial activity within the Castle Markets site;*
- *to determine the profile of the moat;*
- *to characterise the deposits and their sequence within the moat;*
- *to date the deposit sequence;*
- *to evaluate the sedimentary nature of the moat, to evaluate the survival and potential of palaeoenvironmental and waterlogged organic remains; and,*
- *to inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy or a management strategy.*

3.2 Project objectives

3.2.1 In order to achieve the above aims, the general objectives of the work were:

- *to place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance;*
- *to determine the location, extent, date, character, condition, significance and quality of any archaeological remains within the site;*
- *to allow a detailed deposit model for the former Castle Markets site to be developed;*
- *to enhance understanding of construction of the castle's inner court and associated moat;*
- *to enhance understanding of the layout and use of the castle's inner court;*
- *to process and assess any waterlogged organic remains present;*
- *to enhance understanding of phasing of demolition of the castle, post-Civil War;*
- *to enhance understanding of initial post-medieval re-use of the former castle site;*
- *to enhance understanding of post-medieval and modern activities on the former castle site, including steelmaking and other metal trade activities;*
- *to enhance understanding of the impact on earlier deposits of post-medieval and modern demolition and construction phases;*
- *to enhance understanding of the development of the site and its associated buildings;*
- *to assess the artefactual and environmental potential of the archaeological deposits encountered;*
- *to make available information about the archaeological resource within the site by reporting on the results of the evaluation;*
- *to disseminate the results of the work in a manner in keeping with their significance, eg through 'open day' site visits, public talks and publication in a suitable journal;*
- *to deposit the resulting site archive with a suitable museum; and,*
- *to allow for the wider community to play a role in rediscovering the castle's remains.*

3.2.2 The following aims specific to the borehole survey were given:

- *to review any existing geotechnical data, foundation/service plans, etc., to inform the proposed survey and augment it;*
- *to locate two 20m long transects perpendicular to the recorded course of the moat;*
- *to obtain cores at 2m intervals along each transect;*
- *to describe the sediment sequence of each core; and,*
- *to sample the two most promising sequences to obtain suitable material for scientific dating and palaeoenvironmental assessment.*

4 METHODS

4.1 Introduction

4.1.1 All works were undertaken in accordance with the detailed methods set out within the WSI (Wessex Archaeology 2018). This section summarises the methodology presented in the WSI.

4.1.2 All fieldwork conformed to the relevant Chartered Institute for Archaeologists standards and guidance (2014a–c) and Wessex Arcaheoloy's in-house quality ensured standards.

4.2 Setting out and trench location variation from WSI

4.2.1 All trenches and boreholes were set out using GNSS (**Fig. 1–3**). The trenches were laid out as specified in the WSI with variations (detailed below) agreed in advance with SYAS.

4.2.2 Trench 6 partially overlapped with the area of a late-20th century toilet block associated with Castle Market. The steel-reinforced concrete foundations which were used for the toilet block were substantial and were resistant to removal by mechanical excavator and breaker. As a result, trench 6 was split into two parts: trenches 6A and 6B. Trench 6A contained the northern part of Trench 6 and extended further to the east beyond the area specified in the WSI. Trench 6A was successfully excavated and contained archaeological remains as detailed below. Trench 6B occupied the southern part of the proposed trench 6. Excavation in trench 6B revealed 20th century disturbance to a depth of at least 4 m below ground level.

4.2.3 A large drain running across trench 10 had been anticipated, however the strength of flow within the drain was higher than expected. The drain could not be cut and blocked out without risk of flooding the trench. This risk did not combine favourably with the risks of deep excavation. Agreement was reached with SYAS and Sheffield City Council to reduce the size of the trench, targeting the eastern part of the original trench. Specialist shoring equipment had to be re-designed to facilitate safe excavation of the new area of the trench.

4.2.4 Excavation of trench 11 was constrained in the east by the presence of asbestos bearing materials (both fragments of cement tile and an asbestos-bearing conduit). In the west, trench 11 was constrained by the presence of a gas pipe. Following determination that the gas pipe was not live, it was agreed with SYAS that the excavated area was sufficient.

4.2.5 The location of other trenches underwent minor revision during excavation on the basis of ground conditions, and the safe distance from existing deep drop edges on site.

4.3 Excavation methods

4.3.1 Concrete overburden was removed using a mechanical breaker attached to a 360º tracked excavator. After the removal of concrete, the trenches were excavated with the 360º tracked excavator equipped with a toothless bucket. Machine excavation was under the constant supervision and instruction of the monitoring archaeologist. Machine excavation proceeded in level spits of approximately 50–200 mm until either the archaeological horizon or the natural geology was exposed. Where necessary, the base of the trench/surface of archaeological deposits was cleaned by hand. The spoil was removed by a dumper and stored on site, in the pre-agreed designated areas.

4.3.2 All archaeological features and deposits identified were hand-excavated sufficient to address the aims of the evaluation. Spoil derived from both machine stripping and hand-excavation was visually scanned for the purposes of finds retrieval, and where appropriate was also metal-detected by trained archaeologists. Artefacts were collected and bagged by context.

4.4 Deep excavations

4.4.1 In trenches where deep excavations were required, appropriate stepping and/or shoring was used by suitably qualified operatives as specified in the WSI (Wessex Archaeology 2018). Excavations were considered deep when there was a risk of collapse; this was typically at depths greater than 1.2 m.

4.4.2 Two methods of shoring were used. In trench 10, sheets and waling were installed under archaeological supervision by a specialist subcontractor (HB Tunnelling). In other areas, proprietary Groundforce shoring boxes were installed by Wessex Archaeology. Main access to deep excavations was by means either of a stepped or sloped ramp or by a steel ladder fitted with a gated entry point and appropriately secured.

4.5 Recording

4.5.1 All exposed archaeological deposits and features were recorded using Wessex Archaeology's *pro forma* recording system.

4.5.2 A complete drawn record of excavated archaeological features and deposits was made. This included plans and sections, drawn to appropriate scales (generally 1:20 or 1:50 for plans, 1:10 for sections) and tied to the OS National Grid. The OD heights of all principal features were calculated (as defined by OSGM15 and OSTN15) and the levels added to the drawings.

4.5.3 A full photographic record was made using black and white negative film (supplemented, as appropriate, by 35 mm colour slide film); additional working shots of the site were supplemented by high resolution digital data. The record includes:

- the site prior to commencement of fieldwork;
- the site during work, showing specific stages of fieldwork;
- the layout of archaeological features within each trench;
- individual features and their sections; and,
- groups of features where their relationship is important.

4.5.4 Digital photography conformed to Historic England guidance (2015b). Digital images were subject to managed quality control and curation processes to ensure long term

accessibility of the image set. Photographs were also taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the evaluation.

4.5.5 Unmanned aerial vehicle (drone) footage and videos were also taken by Wessex Archaeology.

4.5.6 In addition to the record shots taken by Wessex Archaeology, volunteer Paul Rowland took thousands of digital photographs (https://photos.app.goo.gl/4YfCidq85tvBuHSn7)

4.6 Survey

4.6.1 The real time kinematic (RTK) survey of all trenches, boreholes and features was carried out using a Leica GNSS connected to Leica's SmartNet service. All survey data was recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSGM15 and OSTN15, with a three-dimensional accuracy of at least 50 mm.

4.7 Finds

4.7.1 All archaeological finds from excavated contexts were retained. Any finds requiring conservation or specific storage conditions were dealt with immediately in line with *First Aid for Finds* (Watkinson and Neal 1998).

4.7.2 All retained finds have been, as a minimum, washed, weighed, counted, marked and identified. Finds are suitably bagged and boxed in accordance with the guidance given by Museums Sheffield and generally in accordance with the standards of the CIfA (2014b).

4.8 Environmental samples

4.8.1 All bulk and monolith sampling was undertaken by Wessex Archaeology conforming to Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015c). The sampling strategy was laid out in the WSI and was agreed with SYAS prior to the on-site works.

4.8.2 Bulk environmental soil samples, for the recovery of plant macrofossils, wood charcoal, small animal bones and other small artefacts, were taken by Wessex Archaeology following a targeted approach focusing on nature of the feature, its quantity, size, richness, internal variation, ambiguity, etc. The focus of the bulk sampling was on best understood, well-sealed and dateable contexts or features.

4.8.3 Monolith samples were taken from the castle ditch section in trench 10 and from deposits in trench 3.

4.8.4 Samples were also taken by Wessex Archaeology and by Mark Bateman (The University of Sheffield) for the luminescence dating using pOSL and OSL techniques.

4.9 Geoarchaeological samples

4.9.1 Five monolith samples were taken and described and assessed for microfossil and dating potential.

4.9.2 Monolith samples 3010, 3011 and 3012 were taken through a sequence of construction and destruction deposits in trench 3. Monolith sample 10001 was taken through deposits forming the bank and fills of the castle moat, and monolith sample 10002 were taken through post-medieval deposits overlying the moat; both in trench 10.

4.9.3 The purpose of the assessment was to determine the potential of the sediments preserved at the site to address the project aims, and to make suitable recommendations for further work if appropriate.

4.9.4 The monolith samples were cleaned prior to recording and standard descriptions were used (following Hodgson 1997 and Troels-Smith 1955), including Munsell colour, texture, structure and nature of boundaries (see **Appendix 5**).

5 STRATIGRAPHIC RESULTS

5.1 Introduction

Overview

5.1.1 The following section provides an overview of information held in the site archive. A list of context numbers and context descriptions within each trench is contained in **Appendix 1**.

5.1.2 Deeply stratified archaeological features and deposits were seen across most of the site (trenches 1–6, 10 and 11; **Fig. 2, 3**). However, truncation in the west of the site (trenches 7–9; **Fig. 3**) had impacted archaeological remains, with preservation of archaeological features from below the level of some mid-point of the moat.

5.1.3 The observed archaeological remains across the site dated from the medieval and post-medieval periods, and comprised structures, deposits and features associated with the Sheffield Castle as well as evidence of post-medieval activity including demolition of the castle and the remains of steelworks, slaughterhouses, a bowling green and other structures. Dating of the earliest archaeological remains, at this point, is uncertain and scientific dating techniques have been recommended below.

Methods of stratigraphic assessment and quantity of data

5.1.4 All hand written and drawn records from the excavation have been collated and checked for consistency and stratigraphic relationships. Key data has been transcribed into an Access database for assessment, which can be updated during any further analysis. The excavation has been preliminarily phased using stratigraphic relationships and the spot dating from artefacts, particularly pottery.

5.1.5 **Table 1** (below) provides a quantification of the records from the excavation.

Table 1 Quantification of excavation records

Type	Quantity
Context records	686
Context registers	31
Graphics (A4 and A3)	121
Graphics (A1)	1
Graphics registers	11
Environmental sample registers	8
Other records (brick, timber)	17
Photographic registers	48
Digital photographs	1,538

5.2 Trench 1

Rationale

5.2.1 The WSI (Wessex Archaeology 2018) stated that trench 1 was intended to test for evidence of:

- a probable cementation furnace shown within the Castle Hill Steelworks on the 1896 Goad Fire Insurance plan;
- the projected line of the eastern range of the inner court, associated with the preserved stonework in the adjacent upper chamber;
- the central yard of the inner court;
- the earlier phases of the castle surviving beneath later deposits/structures; and,
- the extent of disturbance from the 1920s construction of Castle Hill Markets.

5.2.2 The trench was successful in identifying structures and deposits associated with the cementation furnace depicted on the 1896 Goad Fire Insurance Plan, the disturbed central yard of the inner court of the castle and the extent of disturbance from the 1920s construction of Castle Hill Markets. However, excavation did not reach the projected line of the eastern range of the inner court or the earlier phases of the castle. This was due mostly to the preservation the remains of the cementation furnace *in situ*, and in part due to the location of the evaluation trench.

Location

5.2.3 Trench 1 (**Fig. 9**) was located in the north-east of the summit area of castle hill (**Fig. 1**).

Overview

5.2.4 Excavation halted at 4 m below ground level for safety and methodological reasons. A series of 13th- to 15th-century strata contained a disturbed surface and a layer of ironworking slag. Elsewhere in the trench, a small patch of probable 15th- to early-16th-century cobbles were recorded. Medieval strata were overlaid by 18th-century made ground layers and a wall associated with a former bowling green. In the 19th century, a cementation furnace and also a drain culvert were constructed. These had been demolished and replaced with structures associated with the markets in the 20th century.

Medieval strata and features in sondage in west of trench 1

5.2.5 At the west end of trench 1 (**Fig. 9**), a sondage was sunk in successive stages to a depth of 4 m below ground level (51.59 m aOD) using box shoring for protection. This location was selected for the sondage as it did not contain 18th- to 20th-century structures (other than the concrete slab of the market), having been within the area of the bowling green in the 18th century and forming part of a yard in the 19th century (**Fig. 4–8**).

5.2.6 The lowest five strata (1079, 1080, 1077, 1074 and 1076) were undated and comprised alternating layers of grey clay (with green, brown and purple hues) and orange brown sand. Inclusions of sandstone and charcoal flecks were present. The first four layers contained no finds, but the fifth layer (1076) contained pottery, the latest sherds of which were late 13th- to 14th-century in date. All five layers were probably contemporary and are thought to represent levelling layers (ie made ground) for the former courtyard surface of the castle. The source of the material is likely to be modified alluvial deposits available on or close to the castle site.

5.2.7 The courtyard surface of the castle was represented in trench 1 by layer 1075, which comprised abundant sandstone in a matrix of yellow brown silt clay. There was no order to the stones, the upper horizon of which sloped down from the west to the east (**Fig. 9**). It is likely that these stones represent a disturbed surface. The cause of the disturbance is unknown. The layer appears to date from between the late 13th to mid-15th centuries based on pottery from lower and higher strata. Rubble layer 1075 was situated at a depth of 2.5–3.1 m below ground level (52.2–52.8 m aOD). This layer was at approximately the same depth as medieval surfaces recorded nearby in trench 5 (described below). It is likely that this rubble represents the courtyard surface of the castle disturbed *in situ*.

5.2.8 Three layers (1078, 1074 and 1061) overlying the disturbed courtyard surface were similar to those found below the surface. It is possible that these layers represent upcast material associated with the works that disturbed the surface. Layers 1078, 1074 and 1061 comprised bluish grey clay, orange brown sand and bright orange silt clay.

5.2.9 A thin (0.05 m deep) layer of red black ironworking slag (1073) appears to be of medieval date (late 13th to mid-15th centuries) again based on the association with the same pottery from lower and higher strata. It is possible that this slag was laid down to form a surface, replacing disturbed surface 1075 described above (Caitlin Buck pers. comm.). The slag has been identified by Rod Mackenzie (see below) as iron smelting slag including some pieces of tap slag. This suggests that iron smelting was taking place, perhaps inside the inner courtyard of the castle.

5.2.10 Six subsequent strata (1072, 1064, 1062, 1048, 1057 and 1049) also appear to be medieval in date, although it is possible that they represent a redeposition of disturbed medieval material. These strata are thought to be levelling layers (ie made ground) and comprised mid-blue brown sand (1072), dark brown silts and clays (1062, 1048, 1057) and mid-grey yellow silt clay (1049). Layers 1062 and 1064 were rich in charcoal and layers 1048 and 1057 contained late-13th- to mid-15th-century pottery.

5.2.11 A pit (1052) had been cut from just below the top of the sondage and was seen in both the north and east sections of the sondage. Pit 1052 was 0.65 m deep and had a diameter of around 1.72 m. The fill (1053) comprised 20% sandstone in a matrix of mid-yellow brown silt clay and it is possible that the purpose of the pit was to dispose of these stones. Further late-13th- to mid-15th-century pottery was recovered from this fill.

Cobblestone surface in south-east of trench 1

5.2.12 Elsewhere at the limit of excavation in trench 1 (in the south-east corner; **Fig. 9**) there were three strata (1067. 1065 and 1066) forming bedding layers for cobblestone surface 1033. Layers 1067 and 1066 comprised pink and grey yellow silt clays and 1065 comprised black sand silt; layers 1065 and 1066 each contained 5% charcoal flecks.

5.2.13 Surface 1033 comprised rounded cobblestones in a matrix of mid-brown sand silt (1042) containing 15th- to early-16th-century pottery. The surface (1033) was situated at 54.54 m aOD, about 1.7 m above the earlier surface (1057) seen in the west of the trench. It is likely that surface 1033 attests to a late medieval remodelling of this part of the castle complex.

5.2.14 Overlying cobblestone surface 1033 was a 0.15 m thick layer of orange red sand (1007) with degraded brick fragments, stone inclusions and pottery of a variety of dates within a range from the 15th to 18th centuries, with no sherd demanding a date of later than the 17th century. It is probable that layer 1007 relates to slighting of the castle around the time of the Civil War and that the degraded brick and the colour of the deposit relate to

slighting by fire. However, the layer is thin and lacking in wider context beyond its immediate stratigraphic neighbours and this interpretation should be treated with caution.

5.2.15 Layer 1007 was overlaid with a 0.1 m thick layer of light brown silt sand (1043) containing pottery with a variety of dates, the latest of which was 19th–20th century. A third layer (1044) was also 0.1 m thick and comprised mainly charcoal. Some or all of these layers may represent natural accumulation above the cobblestone surface, perhaps soils, windblown accumulation or some other general build-up. Alternatively, some or all of these layers may represent intentional levelling layers deposited ahead of construction of later structures (described below). Late medieval surface 1033 may therefore have been buried beneath only 0.1 m of material into the 19th century.

5.2.16 Elsewhere, layers 1040 and 1041 were seen to overlie cobble surface 1033. Layer 1040 comprised over 0.4 m of yellow brown silt clay and contained residual medieval pottery as well as pottery of 18th century date. Layer 1041 comprised 0.06 m of grey black ash and is likely to represent a bedding layer for later 19th century structures (described below).

Bowling green

5.2.17 The medieval layers and features at the west end of trench 1 were sealed by layer 1006 comprising yellow grey silt clay with stone, ash and clinker inclusions. A total of 47 sherds of pottery were recovered from this layer, chiefly consistent with an 18th century date. However, four sherds were of 19th/20th century date; it is suggested that these sherds were incorrectly assigned to layer 1006 by students or volunteers (layer 1006 was the layer exposed across most of the base of trench 1). The same situation was reflected in the clay pipe assemblage, with both 18th and 19th century pipes represented. The 19th century pipes were probably incorrectly assigned. Layer 1006 almost certainly represents levelling material deposited ahead of construction of a bowling green shown on historic maps from the 18th century (**Fig. 4**).

5.2.18 A linear north to south aligned cut (1054) through layer 1006 was 0.93 m wide 0.26 m deep with straight sides. This cut contained two surviving courses of an unmortared sandstone wall (1055) 0.85 m wide. Construction cut 1054 was backfilled with dark grey silt clay (1038).

Demolition of bowling green

5.2.19 Demolition material comprising sandstone blocks (1019) from wall 1055 survived *in situ* above the surviving part of wall 1055.

5.2.20 Demolition material 1019 was overlain by layer 1058, and layer 1056 occupied a similar stratigraphic position overlying deposit 1006 elsewhere in trench 1. Both layers comprised orange or yellow brown sandy silt with inclusions of charcoal and lime mortar, perhaps suggesting that they were associated with demolition of structures associated with the bowling green.

Cementation furnace

5.2.21 A large construction cut was variously recorded as 1068, 1070 and 1082 and penetrated through the bedding layers for surface 1033 (1066 etc.) as well as bowling green demolition layers 1056 and 1058. The cut contained a series of structures that occupied the east end of trench 1. The backfill of the construction cuts comprised brown (1069) and reddish purple (1071) sandy silt, the latter likely representing redeposited ash from a furnace and probably indicating the presence of a furnace in the general area prior to this phase of construction.

5.2.22 Handmade red bricks and lime mortar were initially used to construct a series of structures in the centre of this complex. North to south aligned parallel walls 1022 and 1023 were generally two courses thick, although wall 1022 expanded in the south-west to some 0.94 m in width to fill what would otherwise have been a void in the masonry. The space between walls 1022 and 1023 would have been just large enough for human access. The walls ran from the north limit of excavation to the centre line of the trench where structure 1029 formed a partial blockage or arch constricting access from the space between walls 1022 and 1023 to the south. Structure 1029 contained both firebricks and red bricks bonded by lime mortar. Running south from here was a small space delimited in the east by (two-skin handmade red brick and lime mortar) wall 1047; a matching west wall had likely been removed during installation of a later concrete base (1028) associated with the 20th-century castle market. This southern space would have been too small for access and may represent the ash pit or fire pit of a cementation furnace depicted on historic maps (eg **Fig. 8; Plate 6**). Wall 1039 (two skins, handmade brick, lime mortar) also ran 0.9 m to the east from wall 1023, mirroring the widest part of wall 1022 but with more economy of brick.

5.2.23 Sandstone and lime mortar structures from the same phase of construction in places partly overlay the brick structures described in the last paragraph (1022, 1023, 1029, 1039 and 1047). Structure 1031 was not well preserved and was attested by three rough flattish sandstone blocks. Structure 1031 overlay brick wall 1047 forming an upper course or partial capping of the possible cementation furnace ash pit.

5.2.24 Two substantial sandstone and lime mortar walls (1020 and 1021) were up to 2.3 m thick and had ashlar-faced blocks forming impressive exterior faces. These faces and the robustness of the walls resembled the fabric of medieval fortifications, however the shallow depth (base at around 54.5 m aOD) and stratigraphic position of these features rules this out. Instead, the robustness and high quality of these walls may reflect an abundance of sandstone available in the immediate area, perhaps sourced from the ruins or demolition layers of the castle. Wall 1020 was 'L'-shaped in plan, having originally run north to south across the trench, although the southern portion had been truncated by a drain associated with the 20th-century markets. At the northern limit of excavation, wall 1020 turned to the east, partly overlying brick wall 1022 and ending with respect to the probable access chamber between brick walls 1022 and 1023. On the other side of this chamber, the wall continued as 1021, partly overlying brick wall 1023. The robustness of these walls may have been designed to carry the weight of a cementation furnace above.

5.2.25 A final sandstone structure was wall 1036, 0.6 m wide, which ran south from wall 1021. Wall 1036 was built directly on layer 1043 overlying late medieval surface 1033.

5.2.26 Iron bars (example retained) had been inserted into brick walls 1022 and 1023 to support a flagstone floor (1024). The flagstone floor was also supported on a single skin of each of the brick walls. The flagstones comprising floor 1024 have been reused as evidenced by a groove or rebate carved down one side of some of the stones. This floor may indicate the level of the ground floor associated with the cementation furnace, however the precise arrangement of the furnace is hard to read within the window of the evaluation trench.

Structure 1035

5.2.27 Structure 1035 was seen in section only, due to truncation by a 20th-century drain. Structure 1035 comprised a single course of unbonded sandstone and may represent a fragment of a surface or of a wall. The structure overlay layer 1007 and was in turn overlain by 20th-century layers (1002 etc). The date of structure 1035 could therefore not

be determined; it is possible that it was contemporary with the remains of the cementation furnace.

Culverted drain and yard

5.2.28 Ash and clinker layer 1015 was laid down over layer 1006 in the west of trench 1. Maps from the 19th century depict a yard in this area and it is likely that 1015 was a levelling layer for the yard surface.

5.2.29 A linear cut feature (1008) 0.62 m wide and 0.48 m deep ran from north-east to south-west across the centre of trench 1 and cut through layer 1015. Cut 1008 contained a culverted drain comprising handmade brick and lime mortar walls three courses high and one skin thick (1009) capped with sandstone flags (1010). The sides of the construction cut of the drain were backfilled with dark brown silt sand (1011) and the top of the construction cut above the drain was backfilled with brick and stone rubble in a matrix of brown grey silt with ash and lime mortar.

5.2.30 The drain itself contained a secondary fill of dark brown silt clay (1018), and probable tertiary fills of mid-white grey ash (1017) and dark grey brown silt with stone and lime mortar (1012).

Demolition of cementation furnace

5.2.31 The access chamber between walls 1022 and 1023 was backfilled with deposits 1013, 1063 and finally 1005. Deposit 1013 comprised brick rubble in a matrix of purple red sand and ash clearly associated with intensive heat probably associated with the cementation furnace. The deposit (1013) was, however, *ex situ* backfill. A lens of light grey white fine ash (1063) was present within deposit 1013. Layer 1005 comprised yellow brown silt clay with ashy lenses and stone inclusions.

5.2.32 In the east, demolition layer 1026 (sandstone rubble in a matrix of grey brown silt) overlay the remains of wall 1036. Iron plate 1032 (retained) overlay layer 1026 and had sulphurous bubbles or drips adhering to it.

5.2.33 Moving west, demolition layers 1025 (sandstone and red brick rubble in a matrix of grey yellow silt) and 1051 (dark yellow clay with ash and rubble inclusions) overlay wall 1020 and other structures.

Markets

5.2.34 Levelling layers 1030, 1034 and 1081 were likely associated with preparation of the site ahead of the construction of the Castle Hill Market in the 1920s. These deposits comprised mainly red and blue to black industrial ashes and clinkers likely imported for levelling.

5.2.35 A small cut feature (1059) was seen in section only and may represent a robber pit or similar feature associated with demolition. Feature 1059 was 0.44 m wide and 0.42 m deep with a fill (1060) comprising chiefly disturbed lime mortar, supporting the robber hypothesis.

5.2.36 The main construction cut for the markets (1037) truncated structures such as 1020 and demolition deposits such as 1025.

5.2.37 Subsequent deposits (1027, 1014 and then a sequence of 1004, 1003, 1028, 1045, 1002, 1050, 1001 and 1000) comprised concrete (1000, 1001, 1028), industrial ashes (1002, 1003, 1050), rubble (1002, 1004, 1027, 1045) and orange brown silt clay (1014). Rubble

layer 1045 was significant in containing ganister fragments with bonded crozzle derived from a cementation furnace. It is highly likely that this rubble was orignated from the demolished cementation furnace.

Impact of development

5.2.38 The castle market development included a series of drains that had significantly impacted on buried 19th-century structures to a maximum depth of around 1.2 m below the present ground level. However, preservation between the drains was good and overall preservation was still good despite this caveat. The construction of the markets had not impacted on pre-19th century layers in trench 1. Preservation of 19th-century and earlier remains was good.

5.3 Trench 2

Rationale

5.3.1 The WSI (Wessex Archaeology 2018) stated that trench 2 was intended to test for evidence of:

- the nature of activities within buildings of the Castle Hill Steelworks (shown on the 1850s Ordnance Survey map), later re-used as an iron warehouse (Goad Fire Insurance Plan 1888);
- the structure of the eastern tower of the main gateway;
- the relationship of the gateway with the eastern range of the inner court;
- earlier phases of the castle surviving beneath later deposits/structures; and,
- the extent of disturbance from the 1920s construction of Castle Hill Markets and disturbance caused by linking the 1920s market building to the 1950s extension.

5.3.2 The results of Trench 2 were generally not compliant with these ambitions, with only the extent of 20th century disturbance addressable. Masonry remains of the castle were not encountered. Preservation of the Castle Hill Steelworks was limited to the foundation of an exterior wall and a drain.

Location

5.3.3 Trench 2 (**Fig. 10**) was located in the south-east of the summit area of castle hill (**Fig. 1**).

Overview

5.3.4 A significant depth (around 4 m) of clean clay deposits were present, suggestive of a motte or other fortification. On top of these deposits were 19th and 20th century drains and a wall associated with the Castle Hill Steelworks.

Clay deposits

5.3.5 A 4 m deep unsupported sondage (**Plate 1**) was sunk in the west end of trench 2 to a depth of 51.68 m aOD, recorded from the trench edge, and backfilled to a depth of 2.4 m below ground level without entering the sondage. The sondage was then entered to clean and inspect the upper deposits.

5.3.6 The lowest deposit reached was 2053, comprising grey yellow clay with rare small sandstone inclusions. This deposit was firm to the machine bucket and, importantly, exhibited pronounced veining, suggesting that it had been undisturbed for some time.

5.3.7 It is possible that deposit 2053 represents the undisturbed natural geological substrate. It is also possible in light of the overlying deposits that 2053 represents an anthropogenic deposit possibly forming a motte or other earthwork. On the basis of the veining, the former interpretation (undisturbed natural) is perhaps favourable.

5.3.8 The upper interface of deposit 2053 sloped down straight and sharp to the south at approximately 45°. This interface was interpreted as a landscaping cut (2054), perhaps made during an early phase of activity at the castle, or perhaps consolidating the ground prior to construction of a major earthwork.

5.3.9 Layers 2051 (yellow brown silt clay), 2049 (red brown clay), 2052 (blue clay), 2050 (orange clay) and 2048 (blue grey clay) overlay cut 2054 in turn. Layer 2051 was over 2.5 m thick, continuing beyond the limit of excavation. The other layers were thinner, typically a maximum of 0.2 m each. Each layer contained sandstone inclusions in varying proportions. Iron-panning was present at the interfaces between layers, especially 2049. A dedicated search for anthropogenic material found very rare charcoal flecks (perhaps 1/100th or 1/1000th of 1% of the volume). Two small fragments of woody lignite (coal) were identified in the field consistent with an origin in the underlying coal measures sandstone bedrock. These layers (particularly 2051) were contaminated with hydrocarbons that had likely entered the deposits after deposition. The hydrocarbon contamination likely relates to 19th-century industrial use of the site.

5.3.10 These deposits were found at an unusually high level, several metres above the adjacent gatehouse remains known since Armstrong's excavations in the early 20th century (Armstrong 1930). It is possible that the gatehouse was built into the slope of an earthwork, an arrangement not dissimilar to that seen at other castles (eg the gatehouse to the inner bailey at Corfe Castle, Dorset, or the south-west outer corner tower at Warkworth, Northumberland). It may be that understanding of the medieval topography of the site needs to be revised. Although a natural origin for these deposits cannot be ruled out, it is likely that these layers represent an anthropogenic earthwork such as a motte. Luminescence samples (pOSL and OSL) were taken from these layers for dating.

Disturbed clays and sandstone

5.3.11 Overlying the clean clay layers described above were a series of disturbed clay layers. Layers 2002 (also recorded as 2019) and 2045 comprised light yellow brown clay with sandstone. Two sherds of 18th–19th century pottery were recovered from 2019. It is likely that layers 2002 = 2019 and 2045 were derived *in situ* from the earthwork material described above.

5.3.12 A layer of disturbed sandstone (2055) was present in the south-east of the trench. This sandstone was unworked and was partly laid as if it had been dumped on a south-east facin incline, consistent with the topography of castle hill.

Steelworks

5.3.13 In the east end of trench 2, a north to south aligned construction cut (2005 and 2006) contained a two-skin handmade brick and lime mortar wall (2003 and 2004). The construction cut was backfilled with yellow brown silt clay (2007 and 2008) probably derived from the arisings of the cut. Wall 2003 = 2004 correlated with the outer wall of the Castle Hill Steel Works as depicted on historic maps (**Fig. 6–8**). The historic maps show

the area to the west of this wall as a yard, and the area to the east as the interior of a building.

5.3.14 Inside the building, a layer of dark red silt likely derived from crushed bricks (2011 and 2012) had been laid down as bedding material for lime mortared sandstone flag floor 2009 and 2010. A second layer (2028) beneath floor 2009 comprised light yellow brown clay and may represent a later repair.

5.3.15 West of wall 2003 = 2004 in the yard of the steelworks, a layer of crushed brick and redeposited lime mortar (2046) had been laid over disturbed clay deposit 2045. This layer resembled layer 2011 = 2012 on the other side of the wall. It is likely that all three contexts represent imported material. A slightly curvilinear construction cut (2018) cut through layer 2046 from north-west to south-east. Cut 2018 contained a culverted drain comprising three courses of single skin unmortared red brick sides (2021), with some opportunistic re-use of firebrick, and sandstone capping slabs (2016). The fill of the construction cut (2047) and the secondary fill of the drain (2017) both comprised dark brown silt.

5.3.16 The yard area was then built up with a variety of materials used for levelling. These comprised ash (2020, 2022, 2032, 2033, 2039), redeposited clay (2023, 2031, 2038) and brick crush and fragmentary rubble (2023, 2024, 2029, 2030, 2031). The former surface of the yard did not survive. Layer 2020 contained an assemblage of pottery primarily of 18th century date but also including 19th century sherds consistent with the 19th-century construction of the steel works. All of these made ground layers were likely imported, and the 18th century pottery from layer 2020 likely relates to the unknown source of the levelling material rather than to activity in trench 2.

Markets

5.3.17 A large concrete drain (2015) associated with the markets ran across the centre of trench 2 in a construction cut (2013) truncating the 19th-century archaeological remains. Two further drains (2027/2025, cut 2026 and 2036/2035, cut 2037) seen in section in the west of the trench was also part of the market.

5.3.18 Levelling layers 2034 (dark brown gritty sand) and 2040 (brown orange ash) had been deposited prior to construction of the market. A concrete beam connecting two piles (recorded together as 2043) had been inserted in a construction cut (2041) in the north section of the trench. Two layers of concrete (1001 and 1000) formed the slab of the market.

Impact of development

5.3.19 In trench 2, demolition of 19th century structures prior to the construction of the Castle Hill Market was thorough, with only a few courses of an exterior wall and a buried drain surviving. The impact of the construction of castle market itself was moderate and did not hamper interpretation of the remains. The impact of the piles on any deeper remains was not tested, but cannot have been too severe. Preservation of pre-19th-century strata was good.

5.4 Trench 3

Rationale

5.4.1 The WSI (Wessex Archaeology 2018) stated that trench 3 was intended to test for evidence of:

- the nature of activities within buildings of the Castle Hill Steelworks (shown on the 1850s Ordnance Survey map);
- the make-up of Castle Hill, the road constructed *c.*1800;
- the structure of the western tower of the main gateway, associated with the preserved stonework in the lower chamber;
- the relationship of the gateway with the southern range of the inner court;
- the central yard of the inner court;
- any earlier phases of the castle surviving beneath later deposits/structures; and,
- the extent of disturbance from the 1920s construction of Castle Hill Markets and any disturbance caused by linking the 1920s market building to the 1950s extension.

5.4.2 The trench was largely successful in meeting these objectives, recording walls and a weigh bridge from the steelworks and the cobblestone surface of Castle Hill road. The foundation of a wall associated with the castle was recorded; its relationship with the nearby gatehouse is uncertain.The masonry remains of the castle likely relate to the anticipated 'earlier phase'. The extent of 20th century disturbance in this location was established.

Location

5.4.3 Trench 3 (**Fig. 11**) was located in the south of the summit area of castle hill (**Fig. 1**).

Overview

5.4.4 A series of anthropogenic charcoal-bearing clay deposits likely represent an earthwork such as a motte or *glacis.* These layers both pre- and post-dated a foundation of unmortared unworked stone. Destruction contexts rich in environmental remains may relate to the destruction of the castle during the Second Baron's War in 1266. A 19th-century weighbridge had a deep impact, but only just reached medieval strata. Further post-medieval remains comprised the walls of the steelworks, a system of culverted drains under the former Castle Hill road, and the surface of the road itself.

Earthwork and stone foundation

5.4.5 A hand-dug sondage near the centre of trench 3 extended to a depth of 3.65 m below ground level (52.1 m aOD).

5.4.6 A series of six similar undated charcoal-bearing (less than 1–5%) clay deposits were recorded, with varying hues: 3063 (orange yellow), 3070 (orange blue), 3075 (grey blue), 3071 (yellow orange), 3072 (blue brown) and 3074 (grey blue). The different colours indicated the oxidation state of the clay, yellow indicating oxidised and blue reduced. The yellow clays slowly dimmed in hue following exposure over a period of weeks. Layer 3072 contained a proportion of silt (perhaps derived from soil) mixed with the clay, contributing to the blue brown hue of that deposit. These clays probably derived from redeposited alluvium probably sourced in the local area. The alignment of stone inclusions and the interfaces of the deposits indicated that they had been tipped from north-east to south-west consistent with a hill or motte to the north-east in the area of trench 2 (described above). Luminescence samples (pOSL) were taken.

5.4.7 An alignment of unmortared unworked stones (3064; **Plate 3**) ran from south-south-east to north-north-west. This alignment was 0.52 m wide and was interpreted as a foundation for a wall. A second course of similar stones (3076; **Plate 3**) overlay 3064 but was located slightly to the north-west. It is possible that this altered alignment represented a change in approach during construction or a deliberate stepping out. However, in light of the subsequent deposits (described below), it is most likely that the stones of 3076 had been knocked off the alignment of 3064 during demolition.

5.4.8 A small fragment of a third possible structure (3077) was seen in a small hand-dug intervention to the east of foundation 3064 and comprised a rough collection of sandstone blocks, perhaps no more than rubble..

5.4.9 Further clay deposits continued to be deposited after the construction of foundation 3064. It is likely that construction of the foundation and deposition of the clay deposits proceeded contemporaneously, with the clay deposited in stages as the foundation was built up. Layers 3073 (orange yellow), 3058 (bright light blue), 3062 (mixed brownish blue and orange yellow), 3061 (yellow orange) and 3071 (yellow orange) were similar to the earlier clay layers (3063 etc.) described above, and the same comments apply to these. Importantly, 11 sherds of 13th-century pottery were recovered from layer 3058, providing a date for the earthwork and foundation.

5.4.10 A geoarchaeological monolith sample (sample 3010) taken through the above deposits (3058, 3074, 3070 and 3063) showed nothing inconsistent with the on-site interpretation of redeposited local geological material ('natural'). As such it is consistent with the interpretation of these deposits as forming an anthropogenic earthwork such as a *glacis* or motte. The deposits were noted as having traces of charcoal suggestive of human activity. Deposits 3074, 3070 and 3063 were noted as suggestive of higher energy deposition consistent with an anthropogenic origin (**Appendix 5**).

Destruction

5.4.11 Deposits 3079 and 3057 (**Plate 3**) comprised dark brown humic silt clay with common inclusions of charcoal, charred and uncharred wood, hazel nutshell and vivianite. The presence of vivianite suggests the former presence of organic material (providing phosphates and sulphur) and iron-rich sediment. The lower of these deposits (3079) had a bluish hue; the upper (3057) had a reddish hue. Layer 3057 had also been reached at the base of a hand-dug intervention targeting a post-medieval drain; here, layer 3057 was recorded as 3029. A series of three parallel pieces of wood within deposit 3057 were recorded as 3078. It is possible that 3078 represented a structure or surface. A further five pieces of wood were recovered from layer 3057. Of this total of eight pieces of wood, one was alder, one was hazel and the remainder oak. This may demonstrate that a range of timbers were exploited in the early castle. Deposits 3079 and 3057 both contained 13th-century pottery (a total of 12 sherds). Geoarchaeological monolith samples 3011 and 3012 were taken through these deposits and the results of the geoarchaeological assessment (**Appendix 5**) have informed the above description.

5.4.12 It is thought that layers 3079 and 3057 represent the slighting of the castle at the hands of John de Eyvill during the Second Baron's War in 1266. This destruction context has already been associated in print (Nevell 2019, 18) with the destruction contexts recorded by Armstrong. It is likely that this identification is correct.

Aftermath of destruction

5.4.13 Layer 3056 (**Plate 3**) directly overlay destruction context 3057 and comprised orange yellow silt clay, likely redeposited alluvium perhaps sourced from existing earthworks on

site. Inclusions comprised sandstone, charcoal (5%), mottles including blue clay, suggesting redeposition, and five sherds of pottery falling within a range from the 12th to 14th centuries, with no sherd demanding a date later than the 13th century. Geoarchaeological assessment (samples 3011 and 3012) was undertaken (**Appendix 5**), with the results incorporated into the preceeding description.

5.4.14 The ground level was then reduced again with a wide-ranging landscaping cut (3084 and 3080) truncating layer 3056. The ground was then built up again with layer 3067 (also recorded as 3028), comprising greyish mid-brown silt. Layer 3055 (also recorded as 3027; **Plate 3**) resembled earlier layer 3057 but did not contain dateable artefacts. Layer 3055 comprised dark brown humic clay with sandstone and charcoal inclusions. It is possible that layer 3055 represents a re-deposition of material derived from layer 3057. Geoarchaeological assessment (**Appendix 5**) noted laminations suggesting that layer 3055 was made up of a series of similar events, perhaps the shovelling and/or barrowing of the layer during redeposition.

5.4.15 Layer 3018 (**Plate 3**) comprised 0.8 m of grey yellow silt clay with sandstone inclusions. Dating evidence from trench 3 jumps abruptly from the 13th century to the 19th century and any date in this range is possible for the deposition of layer 3018.

Steelworks

5.4.16 Layer 3003 comprised grey yellow silt clay with crushed brick, sandstone and lime mortar inclusions and probably represented a pre-construction levelling layer.

5.4.17 In the east of trench 3, a series of primarily handmade red brick structures were recorded. These structures correlate with a former steelworks depicted on historic maps (**Fig. 6–8**).

5.4.18 The western exterior wall of the steelworks was defined by three-skin handmade brick and lime mortar brick walls 3025 and 3026. This wall probably pre-dated the rest of the surviving remains from the steelworks in trench 3. Later repairs to this wall (eg 3024) are detailed below.

5.4.19 Two walls extended east from wall 3025/3026 forming interior divisions of the steelworks. In the south, wall 3038 comprised two skins of handmade brick bonded with black ash mortar. Moving north, wall 3040 was of similar construction although the structure also contained a single frogged machine brick. Wall 3040 also contained an iron door lintel carrying handmade bricks and black ash mortar (3042). The door was at cellar-level and communicated between the base of a weighbridge to the north and a room to the south; the door therefore probably represented service access to the weighbridge.

5.4.20 The weighbridge (recorded on an historic map as ‘W.M.’, a ‘weighing machine’ (**Fig. 7**) extended to a depth of around 1.2–1.3 m below ground level. The weighbridge was built in a construction cut (3065, 3081) backfilled with grey sand silt (3066) and it comprised a chamber delineated by two- and three-skin handmade red brick and ash mortar walls (3036, 3046 and 3047). The east end of the weighbridge lay beyond the limit of excavation. Three sandstone and ash mortar stanchions were recorded, two in the west corners of the weighing machine (3049 and 3085) and one opposite door 3042 (stanchion 3048). These walls and stanchions were supported by handmade brick and ash mortar foundation 3044 and sandstone and ash mortar foundations 3053 and 3054. There was no continuous floor to the weighbridge, but three structures were present at the base of each of the walls. Western wall 3036 was accompanied by a sandstone and ash mortar floor-level ‘lip’ and the north and south walls had short sections of single-skin handmade brick and ash mortar added (3052 and 3051 respectively). A further single skin frogged

brick and ash mortar structure (3045) ran across the base of the weighbridge and was probably a later addition.

5.4.21 At the west end of the north side of the weigh bridge, wall 3047 expanded to a full width of eight skins and contained a reused sandstone block (3050). Sandstone block 3050 had a well-carved chamfer strongly suggesting that it had been re-used from the fabric of the castle. Block 3050 was securely located within 19th-century contexts, but the purpose of the structure could not be determined. The block remains buried *in situ*.

Culverted drains

5.4.22 In the west of trench 3, in the area of the former Castle Hill road, a 'Y'-shaped construction cut 0.82 m wide (3004) cut through layer 3018. The base of the 'Y' dipped sharply to the north-west, and the two arms of the 'Y' rose in level, turning towards the south. One of these arms continued beyond truncation by a later drain (3014) as construction cut 3030. The other arm petered out due to rising more sharply. Each arm of the cut contained a culverted drain comprising a sandstone flag base (3007, 3011, 3037), either up to five courses of single-skin handmade brick and black ash mortar sides (3006, 3013) or similar sandstone sides (3010, 3031), and sandstone capping (3008, 3032). An assemblage of 19th-century pottery was recovered from among capping stones 3008. The backfill of the construction cuts comprised grey brown silty clay with ash and rubble inclusions (3005, 3035). A secondary fill had formed within the culverts comprising dark brown and yellow brown silt clay (3009, 3033 and 3034).

5.4.23 A second similar cut (3020; 0.6 m wide) running north to south in the north-west of trench 3 was deeper (1.7 m) and did not contain a culverted drain. Cut 3020 terminated in the south and was deep enough to impact on medieval deposits such as 3057 = 3059. The fills of cut 3020 comprised redeposited yellow clay (3021; perhaps the arisings from digging through layer 3018) and dark grey brown silt (3022). It is possible that cut 3020 was intended as an abortive element of the drain network, ie that it was initially excavated for the installation of a drain but then backfilled prior to the construction of any drain within it.

Steelworks repairs

5.4.24 As outlined above, an additional structure (3045) was added to the base of the weighbridge at a later date.

5.4.25 Perhaps at the same time, alterations were made to the west exterior wall of the steelworks. Part of the wall (3024) was entirely rebuilt using black ash mortar, and the southern part of the wall (3025) was repointed. A fragment of a sandstone flag surface overlay rebuild 3024 and wall 3026, and may have represented a threshold or part of a wider surface, perhaps associated with the weighbridge.

5.4.26 Additionally, a line of bituminous cobblestones (3019) was preserved along the west side of walls 3026 and 3024. These cobblestones represented a remnant of a removed surface of Castle Hill road. They may have been preserved by being buried below a removed surface (the continuation of 3023) allowing access to the weighbridge.

Demolition and re-construction of Castle Hill road

5.4.27 Little evidence survived for the demolition of the steelworks beyond the absence of the structures above ground level. The weighbridge was backfilled with dark grey brown ashy silt gravel with rubble inclusions (3039). Geoarchaeological assessment (samples 3011 and 3012; **Appendix 5**) of this deposit noted laminations suggesting that it was formed

during a series of similar events, perhaps shovelling or barrowing. The cellars of the steelworks were backfilled with redeposited alluvial yellow brown silt clay with sandstone inclusions (3033), perhaps derived from earlier deposits on the site.

5.4.28 It is likely that the surface of Castle Hill road (the continuation of 3019) was removed at the same time the steelworks was demolished.

5.4.29 A layer of dark grey silt ash (3002), probably a post-demolition levelling layer, extended over both the area of the steelworks and of the former road. In the north section of the trench, a series of sandstone setts (3083; **Plate 7**) were seen in the area of the road. These likely represent a remnant of a late re-build of Castle Hill road. The setts were bedded in a matrix of deposit 3002. The resurfacing of the road was therefore roughly contemporary with the demolition of the steelworks. The latest pottery contained within layer 3002 was of broad 19th–20th century date.

Markets

5.4.30 A major east to west aligned concrete drain (3017) ran across trench 3 in a 0.62 m wide construction cut (3014). This is the same drain recorded as 2015 in trench 2. Pottery recovered from the backfill of the drain cut included residual 19th century and medieval material.

5.4.31 The concrete slab of the markets (3000) was bedded on a layer of red brick crush (3001) overlying earlier archaeological strata and structures.

Impact of development

5.4.32 In general, the development of the markets did not have much impact upon archaeological remains in this area. However, drain 3017 impacted deeply on 19th-century deposits, although it did not penetrate far enough to reach medieval strata. Demolition of 19th-century structures in advance of construction of the markets proceeded only as far as ground level. Preservation of 19th-century and earlier remains was good. The construction of the 19th-century weighbridge had impacted upon medieval strata, however the depth of this impact is likely to be unusual across the site as a whole.

5.5 Trench 4

Rationale

5.5.1 The WSI (Wessex Archaeology 2018) stated that trench 4 was intended to test for evidence of:

- the nature of activities within buildings of the Castle Hill steelworks (shown on the 1850s OS map), later re-used as part of wholesale tea dealers (Goad Fire Insurance Plan, 1896);
- the nature of activities in the buildings around a courtyard to the rear of properties fronting Waingate (shown on the 1850s OS map and earlier historic plans);
- any structural remains of buildings associated with the castle's inner court;
- the central yard of the inner court;
- any earlier phases of the castle surviving beneath later deposits/structures; and,

- the extent of disturbance from the 1920s construction of Castle Hill Markets and any disturbance caused by linking the 1920s market building to the 1950s extension.

5.5.2 The trench was successful in finding evidence for the 19th-century steelworks and buildings. However, the trench did not reach any remains associated with the castle. The extent of disturbance from the markets was established.

Location

5.5.3 Trench 4 (**Fig. 12–13**) was located in the south-west of the summit area of castle hill (**Fig. 1**).

Overview

5.5.4 Trench 4 contained the highest number of contexts of any trench. A sondage in the north end contained an undated clean clay deposit comprising alluvium or redeposited alluvium.

5.5.5 The residuality of pottery in later contexts in trench 4 complicates phasing. The cause of this is likely that existing medieval deposits on castle hill (or elsewhere) were used as the source for 18th- and 19th-century levelling layers.. It is possible to cherry-pick some contexts that contain only medieval artefacts, however it is unlikely that these are direct evidence of medieval activity.

5.5.6 Several phases of development of two ranges of 19th century buildings were identified, including limited evidence (power transmission conduits and a base) for processes taking place within the steelworks. Historic maps attest to steelworks in the area of trench 4 in 1853 (**Fig. 6**), in 1892 (**Fig. 7**) and also in 1808 (not illustrated, see Clarke 2019, 41, who also identifies the trench 4 steelworks with the firm of Weldon and Furniss). Prior to this, most of trench 4 was depicted as undeveloped on a composite map c.1800 (**Fig. 5**), and by 1896 (**Fig. 8**) the area had been taken over by a tea wholesaler.

Clean clay 4113 and associated deposits

5.5.7 A machine sondage was sunk to a depth of 4 m below ground level (51.7 m aOD) in the north end of trench 4 in the area of a 19th-century yard.

5.5.8 The lowest 1.6 m of this sondage was dug through a homogenous deposit of sterile yellow clay with sandstone inclusions (4113). The arisings were carefully scanned for finds and inclusions with a negative result. An environmental sample (sample 4003, see below) was taken from the arisings which contained only wind-blown wild seeds that were likely intrusive. It was notable that a medieval surface recorded at a depth of 53.09 m aOD a few metres away in trench 5 (see below) was not present in this sondage.

5.5.9 Deposit 4113 may represent the undisturbed natural geological substrate, or it may have been part of an earthwork associated with the castle similar to deposits seen in trench 2.

5.5.10 An additional 0.45 m of brownish dirty clay with stone inclusions (4114) overlay clean clay 4113. No dateable artefacts were recovered, but deposit 4114 appeared to have been disturbed, probably *in situ*, by some anthropogenic process.

5.5.11 A further layer (4082 = 4094 = 4095) comprised grey or yellow brown clay and silt with sandstone, slate and 19th-century pottery. This layer was likely derived in part from disturbance *in situ* to layers 4113 and 4114 and immediately preceded construction of flue 4091 (described below).

Green grey clay 4106

5.5.12 Hand excavation in the south of the trench halted at layer 4106 (not illustrated) for safety reasons. Layer 4106 comprised green grey clay with sandstone inclusions. Layer 4106 contained late-18th- to early-19th-century pottery and mid-18th-century clay tobacco pipe.

5.5.13 Layer 4106 was dissimilar to later yellow brown sand and sand clay deposits (described below) and so has been described separately here. It is likely that green grey clay layer 4106 represents a 19th-century levelling layer (made ground), probably associated with construction of the steelworks.

Yellow brown sand and sand clay deposits

5.5.14 Overlying layer 4106 was a layer of yellow brown sand clay (4104).

5.5.15 Nearby, the yellow brown sand clay was seen again in a different intervention (4118).

5.5.16 In the west centre of trench 4, at the base of a machine sondage to a depth of 2.4 m below ground level (54.42 m aOD) were a series of four similar deposits (4087, 4103, 4100 and 4086). Each deposit comprised yellow brown sand or sand clay with sandstone and natural coal inclusions.

5.5.17 Elsewhere in the trench, near stone base 4011, hand excavation proceeded until layers 4111, 4109, 4107 and 4117 were reached. Excavation halted for safety reasons. Again, these layers comprised yellow brown sand clay and it is likely that these were the continuation of the same levelling layers seen elsewhere in the trench.

5.5.18 Two of the stratigraphically lowest yellow brown sandy layers from trench 4 (4087 and 4111) contained artefacts of only medieval date. Seven sherds of medieval pottery were recovered from layer 4087 ranging from the 12th century to the late-13th to 15th century. Layer 4111 contained a single sherd of mid-13th- to 14th-century pottery. At first sight it appears that these layers may be of medieval date; a possibility that cannot be ruled out.

5.5.19 However, other yellow brown sandy layers with the same morphology and similar stratigraphic position contained later artefacts alongside residual medieval material. Layer 4104 contained 18th/early-19th century clay pipe alongside six residual sherds of medieval pottery of 12th- to 15th-century date. Layer 4107 contained 19th-century pottery alongside sherds in a range from the 11th- to 18th-centuries. Layers 4086, 4109 and 4117 contained only 18th-/19th-century pottery and clay pipe. Each of these contexts was seen in only a limited excavation and it is likely that they frequently represent the same strata seen in different interventions. Care is needed to avoid cherry-picking the medieval material from the results.

5.5.20 Taking the yellow brown sand clay layers as a group, the latest dating evidence originated from the 18th/early-19th century. In addition, one of these deposits (4104) overlay 19th-century layer 4106. It is most likely that all of these yellow brown sand clay layers (4086, 4087, 4100, 4103, 4104, 4107, 4109, 4111, 4117 and 4118) represent material excavated from medieval deposits and redeposited in the 18th or 19th centuries as levelling material (made ground) prior to construction of the steelworks (described below).

Flue 4091 and associated contexts in northern sondage

5.5.21 Returning to the northern 4 m-deep sondage, layer 4082 = 4094 = 4095 was truncated by a construction cut (4096) containing a flue (4091; **Plate 8**). Flue 4091 comprised an unmortared red brick base with unmortared firebrick sides. The interior of the flue was sooty indicating that it carried exhaust gases.. The base of flue 4091 was deeper than

other structures seen in trench 4 at 53.42 m aOD (2.4 m below ground level). Construction cut 4096 was backfilled with dark brown silt clay with rubble inclusions (4112). The flue contained a fill of red purple fine sand (4092) which may have been intended to protect the brickwork. The colouration of deposit 4092 was likely due to exposure to intense heat.

5.5.22 A series of levelling layers survived to the north of flue 4091. These stratigraphically early layers built up the ground almost to the present level, halting below the make-up layers (4054 etc.) for the market (at 0.3 m BGL, 55.5 m aOD). These layers comprised dark grey clay and silt and 19th-century pottery (4077 = 4081 = 4093), brown yellow clay with rubble (4050), grey yellow ash with rubble (4051), and brown grey redeposited lime mortar with rubble, and pottery and clay pipe suggesting a 19th-century date (4052). These deposits may have represented imported material and are not necessarily indicative of demolition in the area of trench 4.

Belt power transmission conduit 4020, 4021 and 4022

5.5.23 A series of probable belt power transmission conduits located towards the south-east of trench 4 could have been contemporary with flue 4091.

5.5.24 Yellow brown sand clay deposits 4111, 4109, 4107 and 4117 (described above) were overlaid by layer 4065 comprising grey brown silt clay with mortar inclusions and containing both 19th-century and residual 13th- to 15th-century pottery.

5.5.25 Layer 4065 formed a bed for north to south aligned structures 4019, 4020, 4021 and 4022. These structures comprised single-skin walls of handmade bricks and lime mortar. Structures 4020 and 4022 formed a pair (**Plate 9**); structure 4021 was presumably paired with another structure located outside the area of excavation. Structure 4019 comprised a single brick bonded to structure 4022 forming a return to the east. The paired structures (4020 and 4022; 4021 and its unrecorded pair located outside of the trench) may have been drains but have been interpreted as underfloor power transmission conduits. These conduits would have carried leather belts supplying power to whatever processes (perhaps grinding or similar) were undertaken in this part of the steelworks.

Decommissioning of power conduits 4020, 4021 and 4022

5.5.26 Conduit 4020/4022 was backfilled with orange brown silt containing a single sherd of 18th-century pottery. Conduit 4021 was backfilled with brown silt clay with a sherd of 19th-century pottery (4064), black silt (4063), and rubble in a light grey brown silt matrix with 18th/19th-century pottery (4039).

5.5.27 The relationship of deposit 4108 (dark brown sand clay with ash, 18th- to early-19th century pottery, 19th century clay pipe and residual 12th/13th-century pottery) with the power conduits (4020, 4021 and 4022) was not determined.

5.5.28 Backfill deposit 4040 overlay both power conduits (4020, 4021 and 4022) as well as deposit 4108. Backfill 4040 comprised orange brown sand with rubble and 32 sherds of pottery and also clay tobacco pipe, both of which included 19th-century material alongside earlier residual finds.

5.5.29 The power conduits (4020, 4021 and 4022) were truncated along with their decommissioning deposits (4040 etc.) by cut 4061 for the installation of sandstone base 4011, and also by cut 4098 associated with a 20th-century drain.

Demolition cut 4078, fills and associated walls (4060, 4028 etc.)

5.5.30 Returning to the northern sondage, a large demolition cut (4078; **Plate 8**) truncated the above layers and removed all but the lower six courses of flue 4091. This demolition cut (4078) contained almost all of the structures and deposits recorded in trench 4 (see below), and probably served as the construction cut for the second phase of the steelworks in addition to its function as a demolition event. It is possible to view demolition cut 4078 as a terrace cut into the edge of castle hill.

5.5.31 The decommissioned flue (4091) was backfilled with dark brown sand silt with rubble and a residual sherd of late medieval pottery (4097). The flue was then buried by a substantial (0.66 m deep) deposit of dark ash with rubble.

5.5.32 A two-skin handmade brick and black ash mortar wall (4033) was constructed bedded on layer 4097. Three courses survived. Wall 4033 was constructed against the limit of demolition cut 4078; it may be that the wall was intended as a temporary retaining structure.

5.5.33 Following removal of all but three courses of wall 4033, demolition cut 4078 continued to be backfilled with rubble (4043) and ash (4058 and 4057).

5.5.34 A construction cut (4102) through yellow brown clay sand layer 4086 (described above) contained a major east to west aligned sandstone and lime mortar foundation (4060). Construction cut 4102 was visible on the south side of foundation 4060; to the north, truncation by demolition cut 4078 had removed the necessity for a construction cut. Foundation 4060 carried a two-skin handmade red brick and lime mortar wall (4017 and 4018). This wall formed the north exterior wall of a building associated with the steelworks as depicted on historic maps (**Fig. 6–8**).

5.5.35 North of foundation 4060, a series of further fills of cut 4078 post-dated the construction of the foundation. Layer 4036 = 4044 comprised ash with rubble inclusions and 24 sherds of pottery including 19th-century material. Layer 4038 comprised fairly clean yellow grey clay.

5.5.36 A small construction cut in the east of the trench (4067) contained two single-skin handmade brick walls bonded with pink sandy lime mortar (4027 and 4028). Walls 4027 and 4028 extended for 1.35 m from the eastern limit of excavation. They were in-line with earlier flue 4091, although the features were separated by level and stratigraphy. Perhaps both sets of structures related to something (perhaps a chimney) situated outside the area of excavation. The walls were shallow (4028 was no more than three courses high) and there was no base between the walls. The area between walls 4027 and 4028 was filled with brown yellow clay (4030).

5.5.37 A later single-skin handmade brick and black ash mortar wall 4026 ran roughly north from wall 4018 to the west end of wall 4027. Some of the bricks in wall 4026 carried traces of lime mortar indicating re-use.

5.5.38 Walls 4027, 4028 and 4026 may have been temporary structures associated with a yard shown on historic maps (**Fig. 6–8**).

5.5.39 In the west of the trench, the upper fills of large cut 4078 comprised rubble (4056) and ash (4055).

Deposits and structures south of foundation 4060 including walls 4031 and 4035

5.5.40 South of foundation 4060, a series of fills and levelling layers were built up mirroring the fills of large cut 4078 to the north.

5.5.41 The fill of construction cut 4102 (for foundation 4060) comprised dark yellow brown sandy clay (4090), perhaps derived from the arisings of the cut. Cut 4102 was sealed by a thin (0.1 m deep) layer of lime mortar (4089), perhaps surplus or spilt material dumped during the construction of foundation 4060 and wall 4017/4018. A layer of sandy clay in a mixture of hues contained rubble, ash and 19th-century clay pipe and pottery. Layer 4101 comprised dark grey silt sand with coal and rubble.

5.5.42 In the west section of trench 4 (east-facing), the stratigraphic sequence was different. Construction cut 4102 was not identified in this location. Yellow brown sand clay deposit 4086 (described above) was overlain by brown grey clay and rubble with 19th-century clay pipe and pottery (4024). Earlier residual sherds of medieval and post-medieval date were also present. A large (1.1 m diameter) grindstone (4023) overlay layer 4024. Layer 4076 overlay grindstone 4023 and comprised orange grey sand silt. A cut feature of unknown purpose (4072) truncated layers 4076 and 4024. Cut 4072 was just over 1 m wide and 0.4 m deep and extended up to wall 4017 but was not the construction cut for that wall. Cut 4072 was backfilled with 4074, comprising dark grey sand silt with stones.

5.5.43 Wall 4085 also overlay layer 4024. Wall 4085 ran east to west and formed an internal division of the steelworks parallel to wall 4060/4017/4018 to the north. Wall 4085 was two skins wide and comprised handmade red bricks and lime mortar. In the west, wall 4085 was truncated by later drain cut 4098. Wall 4085 terminated in the east, perhaps with an entranceway between this and wall 4031. Levelling layer 4009 filled this possible entranceway below the former ground level and also extended to the south of wall 4085. Layer 4009 comprised orange brown sand with a variety of artefacts including 19th-century pottery and clay pipe.

5.5.44 A bed of black ash mortar (4032) overlay deposit 4101. Mortar bed 4032 did not carry a wall in the vicinity of deposit 4101, however it continued further to the south where it formed the bed for wall 4031. Wall 4031 had been damaged by demolition but was originally two skins thick and was constructed of handmade brick and black ash mortar. It likely formed an internal division in the steelworks.

South walls of steelworks (4034, 4035 etc.)

5.5.45 Yellow brown sand clay deposit 4118 (described above) was overlain by red brick rubble in a matrix of dark brown silt sand with plaster, 19th-century pottery and clay pipe, and residual medieval and 18th-century pottery (4115). Again, this material may have been imported in whole or in part. A series of walls were bedded on layer 4115.

5.5.46 Foundation 4034 (also recorded as 4110) comprised sandstone and lime mortar and ran from east to west forming the base of the south wall of the steelworks as depicted on historic maps (**Fig. 6–8**). Foundation 4034 carried the poorly-preserved remains of a three-skin handmade red brick and lime mortar wall (4035). Both 4034 and 4035 had been disturbed by demolition and by cut 4105 (described below) and as a result the remains of the structures were jumbled, with most of the bricks and sandstone blocks misaligned. Four sherds of pottery were recovered from within wall 4034, consistent with a 19th-century date.

North-east to south-west range of buildings

5.5.47 In the south of trench 4 were a range of structures on a different alignment (north-east to south-west) to the rest of the structures in the trench (north to south and east to west). The structures in the south of trench 4 correlate with the rear of a range of buildings depicted on historic maps (**Fig. 6–8**) aligned with the frontage of Waingate to the south-west. The relationship between these buildings and the steelworks had been damaged both by cut 4105 (described below) and by disturbance during demolition and it was not possible to establish the relative chronologies of the two ranges.

5.5.48 Wall 4006 ran from north-east to south-west and likely formed the south-east wall of the range of buildings fronting Waingate. Wall 4006 was three skins wide and comprised handmade red brick and lime mortar. To the north-east of wall 4006 (ie inside the building), was a levelling layer of dark grey ash containing post-medieval artefacts including 19th-century pottery (4008). An interior kerb comprising sandstone kerbstones in a dark matrix (4047) was bedded on layer 4008 and ran parallel to wall 4006. Between kerb 4047 and wall 4006 was a surface of sandstone slabs or setts (4046) and cobbles (4045) in the same dark matrix. A different flagstone surface (4005, 4003) was present to the north-west of kerbstones 4047. Each of these surfaces (4003, 4005, 4045, 4046 and 4047) had the same black silt matrix.

5.5.49 A linear cut, variously recorded as 4105, 4059 and 4048, ran from east to west across the interface between the two ranges of buildings. Cut 4105 was over a metre wide and had disturbed structures 4003, 4005, 4006, 4034, 4035, 4045, 4046 and 4047. It is possible that this feature was a robber trench, perhaps removing some unknown pipe or other valuable commodity. Cut 4105 was filled with yellow brown clay with rubble and 19th-century pottery (4007) and dark grey sand silt (4071).

5.5.50 A later drain (4004, described below) had truncated surface 4003 and 4005.

Sandstone base 4011

5.5.51 Towards the south-east of trench 4, power transmission conduits 4020, 4021 and 4022 (described above) were truncated by a large cut (4061). Cut 4061 extended up to walls 4031 and 4035, indicating that it was intended to modify but not replace the existing steelworks structures. Cut 4061 was 1.75 m from north to south, and over 2 m from east to west, continuing beyond the limit of excavation to the east.

5.5.52 Cut 4061 was made for the installation of a pair of large (0.9 m by 0.4 m by 0.3 m) sandstone blocks forming a base (4011). The base of the sandstone blocks contained fittings indicating that they had previously been used elsewhere in an inverted position. The size and geology of the blocks was consistent with the fabric of the castle; it is possible that their final use was at least their third use, after having been used as a machine base in their inverted position elsewhere and possibly originating in the structure of the castle. . The top of base 4011 did not contain any fittings and was situated at 55.39 m aOD.

5.5.53 Cut 4061 was backfilled with grey/orange brown silt with redeposited lime mortar, 19th-century pottery and residual 18th-century and medieval material (4042 = 4062), and rubble in a matrix of redeposited lime mortar and 19th-century pottery (4010).

Markets

5.5.54 A series of drains associated with the 20th-century markets truncated archaeological remains in trench 4.

5.5.55 In the far north of trench 4, a linear east- to west-aligned cut (4025) truncated layers 4050, 4051 and 4052. This cut (4025) contained a concrete drain (4080, 4084) bedded on reused bricks (4079). Cut 4025 was backfilled with ash and rubble (4037 = 4049, 4066 = 4083 and 4053).

5.5.56 Concrete drain 4013 passed through wall 4017/4018, dividing wall 4017/4018 into two contexts. Drain 4013 was removed during initial machining.

5.5.57 Drain 4013 intersected with concrete and ceramic pipe drain 4012. Drain 4012 was contained within a north-east to south-west aligned linear service cut (4098), which truncated walls 4018, 4031, 4085 as well as many other contexts in the centre of trench 4. Cut 4098 was backfilled with ash (4041) and orange brown sand clay with rubble and residual 18th-century pottery (4099). The area between drain 4012 and walls 4026 and 4027 was filled with similar brown orange sand (4029) which was likely a fill of cut 4098. These fills were then cut (4015) for installation of a poured concrete and metal stanchion (4014). The stanchion was close to drain 4012 but did not truncate it. Cut 4015 was backfilled with a small amount of ash containing 27 sherds of mainly residual 18th-century pottery (4016).

5.5.58 Sandstone base 4011 (described above) was covered by a localised levelling layer (4002) associated with construction of the markets. Layer 4002 comprised ash with a variety of redeposited pottery and clay pipe.

5.5.59 Concrete and ceramic pipe drain 4004 truncated and divided surfaces 4003/4005 in the south-west of trench 4.

5.5.60 Apart from stanchion 4014, all of the above contexts of trench 4 were sealed by levelling layer 4054 comprising yellow brown clay with rubble, layer 4070 comprising dark grey silt sand with gravel, layer 4069 comprising brown orange sand clay, and layer 4068 comprising yellow brown clay.

5.5.61 The concrete slab of the market (4000) was bedded on red crushed brick (4001).

Impact of development

5.5.62 Although 20th-century drains were common in trench 4 and had impacted upon 19th-century remains, the depth of impact was generally shallow and the truncation did not hamper interpretation of the remains. Any medieval layers or structures that might exist at lower levels will generally not have been impacted by 20th-century development, although the depth of stanchion 4114 is unknown and this may have had a discrete but deep impact. In general, preservation was good.

5.6 Trench 5

Rationale

5.6.1 The WSI (Wessex Archaeology 2018) stated that trench 5 was intended to test for evidence of:

- the nature of activities within buildings of the Phoenix (steel) Works (shown on the 1850s Ordnance Survey map), later re-used as a wheelwrights/carriage repository (Goad Fire Insurance Plan, 1896);
- the make-up of Castle Hill, the road constructed *c.*1800;

- the projected line of the northern range of the inner court;
- the central yard of the inner court;
- earlier phases of the castle surviving beneath later deposits/structures; and,
- the extent of disturbance from the 1920s construction of Castle Hill Markets.

5.6.2 Limited evidence for the steelworks was identified comprising walls and traces of surfaces. No evidence for the Castle Hill road was contained within trench 5. The surface of the central yard of the castle was identified, however no further remains of the castle were uncovered. The extent of 20th-century disturbance was established.

Location

5.6.3 Trench 5 (**Fig. 14**) was located in the north of the summit area of castle hill (**Fig. 1**).

Overview

5.6.4 A cobblestone surface interpreted as that of the courtyard of the castle was reached. Overlying this were 18th-century levelling layers associated with construction of a bowling green known from historic maps. The boundary wall of the bowling green was also recorded. Subsequent layers and walls related to use of the site as a steelworks.

Cobblestone surface

5.6.5 Excavation of a sondage in the centre of trench 5 halted upon discovery of a stone surface at a depth of 2.6 m below ground level (53.09 m aOD). Box shoring was used to facilitate access. The surface comprised three elements (5042, 5043 and 5044) and was accompanied by deposits 5041, 5045 and 5040 (**Plate 4**).

5.6.6 Bedding layer 5041 was visible below the surface (5042, 5043 and 5044) where stones were missing. Layer 5041 comprised blue grey silt and contained three sherds of 13th-century pottery.

5.6.7 In the south, part of the surface (5044) comprised a single layer of rough uneven cobblestones around 0.2 m in diameter. Surface 5044 sloped down slightly to the west.

5.6.8 In the north, a second patch of the surface (5042) was isolated from surface 5044 due to the loss of stones. Surface 5042 resembled surface 5044 and was probably a continuation of the same structure.

5.6.9 A bedding layer of yellow brown silt sand with charcoal flecks contained a sherd of 13th century pottery was laid down prior to the construction of a second layer of rough cobblestones (5043). Surface 5043 overlay surface 5042 and probably overlay surface 5044. This second layer (5043) comprised slightly larger rough cobblestones (0.3 m diameter). The second layer (5043) was constructed as a renovation of the first (5042, 5044), however it is unclear if this was a localised patch, perhaps filling a hollow, or if it formed a widespread structure substantially covering the earlier iteration of the surface. All parts of the surface were roughly arranged and it is hard to imagine, say, a horse doing well on this ground. The repairs to the surface were probably an attempt to improve the situation and demonstrate the importance of the quality of the surface.

5.6.10 In the north-east, a small deposit of dark red silt clay (5040) contained a copper toilet item perhaps from the 14th century. This layer may represent an occupation layer; ie material built up through use of the surface.

5.6.11 In the north-west, some of the cobblestone surface had been dislodged (cut number 5046) and the surface repaired with ironworking slag 5039. The red black ironworking slag (5039) closely resembled medieval slag deposit 1073 seen in trench 1. The stratigraphy of trenches 1, 5, and also 6 (described below) share some similarities, and it is likely that elements of the same broad sequence occured in each.

5.6.12 It is likely that at least part of this surface was exposed for some 500 years, from construction in the 13th century until it was buried in the 18th (see below). The relative chronology of 13th-century remains in trenches 3 and 5 is not known; speculatively the surface in trench 5 may have been constructed after the slighting of the castle in 1266 (ie part of the de Furnival castle).

Bowling green

5.6.13 Examination of the layers overlying surface 5042, 5043 and 5044 was hampered by the box shoring used to support the deep excavation. The following layers (5038, 5037 and 5036) were not cleaned by hand and were recorded at a distance. A layer of dirty yellow clay with stones (5038) overlay surfaces 5042, 5043 and 5044. Four sherds of pottery were assigned to context 5038; two of these were 18th century in date and the remaining two were 19th- and 19th- to 20th-century in date. It is likely that at least the later sherds were disturbed by machine excavation and were intrusive in this context. Further layers of yellow brown silt clay (5037) and orange brown clay (5036 = 5025) followed. Layer 5025 contained two sherds of 18th-century pottery. All three of these layers were ultimately derived from alluvium; it is possible that they were sourced from existing earthworks on site.

5.6.14 Moving beyond the machine sondage, three courses of a 0.6 m wide unmortared sandstone wall (5010) was preserved for a length of around 2 m in the north-west of the trench. This wall correlates with the boundary of a bowling green depicted on 18th-century historic maps (**Fig. 4**). It is likely that layers 5038, 5037 and 5036 described above represent levelling layers deposited during construction of the bowling green.

5.6.15 A bedding layer of black silt (5009) was present on both sides of wall 5010 and had the appearance of formerly carrying a flagstone surface. One stone of this surface survived *in situ* (5031) as it contained a circular iron drain grate, perhaps making it unattractive for re-use. Layer 5009 contained 10 sherds of 18th-century pottery (and one sherd of 15th- to 16th- century pottery) suggesting that it was associated with development of the bowling green.

Steelworks

5.6.16 A layer of dark yellowish-brown silt clay with rubble inclusions (5005) was seen across trench 5 and formed a levelling layer (ie made ground) deposited prior to construction of a steelworks known from historic maps (**Fig. 6–8**). Layer 5005 contained 58 sherds of pottery indicating a late-19th century date for the layer, although with some residual older material (eg 18th century) and a single intrusive sherd of 20th-century pottery. Layer 5005 may have been *in situ* demolition material or may have represented imported material.

5.6.17 A 4.8 m-long fragment of a three-skin handmade brick and lime mortar wall survived running north to south in the centre of trench 5 (5007). Two small buttresses or similar structures were present on the east side of the wall (5030). A second fragment of a similar

wall (5008) ran east to west. These structures formed part of a steelworks known from historic maps (**Fig. 6–8**). Each structure was built in a construction cut (5026, 5028) backfilled with dark brown clay (5027 = 5023 = 5024, 5029). Backfill 5029 and 5024 contained 19th-century clay tobacco pipe alongside residual clay pipe and pottery.

Demolition of steelworks

5.6.18 Other than the absence of the continuation of structures (both horizontally and vertically), there was little evidence for the demolition of the steelworks. Rubble from the demolition had been removed from the immediate environs, perhaps used elsewhere on the site or removed to some distant depot.

Markets

5.6.19 A construction cut (5032) ran east to west across the centre of trench 5, impacting to a depth of around 1.75 m below ground level (53.9 m aOD). The cut contained a primary fill of brick rubble (5035) carrying a concrete drain (5033). The cut was backfilled with dark brown silt and rubble (5034) from which 143 sherds of 19th/20th century pottery were bagged.

5.6.20 Layer 5002 comprised yellow brown silt clay with some rubble and 19th to 20th century pottery, and layer 5003 comprised dark grey ash and clinker. Overlying drain 5032 and layer 5003 were 5015 (fine black ash), 5014 (yellow brown clay with rubble), 5019 (dark brown ash with rubble), 5013 (dark grey silt with rubble), 5016 (dark yellow brown clay with rubble) and 5018 (dark grey silt with stone and concrete inclusions). These represent possibly imported levelling materials associated with the construction of the markets.

5.6.21 In the north-east, a construction cut (5011) 0.75 m by 1.85 m in plan truncated layers 5002 and 5013. Concrete 5006 containing somewhat coursed red brick rubble was poured into cut 5011 to form a drain. The cut was backfilled with stone and brick rubble (5004, 5012).

5.6.22 A bedding layer of brick crush (5001) for the final concrete slab (5000) was spread over the area. However, a concrete drain (5017) was cut (5020) through layer 5001 at a late stage in construction immediately prior to the slab of the markets being poured (5000).

Impact of development

5.6.23 In general, the development of the market in this area was not sufficiently deep to impact archaeological remains. In fact, the ground level was built up in area 5 to facilitate the construction of the markets. However, demolition of 19th-century structures appeared to be thorough in this locality. Additionally, drain 5032 was unusually deep (around 1.75 m) and had impacted on post-medieval archaeological remains. Overall preservation was, however, good.

5.7 Trench 6

Rationale

5.7.1 The WSI (Wessex Archaeology 2018) stated that trench 6 was intended to test for evidence of:

- the nature of activities within buildings of the Phoenix (steel) Works (shown on the 1850s Ordnance Survey map), later re-used as a wheelwrights/carriage repository (Goad Fire Insurance Plan, 1896);

- the projected lines of the northern and western ranges of the inner court, and the relationship between the two;
- the nature of the curvilinear feature and possible floor identified by Leslie Butcher;
- any earlier phases of the castle surviving beneath later deposits/structures; and,
- the extent of disturbance from the 1920s construction of Castle Hill Market and later works associated with the 1970s construction of a toilet block.

5.7.2 The results of trench 6 largely did not relate to these objectives. The south and centre of the trench had been subject to a high level of disturbance in the 20th-century. No evidence of the steelworks/wheelwrights was contained within trench 6. No evidence of the north and west ranges of the inner court of the castle were identified. The curvilinear feature identified by Leslie Butcher lay outside the area of trench 6 and was likely removed by 20th-century development (a plan showing this feature was supplied to Wessex Archaeology by SYAS). It is unclear if this feature relates to anything identified in trench 6.

5.7.3 Early features probably representing 'earlier phases' of the castle were identified. The extent of the disturbance from the 1920s and late-20th-century development was established.

Overview

5.7.4 An undated palimpsest of cut features were identified towards the base of excavation in the north-east of the trench from around 51.50 m to 50.40 m aOD (maximum 4 m below ground level). Substantial 18th-century sandstone structures were recorded. Later contexts represented services and made ground. In the south of the trench ('trench 6B') late-20th century development had impacted to a depth of over 4 m below ground level. Dating is problematic for the whole trench; scientific dating is recommended below.

Location

5.7.5 Trench 6 (**Fig. 15–17**) was located in the north-west of the summit area of castle hill (**Fig. 1**).

Earliest cut features

5.7.6 A machine sondage was excavated in stages to a depth of 4 m below ground level in the north-east of trench 6 and protected with box shoring (**Plate 5**). At the base of the sondage, layer 6066 was revealed, comprising green grey sand clay with stones. Four shallow (0.1 m deep) cut features were cut through layer 6066, including two gully terminals or beam slots (6063, 6067) with a central gap, possibly forming an entranceway. Feature 6063 was 0.38 m wide; feature 6067 was 1.95 m wide. There was a small pit or posthole (6059, 6061) flanking the possible entranceway adjacent to each terminal. Pit 6059 was sub-circular, 0.6 m in diameter, whereas pit 6061 was sub-square and 0.36 m in diameter. Features 6063 and 6067 continued beyond the sondage. It is possible that these features represent the entrance to a structure.. No dateable artefacts were recovered. Luminescence samples (pOSL) were taken, and there is potential (outlined below) for AMS dating and dendrochronology. The overall stratigraphy of the trench suggests that these features are medieval or earlier in date.

Second sub-phase of cut features

5.7.7 A layer of dark brown silt clay (6055) sealed features 6059, 6061, 6063 and 6067. Two pits (6073 and 6075) were cut through layer 6055.

5.7.8 Pit 6073 (**Plate 5**) had a wide 'V'-shaped profile 0.97 m wide and 0.49 m deep with a light-coloured fill (6074, green yellow silt clay with charcoal), and contained a stone post pad (6071) and an *in situ* wooden post base (6070, retained). The post was not situated centrally within the large cut.

5.7.9 Pit 6075 was 0.44 m wide and 0.47 m deep and contained three layers of alternating dark and light fills (6076, dark brown silt clay with stones and wood; 6077, grey green silt clay with charcoal and wood; and 6079, dark brown silt loam).

Third sub-phase of cut features

5.7.10 Two small pits (6080 and 6082, both with light-coloured brown yellow clay fills; **Plate 5**) truncated earlier pits 6073 and 6075. Pit 6080 was 0.31 m wide and 0.17 m deep; pit 6082 was only partially within the area of excavation.

Fourth sub-phase of cut features

5.7.11 A layer of yellow grey silt clay (6053 = 6065) sealed pits 6080 and 6082.

5.7.12 The following sequence was also recorded in two separate machined sections as well as two earlier hand-dug sondages located around 2–3 m to the west.

5.7.13 Layer 6052 (recorded in both machined sections) comprised dark blue ashy clay. This was probably the same layer recorded in the base of two hand dug sondages: 6047 (dark brown ashy clay) and 6048 (dark brown clay). Similarly, the next layer seen in the machined sections (6051), comprising greenish grey silt clay, was probably the same as layers 6043 (grey yellow silt clay) and 6044 (grey brown silt clay) from the hand-dug sondages.

5.7.14 In the earliest machined section only, a shallow (0.3 m deep), broad (over 0.7 m wide) cut feature (6057) truncated layer 6051 and contained a primary trample fill (6050) of red black slaggy ash containing a single sherd of pottery that was medieval in date but could not be more closely dated. This sherd of pottery was stratigraphically the earliest dateable artefact recovered from trench 6. The red black slag resembled slag deposits 1073 and 5039 in trenches 1 and 5 which may have been deposited as surfaces. The main fill of feature 6057 comprised grey yellow silt clay (6058).

Fifth sub-phase of cut features

5.7.15 Stone rubble layer 6054 sealed pit 6057 and was recorded in the earlier machined section only.

5.7.16 Pit 6078 probably cut through layer 6054, although the upper boundaries of the pit were hard to identify, both where it cut through layer 6054 and also where it cut through lower layer 6051. Pit 6078 was recorded in both machined sections. The pit (6078) was 0.3 m wide and at least 0.7 m deep. The fill (6084) comprised dirty yellow clay with stone and ash and, importantly, contained a large block of dolomite (magnesian limestone). The purpose of the pit appeared to be to dispose of the limestone block. Records suggest that limestone was imported to the castle in the 15th century; earlier and later imports of limestone are also possible. A band of magnesian limestone runs approximately north to south around 20 km to the east of Sheffield. Further magnesian limestone was

discovered, probably residually, in late contexts in trench 3. Himsworth (nd) also noted magnesian limestone discovered on the castle site on the 15 Nov 1927.

Undated layers

5.7.17 In one of the hand-dug sondages, an additional layer (6045) of grey yellow silt clay with stones was recorded.

5.7.18 Layers 6045, 6043 and pit 6078 were sealed by layer 6039, also comprising grey yellow silt clay. Six sherds of pottery were recovered suggesting a 12th-century date for deposition. This data point is important in a largely undated sequence. Layer 6039 also contained a small lens of charcoal and ash (sample 6005).

5.7.19 Layer 6038 comprised dark brown ash; layer 6046 was grey brown silt and layer 6042 comprised grey yellow silt with sandstone rubble.

Sandstone structures

5.7.20 A series of visually impressive sandstone and lime mortar structures (**Plate 10**) were excavated in the north centre of trench 6. Existing deposits were truncated by a construction cut (6085) prior to construction of the structures. The structures were located on the north-east edge of castle hill, with the topography falling rapidly to the north-west down towards the River Don.

5.7.21 Wall 6029 ran north to south and was 0.8 m wide. The wall comprised a well-made west face and a rubble core backing onto deposits 6046 and 6042, acting as a retaining wall for these earlier deposits. A single handmade brick (retained) was contained within the sandstone rubble core of wall 6029. The brick was morphologically consistent with a date from the period 1776–1784, although this approach to dating should be treated with caution (see Artefactual Evidence below). Additionally, the brick had been re-used at least once and is therefore residual. The north end of wall 6029 turned 90° to the east before turning again 45° to the north-east (6031). This wall was much less robust (0.4 m wide max.) but continued the pattern of a well-finished face exposed to the north-east and an unfinished rubble rear built to retain older deposits.

5.7.22 A staircase (6032) ran up from north to south adjacent to the west face of wall 6029. The stairs included flagstone treads and a rendered keeping hole with iron stains.

5.7.23 Piled against staircase 6032 was deposit 6041 comprising dark brown clay silt and containing a sherd of 18th-century pottery. The pottery comprised a large sherd sealed below flagstone surface 6037.

5.7.24 North of the stairs and partially overlying deposit 6041 were flagstone surfaces (6037 and 6036) forming a passageway running from west to east before turning to the north-east following the alignment of wall 6031. A carved indentation revealed the position of a door jamb in line with wall 6029. The north side of the flagstone surfaces was enclosed by a further wall (6035).

5.7.25 The structures were truncated in the north by a drain cut (6014) and in the south by the cut for late-20th century redevelopment of the market (6005).

5.7.26 These structures broadly correlate with buildings depicted on 18th-century plans (**Fig. 5**). The function of the structures is unknown.

Demolition of sandstone structures

5.7.27 A layer recorded variously as 6026, 6030 and 6033 comprised grey or orange brown silt with sandstone fragments, plaster, clay pipe and 66 sherds of pottery. The pottery dated from the 15th century to the 20th century, with only three possibly intrusive sherds demanding a date later than the 18th century. The clay pipe assemblage contained 17th and 18th century pipes. This material probably represented the decayed remainder of the demolished structures after the useable stone etc. had been removed. The 19th- and 20th-century pottery was likely intrusive and demolition of the structures likely occurred in the late 18th century.

Markets

5.7.28 A layer of dark orange brown sand clay with sandstone and slate inclusions (6023) overlay demolition deposits 6026, 6030 and 6033. Layer 6022 comprised dark brown sand with sandstone, natural coal and mortar inclusions. Layer 6004 comprised clean yellow brown clay with natural sandstone inclusions. These three layers (6023, 6022 and 6004) likely represent levelling layers deposited prior to construction of the market.

5.7.29 A complex series of early 20th-century drainage structures in the north-west of trench 6 included frogged brick and cement inspection chambers (6017, 6021) and a cast iron pipe (6019). These drainage structures were constructed in a series of service cuts (6005, 6008, 6014, 6015, 6018 and 6024) excavated through levelling layers 6026, 6030 and 6033. Cut 6014 extended east to west across the north of trench 6 and was not bottomed after 1.2 m of hand excavation. Backfill of these service cuts comprised general demolition rubble, typically in a matrix of grey brown silt (6006, 6007, 6009, 6013, 6016, 6020, 6025, 6040).

Market renovation

5.7.30 In the centre of trench 6, a large concrete foundation approximately 3 m by 3.2 m in plan contained inspection chamber shafts several metres deep (6000). Foundation 6000 was constructed within construction cut 6005 which was seen in the north of trench 6 in association with modern drains (described above).

5.7.31 To the south of foundation 6000 (‘trench 6B’), a north to south aligned frogged machine brick and cement wall (6503) ran down the east side of the trench and was seen in an unsupported machine sondage to be over 4 m deep. A concrete inspection chamber (6504) was adjacent to wall 6503. Layers were piled against wall 6503 and inspection chamber 6504, comprising yellow brown and yellow clay silts and clays with rubble (6506, 6507, 6508). The clay components of these deposits may have been derived from the arisings from excavating through deposits similar to 4113 seen in trench 4, or other alluvial or earthwork deposits formerly in this locale.

5.7.32 A cut (6509) truncated the west side of deposits 6506, 6507 and 6508 and contained a concrete inspection chamber (6505) and a concrete pile-like foundation (6502). Cut 6509 was backfilled with two deposits of stoney sand hardcore of differing hues (6510 and 6511).

5.7.33 Elsewhere in the south of trench 6 (‘trench 6B’) a deposit of yellow brown clay with sandstone was reached at a depth of 1.27 m below ground level (55.26 m aOD). This deposit may have derived from re-deposition of a layer similar to 4113 seen in trench 4.

5.7.34 Deposit 6512 was cut by a 0.65 m-wide east to west aligned linear feature (6513) filled with stoney sand hardcore (6514). Cut 6513 was not excavated but was assumed to be a service cut.

5.7.35 Finally, in the south-west corner of trench 6, a concrete surface (6515) partially survived at a depth of 1.3 m below ground level. Surface 6515 was overlaid with grey brown grit sand with rubble (6516).

5.7.36 Across the south of trench 6 ('trench 6B') A layer of foam insulation (6501) had been installed below a series of concrete foundation beams (6000) running between a series of piles (eg 6502). The foundation beams (6000) contained substantial steel reinforcement and could not be removed with the resources available during evaluation.

5.7.37 At this time, a new surface was laid down in the 'loading bay' area encompassing the north of trench 6. This surface comprised a layer of brick rubble, intermittently roughly arranged into a surface (6003) overlaid with grey brown grit hardcore (6002) bedding a layer of tarmac (6001).

Borehole

5.7.38 A modern borehole (6068) had been drilled from the tarmac surface and was backfilled with pea gravel. The borehole was seen throughout the various stages of excavation, including in plan accompanying the earliest cut features at the base of the trench.

Impact of development

5.7.39 The impact of the development of the markets on 19th-century structures was severe in trench 6 as no 19th-century remains survived at all, although the presence of 19th-century structures is known from historic maps (**Fig. 6–8**). Drains associated with the markets had had a substantial impact upon 18th-century remains, and it is likely that these drains impacted upon medieval layers too, although the drains were not excavated to their bases. However, the chief impact of 20th-century activity was during late-20th-century renovations. In the area of these renovations, archaeological remains will have been completely removed to a depth of over 4 m below ground level (below 51.66 m aOD). Taken as a whole, preservation in trench 6 was poor. However, in a substantial part of the north of the trench there was an area with excellent preservation of 18th-century and earlier remains.

Remarks on nearby ARCUS trench 2

5.7.40 A previous evaluation trench (Davies 2002, trench 2) was located a short distance to the north-east of trench 6. This trench recorded a series of sandstone and lime mortar walls stratigraphically situated between layers containing 13th- to 14th-century pottery.

5.7.41 The ARCUS trench 2 structures were recorded between 51.6m to 53.41m AOD; the tops of the surviving Wessex Archaeology trench 6 structures were at 52.93m to 53.02m AOD. The similarity in level, their alignment and the appearance of the structures suggests that they are related. The dating evidence for the trench 6 structures is slight and there is dissonance between the interpretations of these two sets of results. It is possible that the medieval pottery recovered from ARCUS trench 2 was residual. Alternatively, it is possible that the artefacts from Wessex Archaeology trench 6 were intrusive. It is somewhat hard to explain the sherd of large unabraded 18th-century slipware recovered from below flagstone surface 6057 in trench 6 (see below), however one possibility is that the structures in trench 6 represent ruins of the castle that survived to be depicted on 18th-century maps and were maintained and repaired to some degree at some point during the

18th century. At present it is difficult to conclusively resolve the dissonance between these two sets of results and the results of future work are keenly awaited.

5.8 Trench 7

Rationale

5.8.1 The WSI (Wessex Archaeology 2018) stated that trench 7 was intended to test for evidence of:

- the location of a sample of driven piles – to be assessed in a separately commissioned condition survey;
- the nature of activities within buildings shown on 19th century maps (marked as 'clothier' on the Goad Fire Insurance plan, 1896 – part in a basement);
- the make-up of Castle Hill, the road constructed *c.*1800 and the original vehicular access to the 1920s Castle Hill Markets;
- the western arm of the moat, as it reaches Waingate; and,
- the extent of disturbance from the extension of the market in the 1960.

5.8.2 Driven piles were identified to facilitate a separate condition survey. No remains relating to the clothiers, to the Castle Hill road or to the moat were identified. The extent of disturbance in the area was determined.

Location

5.8.3 Trench 7 (**Fig. 18**; **Plate 12**) was located in the north-west of the site close to the road Waingate (**Fig. 1**).

Overview

5.8.4 A series of modern drains impacted directly on truncated natural bedrock. A small fragment of wall in frogged machine brick and cement may pre-date the mid-20th century expansion of the market but is unlikely to be older than the early 20th century. No archaeological remains pre-dating the 20th century were identified.

Natural

5.8.5 The undisturbed natural geological substrate (7000) was quickly reached during excavation of trench 7. The natural (7000) comprised light brown yellow coal measures sandstone bedrock. The bedrock was unweathered indicating that the upper horizons of bedrock had been removed.

Frogged brick and cement wall

5.8.6 In the north-west of the trench, a frogged machine brick and cement wall (7023) ran roughly west-south-west to east-north-east approximately along the north side of the former Castle Hill road. Wall 7023 was only partially within the area of excavation and 1.1 m in length, 0.3 m in width and 0.5 m in depth were exposed. Based on the materials used, the wall is likely 20th century in date. The wall was constructed in a cut (7024) made through bedrock 7000 and backfilled with rubble (7025). It is possible that this wall was associated with the Co-operative Store that occupied this part of the site prior to the expansion of the markets.

Drains

5.8.7 Major drain cut 7001 ran approximately east to west across the centre of trench 7 and contained iron drain 7003 set on a bed of concrete (7002) as well as ceramic drain 7004. Cut 7001 widened in the east of the trench, perhaps due to the two drains splitting. Cut 7001 was backfilled with yellow brown clay (7006) and rubble (7011).

5.8.8 Service cut 7026 ran from south-west to north-east and carried iron drain 7005. Frogged machine brick and cement inspection chamber 7012 was also contained in cut 7026 and was situated at the intersection of drains 7003, 7004 and 7005. Cut 7026 was backfilled with dark rubble deposits (7007, 7008, 7017), dark brown silt (7009) and dirty yellow clay (7010).

5.8.9 Service cut 7020 ran from north-north-west to south-south-east in the south of trench 7. Cut 7020 carried ceramic drain 7021 and was backfilled with dark brown sand silt with slates (7022).

5.8.10 These drains were associated with 20th-century development, probably with the expansion of the markets in the mid-20th century.

Markets

5.8.11 A series of concrete piles and horizontal beams connecting the piles formed the mid-20th-century foundation of the expanded area of the markets. A construction cut (7013) was associated with installation of the piles. Cut 7013 had partially exposed a vertical iron pipe (7014) and was backfilled with crushed and uncrushed rubble (7016).

5.8.12 Inspection chamber 7012 was backfilled with light grey dry silt and rubble (7018).

5.8.13 The area was capped with a complex concrete surface (7019) shaped to accommodate a former vehicle entrance ramp.

Impact of development

5.8.14 Development has had a significant impact upon archaeological remains in trench 7. Truncation has extended to the removal of the upper horizons of bedrock, likely including removal of overlying alluvial deposits. Any archaeological remains from all periods have been removed by development, however there is still archaeological potential in the general area as demonstrated by the survival of the moat in trench 9 (see below).

5.9 Trench 8

Rationale

5.9.1 The WSI (Wessex Archaeology 2018) stated that trench 8 was intended to test for evidence of:

- the location of a sample of driven piles – to be assessed in a separately commissioned condition survey;
- the nature of activities in the buildings around a courtyard to the rear of properties fronting Waingate (shown on the 1850s Ordnance Survey map and earlier historic plans);
- the projected line of the western range of the inner court;
- any earlier phases of the castle surviving beneath later deposits/structures; and,

- the extent of disturbance from the 1920s construction of Castle Hill Market and the extension of the market in the 1960s.

5.9.2 Driven piles were identified to facilitate a separate condition survey. No remains relating to either the properties fronting Waingate, or to the castle were identified. The extent of disturbance in the area was determined.

Location

5.9.3 Trench 8 (**Fig. 19**; **Plate 13**) was located in the west of the site (**Fig. 1**).

Overview

5.9.4 A series of 20th-century foundations and services were cut into the natural bedrock.

Natural

5.9.5 As in trench 7, the undisturbed natural geological substrate (8008) comprised orange yellow coal measures sandstone bedrock. The bedrock was unweathered indicating that the upper horizons of bedrock had been removed.

Markets

5.9.6 In the south-east of trench 8, two-skin frogged machine brick and cement wall 8007 ran roughly north to south at the limit of excavation. Construction cut 8014 adjacent to wall 8007 contained pile 8006.

5.9.7 In the north-east of trench 8, construction cut 8018 contained pile 8005.

5.9.8 In the west and centre of trench 8, construction cut 8002 had a complex shape (**Fig. 19**) to accommodate a series of concrete walls or foundations (8001). Cut 8002 also contained an iron pipe (8004) and was backfilled with yellow brown stoney sand (8003).

5.9.9 Linear feature 8010 ran from the west of trench 8 to wall 8001 in the centre of the trench, cutting fill 8003. Linear feature 8010 was 1.62 m wide and was filled with brown yellow stoney sand (8012). The feature (8010) was not excavated but was assumed to be a service cut.

Impact of development

5.9.10 Development has had a significant impact upon archaeological remains in trench 8. Truncation has extended to the removal of the upper horizons of bedrock. Any archaeological remains from all periods have been removed by development, however there is still archaeological potential in the general area as demonstrated by the survival of the moat in trench 9 (see below).

5.10 Trench 9

Rationale

5.10.1 The WSI (Wessex Archaeology 2018) stated that trench 9 was intended to test for evidence of:

- the location of a sample of foundations from the 1950s high office block – to be assessed in a separately commissioned condition survey;

- the location and character of a sample of foundations from the 1920s Co-op store and the impact of these foundations on archaeological deposits; and,

- the extent of disturbance from the 1920s construction of the Co-op building and the 1950s extension of the markets.

5.10.2 Foundations were identified to facilitate a separate condition survey. The extent of disturbance in the area was determined.

Location

5.10.3 Trench 9 (**Fig. 20**; **Plate 14**) was located in the south-west of the site (**Fig. 1**).

Overview

5.10.4 The cut of the moat of Sheffield Castle was identified in the south of trench 9 and the fills investigated. 20th-century foundations and services were identified.

Natural

5.10.5 As in trenches 7 and 8, the undisturbed natural geological substrate (9001) comprised brown orange coal measures sandstone bedrock. The bedrock was unweathered indicating that the upper horizons of bedrock had been removed.

Moat

5.10.6 The north side of the cut of the moat (9007; **Plate 14**) ran from north-west to south-east across the south end of trench 9, in agreement with unpublished plans of previous excavations held by Museums Sheffield (Butcher nd). Cut 9007 was steep and made directly into the sandstone bedrock. An intervention was excavated into the fill of the moat (9011) and was halted at a depth of 1.2 m below ground level (49.89 m aOD) for safety reasons (the top of the surviving moat cut was at 51.12 m aOD). The fill (9011) comprised homogeneous brown sand clay, although the upper 0.15 m contained intrusive modern brick rubble that had been pressed into the deposit from above. Seven sherds of pottery were recovered suggesting a 14th-century date for deposition of 9011. A second fill (9016) was identical save for a bluish hue, and was contaminated by intrusive modern brick rubble pushed into the deposit.

5.10.7 It is important to note that the 1.2 m of the moat investigated in trench 9 neither represents the top of the moat nor the base of the moat. Deposit 9011 was situated at some mid-point in the sequence of moat fills and cannot be placed within the wider stratigraphic context of the infilling of the moat.

Markets

5.10.8 The fills of the moat were truncated by two concrete piles (9009 and 9010).

5.10.9 Two further similar piles (9008 and 9013) were located slightly to the north, cutting through the sandstone bedrock.

5.10.10 The service cut (9005) for an electric cable ran north to south across trench 9, partially truncating moat fill 9011 and was backfilled with orange brown silty sand with rubble (9006).

5.10.11 The north end of service cut 9005 was truncated by an east to west aligned service cut (9002) containing and iron drain (9003) and backfilled with red brown sand and rubble (9004). Cable cut 9005 did not continue north of drain cut 9002. In the east, drain 9003 ran into concrete inspection chamber 9015.

5.10.12 Levelling deposit 9014 comprised dark brown gritty sand with rubble and was overlain by the concrete slab of the markets (9000)

Impact of development

5.10.13 Development has had a significant impact upon archaeological remains in trench 9. Truncation has extended to the removal of the upper horizons of bedrock, likely including removal of overlying alluvial deposits. Archaeological remains from all periods have been significantly impacted by development.

5.10.14 However, the survival of the moat in trench 9 demonstrates the potential depth of archaeology across the western area of the site.

5.11 Trench 10

Rationale

5.11.1 The WSI (Wessex Archaeology 2018) stated that trench 10 was intended to test for evidence of:

- a full profile of the eastern arm of the moat;
- samples suitable for palaeoenvironmental assessment, analysis and scientific dating;
- a detailed understanding of the character, condition, date and palaeoenvironmental potential of deposits within the eastern arm of the moat; and,
- the extent of disturbance from the 1920s construction of Castle Hill Market and later construction particularly that associated with changes to vehicular access to the markets in the 1960s.

5.11.2 During excavation, the scope of trench 10 was reduced due to the presence of a drain containing a strong flow of water. Only the eastern part of the trench as originally designed was excavated.

5.11.3 Part of the profile of the moat was recorded. Despite the 6 m depth of excavation, the volume of moat fill deposits encountered was small. The greatest part of the volume of the trench was occupied by 18th- and 19th-century levelling layers limiting the potential of palaeoenvironmental techniques. Nonetheless, samples were taken and their results are presented in a separate section below. The character, condition and date of the moat fills was established. The extent of 20th-century disturbance was established.

Location

5.11.4 Trench 10 (**Fig. 21**) was located in the south-east of the site (**Fig. 1**).

Overview

5.11.5 Deposits forming the bank of the moat were identified, along with two undated fills. Demolition deposits relating to the 17th-century siege and/or slighting of the castle partly filled the moat. The largest part of the stratigraphic sequence was occupied by 18th- and 19th-century made ground layers forming two major phases of activity, the latter associated with construction of a range of 19th-century slaughterhouses. Drains and surfaces associated with 20th-century development completed the sequence. The results accorded with and expanded upon the results of an earlier evaluation trench (Davies 2000).

Moat bank

5.11.6 Excavation of trench 10 extended in stages to a depth of 6 m below ground level and was protected by shoring installed by a specialist contractor.

5.11.7 A deposit of blue yellow clay with sandstone and charcoal inclusions (10072) had a sharply-sloping upper interface. A second deposit of orange yellow clay with similar inclusions (10073) likely overlay deposit 10072 although this was not demonstrated. Augering of deposit 10073 revealed that it extended to at least 6.6 m below ground level (44.53 m aOD) with no change. The upper interface of 10073 was shallower than that of 10072. A third deposit (10071) comprised grey yellow clay containing animal bone and two sherds of 13th- to 15th-century pottery. Deposit 10071 overlay both deposits 10072 and 10073; the upper interface of deposit 10071 continued the gradient established by 10073.

5.11.8 Deposits 10071, 10072 and 10073 were interpreted as a bank forming the outside (east side) of the eastern arm of the castle moat (**Plate 2**). The presence of a constructed bank forming the outside of the moat was an unexpected result as it had been assumed that the moat would be rock-cut on both sides. The inside (west side) of the moat had been shown to be steeply rock-cut during previous excavation (Davies 2000). The interpretation of an outer moat bank is consistent with the topography of the site..

5.11.9 The upper interface of deposits 10071 and 10073 was interpreted as the boundary of the castle moat and was assigned a cut number (10065) although it did not represent a cut feature. The upper interface of deposits 10071 and 10073 was at around 3.6 m below ground level (47.53 m aOD), although the top of the bank was truncated by early-19th-century drain 10068 (see below). The interface sloped down below the limit of excavation at 6 m below ground level (45.13 m aOD)..

5.11.10 Previous excavation (Davies 2000) assigned the construction of the moat to 'phase 1'. This likely dates to the beginning of the range 13th–15th centuries suggested by the pottery recovered from 10071.

5.11.11 Combining the results of trench 10 and the ARCUS trench (Davies 2000), the total width of the moat was around 8.5 m. This is not too dissimilar to Armstrong's (1930) planned estimate of 7.6 m (as given by Davies 2000). The top of the moat bank in the east was at 47.53 m aOD, whereas the top of the moat cut in the west was just below 48.56 m aOD, a difference of a metre.

Moat fills

5.11.12 The base of the moat was not reached in trench 10. This was primarily due to the positioning of the re-designed trench on the shoulder of the moat. The base of the moat is over 6 m below ground level, perhaps at around 7 m below ground level, and is likely to be located to the west of trench 10 as excavated, in the area of the modern drain that limited the size of trench 10.

5.11.13 An orange blue silt clay deposit with charcoal inclusions (10078) was the deepest moat fill reached and was overlain by 10076, grey blue silt clay with charcoal inclusions (**Plate 2**). These two deposits were undated but may represent late medieval or early post-medieval secondary deposits. The blue clay composition of the fills was not inconsistent with water-borne deposition.

5.11.14 These two deposits likely correlate with Davies' (2000) 'phase 2'. Two sherds of pottery recovered by Davies from deposits belonging to this phase dated to the 11th to 13th and

13th to 14th centuries. A 13th-century date is therefore likely for these fills, perhaps suggesting they were deposited not long after the moat was cut.

Siege/slighting demolition deposits

5.11.15 A series of deposits were likely related due to their jumbled arrangement in section (**Fig. 21**). The arrangement of these deposits was suggestive of sudden dramatic infilling.

5.11.16 Light grey silt clay with stones (10077) was deposited away from the bank of the moat. Grey brown silt clay with few inclusions (10067) filled some of the gap between 10077 and the bank and extended up the bank of the moat. A single sherd of 14th-century pottery was recovered from deposit 10067, although this is likely to be residual due to the jumbled arrangement of the deposits (**Fig. 21**). A deposit of dark brown silt clay with few inclusions (10075) filled the rest of the gap between 10077 and the bank.

5.11.17 Two large pieces of masonry tumble (10064 and 10063; **Plate 2**) comprised rough sandstone blocks bonded with lime mortar and were derived from the core of substantial structures. It is likely that these pieces of masonry fell from castle walls, towers or similar structures situated on castle hill in the vicinity of trench 2 (ie the possible motte). A fall from height is consistent with the position of tumble 10064 partially buried in deposit 10075.

5.11.18 Deposit 10066 comprised blue grey silt clay with sandstone and ‘early’ handmade brick fragment inclusions (not retained) and may have been deposited either before or after tumble 10064. Deposit 10066 contained three sherds of pottery, two dating to the 17th century (contemporary with the siege and slighting), and the other slightly earlier. A similar deposit of grey brown silt clay with fragments of sandstone and ‘early’ handmade brick and lime mortar (10074) was present on the west side of tumble 10064, post-dated tumble 10064, and was probably contemporary with deposit 10066.

5.11.19 These deposits (10063, 10064, 10067, 10066, 10074, 10075 and 10077) have been interpreted as relating to the siege and/or slighting of Sheffield Castle around the time of the Civil War in the 17th century. A geoarchaeological monolith sample was taken through deposits 10067 and 10060 (sample 10002; **Appendix 5**). These deposits were relatively homogenous silt clay. What evidence there is for water activity was in the form of the products of redoximorphism (manganese concretions, colouration), indicating a fluctuating water table. There were no waterlogged deposits here; the preservation of non-charred environmental indicators is expected to be poor. Inclusions within the samples suggested deliberate infilling.

5.11.20 In comparison with previous work on the site, little evidence broadly contemporary with the Civil War was encountered during this evaluation as a whole. The difference is likely due to the design of the evaluation targeting different areas.

5.11.21 Davies (2000) repeatedly states that he encountered no remains relating to the destruction of the castle during the Civil War. However, he identifies deposit 0061 as unusual in its sandy composition and interpreted this, probably correctly, as indicating that it had a different origin to the other moat fills. Davies recovered 16th- to 17th- century pottery from his context 0061 and assigned the designation ‘phase 2/3’ to this deposit. It seems likely that this layer (0061) was deposited during siege or slighting and may represent the arisings of mining similar to deposits 10077, 10067 and 10075 recorded in trench 10.

Redevelopment

5.11.22 At the beginning of the 18th century, the moat likely appeared as an area of uneven topography at around 4 m below the present ground level (47.23 m aOD), with lumps of masonry tumble (10064 etc.) protruding some 0.6–0.7 m above this level.

5.11.23 A thin (0.2 m) deposit of brown yellow clay with sandstone (10070) formed a bedding layer for wall 10060. Wall 10060 comprised unworked, unmortared sandstone blocks and was 0.9 m wide. The source material for this wall is likely to have been the easily available demolition material from the siege and slighting of the castle. The upper part of wall 10060 was bonded with lime mortar and was recorded as context 10051.

5.11.24 Levelling layers (made ground) were built up west of wall 10060/10051 comprising dark yellow grey clay silt with stone (10056), a thin lens of sandstone rubble (10054), dark brown grey clay silt with ash and slag (10049), brown clay with fragments of red brick (10050), dark blue silt clay with brick fragments and ash (10048), and brown orange clay with sandstone (10046). Geoarchaeological assessment (Sample 10001; **Appendix 5**) suggests that layers 10050 and 10048 were derived from alluvial deposits and had been redeposited by a high-energy process such as human activity. These deposits frequently contained large blocks of predominantly unworked masonry likely derived from continued demolition of castle structures or redeposition of existing demolition layers. The levelling layers (10046, 10048, 10049, 10050, 10054 and 10056) were laid down to create a terrace in the topography (a step between the Sheaf valley and castle hill) that survives to the present day.

5.11.25 A cut (10068) truncated the exposed top of the moat bank (10071 and 10072) and contained a primary fill of ash (10069) upon which a ceramic drain was bedded. The cut was backfilled with deposit 10055 comprising brown yellow clay with stones. Deposit 10055 acted both as a fill of the drain cut and as a general levelling layer in the area. Deposit 10055 contained clay tobacco pipe with a date of 1800–1850.

5.11.26 Overlying drain cut 10068 was a thin (0.05 m) layer of blue grey silt clay and ash (10058) forming a bedding layer for a flagstone surface (10059) at 3.15 m below ground level (48 m aOD). This surface correlates with a lane extending from Shambles Lane (later Castle Folds Lane) towards the River Sheaf as depicted on historic maps (**Fig. 4–8**). It has been speculated previously that the lane followed the former outer bank of the moat (Belford 1998, 22); the results of this evaluation appear to confirm this speculation.

5.11.27 In the south of the trench, a cobblestone surface (10013) was bedded on a layer of ash (10041) containing nine sherds of 18th-century pottery.

5.11.28 Consistent with these results, historic maps (**Fig 4–5**) suggest the area of trench 10 largely did not contain buildings during the 18th century.

5.11.29 Davies' (2000) 'phase 3' appears to primarily relate to these 18th-century levelling works. The lowest context in his phase 3 (0054) contained 16th- to 17th-century pottery, clay pipe (stem, not dated), brick and window glass and may have formed part of the 17th-century slighting deposits.

Slaughterhouses

5.11.30 Historic maps show that a slaughterhouse district at the confluence of the rivers Don and Sheaf had expanded to the area of trench 10 by the 19th century (**Fig. 7–8**).

5.11.31 A major levelling or landscaping cut (10028) truncated the entire area of trench 10 (including wall 10060/10051) to a level of 1.6–2.35 m below ground level (48.78–49.53 m aOD). The cut (10028) contained a thin (0.1 m thick) primary fill of black ash trample (10045).

5.11.32 Wall 10060/10051 was rebuilt as 10038, comprising sandstone and black ash mortar. The wall was rebuilt in the original style and was distinguished only by the change in mortar; the mortar change was at the same level as landscaping cut 10028. Wall 10038 was capped with sandstone flags (10006). A similar wall (10035, also recorded as 10029) was constructed running from east to west but without the benefit of the substantial foundation offered by wall 10060/10051. In the east, wall 10035 had been truncated by a previous archaeological intervention, which recorded the wall as 0010 (Davies 2000). Wall 10035 was capped by sandstone flags (10007) which supported a three-skin handmade brick and ash mortar wall (10008 and 10009). Deposits of brown grey ash (10017 and 10018) were laid down on either side of the wall (10035/10007/10008/10009) as levelling layers. Layer 10017 contained 12 sherds of pottery with a variety of dates, the latest of which was the 19th century. Earlier sherds were residual and likely derived from whatever source was used for the levelling material before it was redeposited.

5.11.33 A posthole (10014) containing an *in situ* wooden post (10015) and a fill of black ash (10016) cut layer 10017 as well as earlier surface 10013.

5.11.34 In the north-east of trench 10, brick structures (10019 and 10020) were of unknown function but correlate with detail shown on the 1892 Ordnance Survey map (**Fig. 7**). Walls 10019 and 10020 comprised a variety of re-used brick types, most frequently bull-nosed machine bricks, all bonded with ash mortar. Structures 10019 and 10020 formed an inverted ‘F’-shape in plan, with each element comprising two- or three-skins.

5.11.35 In the south of trench 10 was a small complex area of surfaces and kerbs. Minor sandstone foundation 10042 carried a two-skin handmade red brick and ‘yellow brown sandy mortar’ wall 10011. Made ground layers 10047 (dark grey ash), 10044 (dark blue grey clay with gravel and lime mortar) and 10043 (black ash) surrounded wall 10011 and bedded structures 10010, 10012 and 10021. Structure 10010 was an unmortared two-skin handmade red brick kerb imitating a single course of wall 10011. Surfaces 10012 (cobbles) and 10021 (setts) filled the space between wall 10011 and kerb 10010.

5.11.36 Apart from this small surface (10012, 10021 etc.), the floor of the slaughterhouses did not survive. Surface 10013 (described above) was not contemporary with the slaughterhouses.

5.11.37 East of wall 10038, the lane was still in use throughout the 19th-century.

5.11.38 Davies’ (2000) ‘phase 4’ corresponds to the construction of the slaughterhouses, although he was not able to identify his structures as such. An interpretation of ‘rudimentary industrial activity’ is probably an error. Pottery of 17th/18th century date recovered from phase 4 contexts was likely residual, consistent with the results of trench 10, where earlier residual pottery was found in 19th-century contexts. Burnt cobbles (0002) recorded by Davies, which inspired the interpretation of industrial activity, can be stratigraphically linked to the slaughterhouse development as both cobbles 0002 and wall 0010 overlay bedding layer 0004. Wall 0010 was the continuation of wall 10007 recorded in trench 10. Davies struggled to identify the foundation trench for wall 0010; this is because wall 0010 (= 10007) was built within a wide-reaching levelling truncation (10028).

Demolition

5.11.39 Demolition of the slaughterhouses in trench 10 extended to a maximum depth of 4.1 m below ground level (47.03 m aOD), reaching even the 13th- to 15th-century moat bank deposits (10071). This deepest extent of the demolition was a robber trench (10057) located below lane surface 10059. Deposit 10052 both filled robber trench 10057 and buried lane surface 10059 and comprised black ash containing frequent frogged machine bricks including a toppled wall directly overlying surface 10059.

5.11.40 This demolition is probably represented on a set of three photographs taken on the 27 June 1918 by Mrs C E Lees and held by Museums Sheffield (Lees 1918). The photographs appear to depict wall 10060/10051/10038/10006 and photograph 3 may depict robber trench 10057 and surface 10059. The walls in this area had attracted attention as possible relicts of the castle, leading Armstrong (1930, 21) to state that '[s]ome of the walls of these buildings on the Castle Folds Lane frontage were built of masonry in large blocks which had frequently caused them to be mistaken for actual parts of the castle walls.'

5.11.41 A deposit of brown yellow clay (10033) had been mostly removed by later development but survived bonded to the east face of wall 10038. Deposit 10033 was likely contemporary with, and overlay, deposit 10052. That is, deposit 10033 was likely associated with the demolition of the slaughterhouses.

5.11.42 The typical depth of demolition in trench 10 was 0.9 m below ground level (50.23 m aOD). A series of black ash and dirty clay levelling layers (made ground) buried the remains of the slaughterhouses (10025, 10024 and 10023). Thirty sherds of 18th- and 19th-century pottery were recovered from layer 10025.

Markets

5.11.43 East of wall 10060/10051/10038/10006, a construction cut (10034 = 10053) truncated deposits to a depth of 2.25 m below ground level (48.88 m aOD). Cut 10034 = 10053 contained a frogged machine brick and cement wall (10005). Wall 10005 was used during excavation to define the east end of trench 10. The construction cut was backfilled with black ash (10004) containing eight sherds of primarily residual 18th-century pottery, but also including a single 19th/20th-century sherd.

5.11.44 A construction cut (10027) had removed the red brick wall which probably formerly sat on wall 10006. Cut 10027 contained concrete drain 10026 and was backfilled with black ash (10030).

5.11.45 Rubble in a matrix of dark blue grey clay (10003) was used as levelling material.

5.11.46 A major drain (cut 10036, drain 10037) was cut from above layer 10003 and limited the size of trench 10. Drain 10037 still carried a substantial flow towards the sewer system to the north. Within the original area of trench 10 (west of the final design of trench 10), drain 10037 contained an elbow turning sharply downwards.

5.11.47 Two reinforced concrete foundations (10022 and 10031) were present.

5.11.48 A layer of brown silt (10002) acted as bedding material for concrete slab surface 10001 and tarmac 10032.

5.11.49 The construction of the markets was described as 'phase 5' by Davies (2000).

ARCUS trench

5.11.50 The cut of the former ARCUS evaluation trench (Davies 2000) was identified in the west of trench 10 (10039). The ARCUS trench was backfilled with dark grey gravel ballast and the tarmac surface had been repaired across both the ARCUS trench and in the general area (10000).

Impact of development

5.11.51 The development of the market had a limited impact on 19th-century and earlier remains. Although robber trench 10057 had a very deep impact (4.1 m), it did not substantially interfere with survival or interpretation of the remains. The primary impact of the markets was the prior demolition of 19th-century structures. The lack of substantial market structures in the area of trench 10 probably contributed to the limited nature of the impact. In general, the ground level was built up in the area of trench 10 during works for the construction of the markets. Preservation of 19th-century and earlier remains was good.

5.12 Trench 11

Rationale

5.12.1 The WSI (Wessex Archaeology 2018) stated that trench 11 was intended to test for evidence of:

- the projected line of the eastern moat;
- the profile of the moat, if identified – by augering rather than hand excavation;
- the relationship between the eastern arm of the moat and the former line of the river Sheaf; and,
- the extent of disturbance from the 1920s construction of Castle Hill Market, construction works associated with the adjoining Transport Canteen and storage, and later construction works – particularly those associated with changes to vehicular access to the markets in the 1960s.

5.12.2 No evidence for the moat was detected within the 2.4 m depth of excavation of trench 11. The extent of 20th-century disturbance was recorded.

Location

5.12.3 Trench 11 (**Fig. 22**) was located in the north-east of the site, close to the road Castle Gate (**Fig. 1**).

Overview

5.12.4 At the base of excavation, a sequence of deposits likely represented 18th-century levelling layers deposited prior to construction of a range of slaughterhouses. The slaughterhouses were buried beneath 20th-century levelling deposits.

5.12.5 In trench 11, excavation was limited to a depth of 2.4 m below ground level (46.5 m aOD) due to the area available. Access was restricted by an access ramp, by the site boundary and by the site compound, comprising cabins and other temporary facilities. The 3 m available width of the trench meant that the box shoring could not be used to excavate deeper than 2.4 m.

5.12.6 Although 18th-century layers were the earliest reached, there is strong potential for earlier features, perhaps including the moat, to exist at lower levels.

Slaughterhouses

5.12.7 Historic maps (**Fig. 5–7**) suggest that a range of slaughterhouses in the area of trench 11 were already in place by 1800.

5.12.8 Grey brown silt clay with stone inclusions (11033) formed the earliest context reached. The upper interface of layer 11033 was incorrectly assigned a cut number (11035). Layer 11033 was overlaid by 11036 (dark brown silt sand) containing clay tobacco pipe dating to the late 18th century. A layer of brown yellow silt clay with stone (11027) came next. A second incorrectly-assigned cut number (11028) was given to the upper interface of layer 11027. Layer 11022 (also recorded as 11026) comprised dark brown silt with sandstone and contained 11 sherds of a variety of pottery and also clay tobacco pipe, overall suggesting an 18th-century deposition date. Layer 11021 comprised grey yellow clay with rubble and ash inclusions. Clay pipe from layer 11021 has been assessed as of early 19th-century date, however this is on the basis of plain stems and a slightly earlier date consistent with a recovered 18th-century bowl is likely.

5.12.9 These layers (11021, 11022 = 11026, 11027, 11033 and 11036) are interpreted as levelling layers (made ground) deposited for construction of the slaughterhouses prior to 1800. The layers are consistent with tipped deposits; the interfaces between different tipping layers were consistently misinterpreted in the field as cut features. There is no reason to believe that any of these deposits relate to the castle moat. The presence and location of any moat in the vicinity of trench 11 is unknown.

5.12.10 A construction cut (11029) was one of a probable series of construction cuts excavated through the above made ground layers for the construction of wall foundations for the slaughterhouses. Two foundations were seen (11032 and 11023), comprising rough sandstone bonded with lime mortar.

5.12.11 A series of similar walls (11004, 11006, 11009, 11010, 11011 and 11016; **Plate 11**) delineated the slaughterhouses and comprised handmade brick bonded with lime mortar. East to west aligned three-skin walls 11004, 11006, 11009 formed the southern exterior wall of the slaughterhouses fronting a lane. North to south aligned two-skin walls 11010 and 11011 formed divisions between slaughterhouses. Wall 11016 supported a step in the floor of one of the slaughterhouses. Each slaughterhouse had a sandstone threshold (11005, 11008) indicating the position of the entrance.

5.12.12 Remains of three similar sub-square slaughterhouses were excavated; the central slaughterhouse was 4.3 m wide internally (**Plate 11**). These results were consistent with historic maps (**Fig. 5–7**).

5.12.13 After the walls of the slaughterhouses were constructed, made ground was introduced prior to the construction of the floors. In one location, this was yellow clay sand with stones (11025); in another location it was instead grey brown silt sand with stones (11030). Late-18th-century clay pipe was recovered from 11025. A layer of black ash (11024, 11020 and 11019) formed a bed for the floor surfaces and contained 18th-century pottery and clay pipe; 19th-century clay pipe from layer 11024 may be intrusive.

5.12.14 The floors of the slaughterhouses comprised high-quality sandstone flags (11013, 11014 and 11015; **Plate 11**) and sloped to carry blood and other liquids away. Floor 11014 sloped to the west to carry liquids onto floor 11015. Floors 11015 and 11013 sloped to the

north in the direction of the River Don. The same pattern of flooring was probably present in each slaughterhouse.

5.12.15 The lane to the south of the slaughterhouses ran from east to west and is not named on historic maps (**Fig. 5–7**). It may have been considered an extension or court associated with Chandler's Row. The surface of the lane comprised sandstone setts (11012).

Slaughterhouse repairs

5.12.16 Wall 11006 (the south wall of the central slaughterhouse fronting a lane) was partially rebuilt re-using the same handmade brick but bonded with black ash mortar (11007).

5.12.17 The floor of the western slaughterhouse had been covered in a poured concrete to form a new floor (11017).

Demolition

5.12.18 Demolition of the slaughterhouses in trench 11 was not thorough, with up to seven courses of bricks surviving above ground level. No attempt had been made to remove the valuable flagstone floors, although one flag had been lifted in the eastern slaughterhouse, perhaps to inspect the deposit below.

5.12.19 A demolition layer was present and was recorded separately in the central slaughterhouse as 11002, in the eastern slaughterhouse as 11003 and in the area of the lane as 11018 (the layer was not present in the western slaughterhouse). The demolition material comprised rubble in a matrix of light brown grey sandy clay. It is likely that this material represents *in situ* demolition material due to the surviving height of the walls buried within it, although it is possible that is was imported.

5.12.20 Animal bone recovered from the slaughterhouses represents the 'background noise' of activity in industrial Sheffield. Large quantities of slaughtered animal remains were not present. The waste products of slaughtering were likely removed to some distant location as would be necessary for the large scale slaughtering of animals for food.

Markets and transport canteen

5.12.21 A substantial layer (up to 1.2 m thick) of likely imported ash and rubble (11001) was used to level the area of trench 11 and bed a layer of tarmac (11000) associated with 20th-century vehicular access to the markets and transport canteen. Layer 11001 was noted to contain probable asbestos-bearing materials (visually identified) in the area immediately east of trench 11. These were immediately reburied. No asbestos-bearing materials were identified within the area of trench 11.

5.12.22 A disused yellow plastic gas conduit was present at the west end of trench 11, and constrained excavation prior to the identification by gas professionals that it was disused.

Impact of development

5.12.23 Development in the 20th-century had had no impact on archaeological remains in trench 11, save for the initial incomplete demolition of slaughterhouse structures. Preservation of 18th/19th-century remains was good, and there is the potential for earlier remains at lower levels.

6 ARTEFACTUAL EVIDENCE

6.1 Introduction

6.1.1 This section discusses the finds recovered during the evaluation. Finds were recovered from ten of the 11 trenches excavated (trench 8 yielded no finds), although quantities from trenches 7 and 9 were negligible. Hand-excavated material has been supplemented by some finds extracted from sieved soil samples.

6.1.2 The assemblage is of moderate size, and dates predominantly to the post-medieval/modern period, with a smaller proportion of medieval material. The assessment has suggested that there is a certain level of residuality of medieval material in later contexts.

6.1.3 All finds have been quantified by material type within each context, and the results are presented in **Appendix 2**, with a summary by material type in **Table 2**.

Table 2 Finds totals by material type

Material type	Count	Weight (g)
Animal Bone	1074	7882
Ceramic Building Material	40	13530
Clay Tobacco Pipe	673	1739
Glass	455	6155
Leather	152	-
Metal *Coins* *Copper alloy* *Lead* *Iron* *Other metal*	4 38 369 16 25	- - - - -
Mortar/Plaster	54	1184
Other Ceramic	2	1454
Pottery	1608	26229
Shell	16	287
Slag	776	23332
Stone	50	29300
Wood	69	20234

6.2 Pottery

6.2.1 The pottery assemblage amounts to 1608 sherds (26,229 g), and ranges in date from medieval to post-medieval/modern.

6.2.2 The medieval pottery included Hallgate A ware (present but rare in the Butcher Archive) and small quantities of Humberware and other regional types but consisted primarily of white-firing Coal Measures wares, most probably of local origin, which have been classified as Sheffield-type ware, based on comparison with sherds from the Norfolk Street pottery. The problem with this is that the Norfolk Street assemblage was very small and as a result the range of variation in the products of this pottery is unknown (compare Brackenfield with nineteen fabric variants). It is not impossible that the products of other

potteries (which were also exploiting Coal Measures clays) resembled the Sheffield type wares; there is certainly a high degree of similarity with the Coal Measures Finewares found elsewhere in South Yorkshire. These matters are discussed in the report on the Butcher Archive (Cumberpatch forthcoming) and will be revisited in more detail in the final report (Wessex Archaeology forthcoming).

6.2.3 Three sherds of shell- and quartz-tempered pottery from deposit 4104, from a single large bowl may have an East Midlands source (J Young pers. comm.). The everted rim has a single row of triangular stabbing marks around the rim top. Stylistically this large bowl form and decoration belong to the period between the mid-12th and mid-14th centuries.

6.2.4 The medieval assemblage included several hand-made sherds – further evidence of a phase of hand-made pottery production in northern England in the mid-11th to early/mid-12th century, also identified in Durham, Wetherby, Doncaster, Ripon and elsewhere but as yet not incorporated into the overall regional narrative. There is an unresolved issue of the relationship between these wares and the more technically sophisticated Yorkshire Gritty wares and Pontefract Stamford wares. Related to this is the problem of the dating of the Hallgate wares. Date ranges cited in the tables follow the traditional scheme but there is increasing evidence that this is unsatisfactory and this will be discussed in the final report.

6.2.5 The assemblage consists primarily of medieval and late early modern to recent material. Although not entirely absent, pottery dating to the later post-medieval period (17th century) is sparse, in direct contrast to the situation with the Butcher Archive in which deposits interpreted as post-Civil War demolition were very prominent and contained large quantities of pottery.

6.2.6 The 18th and 19th century component shows characteristics similar to those seen in many assemblages from Sheffield. Some of these are the results of the distinctive patterns of discard and reuse which result from the use of refuse depots and the reuse of waste as building material although the nature of the site might have introduced other factors into the processes of site formation. These will be discussed in the full report.

6.3 Ceramic building material

6.3.1 The assemblage of ceramic building material (CBM) is small (40 fragments), and entirely of post-medieval/modern date. It includes roof tile, floor tile, wall tile and brick.

6.3.2 Roof tile includes both flat peg tile (11 fragments from bedding layer 1042) and pantile (one fragment from construction cut 5032).

6.3.3 All floor and wall tiles are modern (19th/20th century); these include terracotta examples (13 fragments from made ground 10041, including two with nail holes; one from made ground 4009) and white glazed (one fragment from made ground 10025).

6.3.4 The remainder comprises brick fragments. Three bricks (two of which are fused together, from made ground 1006) are heat-affected, presumably deriving from furnaces.

6.3.5 A half-brick from context 6029 was examined in detail due to a lack of chronological information from this part of trench 6. The brick was red and handmade with a general 18th/19th-century appearance. The brick had been exposed to intense heat and had been heavily blistered on one of the bed faces (perhaps from use in a steel furnace or similar), prior to re-use of the brick as part of the rubble core of a wall. The dimensions of the brick are 110 mm wide and 60 mm thick (4 and 3/8 of an inch by 2 and 3/8 of an inch). The

original length of the brick could not be determined. The fabric is coarse and mixed with slag inclusions. Parliament fixed brick sizes in 1776 at 8.5 x 4 x 2.5 inches (216 x 102 x 63 mm). In 1784 parliament taxed each brick used, and in response some bricks were made larger, up to 10 x 5 x 3 inches (254 x 127 x 76 mm) (Brunskill 1997, 38; Cunnington 2002, 147; Iredale and Barrett 2002, 22). The size of the brick from context 6029 is broadly consistent with the fixed brick size of 1776. It is therefore likely, though not certain, that the manufacture of the brick fragment dates from the period 1776–1784.

6.3.6 Other building material was recovered in the form of small quantities of mortar (53 small fragments) and plaster (one fragment). The plaster is painted red, and this fragment came from a potentially medieval layer (6066) at the base of the stratigraphic sequence in trench 6.

6.4 Clay tobacco pipes

Background

6.4.1 In their *Research Priorities for Post-Medieval Archaeology*, the Society for Post-Medieval Archaeology have identified the systematic collection of clay tobacco pipes as an area of particular importance where more work is needed (Anon 1988, 6).

6.4.2 For many years the north-east of England, and in particular Yorkshire, remained little studied so far as pipe research is concerned. This has been partly remedied by PhD research focussing on certain aspects of the clay tobacco pipe industry in Yorkshire during the seventeenth and eighteenth centuries (White 2004). Excavations carried out in more recent years in and around Sheffield are starting to provide more material from the end of the eighteenth century and nineteenth century, allowing pipe researchers to draw up a clearer picture of pipe production and usage in the city at this time. Regional synthesis and discussion of the late 18th and 19th century material from elsewhere in Yorkshire however, remains poorly represented.

Description

6.4.3 The excavations at Sheffield Castle produced a total of a total of 662 clay tobacco pipe fragments consisting of 73 bowls, 569 stems and 20 mouthpieces. This material was recovered from 59 pipe-bearing contexts and 10 unstratified deposits.

6.4.4 The majority of the pipe fragments are plain stems, but there are a number of 18th-century roll-stamped name marks that can be attributed to makers from Rotherham such as William Wild, Thomas Wild, Benjamin Marsden and Richard Scorah (White 2015).

6.4.5 A small number of the plain bowls from the excavations have makers' initials stamped on the bowl facing the smoker. These include the initials TW which is almost certainly Thomas Wild of Rotherham (fl. c. 1777). One of the roll-stamped stems from Context 6026 is a rare survival in that it joins with a bowl, allowing the associated bowl form to be determined.

6.4.6 The group from made ground 6026 is the largest context group from the excavation. This context contains some mid- to late-17th century material including one bowl with a milled heel and two with stamped marks (a gauntlet and a crowned IW). The gauntlet mark is particularly unusual for Yorkshire and may represent a local attempt to copy one of the famous Gauntlet pipes from Wiltshire. There is also a 17th century stem that has been repaired during manufacture, leaving a distinctive flaw in the stem. The majority of the finds, however, date from the 18th century and include some bowls of c. 1710–50 with long surviving stems suggesting fresh and little disturbed deposits of this date. The group

also contains a number of different eighteenth century roll-stamped stems and a very early glazed mouthpiece, supporting the suggestion from other excavations that the use of glazed tips originated in this area. Many of the eighteenth-century pipes are finely burnished, showing that good quality pipes were in use on the site at this time.

6.4.7 A total of 17 of the bowl fragments from the excavations are decorated. Some of these simply have a band of leaves along the bowl seams, but others are more elaborately decorated, for example, the Armorial bowl from made ground 6033, which also bears the name of the maker WILL WILD. The earliest mould decorated bowl from the site includes a series of enclosed scallops with a stag's head on the seam facing the smoker. Pipes decorated with this particular motif appear throughout Yorkshire and this is a design that is known to have been produced by Samuel Lumley of Doncaster c. 1790. Made ground 6026 also produced an elaborately decorated late-18th century bowl with the moulded maker's initials PR that provides the full design for a type that was previously only known from fragments.

6.4.8 A full list of the pipes by context, showing the number of bowls, stems and mouthpieces as well as the number of marked or decorated fragments, is presented in **Appendix 3**. In addition, a broad date range is given for each context followed by the most likely date of deposition. General comments relating to each individual context are also given.

6.5 Glass

6.5.1 The glass assemblage is extensive (452 fragments) but is extremely fragmentary. All is of post-medieval/modern date. It includes free-blown/mould-blown bottles of mid-17th to early 19th-century date, as well as later machine-made bottles and other containers, drinking vessels, glass from internal fixtures (lampshades) and window glass.

Containers

6.5.2 The earliest glass recovered comprises 51 fragments from free-blown or mould-blown green wine bottles. One neck from surface 5031 could belong to a bottle of 'onion' or 'mallet' form (late 17th to mid-18th century), and one base from service cut 6014 is from a cylindrical form (mid-18th to early 19th century), but otherwise these fragments can only be broadly dated as mid-17th to early 19th-century. The condition of these fragments (abraded and with surface oxidation), as well as later pieces found in association, suggests that all are residual here. There is also one free-blown pale green phial base of 18th or early 19th-century date (construction cut 6005).

6.5.3 Other bottles are 19th-/20th-century machine-made forms and include containers of carbonated and alcoholic drinks. There are examples of Hamilton (or torpedo) bottles, and one Codd closure. It is probable that other bottles and jars contained other foodstuffs (eg condiments) or pharmaceutical preparations, but the assemblage is too fragmentary for specific function to be assigned in most cases, and few containers carry proprietorial marks indicating contents - only five such marks were recorded, of which the most complete (on the Codd bottle) is for Rider Wilson's Table Waters Ltd of Sheffield. The other four are very partial: ...CART... (made ground 1006), ...ERS LTD (made ground 3002), ...ELD... (?Sheffield, drain 3006) and DUNCA... (made ground 11018). There are two ink bottles from drain 3006, one complete square bottle with a cracked-off rim, and the base from a second.

Drinking vessels

6.5.4 Drinking vessels are limited to a clear wine glass stem from made ground 6030, and fragments of two others (one etched) from construction cut 5032.

Other vessel

6.5.5 A significant proportion of the assemblage (152 fragments) consists of opaque glass in a range of colours (white, pale green, pale turquoise, blue and pink); these were concentrated in trench 5 (made ground 5005, construction cut 5032) and appear to belong to lampshades with fluted edges.

Window

6.5.6 Window glass (95 fragments) includes one piece of blue/green 'crown' glass (service cut 6016), and at least nine other fragments are in pale greenish glass which could pre-date the 19th century, but the majority are clear sheet/plate glass, some thick and frosted or reinforced.

Miscellaneous

6.5.7 A small fragment of a narrow tube in clear glass came from made ground 11018.

6.6 Stone

6.6.1 Of the stone recovered (original total of 50 fragments), some pieces have been examined and subsequently discarded as unworked. Eleven pieces have been selected as comprising the most interesting in terms of their significance to the Site, with briefer notes on ten further pieces. This small group includes both building material and portable objects, but there is very little that can be definitively dated as medieval.

- Fragment of grinding stone of whitish grit, 130 x 110 x 40 mm. Original diameter around 240 mm. Slightly bevelled edges. Unstratified.

- Segment (12 mm long) of well-finished moulded stone ring, in section 97 x 80 mm. Original external diameter around 210 mm. Level top, outer face with a sophisticated moulding of Classical nature; inner face with fine grooving, possibly produced by friction. It is not at all clear what this stone is, but it has the feel of being post-medieval rather than medieval. Context 6026.

- Piece of stone roof slate, 155 x 92 x 35 mm, with peg hole, only 8 mm wide in centre but splaying to around 30 mm on both faces. Context 6026.

- Rather more than half of a small grindstone, 217 mm in external diameter and 62 mm thick, with central hole 55 mm square. One face smooth, the other rougher although with a smoothed border. Context 4042.

- Fragment of grindstone 160 x 85 mm and 52 mm thick; original external diameter around 230 mm. One face is probably one side of a central hole 60mm square. One face smooth, the other rougher with a smoothed border. The edge has an incised cross-cross pattern. Context 4042.

- Fragment of window tracery in fine-grained buff sandstone, overall 143 x 125 x 68 mm. head of a bifurcating mullion between two lights or sub-lights, chamfered on one side and hollow-chamfered on the other; cusping to the lights on both faces. In form appears medieval (late 14th–early 16th century), but was found with relatively modern material and is absolutely unweathered, suggesting that it is in fact a piece of 19th-century Gothic revival work. Alternatively it could have been part of an internal feature such as a screen, but it seems unlikely that this is a genuinely medieval piece. Context 7017.

- Fragment of grindstone 125 x 100 mm and 46mm thick, original diameter around 220 mm, of grey silt stone with carbonaceous plant remains. Incised criss-cross pattern on top, except for border, and similar pattern on edge.

- About half a grindstone around 220 mm in diameter and 58mm thick, with central hole 55mm square, of whitish grit. One smooth face, one rough and raised within a smoothed border 16mm wide. Context 4042.

- Small fragment of a grindstone 100 x 84 mm by 55 mm thick, original diameter perhaps around 220 mm, and of orange-brown millstone grit. Context 4040.

- Large block, apparently a voussoir from a large arch (at least 3 m wide), overall 460 x 350 x 260 mm, of buff medium-grained sandstone, quite badly weathered; there is some evidence that at least some of this weathering may have taken place when the stone was in a secondary context. Despite erosion, patches of light diagonal tooling are still discernible. The voussoir is moulded with a square step and two hollow chamfers, and stylistically would appear to be of 14th or 15th century date. Trench 10, unstratified.

- Block, overall 440 x 350 x 240 mm, rectangular, with abroad chamfer on one angle. This may will be medieval, although there is nothing really diagnostic of date; it could have formed part of the plinth of a substantial building, although where undamaged the faces are relatively unweathered. Trench 10, unstratified.

6.6.2 Other fragments include eight further pieces of stone roof tile and four pieces of slate, probably Welsh slate which only came into common use with the development of the railway network in the mid-19th century;

6.7 Slag

6.7.1 Some 23,332 g of material has been recorded as ‘slag’. At this stage no detailed catalogue has been compiled, but the slag has been subjected to a visual scan in order to characterise it in broad terms.

6.7.2 This material type includes metalworking residues, as well as encompassing fuel ash slag, clinker and coke, not all of which necessarily relates to metalworking. The majority of this material came from post-medieval/modern layers, and undoubtedly results primarily from use of part of the site as a steelworks.

6.7.3 A small proportion of the slag (2520 g) derived from contexts stratigraphically phased as medieval (in trenches 1, 3, 4, 5 and 10). This material, and also that from some contexts dated prior to the 19th century, is visually distinct, and is much more consistently made up of ironworking slag, with some clinker and fuel ash slag. The later material contains much less slag that is definitively derivative of ironworking, and consists largely of clinker, fuel ash slag and coke.

6.7.4 A subset of the medieval/probably medieval slag was supplied to Rod Mackenzie for rapid assessment. Of 34 pieces assessed, at least 6 are possible iron smelting tap slag. The six pieces are from the following contexts: 4087, 1048, 1061 and 1073.

6.8 Metalwork

6.8.1 Metalwork includes coins, as well as objects of copper alloy, lead, iron and other metals. The ironwork in particular in is very poor, corroded condition. All objects (apart from lead,

and a few of the larger iron objects which were obviously large structural objects items of modern date, were X-radiographed as part of the assessment stage, to act as a basic record, to aid identification and to inform any assessment of conservation requirements (see below). At this stage no detailed catalogue has been compiled, but the metalwork has been subjected to a visual scan in order to characterise it in broad terms.

Coins

6.8.2 Four coins were recovered. One is a 1978 penny (7016); the other three (all from 3015) are too corroded for identification, but are almost certainly 20th-century issues.

Copper alloy

6.8.3 Copper alloy objects, although suffering from some active corrosion, are generally better preserved, and with a higher proportion of identifiable objects than the ferrous metalwork.

6.8.4 Of particular interest is a small toilet implement (layer 5040 in trench 5, the matrix between a cobbled surface). The object is made from a narrow strip, and is complete. It features a small ear scoop at one end; the opposite end is bifurcated and possibly functioned as a nail cleaner. There is evidence of an increase in the range of specialised toilet implements in the later medieval period; nail cleaners and ear scoops were popular from the 14th century. Implements made from strips are considered to be medieval, while those made from wire are later, 15th or 16th century, based on evidence from Colchester (Margeson 1993, 63–4, fig 32).

6.8.5 No other objects are definitively datable as medieval (none came from phased medieval layers), and many are clearly of modern date. These include a small safety pin¸ five buttons, a lid fitting from a Kilner jar, a figure-of-eight chain link, two knob handle fittings, four short lengths of narrow piping, two with crimped ends, and several other miscellaneous fittings. Other objects and fragments, including a plated disc, seven short lengths of wire, and various bar and strip fragments, are of uncertain function but are almost certainly of post-medieval/modern date.

Lead

6.8.6 Sixteen pieces of lead were found. Apart from two short lengths of window came, this consisted entirely of scrap fragments of sheet and plate. All objects came from post-medieval/modern contexts.

Iron

6.8.7 The X-radiographs of iron objects have not added greatly to the identification process. There are certainly some structural items, including nails, a section of narrow pipe, a window fastener and a possible hinge; and also tools, including three-square (triangular) files, knife blades and at least one punch (knives and other tools came particularly from trench 4). Some of the blades may be unfinished objects, and in general these and the other tools could have been either used on the site (files, for example, were the most commonly used tool types in manufacturing processes), or represent products in various stages of manufacture, for example from the steelworks.

6.8.8 There is one large annular buckle, of a size appropriate for use on horse harness, two S-hooks and a large chain link. Much of the ironwork, however, consists of miscellaneous bar, rod and sheet fragments of uncertain function. Some of this may represent manufactured bar for sale, or material brought in for further processing.

6.8.9 Two objects came from medieval contexts (nail from layer 4111 in trench 4, and strip/bar from layer 3057, phased with the possible 13th-century demolition levels in trench 3), with four more from a late medieval layer 1042 (unidentifiable objects).

Other metal

6.8.10 The other metal objects, all of 19th-/20th-century date, include a teaspoon (stamped with the mark of Arthur Price), a small fork (no mark), a container lid with an oily residue, and a squeezed tube of Gordon Moore's Cosmetic Toothpaste.

6.9 Leather

6.9.1 Leather was recovered from 11 contexts, all but one of them in trench 4; the assemblage totals 152 fragments, but the majority of these are small scraps – fragments and possible offcuts. At this stage no detailed catalogue has been compiled, but the leather has been subjected to a visual scan in order to characterise it in broad terms.

6.9.2 Part of two shoes survive, one fairly complete from wall 4006 (in seven fragments) and five fragments from a small nailed sole from made ground 4009. Further small fragments possibly from footwear came from made ground 4042. Other leather includes strip fragments, some with stitched edges, some perforated. These could represent harness or possibly belts or straps from machinery.

6.9.3 None of the leather came from medieval contexts, and the likelihood is that all of it is post-medieval/modern in date. It thus varies considerably from the assemblage previously recovered from the Castle, which included a higher proportion of shoes (Q Mould pers. comm.).

6.10 Wood

6.10.1 Thirty-five pieces of wood were recovered from the site. The assemblage includes three large pieces of structural timber, as well as fragments that may have broken off from large timbers, and other small fragments. The wood was examined macroscopically for the purposes of this assessment, and samples of each piece taken for wood species identification.

6.10.2 The largest piece of wood recovered is part of a large rectangular beam from a medieval layer (3057) in trench 3. This beam is broken at both ends and appears to have been burnt, giving it a twisted appearance. A broken fragment from another large timber was also recovered from the same context; again this is broken at both ends and very little of the original surface remained, although this piece does not appear to have been burnt.

6.10.3 Potentially the most interesting piece of timber recovered is a section of a large beam that had been cut down and subsequently re-used. This was recovered from a potentially medieval layer (6055) in trench 6. Evidence of a face lap with a large peg can be seen on one side, and a deep contemporary groove has been cut into the side of the beam. Subsequent reduction of the width of the beam left this groove on the edge of the timber. In later re-use the piece had also been chamfered into a chisel point with a flat facet at one end, whilst the other end was more crudely cut back. Nine other fragments of wood were recovered from this context; these pieces are broken fragments from larger timbers. One has possibly been sawn at one end, but no other toolmarks are visible.

6.10.4 Another large piece of timber is the broken end of a large squared-off timber post from potentially medieval pit 6073. This piece has lost most of its original surface, and no toolmarks are visible. The flat base of the post has a sub-rectangular depression in the

base that may have come from being pressed up against a large stone (the post was set on stone postpad 6071).

6.10.5 In the north-east corner of trench 3, three further pieces of wood were recorded from medieval context 3058. These pieces comprise a broken fragment from a larger timber, with possible cut marks and a possible notch on one side; a short section from a roundwood stake which has possibly been chopped off diagonally at one end; and a broken branch that has not been worked.

6.10.6 The remainder of the assemblage consisted of three small lath or plank fragments (all from trench 4), two broken fragments from a sawn timber recovered from potentially medieval layer 6077 in trench 6, two small fragments from post-medieval made ground 4009 in the south-west corner of trench 4.

Species identification and suitability for dendrochronology

Introduction

6.10.7 Twenty samples of waterlogged wood and two fragments of dry wood were submitted to Archaeology South-East for taxonomic identification and to assess their suitability for dendrochronology. The following report does not provide a full timber record.

Methods

6.10.8 Wood fragments were hand sectioned along three planes (transverse, radial and tangential), temporarily mounted on slides and viewed under a transmitted light microscope at magnifications up to 500x to facilitate identification. Taxonomic identifications were assigned by comparing suites of anatomical characteristics visible with those documented in reference atlases (Hather 2000; Schoch *et al.* 2004; Schweingruber 1990).

Table 2 Wood Identification and suitability for dendrochronology

Timber Context Number	Context/ timber sample notes	Notes	Roundwood	Knotwood	Rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
3057A		small fragment of roundwood	Y			Y	N	Alnus sp.	alder	N
3057B		subsample from larger piece of timber? (no corresponding photo for this one). Depending on original size and presence of bark or sap wood this could be suitable for dendro				N	N	Quercus sp.	oak	N? (see notes)
3057	T1 of 3	closely spaced growth rings and possibly sufficient for dendro work but as an isolated sample it is unlikely to be suitable, edge may retain some sapwood although difficult to tell as drying may be causing colour differentiation.				poss sapwood	IMGP5390.3057. Timber 1 of 3	Quercus sp.	oak	? (see notes)
3057	T2 of 3	Subsample submitted - very dark, but not charred, fragment from larger timber submitted for identification. Original doesn't look large enough for dendro work				N	IMGP5380.3057. Timber 2 of 3	Quercus sp.	oak	N
3057	T3 of 3	twisted piece of possible roundwood. It is either compressed and twisted, or this is the natural growth form. From the wood anatomy, it looks like the growth form is twisted. ?root wood?	?		?		IMGP5373.3057. timber 3 of 3	Corylus avellana	hazel	N
3078	E-most timber	sub-sample submitted - cross section of part of a branch with knotwood where it attaches to a larger branch/stem, too small for dendro	Y	Y		Y	IMGP5375.3078. E-most timber	Quercus sp.	oak	N
3078	central timber	sub-sample submitted - fragment of larger piece - see photo, possibly from roundwood, not large enough for dendro	?				IMGP5371.3078. central timber	Quercus sp.	oak	N
3078	W-most timber	sub-sample submitted - although fragment from large original piece the original appears fairly thin and without sap or pith from the photo so unlikely to be suitable for dendro work				N	IMGP5364.3078. W-most timber	Quercus sp.	oak	N
6055A		close growth rings, small flat fragment from timber				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055B		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055C		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N

Timber Context Number	Context/ timber sample notes	Notes	Roundwood	Knotwood	Rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
6055D		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055E		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055F		Small fragments displaying poor preservation (difficult to section)				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055G		med-close growth rings, blocky fragment probably from a larger timber, very poor preservation of anatomical features				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055H		close growth rings, blocky fragment possible from a plank?				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055I		close growth rings, wedge shaped fragment				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055		large timber/object(?) approx. measurements 33lx27wx13d. With Fe rich mineral encrusting on several surfaces. Some mineral replacement has also occurred. Although large, the growth rings run parallel to the breadth of the object and it is therefore unlikely to provide sufficient rings for denrdo dating. The edges have been removed in shaping the piece and no sap wood is evident. Pith or close to pith may be present but this is difficult to determine without sectioning the object.				? Pith (see notes)	IMGP5386.6055J	Quercus sp.	oak	N (see notes)

Results

6.10.9 Taxonomic identifications and notes regarding their suitability for dendrochronological work, presence of sapwood, pith, bark and overall form, are outlined in **Table 3**.

6.10.10 The majority of wood samples submitted were small fragments, some of which were subsamples, of waterlogged wood deriving from larger oak timbers. Almost all of the oak displayed tightly spaced growth rings, suggesting they derive from mature, slow grown components of the trees, consistent with the presence of timber. By contrast, eastern-most 'timber' sample 3078 was a subsample of small branch oak wood and differed from the majority of the assemblage. Other roundwood included a small fragment of alder (3057A) and hazel (3057 Timber sample 3 of 3) revealing the presence of taxa other than oak. Two wood samples (4009 A and B), retrieved from a late-19th-century context in dry condition were identified as common spruce/ European larch. This identification could not be satisfactorily refined due to inherent difficulties in distinguishing the two taxa (Schweingruber 1990) which is further compounded by the effects of drying.

Suitability for dendrochronological dating

6.10.11 Very few fragments were large enough or retained sufficient growth rings, pith or sap that could make them suitable for dendrochronology. One exception is timber sample (3057 Timber 1 of 3) which may retain some sapwood (see notes in **Table 3**) and displays closely spaced growth rings suggesting it could retain sufficient rings for dating. It should be noted, however, that this is an isolated sample, which may lessen its potential for dating. The only other timber that was superficially large enough for dendro work was timber/object 6055, which measured approximately 0.33 m by 0.27 m by 0.13 m in length/width/depth. It appears to be box-halved with considerable further conversion and shaping that have removed the sapwood. It is possible that pith, or close to the pith, is retained however this could only be fully determined if sectioned. The growth rings run parallel to the breadth of the object and it is therefore unlikely to provide sufficient rings for denrdo dating.

6.11 Animal bone

Material and methods

6.11.1 The evaluation yielded a very small assemblage of faunal remains consisting of 1074 fragments (7.9 kg). Once joins are considered, this falls to 235 bones. Due to the small amount of material, the entire assemblage was analyzed at once and entered into a Microsoft Access database. Fields for the database included, but were not limited to: trench, context, preservation, element, side, taxon, taphonomic modifications (ie. butchery and/or gnawing), ageing, as well as measurements and a notes field. This was concurrent with the recording protocol established at the outset of analysis and loosely follows Davis (1992) and Albarella and Davis (1994). A 'diagnostic zone approach' was used, which means that only a pre-determined list of specific anatomical zones were regularly recorded; when 50% or more of that area was preserved (cf. Watson 1979; Serjeantson 1991; Davis 1992). Specimens that were regarded as of interest but did not belong to a 'diagnostic zone' were still recorded (as 'non-countable') but not used in quantifications. Zones used for recording will be provided in the final report.

6.11.2 Due to the very small size of the assemblage, it was agreed that it was not worthwhile to produce a formalized assessment report, that all material would be studied in one go, and preliminary observations would be provided in the current report. Once the full contextual information will become available, it will be possible to move observations in this preliminary report to the final one.

Preliminary observations

6.11.3 A variety of species were identified across the stratigraphic phases at Sheffield Castle (**Table 4**). The assemblage was primarily associated with post-medieval and early modern deposits. A small number of specimens were attributed to the medieval occupation of the site.

6.11.4 The three main domesticates (cattle, sheep, and pig) were represented by post-cranial bones and teeth in all phases. Teeth of domesticates were better represented than post-cranial bones and a high proportion of teeth were isolated. Though faunal remains from medieval contexts were few, they notably yielded fallow deer (layer 4111 at the lowest limit of excavation in trench 4), and woodcock remains (made ground 3057, phased with 13th-centruy demolition deposits in trench 3). Canids (ie dog/fox) species and horse were also present specifically in the 13th–15th century moat bank deposits in trench 10 (10071).

6.11.5 A high proportion of bone in post-medieval and early modern contexts was not identifiable to species due to anthropogenic modification. This was evidenced by sawing and cutting on a variety of post-cranial bones, a worked antler (made ground 6026), working debris (eg made ground 4090), and incomplete or broken implements (construction cut 2005; and made ground deposits 4024, 4036, 4040 and 4108). The 20th-century made ground deposits 6026 and 6033 yielded Galliformes (probably chicken) and bedding layer 1002 and made ground 1003 Gadidae (cod) species in addition to cattle, sheep, and pig.

Table 3 List of animal bone recorded by trench

Species	Tr 1	Tr 2	Tr 3	Tr 4	Tr 5	Tr 6A	Tr 9	Tr 10	Tr 11	U/S	Total
Bos taurus (cattle)	24			4	3	15	1	22		2	71
cf *Bos/Cervus* (cattle/red deer)						1					1
cf *Bos/Equus* (cattle/horse)						1					1
Ovis aries (sheep)				1		2					3
cf *Ovis/Capra* (sheep/goat)	1			1	2	5		2	2	1	14
Equus caballus (horse)				4				8	2		14
Sus domesticus (pig)	7			9	1	7					24
Cervus elaphus (red deer)				1							1
Dama dama (fallow deer)	2	2		2						1	7
cf *Cervus/Dama* (red/fallow)						3		1			4
Canid familiaris (dog)			1								1
cf *Canis/Vulpes* (dog/fox)	1				1			1			3
Felis cf *catus* (cat)					1						1
Lepus europeus (hare)						2					2
Oryctolagus cuniculus (rabbit)				2	2	1					5
Rattus cf *rattus* (black rat)						2		1	6		9
Anser anser (goose)					1						1
Anser cf *anser*						1					1
cf *Gallus/Numida* (chicken/grouse)						1					1
cf *Gallus/Numida/Phasianus* (chicken/grouse/Pheasant)						9					9
Scolopax rusticola (woodcock)			1								1

Species	Tr 1	Tr 2	Tr 3	Tr 4	Tr 5	Tr 6A	Tr 9	Tr 10	Tr 11	U/S	Total
Gadidae			1								1
Gadus morhua (cod)	1										1
Unidentified	1	1		31	12	12			1	1	59
Total	37	3	3	55	23	62	1	35	11	5	235

6.12 Shell

6.12.1 A very small quantity of shell (16 shells) was recovered by hand; species represented comprise oyster (6), whelk (7), cockle (2) and mussel (1). Amongst the oyster, where valve side could be determined, all are left valves, ie consumption waste. There is also a small fragment of mother-of-pearl, which could represent button-making waste. Shell was recovered from 18th-, 19th- and 20th-century deposits in trenches 1, 4 and 6.

6.13 Conservation

6.13.1 No immediate conservation requirements were noted in the field. Finds which may be considered as vulnerable, and therefore potentially in need of conservation treatment, comprise the metalwork and leather objects. The iron objects in particular are heavily corroded and further degradation and disintegration are likely. Metalwork is currently stored in airtight plastic containers with a drying agent (silica gel) and indicator strips. A programme of X-radiography has been carried out, primarily to act as a basic record of the metalwork, some of which may not be recommended for long-term curation.

6.13.2 A few of the leather objects have completely dried out, but most were found damp and are currently stored in a waterlogged condition in airtight tubs under refrigeration.

7 ENVIRONMENTAL EVIDENCE

7.1 Introduction

7.1.1 A comprehensive archaeobotanical sampling strategy was implemented during an archaeological evaluation at the site of Sheffield Castle, Sheffield, South Yorkshire (NGR 435805, 387684) in 2018 by Wessex Archaeology. Forty eight samples were processed for the recovery of plant macrofossils and wood charcoal. The samples were then assessed in order to determine the concentration, diversity, state of preservation and suitability for use in AMS dating, of any palaeoenvironmental material present. A further aim of this assessment was to evaluate the potential of any palaeoenvironmental material present in the samples to aid in an interpretation of the sampled contexts and an understanding of the economy of the site or the local environment.

7.2 Methodology

7.2.1 The samples were processed by Liz Chambers of Wessex Archaeology using a water separation machine. Floating material was collected in a 250 µm mesh, and the remaining heavy residue retained in a 500 µm mesh. Flots and heavy residues were air dried. Where potential for the preservation of organic remains by anoxic waterlogging was noted, one litre sub-samples were processed using a water separation machine, with the heavy residues being passed through a stack of sieves of mesh size 5.6 mm, 2 mm, 1 mm and 500 µm. The flots and heavy residues from potential waterlogged samples were kept wet.

7.2.2 The samples were assessed in accordance with Historic England guidelines for environmental archaeology assessments (English Heritage 2011). A preliminary

assessment of the samples was made by scanning using a stereo-binocular microscope (x10–x65) and recording the abundance of the main classes of material present. Macroscopic plant material, wood and wood charcoal was quantified using a scale of abundance (- = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items).

7.2.3 Preliminary identifications of plant material were carried out by comparison with material in the reference collections at the Department of Archaeology, The University of Sheffield and various reference works (eg Cappers *et al.* 2006). Cereal identifications and nomenclature follow Jacomet (2006). Other plant nomenclature follows Stace (2010). Information relating to the ecology of various plant taxa was sourced from Stace (2010) and Preston *et al*. (2002). The composition of the samples is recorded in tables 1–8. The seed, in the broadest sense, of the plant is always referred to in the tables, unless stated otherwise. The abbreviation *cf.* means 'compares with' and denotes that a specimen most closely resembles that particular taxon more than any other.

7.3 Preservation

7.3.1 Preservation of plant macrofossils and wood is by both charring and probable anoxic waterlogging. Preservation of charred plant material is relatively poor, with the majority of cereal grains being distorted and identifiable by gross morphology only. Preservation of wood charcoal is relatively good, with minimal evidence for vitrification, whereby charcoal takes on a glassy appearance resulting in anatomical features becoming fused and difficult to identify.

7.3.2 Preservation of uncharred plant material and wood present in contexts 3056, 3057 and 3079 from the lower layers of a sequence of rich organic deposits in Trench 3 is good, with a rich and diverse assemblage of plant material being present. Preservation of uncharred plant material and wood present in pit fills 6060, 6062, 6072, gully fill 6064 and layer 6055 in Trench 6 is also good. Uncharred seeds were also found in other contexts from Trench 3 and Trench 6, as well as in contexts from other trenches. It is not however generally possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

7.4 Results

Early undated, probably medieval deposits

Trench 6

7.4.1 Sample 6009 (from pit fill 6060) and sample 6011 (from pit fill 6072), which are amongst the earliest cut features in Trench 6, along with sample 6006 (from made ground layer 6055), which seals these early cut features, were processed for the recovery of waterlogged plant macrofossils. Rich and diverse assemblages of uncharred seeds were found in these samples, along with rich assemblages of uncharred wood. Similar assemblages of uncharred seeds and abundant wood fragments were also found in sample 6007 (from gully fill 6064) and sample 6008 (from pit fill 6062), which are associated with pit fill 6060 and pit fill 6072 and form part of the group of early cut features in Trench 6 which are sealed by layer 6055. The similar composition of these plant assemblages, particularly the presence of uncharred wood fragments (>4 mm) which are less likely to represent modern intrusion, and the fact they were found in a sealed deposit, indicate that they are likely to date to the period of the features in which they were found and to have been preserved by anoxic waterlogging.

7.4.2 The taxa noted in these uncharred seed assemblages include the crop weed corncockle (*Agrostemma githago*), along with plants commonly associated with fertile disturbed soils

but which may also be representative of crop weeds such as wild radish (*Raphanus raphanistrum* ssp. *raphanistrum*), redshank / pale persicaria (*Persicaria maculosa / lapathifolia*), knotgrass (*Polygonum aviculare* agg.), chickweed (*Stellaria media*), goosefoots (*Chenopodium* spp.), hemp-nettle (*Galeopsis* sp.), nipplewort (*Lapsana communis*), stinking chamomile (*Anthemis cotula*) and corn marigold (*Glebionis segetum*). Hemlock (*Conium maculatum*) is a plant of fertile disturbed soils and damp ground. Common nettle (*Urtica dioica*) is a plant of nutrient enriched soils. Grassy habitats are represented by buttercups (*Ranunculus acris* / *repens* / *bulbosus*) and sheep's sorrel (*Rumex acetosella*). Plants commonly associated with damp soils include lesser spearwort (*Ranunculus flammula*), rushes (*Juncus* spp.) and sedges (*Carex* spp.). Scrub type vegetation is represented by bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), birch (*Betula pendula*), blackthorn (*Prunus spinosa*), hazel nutshell (*Corylus avellana*) and elder (*Sambucus nigra*).

7.4.3 Low concentrations of less than thirty wood charcoal fragments (>2 mm) were found in samples 6007, 6008, 6009 and 6011. Preliminary observation of the charcoal fragments using low power microscopy indicates that both diffuse porous and ring porous taxa are present.

7.4.4 Samples 6009 and 6006 both contain between one and ten fragments of waterlogged round wood (>4 mm) which would be suitable for AMS dating, particularly as round wood is of short life duration and so accurately datable. Sample 6011 contains between one and five hundred fragments of waterlogged wood (>4 mm) and sample 6008 contains between one and five fragments of wood charcoal (>4 mm) which is of a suitable size for AMS dating, although no round wood was noted, which may limit the accuracy of the dating result. Between five and ten smaller charcoal fragments (2–4mm) were found in sample 6007, which may be of a suitable size for AMS dating. Between one and five fragments of round wood (>4 mm) were also found in samples 6007 and 6008, although it would not be possible to taxonomically identify this material as it had not been kept wet.

7.4.5 Low concentrations of between one and five charred cereal grains were found in sample 6001 (from made ground layer 6043), sample 6004 (from made ground layer 6047) and sample 6003 (from made ground layer 6048), which are a series of closely related deposits stratigraphically later than cut feature fills 6060, 6064, 6062 and 6072. The crop types present in these contexts are indeterminate wheat (*Triticum* sp.) and oat (*Avena* sp.), although it could not be determined whether the oat grains are representative of crops or crop weeds due to a lack of diagnostic chaff. Less than five charred seeds of corn marigold (*Glebionis segetum*) and grasses (Poaceae) were also found. Low concentrations of between one and five charred hazel nutshell fragments (*Corylus avellana*) are present in sample 6002 (from made ground layer 6044), which is closely related to made ground layer 6043. Charred hazel nutshell is also present in made ground layer 6047. The charred cereal grains and hazel nutshell from all these deposits would be suitable for AMS dating. The low density of charred material in samples 6001, 6002 and 6003 does however increase the likelihood that it may be intrusive.

7.4.6 Less diverse assemblages of uncharred seeds were also found at low density in samples 6001, 6002, 6003 and 6004 (from made ground layers 6043, 6044, 6048 and 6047). These assemblages include common nettle (*Urtica dioica*), corn marigold (*Glebionis segetum*) and hemlock (*Conium maculatum*) along with rushes (*Juncus* spp.) and sedges (*Carex* spp.). Bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*) and birch (*Betula pendula*) are also relatively abundant. A rich assemblage of wood fragments is also present in sample 6004 (from made ground layer 6047). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material

preserved by anoxic waterlogging. It is interesting to note that no uncharred seeds are present in sample 6005 (from made ground layer 6049) which is stratigraphically later than made ground layers 6043, 6044, 6047 and 6048.

7.4.7 Rich assemblages of over one hundred wood charcoal fragments (>2 mm) were found in sample 6004 (from made ground layer 6047) and in sample 6005 (from stratigraphically later made ground layer 6049). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that made ground layer 6047 is composed primarily of ring porous taxa while made ground layer 6049 is composed of both ring porous and diffuse porous taxa. Diffuse porous taxa which are frequently represented in archaeological charcoal assemblages include hawthorn / apple / pear / whitebeams (Pomoideae), willow / poplar (*Populus / Salix*), birch (*Betula* sp.), alder (*Alnus glutinosa*), hazel (*Corylus avellana*), field maple (*Acer campestre*), blackthorn (*Prunus spinosa*) and cherry (*Prunus padus / avium*) while frequently represented ring porous taxa include oak (*Quercus* sp.), ash (*Fraxinus excelsior*) and elm (*Ulmus* sp.). Identification using high power microscopy would however be necessary in order to confirm which taxa are present. The round wood charcoal (>4 mm) in sample 6004 (from made ground layer 6047) would be suitable for AMS dating. No round wood was noted in sample 6005 (from made ground layer 6049) although it is possible that wood charcoal with strong ring curvatures indicative of small diameter round wood would be identified as a result of further analysis of this rich and diverse charcoal assemblage.

7.4.8 Made ground layers 6043 and 6044 may be the same deposit in two separate sondages, as may probable medieval made ground layers 6047 and 6048. These contexts all contain similar assemblages of charred plant macrofossils which support this interpretation, although sample 6004 (from made ground layer 6047) produced a rich assemblage of wood and wood charcoal which is composed of both ring porous and diffuse porous taxa, while the other contexts contain low concentrations of wood charcoal, which is predominantly composed of a ring porous taxon morphologically similar to oak. This indicates a possibility that context 6047 may relate to a different depositional event than contexts 6048, 6043 and 6044. Probable medieval made ground layer 6049, is later stratigraphically than made ground layers 6043, 6044, 6047 and 6048 and it is at present uncertain whether this context is part of the medieval palimpset or a later deposit. Context 6049 is largely devoid of charred or uncharred plant macrofossils and contains a wood charcoal assemblage composed of ring porous and diffuses porous taxa. This suggests that context 6049 may relate to a different depositional event or phase than made ground layers 6043, 6044, 6047 and 6048.

13th- to 15th-century deposits

Trench 1

7.4.9 A moderate concentration of between ten and fifty charred cereal grains and chaff fragments was found in sample 1003 (from made ground layer 1057). The crop types present in this context are probable oat grain (cf. *Avena* sp.), rye grain and chaff (*Secale cereale*) and free threshing wheat (*Triticum aestivum / turgidum* s.l.) grain. A low concentration of charred wild or weed plant seeds was also found, including the crop weed corn cockle (*Agrostemma githago*) as well as seeds of plants commonly associated with fertile disturbed soils or cultivation, such as mallow (*Malva* sp.), redshank / pale persicaria (*Persicaria maculosa / lapathifolia*), knotgrass (*Polygonum aviculare* agg.), corn spurrey (*Spergula arvensis*) and brome / rye grass (*Bromus* spp. / *Lolium* spp.). Seeds of plants commonly associated with damp soils such as lesser spearwort (*Ranunculus flammula*), club-rush (*Schoenoplectus* sp.) and sedges (*Carex* spp.) were also found. Hemlock (*Conium maculatum*) is a plant of fertile disturbed soils and damp ground. A low concentration of charred cereal grains was also found in sample 1009 (from made ground

layer 1076). The crop types present in this context are probable oat (cf. *Avena* sp.), hulled barley (*Hordeum* vulgare/distichum) and indeterminate wheat (*Triticum* sp.). Charred hazel (*Corylus avellana*) nutshell, and less than five charred grass (Poaceae) seeds were also found. The charred cereal grain in both these samples would be suitable for AMS dating.

7.4.10 Relatively rich assemblages of uncharred seeds, hazel nutshell and wood fragments were found in sample 1009 (from made ground layer 1076) and in sample 1010 (from made ground layer 1079). Taxa present in the assemblage of uncharred seeds include common nettle (*Urtica dioica*), henbane (*Hyoscyamus niger*), sedges (*Carex* spp.), bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), birch (*Betula pendula*), elder (*Sambucus nigra*) and fragments of hazel nutshell (*Corylus avellana*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Uncharred hazel nutshell from the relatively rich assemblage of between fifty and one hundred nutshell fragments in sample 1009 would be suitable for AMS dating, which may also provide some insight as to whether the uncharred material in this deposit is likely to be ancient or modern intrusive material.

7.4.11 A rich assemblage of over five hundred wood charcoal fragments (>2 mm) was found in sample 1003 (from made ground layer 1057). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Vitrified charcoal and slag / metallurgical debris were also abundant in this sample. A rich assemblage of over one hundred wood charcoal fragments (>2 mm) was found in sample 1009 (from made ground layer 1076) and small assemblages of ten to fifty wood charcoal fragments (>2 mm) were found in sample 1008 (from made ground layer 1064) and in sample 1010 (from made ground layer 1079). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that these assemblages are composed of both ring porous and diffuse porous taxa. Charcoal fragments (>4 mm) of a suitable size for AMS dating are present in sample 1003, 1008, 1009 and 1010 although no round wood was noted, which may limit the accuracy of the dating result and the low density of charred material in sample 1008 increases the likelihood that charred material in this sample may be intrusive.

Trench 3

7.4.12 Low concentrations of charred cereal grain and charred wild or weed plant seeds, along with rich assemblages of uncharred wild or weed plant seeds, were found in samples from two probable phases of activity in Trench 3. The probable early phase is represented by samples 3003 (from context 3062), 3004 (from context 3070) and 3014 (from context 3072), from a series of earthwork deposits associated with stone foundation 3064/3076. Samples 3013 (from context 3079), 3002 and 3009 (from context 3057) and 3008 (from context 3056), are from a series of deposits associated with a probable second phase of activity relating to the demolition or destruction of earlier structures.

Earthwork

7.4.13 In the ‘earlier’ (de Lovetot) phase, a moderate concentration of between fifty and one hundred charred cereal grains was found in sample 3003 (from made ground layer 3062). The crop types present in this context are oat (*Avena* sp.), hulled barley (*Hordeum* vulgare/distichum), rye (*Secale cereale*) and free threshing wheat (*Triticum aestivum / turgidum* s.l.). A low concentration of charred wild or weed plant seeds was also found, including seeds of plants commonly associated with fertile disturbed soils or cultivation, such as orache (*Atriplex* sp.), stinking chamomile (*Anthemis cotula*), corn marigold (*Glebionis segetum*) and brome / rye grass (*Bromus* spp. / *Lolium* spp.). Seeds of plants

more commonly associated with grassland include vetch / vetchling (*Vicia* spp. / *Lathyrus* spp.), ribwort plantain (*Plantago lanceolata*) and grasses (Poaceae) although these may also have been of crop weeds. The charred cereal grain in sample 3003 would be suitable for AMS dating.

7.4.14 Sample 3003 also produced a relatively rich and diverse assemblage of uncharred seeds including common nettle (*Urtica dioica*), knotgrass (*Polygonum aviculare* agg.), chickweed (*Stellaria media*), goosefoots (*Chenopodium* spp.), henbane (*Hyoscyamus niger*), rushes (*Juncus* spp.), sedges (*Carex* spp.), bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*) and elder (*Sambucus nigra*). Relatively rich assemblages of uncharred seeds including common nettle (*Urtica dioica*), sedges (*Carex* spp.) bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), birch (*Betula pendula*), hazel nutshell (*Corylus avellana*) and elder (*Sambucus nigra*), were also found in samples 3004 and 3014 (from made ground layers 3070 and 3072), although the diversity of taxa was low and dominated by robust seed types, that survive particularly well. It is possible that these seeds are of ancient origin and were preserved by anoxic waterlogging (as described below for the 'later' destructive phase) or they may represent modern intrusive material.

7.4.15 Between fifty and one hundred wood charcoal fragments (>2 mm) were found in sample 3003 (from made ground layer 3062). Low concentrations of between five and thirty wood charcoal fragments (2–4 mm) were found in sample 3004 (from made ground layer 3070) and in sample 3014 (from made ground layer 3072). Preliminary examination of these charcoal fragments using low power microscopy indicates the presence of both ring porous and diffuse porous taxa. Charcoal fragments (>4 mm) of a suitable size for AMS dating are present in samples 3003, 3004 and 3014, although no round wood was noted, which may limit the accuracy of the dating result and the low density of charred material in sample 3004 increases the likelihood that charred material in this sample may be intrusive.

Destruction

7.4.16 In the 'later' phase, a moderate concentration of between ten and fifty charred cereal grains was found in sample 3008 (from demolition/destruction layer 3056). The crop types represented in this context are oat (*Avena* sp.), hulled barley (*Hordeum* vulgare/distichum) and free threshing wheat (*Triticum aestivum / turgidum* s.l.). Low concentrations of charred wild or weed plant seeds were also found, including corn marigold (*Glebionis segetum*), sedges (*Carex* spp.) and bramble (*Rubus fruticosus*). The charred cereal grains present in this sample would be suitable for AMS dating.

7.4.17 Sub-samples of samples 3002 and 3009 (from demolition/destruction layer 3057) and 3013 (from demolition / destruction layer 3079) were processed for the recovery of waterlogged plant macrofossils, and provided rich and diverse assemblages of uncharred seeds, along with rich assemblages of uncharred wood in samples 3002 and 3009. A similar assemblage of uncharred seeds and wood fragments was also found in sample 3008 (from layer 3056 which overlays layer 3057), which may indicate that this assemblage too was preserved by anoxic waterlogging. Samples 3002 and 3009 contain between five and thirty fragments of waterlogged round wood (>4 mm) which would be suitable for AMS dating. Sample 3013 contains between one and five fragments of waterlogged round wood (>4 mm) which would be suitable for AMS dating.

7.4.18 The taxa noted in these uncharred seed assemblages include plants commonly associated with fertile disturbed soils and cultivation such as redshank / pale persicaria (*Persicaria maculosa / lapathifolia*), knotgrass (*Polygonum aviculare* agg.), black bindweed (*Fallopia convolvulus*), chickweed (*Stellaria media*), fat hen (*Chenopodium*

album) and corn marigold (*Glebionis segetum*). Common nettle (*Urtica dioica*) and oak-leaved goosefoot / red goosefoot (*Chenopodium glaucum / rubrum*) indicate nutrient enriched soils. Grassy habitats are represented by buttercups (*Ranunculus acris* / *repens* / *bulbosus*), sheep's sorrel (*Rumex acetosella*), greater plantain (*Plantago major*), hawkweed oxtongue (*Picris hieracioides*) and grasses (Poaceae). Damp soils are represented by lesser spearwort (*Ranunculus flammula*), water pepper (*Persicaria hydropiper*), rushes (*Juncus* spp.) and sedges (*Carex* spp.). Scrub type vegetation is represented by bramble (*Rubus fruticosus*), alder (*Alnus glutinosa*) and elder (*Sambucus nigra*) as well as a particularly high concentration of hazel nutshell (*Corylus avellana*) in samples 3002 and 3009 from made ground layer 3057 and sample 3013 from made ground layer 3079.

7.4.19 A rich assemblage of over one hundred wood charcoal fragments (>2 mm) was found in sample 3008 (from demolition / destruction layer 3056). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Between fifty and one hundred wood charcoal fragments (>2 mm) were found in sample 3009, and between ten and thirty wood charcoal fragments (>2 mm) were found in sample 3002 (from demolition / destruction layer 3057). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that both diffuse porous and ring porous taxa are present.

Aftermath of destruction

7.4.20 Demolition / destruction layer 3055 is of an uncertain date and it is suggested that this context may be of a later date than demolition / destruction layers 3057 and 3079 which are dated to the 13th century. Sample 3007 (from context 3055) contains a low concentration of uncharred plant remains, while sample 3009 (from context 3057) and sample 3013 (from context 3079) are rich in organic material. Moderately rich wood charcoal assemblages are also present in contexts 3057 and 3079, while a very low concentration of wood charcoal fragments is present in context 3055. These differences in sample composition support an interpretation that contexts 3057 and 3079 may relate to a different depositional event or phase than 3055. It is also suggested that demolition / destruction layer 3056 may be representative of a separate depositional event than neighbouring contexts 3055 and 3057. However, layer 3056 produced a similar assemblage of plant macrofossils to layers 3057 and 3079 which may indicate that these contexts are representative of similar depositional events.

Trench 5

7.4.21 Low concentrations of charred cereal grains were found in sample 5004 (from the matrix 5041 between a cobbled surface) and in sample 5003 (from made ground layer 5045). The crop types present are probable oat (cf. *Avena* sp.), free threshing wheat grain (*Triticum aestivum / turgidum* s.l.) and indeterminate wheat grain (*Triticum* sp.). A low concentration of charred wild or weed plant seeds was also found in sample 5004 (from cobbled surface matrix 5041), including seeds of plants commonly associated with fertile disturbed soils and cultivation such as cleavers (*Galium aparine*), stinking chamomile (*Anthemis cotula*) and corn marigold (*Glebionis segetum*). Charred seeds of sedges (*Carex* spp.) and grasses (Poaceae) are also present. The charred cereal grains in both these samples would be suitable for AMS dating although thelow density of charred material in these samples does however increase the likelihood that it may be intrusive. Uncharred seeds of birch (*Betula pendula*), dead nettle family (Lamiaceae) and elder (*Sambucus nigra*) were also found in these deposits along with uncharred hazel nutshell (*Corylus avellana*) in sample 5004. It is not however possible to determine with confidence

whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

7.4.22 Between ten and thirty wood charcoal fragments (>2 mm) were found in sample 5004 (from cobbled surface matrix 5041) and in sample 5003 (from made ground layer 5045). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblages are composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present, although no round wood is noted, which would limit the accuracy of the dating result.

Trench 9

7.4.23 Sample 9000 (from the lower fill 9011 of the moat) was the only sample taken from the moat fills in trench 9 and was found to contain a low concentration of uncharred seeds including birch (*Betula pendula*), henbane (*Hyoscyamus niger*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. A low concentration of wood charcoal fragments (2–4 mm), which are morphologically similar to oak (cf. *Quercus* sp.), was also found. These charcoal fragments may potentially be of a suitable size for AMS dating, although their low density in this deposit increases the likelihood that they may be intrusive. A rich assemblage of over one hundred land snail shells (Mollusca) was also found in sample 9000. The position of fill 9011 in the sequence of moat fills is unknown at this location which limits the utility of this sample.

Trench 10

7.4.24 Very low concentrations of uncharred plant seeds consisting of birch (*Betula pendula*) and elder (*Sambucus nigra*) were found in sample 10004 (from moat bank deposit 10071), sample 10003 (from moat bank deposit 10072) and sample 10005 (from moat bank deposit 10073). A low density and diversity of uncharred plant seeds including common nettle (*Urtica dioica*), corn marigold (*Glebionis segetum*), sedges (*Carex* spp.), birch (*Betula pendula*) and elder (*Sambucus nigra*) were found in samples 10008 and 10009 (from secondary moat fills 10076 and 10078). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

7.4.25 Between ten and thirty wood charcoal fragments (>2 mm) were found in sample 10003 (from moat bank deposit 10072). Preliminary examination low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Both ring porous and diffuse porous taxa are present in the small assemblage of between five and ten wood charcoal fragments (>2 mm) in samples 10008 and 10009 (from secondary moat fills 10076 and 10078). Charcoal of a suitable size for AMS dating is present although no round wood is noted as present which would limit the accuracy of the dating result.

15th- to early-16th-century deposits

Trench 1

7.4.26 An assemblage of fifty to one hundred wood charcoal fragments (>2 mm) present in sample 1006 (from bedding layer and matrix 1042 of cobblestone surface 1003) and an assemblage of ten to fifty wood charcoal fragments (>2 mm) present in sample 1007 (from the same context), were composed primarily of diffuse porous taxa. Charcoal of a suitable size for AMS dating is present although no round wood is noted as present which would limit the accuracy of the dating result.

17th-century deposits

Trench 10

7.4.27 Sample 10007 (from tertiary moat deposit 10075) produced a low concentration of uncharred plant seeds including common nettle (*Urtica dioica*), docks (*Rumex* spp.) buttercup (*Ranunculus acris/repens/bulbosus*), sedges (*Carex* spp.), birch (*Betula pendula*) and elder (*Sambucus nigra*). Sample 10006 (from redeposited natural deposit 10067) produced uncharred seeds of birch (*Betula pendula*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Low concentrations of wood charcoal fragments (<2mm) were also found which would not be of a suitable size for AMS dating.

18th- to 19th-century deposits

Trench 1

7.4.28 A rich assemblage of over one hundred wood charcoal fragments (>2 mm) was found in sample 1000 (from culverted drain fill 1018). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Vitrified charcoal and slag / metallurgical debris are also abundant in this sample. Charcoal of a suitable size for AMS dating is present although no round wood is noted as present which would limit the accuracy of the dating result. No food plants were found in this deposit.

Trench 3

7.4.29 Sample 3000 (from culverted drain fill 3034) produced a low concentration of uncharred seeds including grape (*Vitis vinifera*), fig (*Ficus carica*), bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*) and birch (*Betula pendula*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Wood charcoal fragments (<2 mm) were also found which would not be of a suitable size for AMS dating. Vitrified charcoal and slag / metallurgical debris were also abundant in this sample.

Trench 4

7.4.30 Very low concentrations of wood charcoal fragments (>2 mm) were found in samples 4000, 4001 and 4002 (from made ground layers 4009, 4064 and 4008). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that both ring porous and diffuse porous taxa are present. Charcoal of a suitable size for AMS dating (>4 mm) is present although no round wood is noted as present which would limit the accuracy of the dating result.

Trench 10

7.4.31 Sample 10000 (from made ground layer 10049) produced a low concentration of wood charcoal fragments (>2 mm), along with a low concentration of vitrified charcoal. Preliminary examination of the wood charcoal assemblage indicates that predominantly diffuse porous taxa are present. Charcoal of a suitable size for AMS dating (>4 mm) is present, although no round wood is noted as present which would limit the accuracy of the dating result.

Trench 11

7.4.32 Samples 11001 and 11002 (from 18th-century layers 11022 and 11036) produced low concentrations of uncharred plant seeds including common nettle (*Urtica dioica*), henbane

(*Hyoscyamus niger*), sedges (*Carex* spp.), birch (*Betula pendula*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Between five and ten wood charcoal fragments (>2 mm) were found in sample 11001. Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). These charcoal fragments may potentially be of a suitable size for AMS dating although their low density in this deposit increases the likelihood that they may be intrusive. A moderately rich assemblage of between fifty and one hundred land snail shells (Mollusca) was also found in sample 11002.

Uncertain date

Trench 3

7.4.33 Sample 3006 (from made ground (redeposited natural) layer 3018) was found to contain between fifty and one hundred wood charcoal fragments (>2 mm). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present although no round wood is noted, which would limit the accuracy of the dating result. Sample 3006 also produced low concentrations of uncharred plant seeds including buttercup (*Ranunculus bulbosus/acris/repens*), bramble (*Rubus fruticosus* agg.), raspberry (*Rubus idaeus*), nettle (*Urtica dioica*), elder (*Sambucus nigra*) and sedges (*Carex* spp.). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging

7.4.34 Sample 3007 (from demolition / destruction layer 3055) produced between one and five wood charcoal fragments (>2 mm). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present although no round wood is present, which would limit the accuracy of the dating result. This sample was also found to contain low concentrations of uncharred plant seeds including bramble (*Rubus fruticosus* agg.), birch (*Betula pendula*), elder (*Sambucus nigra*), rushes (*Juncus* ssp.) and sedges (*Carex* spp.) It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Sample 3001 (from the same deposit) did not produce any remains other than wood charcoal fragments which were all less than 2 mm in size.

Trench 4

7.4.35 Sample 4003 (from yellow clay layer 4113) produced a low concentration of uncharred wild or weed plant seeds including common nettle (*Urtica dioica*) birch (*Betula pendula*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. There was no evidence for anthropogenic activity and no datable material was found.

Trench 5

7.4.36 A rich assemblage of over one hundred wood charcoal fragments (>2 mm) was found in sample 5001 (from made ground layer 5039). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present although no round

wood is present, which would limit the accuracy of the dating result. This sample also produced a low concentration of uncharred wild or weed plant seeds as did sample 5002 (from made ground layer 5038), including birch (*Betula pendula*), chickweed (*Stellaria media*), henbane (*Hyoscyamus niger*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

8 STATEMENT OF POTENTIAL

8.1 Fulfilment of original aims and objectives

8.1.1 The original aims and objectives of the project were laid out in the WSI (Wessex Archaeology 2018). **Table 7** below outlines the degree to which the project has fulfilled these aims and objectives. As can be seen from the table, the aims and objectives of the work have been progressed to the assessment stage but further analysis and publication is required to fulfil them. Some of the aims have particular reference to the Borehole survey, assessment of which has not yet been finalised.

8.1.2 An updated project design with revised aims is presented below.

Table 4 Fulfilment of original aims and objectives

Original aim or objective	Degree of fulfilment
To gather sufficient information to establish the presence/absence, nature, date, quality of survival and importance of any archaeological deposits associated with the former Sheffield Castle and of later industrial, residential and commercial activity within the Castle Markets site.	Fulfilled
Borehole survey: to locate two 20m long transects perpendicular to the recorded course of the moat.	Fulfilled
Borehole survey: to obtain cores at 2m intervals along each transect.	Fulfilled
To process and assess any waterlogged organic remains present.	Fulfilled
Borehole survey: to describe the sediment sequence of each core.	Fulfilled (see separate borehole report)
To characterise the deposits and their sequence within the moat.	Fulfilled within the scope of the results of evaluation
To enhance understanding of initial post-medieval re-use of the former castle site.	Fulfilled within the scope of the results of the evaluation.
To determine the profile of the moat.	Fulfilled within the scope of the results of the evaluation; synthesis with previous excavation records (Davies 2000) recommended to determine full profile.
To enhance understanding of phasing of demolition of the castle, post-Civil War.	The results of the evaluation do not contain significant information relevant to this objective.
To gather sufficient information to establish the presence/absence, nature, date, quality of survival and importance of any archaeological deposits associated with the former Sheffield Castle and of later industrial, residential and commercial activity within the Castle Markets site.	Assessed, full analysis required to finalise.
To place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance.	Assessed, full analysis required to finalise.
To determine the location, extent, date, character, condition, significance and quality of any archaeological remains within the	Assessed, full analysis required to finalise.

Original aim or objective	Degree of fulfilment
site.	
To enhance understanding of construction of the castle's inner court and associated moat.	Assessed, full analysis required to finalise.
To enhance understanding of post-medieval and modern activities on the former castle site, including steelmaking and other metal trade activities.	Assessed, full analysis required to finalise.
To enhance understanding of the impact on earlier deposits of post-medieval and modern demolition and construction phases.	Assessed, full analysis required to finalise.
To enhance understanding of the development of the site and its associated buildings.	Assessed, full analysis required to finalise.
To enhance understanding of the layout and use of the castle's inner court.	Assessed, full analysis required to finalise. The results of the evaluation will allow for only limited fulfilment of this objective.
To inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy or a management strategy.	Full analysis and reporting is required to allow the results to be used for this purpose.
To date the deposit sequence.	Partially fulfilled; scientific dating required to expand and enhance existing dating.
To assess the artefactual and environmental potential of the archaeological deposits encountered.	Fulfilled for trial trench evaluation, in progress for boreholes (see separate report)
Borehole survey: to sample the two most promising sequences to obtain suitable material for scientific dating and palaeoenvironmental assessment.	Partially fulfilled/in progress (see separate borehole report)
To allow a detailed deposit model for the former Castle Markets site to be developed.	Partially fulfilled/in progress (see separate borehole assessment report)
To evaluate the sedimentary nature of the moat, to evaluate the survival and potential of palaeoenvironmental and waterlogged organic remains.	Partially fulfilled/In progress (see separate borehole assessment report)
To disseminate the results of the work in a manner in keeping with their significance, eg through 'open day' site visits, public talks and publication in a suitable journal.	Ongoing. Open days, volunteering, public talks and social media and media engagement have been facilitated. Further public talks are planned and publication of the results is required.
To allow for the wider community to play a role in rediscovering the castle's remains.	Ongoing. Open days, volunteering, public talks and social media and media engagement have been facilitated. Further public talks are planned and publication of the results is required.
To make available information about the archaeological resource within the site by reporting on the results of the evaluation.	Ongoing. Production of a final archive report and publication of the results are required.
Borehole survey: to review any existing geotechnical data, foundation/service plans, etc., to inform the proposed survey and augment it.	Outstanding
To deposit the resulting site archive with a suitable museum.	Outstanding

8.2 Stratigraphic potential

8.2.1 The quality of the stratigraphic information is generally good. Within the areas examined, the records form a reliable preservation by record and significantly contribute to our understanding of the Sheffield Castle site.

8.2.2 The stratigraphic record has been subjected to a high level of interpretation consistent with full analysis rather than assessment. The stratigraphic narrative will be updated in light of analysis of other data categories, particularly scientific dating.

8.2.3 Publication of the results is recommended.

Recommendations for analysis

- Update stratigraphic narrative in light of analysis of other data categories; and,
- Publish the results of the evaluation.

8.3 Finds

8.3.1 The finds assemblage recovered during the evaluation offers a supplement to the material contained in the Butcher and Armstrong archives held by Museums Sheffield deriving from earlier campaigns of excavation on the Castle site. The quantities and range of artefacts recovered from the present work are more restricted, but some similarities have been observed, as well as contrasts. The pottery assemblage, as from the earlier excavations, includes a significant medieval component, but this is the only material type for which this is the case, although some medieval material has been noted amongst the metalwork, as well as animal bone and metalworking residues (on stratigraphic provenance). Structural material from the medieval period (apart from the remains recorded *in situ*) is extremely sparse, limited to two architectural stone fragments (both found unstratified), six pieces of structural timber (one reused) and some small fragments of mortar and plaster.

8.3.2 There appears to be little that can be dated to the early post-medieval period (although significant quantities of pottery of this date were encountered during earlier excavations); the post-medieval/modern assemblage recovered appears to date from the 18th century and later. This part of the assemblage represents use of the site at this period for industrial and commercial purposes (steelworks, slaughterhouses, warehouses, markets). The metalwork assemblage in particular includes possible products of steelworking (cutlery, tools), as well as possible raw materials. This material, however, appears to be largely (if not totally) in redeposited contexts.

8.3.3 Some finds categories (CBM, glass, shell, stone) warrant no further analysis or reporting. Information presented in this report could be incorporated if necessary into the final report. Categories for which further work is proposed are detailed below.

Pottery

8.3.4 The pottery assemblage provides a useful supplement to the assemblage from earlier excavations, examined recently as part of a reassessment of the Butcher and Armstrong archives. In particular, the medieval wares, not particularly well represented elsewhere in the city, will enable a discussion of potential sources of supply to the city, including the possibility of some local production. The medieval wares may enable some refinement of the dating of the medieval remains uncovered, though the difficulty in dating some of the wares is admitted.

8.3.5 The deposition of 18th and 19th century wares may add to the evidence of patterns of discard and reuse observed elsewhere in the city, resulting from an organised system of waste collection and redistribution.

Recommendations for analysis

8.3.6 The whole pottery assemblage should be subjected to full fabric and form analysis, to accord with nationally recommended standards for pottery analysis (Prehistoric Ceramics Research Group *et al.* 2016). The full catalogue of pottery will form part of the project archive.

8.3.7 A report will be prepared, which will present the range of types represented, by chronological period, and supported by tabulated data. The assemblage will be discussed in terms of the sources of supply represented, how this information augments our understanding of pottery production and distribution in the Sheffield area, with particular regard to the medieval white-firing Coal Measures wares of possible local origin. The chronological implications for the site will also be considered, and the problem of dating the medieval Hallgate wares discussed. The distinctive patterns of discard and reuse, observed elsewhere in the city amongst 18th and 19th century assemblages, and with an implication for site formation processes, may also be visible here, and this will be included in the discussion. Cross-reference will be made throughout to the assemblage contained in the Butcher archive.

CBM

8.3.8 The ceramic building material was entirely of post-medieval date and has little potential to make further contribution to interpretation of the remains.

Recommendations for analysis

8.3.9 No further work on the ceramic building material will be undertaken.

Clay tobacco pipes

8.3.10 Pipe fragments offer one of the most accurate and reliable classes of artefact for dating deposits in the post-medeival period. The excavated pipes should be able to provide a valuable contribution to the identification and phasing of these contexts.

8.3.11 Clay tobacco pipes also have two other significant attributes; their regional diversity allows them to be used to study trade and marketing contacts while differing qualities allow for an examination of social status. Although clay pipes were recovered during previous investigations, they were not the focus of study (Armstrong 1930; Dennison and Richardson 2014). The current assemblage can usefully augment the pipe evidence from other sites in the city, such as Riverside Exchange and sites along the route of the Inner Relief Road (White 2015). Although only a relatively small number of marked pipes are present in this assemblage they should be able to go some way towards assessing the catchment area from which services and supplies were drawn.

8.3.12 The earliest bowl fragments recovered from the site date from *c.*1660–80. All the other bowls from the site appear to date from the early 18th century through to the mid- to late 19th century and include some interesting decorated fragments.

8.3.13 Also of interest here are a number of stems from nicely burnished 18th-century types with makers' names included on them.

Recommendations for analysis

8.3.14 The pipe fragments will be individually examined to check for any further marked or decorated pieces and to check the provisional dating given above. The context summary will be updated as necessary.

8.3.15 There is probably little more that can be said about the plain stems from the assemblage than has already been presented in this report. However, the assemblage as a whole, and in particular made ground 6026, does include a number of interesting marked and decorated bowl fragments ranging from the 17th to early 19th century, some of which are previously unrecorded. It will therefore be worth examining and recording all the bowl fragments and any marked stems in more detail so as to make them directly comparable with other excavated finds from the region.

8.3.16 Illustrations for publication at 1:1 will be prepared of selected marks, bowl forms and decorated fragments, particularly those that are previously unrecorded. It is estimated that approximately ten drawings will be required for the final report.

8.3.17 A publication report will be prepared to describe the assemblage as a whole, highlight the most important elements and set the group as a whole in its broader context. This report will describe the work carried out and present a synthesis of the pipe evidence from the site.

Glass

8.3.18 The glass assemblage has little further potential and no further analysis is proposed. The glass assemblage primarily comprised post-medieval containers and vessels. A small proportion of the window glass could be medieval in date, however this material is not diagnostic and further analysis is unlikely to be fruitful.

Recommendations for analysis

8.3.19 No further work on the glass will be undertaken.

Stone

8.3.20 The recovered stone has been examined for lapidary material and further examination is unlikely to enhance understanding of the remains. The majority of the stone, both that recovered to Wessex Archaeology's laboratories and that stored on site, shows no sign of having been worked and should be considered for discard. Details of the items identified as medieval (voussoir, chamfered block), as presented here, will be incorporated in the final report. The voussoir could be illustrated (using existing archive drawing, and/or photograph).

Recommendations for analysis

8.3.21 Illustrate voussoir stone.

Slag

8.3.1 Given the redeposited provenance of much of the slag, its potential is somewhat limited, but there is some interest in characterising it in a little more detail in order to highlight the differences between 19th-/20th-century slag and the earlier material.

8.3.2 The earlier contexts have potential to inform our understanding of metalworking in Sheffield prior to the expansion of industrialisation in the later 18th century.

8.3.3 Metallographic analysis could be used to confirm whether the medieval/probably medieval fragments of slag are indeed iron smelting slag. There are two options for analysis. Metallography using reflected light microscopy to examine and record images of the microstructure of samples of the pieces of slag, or metallography using an analytical Scanning Electron Microscope (SEM). Both options have the potential to confirm whether the slag originated from iron smelting, although the latter gives the option to determine the

chemical composition of the slag, and it can be used to obtain images that clearly show mineral phases present in the slag.

Recommendations for analysis

8.3.4 Characterise slag to highlight differences between time periods. Examine earlier material for any evidence to inform understanding of metalworking in Sheffield prior to industrialisation.

8.3.5 Samples of the medieval/probably medieval slag should be subjected to metallography using reflected light microscopy. If the results of the reflected light microscopy are inconclusive, then SEM analysis should be considered.

Metalwork

8.3.6 The medieval toilet implement is of intrinsic interest; it adds to the group of medieval personal items found on the Castle site and held in the Butcher and Armstrong archives, as an indicator of lifestyle.

8.3.7 The remainder of the metalwork has limited potential, recovered from largely redeposited contexts, and the range replicates that found on other industrial sites across the city. However, it would be worth some further enhancement of the catalogue, if only to provide some comparable quantified data on the possible products of metalworking on or near the site.

Recommendations for analysis

8.3.8 Further parallels will be sought for the medieval toilet implement, and a short report will be prepared, enhancing the information presented here. The object will be illustrated.

Leather

8.3.9 The leather has limited potential, as likely to be of relatively recent date, and consisting largely of small fragments. Some comment may be possible on the two shoes, and some possible interpretation of the strip fragments.

Recommendations for analysis

8.3.10 A full catalogue should be compiled for the leather, to ensure that all possible identifications have been checked. A brief commentary may be prepared on the shoes in particular, and also offering some interpretation of the miscellaneous fragments. None of the leather warrants illustration, although the more complete shoe may be photographed.

Wood

8.3.11 One piece of timber (from trench 6) is reused, and likely to be of medieval date. The timber is unsuitable for dendrochronology. However, the piece warrants some further specialist examination and comment in order to determine both original and subsequent function.

Recommendations for analysis

8.3.12 The re-used piece of timber from (6055) is worthy of further research to attempt to determine both original and subsequent function. This item should be drawn.

Animal bone

8.3.13 In addition to the small sample of bones produced from the excavation, anthropogenic modification and other taphonomic processes meant that preservation of the faunal

remains was variable. This very small sample size limits the analysis of animal husbandry and management practices throughout the occupation of the site, but other points of interest can be raised.

8.3.14 There was little animal bone recovered from medieval contexts, but these did include species such as fallow deer and woodcock which indicate a potential to comment on status related activity of the site. However, an important aspect of the post-medieval and early modern components of the assemblage is the presence of Cervidae post-crania in 18th/19th century and 20th century deposits. This may suggest residual bones from earlier occupations are present in later phases at Sheffield Castle, but requires further investigation.

8.3.15 Otherwise, the post-medieval/modern assemblage, although limited by the low proportion of identifiable bones, does include a number of objects and bone-working waste, unsurprising given the proliferation of bone-working across industrial Sheffield, providing cutlery handles amongst other items.

Recommendations for analysis

8.3.16 Age, biometric and butchery data should be recorded following established methods and guidelines (Baker and Worley 2014), and a more comprehensive analysis and interpretation of the observations presented here will be completed for the final report, to include consideration of the possible status of the medieval site through diet.

Shell

8.3.17 The potential of the small assemblage of shell has been realised and no further analysis is proposed.

Recommendations for analysis

8.3.18 No further work on the shell will be undertaken.

Conservation

8.3.19 On the basis of the X-rays, and a scan of the metal objects concerned, minimal further recommendations for conservation treatment are proposed. The copper alloy toilet implement requires cleaning and stabilisation for long-term curation. Other copper alloy objects are considered either to be in a sufficiently stable condition, or fall into the category of items which are likely to be targeted for selective retention.

8.3.20 Amongst the ironwork, there are a few objects of intrinsic interest (eg tools, knife blades), but it is considered that investigative cleaning will not yield significant further detail of these objects that are not currently visible on the X-rays, and would moreover potentially make the objects more vulnerable to further deterioration. The metal objects may be targeted for selective retention, and objects retained will be appropriately packaged in stable storage (airtight plastic tubs with drying agent) for long-term curation.

8.3.21 None of the leather is considered to warrant conservation for long-term curation.

8.4 Environmental potential

8.4.1 The Sheffield Castle assemblage of plant remains included (a) uncharred wood and other macrofossil material, (b) charred seeds and (c) wood charcoal, as follows. Rich assemblages of uncharred plant macrofossils, some of which are likely to have been preserved by anoxic waterlogging, were found in a series of 13th-century demolition / destruction layers in Trench 3 and, in Trench 6, a series of cut feature fills and a made

ground layer 6055 which seals these cut features all of which probably date to the medieval period. These assemblages have potential to provide evidence for the nature of the environment at the site during the medieval period, as well as potential evidence for human activity and food consumption. Low concentrations of charred seeds, consisting primarily of cereal grain and wild or weed plant seeds, were found in 13th-century earthwork layer 3062 and demolition / destruction layer 3056 in Trench 3, 13th-century cobbled surface matrix 5041 and medieval courtyard made ground layer 5045 in Trench 5, and probable medieval made ground layers 6043, 6047 and 6048 in Trench 6. Despite the low concentrations of material, these assemblages have potential to provide evidence for crop types, cultivation and crop husbandry practices. Relatively rich assemblages of at least fifty wood charcoal fragments (>2 mm) were found in 13th-century demolition/destruction layers 3056 and 3057, 13th-century made ground layer 3062, 13th- to 15th-century made ground layers 1057 and 1076, probable medieval made ground layers 6047 and 6049, 15th- to early-16th-century cobbled surface bedding layer 1042, 19th-century culverted drain deposit 1018 and made ground layers 3018 and 5039 which are of uncertain date. These assemblages have potential to provide evidence for the availability of local woodland and scrub, and to investigate changes through time.

8.4.2 Uncharred seeds from a range of different taxa occurred frequently throughout the site. Taxa commonly associated with damp, muddy or wet soils are consistently present, as is often the case with material preserved by waterlogging. As these seeds primarily occurred in deposits that were not waterlogged at the time of excavation, however, it remains uncertain whether they represent activities contemporary with the excavated features, preserved by anoxic waterlogging, or the intrusion of more recent plant material. The frequent occurrence in medieval deposits of uncharred seeds from a range of taxa commonly associated with disturbed and nitrogen enriched soils is consistent with human activity at a site of this type. The rich assemblages of uncharred wood in samples from Trenches 3 and 6 may represent building material brought to the site, though it is equally possible that at least some of this wood represents scrub vegetation growing in the vicinity of the sampled features. Unlike the uncharred seeds, it is relatively unlikely to represent modern intrusion. The presence of uncharred seeds from a number of woody taxa (eg elder (*Sambucus nigra*), birch (*Betula pendula*), raspberry (*Rubus idaeus*) and blackberry (*Rubus fruticosus* agg.) may support this latter possibility. The plentiful seeds of birch (*Betula pendula*) could, however, have travelled from some distance, as they are easily dispersed by wind.

8.4.3 The seeds of raspberry (*Rubus idaeus*) and blackberry (*Rubus fruticosus* agg.) may also have been brought to the site as collected food plants. The presence of seeds from a range of edible fruits is a typical feature of medieval waterlogged plant macrofossil assemblages (Moffett 2006, 54). Seeds of bramble and raspberry are particularly associated with garderobe pits and cess deposits, raising the possibility that some of these edible fruit remains represent of the dumping of cess. The presence of a relatively rich assemblage of uncharred (whole and fragmented) seeds of corncockle (*Agrostemma githago*) in sample 6007 (from gully fill 6062) may support this interpretation as it was a common crop weed found in medieval cess deposits (Kenward and Hall 1995, 758; Smith 2013). This poisonous weed of cereal crops was progressively eradicated in Britain from the 19th century onwards, and so is unlikely to be a modern intrusion. The rich deposits of uncharred hazel nutshells (*Corylus avellana*) in 13th century contexts 3057 and 3079 are also likely to represent the debris of collected food, and they are frequently present in medieval archaeobotanical assemblages (Grieg 1996). The seeds of figs (*Ficus carica*) and grapes (*Vitis vinifera*) that were found in sample 3000 from 19th century culverted drain fill 3034, are typical of post-medieval urban waterlogged plant macrofossil assemblages (Grieg 1996), although they could also represent intrusive modern material.

8.4.4 The charred cereal grains found in a series of 13th-century and probable medieval deposits provide evidence for cultivated food plants. The crop types present are oat (*Avena* sp.), hulled barley (*Hordeum vulgare/disticum*), rye (*Secale cereale*) and free threshing wheat (*Triticum aestivum/turgidum*), which are typical crops of the medieval period in England. Free threshing wheat is the most frequently represented wheat type in medieval archaeobotanical assemblages, with barley, oats and rye also present as important crops (Moffett 2006). Rye was increasingly cultivated in northern England during the medieval period, possibly due to an increase in temperatures during the 13th century which provided more favourable conditions for the cultivation of this crop (Huntley 1995). Archaeobotanical finds of oat grains cannot usually be distinguished as wild or cultivated, however, in the absence of chaff.

8.4.5 Many of the wild taxa present in the assemblages of charred seeds, such as corn spurrey (*Spergula arvensis*), corn cockle (*Agrostemma githago*), corn marigold (*Glebionis segetum*), stinking chamomile (*Anthemis cotula*) and brome / rye grass (*Bromus* spp. / *Lolium* spp.) are typical crop weeds which are likely to have been harvested along with the crops and charred as waste removed during crop processing. The increasing presence of stinking chamomile (*Anthemis cotula*) in assemblages dating to the medieval period in England has been related to changes in cultivation practices such the expansion of cultivation onto heavier clay soils (Jones 1981), facilitated by deep plough agriculture (Jones 1981, 1988). The presence of taxa commonly associated with damp soils such as sedges (*Carex* spp.) in the charred wild or weed seed assemblage may also indicate the cultivation of poorly drained fields, although the seeds of these taxa may also be representative of plants collected for use as fodder, roofing, bedding or flooring material.

8.4.6 Wood charcoal provides evidence for the utilisation of local woodland and scrub for the collection of fuel (or building material where there is evidence of destruction by fire). Preliminary examination of the wood charcoal assemblages indicates that, throughout the 13th to 15th century, a ring porous taxon morphologically similar to oak predominates in many contexts while others are composed of a mix of both ring porous and diffuse porous taxa. Sample 1006 (from 15th- to early-16th-century cobbled surface bedding layer 1042) is composed of primarily diffuse porous taxa, while sample 1000 (from 19th century drain fill 1018) is primarily composed of probable oak. These differences in charcoal assemblage composition may be related to many factors, such as changes in woodland availability over time and context type (for example where contexts may be associated with potential industrial activity).

8.4.7 Palynological and documentary evidence from northern England indicates that woodland clearance was sustained throughout the medieval period and that any remaining woodland would likely have been extensively managed in order to provide sustainable resources (Huntley 1995, 74). Large numbers of wood charcoal fragments from excavations at Sandal Castle near Wakefield, dated to the 12th to 17th centuries, include both ring porous taxa such as oak and diffuse porous taxa such as hazel, birch and hawthorn/apple/pear/whitebeams (Smith *et al.* 1983). Huntley (2010, 38) also notes that an increase in diversity of taxa over time is evident in the assemblage from Sandal Castle, possibly indicating the exploitation of a wider range of woodlands (Huntley 2010, 38). Full analysis of the wood charcoal assemblage from Sheffield Castle could provide comparable evidence for changing exploitation of woodland.

Recommendations for analysis

8.4.8 Assemblages of charred and waterlogged plant remains from medieval contexts have been analysed from a number of urban sites in the region such as Doncaster, Hull, Beverly and York (Hall and Huntley 2007). Archaeobotanical assemblages from medieval

castle sites in the region are however relatively sparse (Hall and Huntley 2007, 172 & 174). The assemblage from Sheffield Castle therefore represents an important new dataset. Full analysis of this dataset would provide quantitative results which could be compared with published data from other sites. Van der Veen *et al.* (2013, 174) have also highlighted the need for the recovery of archaeobotanical data, especially waterlogged and mineralised plant remains, from medieval contexts in urban centres other than London. This analysis would be of national significance in providing palaeoenvironmental evidence from a medieval castle site and urban centre.

8.4.9 Full sorting, identification and analysis of the uncharred seeds is recommended for deposits that have been identified as likely to have been preserved by anoxic waterlogging. It is likely that full sorting of these samples would result in the identification of additional taxa which were not identified during preliminary assessment and it would also be possible to identify some taxa to species which are currently only identified to family or genera. These deposits are listed in the following table.

Table 5 Seeds likely to be waterlogged

Trench	Context number	Sample number	Date based on stratigraphy and artefacts
3	3057	3009	13th century
3	3079	3013	13th century
3	3056	3008	13th century
6	6060	6009	Probably medieval
6	6064	6007	Probably medieval
6	6062	6008	Probably medieval
6	6072	6011	Probably medieval
6	6055	6006	Probably medieval

8.4.10 Full identification and analysis of the waterlogged wood assemblages is recommended for samples that were processed as waterlogged (and have been kept wet). These deposits are listed in the following table.

Table 6 Wood from samples processed as waterlogged

Trench	Context number	Sample number	Date based on stratigraphy and artefacts
3	3057	3009	13th century
6	6055	6006	Probably medieval
6	6060	6009	Probably medieval
6	6072	6011	Probably medieval

8.4.11 Full sorting, identification and analysis of the charred seeds for all deposits in which they were found is recommended, to provide a fully quantified record of crop types and wild taxa present at the site, for comparison with published material from other sites. These deposits are listed in the following table.

Table 7 Charred seeds

Trench	Context number	Sample number	Date based on stratigraphy and artefacts
3	3062	3003	13th century
5	5041	5004	13th century
5	5045	5003	13th century
1	1057	1003	13th–15th century

1	1076	1009	13th–15th century

8.4.12 Full identification of the wood charcoal assemblages from all samples with more than 50 fragments (>2 mm) is recommended, to provide evidence for the use of wood as fuel and (if there is evidence for destruction by fire) as building material. Detailed examination of the wood charcoal assemblage would also provide further information regarding whether large or small diameter wood was utilised, and for what purpose, and would be useful for comparison with the charcoal assemblage from Sandal Castle.

Table 8 Charcoal

Trench	Context number	Sample number	Date based on stratigraphy and artefacts
3	3057	3009	13th century
3	3056	3008	13th century
3	3070	3003	13th century
1	1057	1003	13th–15th century
1	1076	1009	13th–15th century
6	6047	6004	Probably medieval
6	6049	6005	Probably medieval
5	5039	5001	Uncertain (possibly 18th century)
1	1018	1000	19th century

8.4.13 Processing by paraffin flotation for the recovery of invertebrate macrofossils, and assessment of the assemblage by a palaeoentomologist, is recommended for deposits that were processed as waterlogged. These deposits are listed in the following table.

Table 9 Waterlogged contexts for palaeoentomological study

Trench	Context number	Sample number	Date based on stratigraphy and artefacts
3	3057	3009	13th century
3	3079	3013	13th century
6	6060	6009	Probably medieval
6	6072	6011	Probably medieval
6	6055	6006	Probably medieval

8.4.14 The small assemblage of land snail shells (Mollusca) present in sample 9000 from 14th- to early-15th-century moat fill 9011 may also provide some palaeoenvironmental information on the immediate environment, and it is recommended that this assemblage be assessed by a molluscan specialist.

8.4.15 It is also recommended that a retained borehole core (BH1) be processed for all types of palaeoenvironmental material in order to further investigate the potential motte in trench 2.

8.4.16 The geoarchaeological report below also recommends subsampling of monolith sample 10002 for palaeoenvironmental information.

8.5 Geoarchaeological samples

8.5.1 The monolith samples have no potential for further geoarchaeological work. The sediments in the monolith samples have been fully described. However, the samples do have potential as a source of subsampling for the other methods. The monolith samples

should therefore be retained only until the requirements for analysis have been addressed.

8.5.2 Monolith samples 3010–3012 contain deposits that are well-represented by bulk environmental samples. Subsampling of these monolith samples is therefore not proposed.

8.5.3 Monolith sample 10001 contains redeposited 18th-century levelling layers only, and as such is not suitable for palaeoenvironmental techniques.

8.5.4 Monolith sample 10002, however, is recommended for subsampling. This monolith sample provides the only opportunity for palaeoenvironmental analysis of deposits associated with the 17th-century slighting of the castle. Despite the likely poor preservation of many indicators, the potential significance of a positive result would make it worth processing for assessment for macrofossils (charred plant remains) and microfossils (pollen, diatoms).

Recommendations for analysis

8.5.5 Monolith sample 10002 will be processed for palaeoenvironmental analysis. Although the sample has low potential, this is a valuable opportunity to study the environment of the slighting of Sheffield Castle and palaeoenvironmental analysis of the sample should be attempted.

8.5.6 The remaining monolith samples will be retained until the end of the project and then discarded.

8.6 Geoarchaeological boreholes

8.6.1 Borehole survey was undertaken alongside the archaeological trial trenching. Assessment of the borehole data will be presented in a separate report.

8.7 Scientific dating

AMS dating

Appraisal of available material

8.7.1 It is recommended that AMS (accelerator mass spectrometer) dates be obtained for the studied features where dating is uncertain, and no other dating evidence is available.

8.7.2 Where charcoal is present, but no round wood, cereal grain or hazel nutshell is present, the accuracy of the dating result may however be limited. It is recommended that the AMS dating strategy avoids contexts from which there is only non-roundwood charcoal.

Table 10 Contexts/samples containing only non-roundwood charcoal therefore unsuitable for AMS dating

Trench	Context	Sample number	Material	Quantity	Recommendation
1	1018	1000	Wood charcoal (>4mm)	50-100 charcoal fragments	Do not date: only non-roundwood charcoal present
1	1042	1006	Wood charcoal (>4mm)	1-5 charcoal fragments	Do not date: only non-roundwood charcoal present
1	1064	1008	Wood charcoal (>4mm)	1-5 charcoal fragments	Do not date: only non-roundwood charcoal present
1	1065	1007	Wood charcoal (>4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present

Trench	Context	Sample number	Material	Quantity	Recommendation
1	1079	1010	Wood charcoal (>4mm)	10-50 charcoal fragments	Do not date: only non-roundwood charcoal present
3	3018	3006	Wood charcoal (>4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present
3	3055	3007	Wood charcoal (>4mm)	1-5 charcoal fragments	Do not date: only non-roundwood charcoal present
3	3070	3004	Wood charcoal (>4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present
4	4008	4002	Wood charcoal (>4mm)	1 – 5 fragments	Do not date: only non-roundwood charcoal present
4	4009	4000	Wood charcoal (>4mm)	1 – 5 fragments	Do not date: only non-roundwood charcoal present
4	4064	4001	Wood charcoal (2-4mm)	1 – 5 fragments	Do not date: only non-roundwood charcoal present
5	5038	5002	Wood charcoal (>4mm)	1 – 5 fragments	Do not date: only non-roundwood charcoal present
5	5039	5001	Wood charcoal (>4mm)	50-100 charcoal fragments	Do not date: only non-roundwood charcoal present
6	6049	6005	Wood charcoal (>4mm)	10-50 charcoal fragments	Do not date: only non-roundwood charcoal present
6	6062	6008	Wood charcoal (>4mm)	1 – 5 charcoal fragments	Do not date: only non-roundwood charcoal present
6	6064	6007	Wood charcoal (2-4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present
6	6072	6011	Waterlogged wood (>4mm)	100-500 wood fragments	Do not date: only non-roundwood waterlogged wood present
9	9011	9000	Wood charcoal (2-4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present
10	10049	10000	Wood charcoal (>4mm)	1-5 charcoal fragments	Do not date: only non-roundwood charcoal present
10	10071	10004	Wood charcoal (2-4mm)	1-5 charcoal fragments	Do not date: only non-roundwood charcoal present
10	10072	10003	Wood charcoal (2-4mm)	10-50 charcoal fragments	Do not date: only non-roundwood charcoal present
10	10076	10008	Wood charcoal (>4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present
10	10078	10009	Wood charcoal (>4mm)	1-5 charcoal fragments	Do not date: only non-roundwood charcoal present
11	11022	11001	Wood charcoal (2-4mm)	5-10 charcoal fragments	Do not date: only non-roundwood charcoal present

8.7.3 Deposits from which suitable palaeoenvironmental material for AMS dating is present are listed in **Table 12** below. No further categories of environmental material suitable for dating were present.

8.7.4 Wood artefacts were recovered from the site. Mature wood is not a good candidate for scientific dating, as it is long-lived and likely to be residual. Short-lived plant material is available for dating from every pre-18th/19th-century context containing wood artefacts. Short-lived plant material should be preferred from each context.

8.7.5 No animal bones suitable for scientific dating were recovered. There was no articulated bone and no mandibles or maxilla with substantially intact teeth. The animal bone recovered is likely to be residual and is not suitable for dating.

Table 11 Material suitable for radiocarbon dating

Trench	Context	Sample number	Material suitable for AMS dating	Quantity	Phase	Recommendation
1	1057	1003	Charred cereal grain	10-50 grains	13th–15th century	Obtain AMS date (round 1)
1	1076	1009	Charred cereal grain, hazel nutshell	10-50 grains, 50-100 nutshell fragments	13th–15th century	Obtain AMS date (round 1)
3	3056	3008	Cereal grain, wood charcoal (>4mm)	10-50 grains, 100-500 charcoal fragments	13th century demolition/destruction	Obtain AMS date (round 2)
3	3057	3002	Waterlogged round wood (>4mm), hazel nutshell	5-10 wood fragments, 50-100 nutshell fragments	13th century demolition/destruction	Do not date: sample has greater chance of contamination than sample 3009 below
3	3057	3009	Waterlogged round wood (>4mm), hazel nutshell	10-50 wood fragments, >500 nutshell fragments	13th century demolition/destruction	Obtain AMS date (round 2)
3	3062	3003	Charred cereal grain	50-100 grains	13th century, construction	Obtain AMS date (round 2)
3	3072	3014	Round wood charcoal (>4mm)	1-5 charcoal fragments	13th century, construction	Obtain AMS date (round 2)
3	3079	3013	Waterlogged round wood (>4mm), hazel nutshell	1-5 wood fragments, 100-500 nutshell fragments	13th century, demolition/destruction	Obtain AMS date (round 2)
5	5041	5004	Cereal grain	2-5 grains	Pre-dates 13th century courtyard	Obtain AMS date (round 1)
5	5045	5003	Cereal grain	5-10 grains	Intermediary context in development of courtyard	Obtain AMS date (round 2)
6	6043	6001	Charred cereal grain	1-5 grains	Undated, probably medieval	Environmental specialist to select either material from this context of from probably contemporary context 6044 to obtain a single AMS date (round 1)
6	6044	6002	Charred hazel nutshell	1-5 nutshell fragments	Undated, probably medieval	Environmental specialist to select either material from this context of from probably contemporary context 6043 to obtain a single AMS date (round 1)

Trench	Context	Sample number	Material suitable for AMS dating	Quantity	Phase	Recommendation
6	6047	6004	Charred cereal grain, charred hazel nutshell, round wood charcoal (>4mm)	1-5 grains, 1-5 nutshell fragments, 1-5 charcoal fragments	Undated, probably medieval	Obtain AMS date (round 2) from either this or probably contemporary context 6048
6	6048	6003	Charred cereal grain	1-5 grains	Undated, probably medieval	Obtain AMS date (round 2) obtain date from either this or probably contemporary context 6047
6	6055	6006	Waterlogged round wood (>4mm)	5 – 10 wood fragments	Undated, probably medieval	Obtain AMS date (round 2)
6	6060	6009	Waterlogged round wood (>4mm)	1-5 wood fragments	Undated, potentially medieval	Obtain AMS date (round 1)

8.7.6 Sample 3002 should be passed over in favour of sample 3009 from the same context (3057). There is a greater possibility that sample 3002 was contaminated with material from nearby contexts, which is why sample 3009 was taken.

8.7.7 Contexts 6043 and 6044 are almost certainly the same deposit seen in neighbouring sondages. Similarly, contexts 6047 and 6048 are almost certainly the same layer.

8.7.8 When these factors have been taken into account, a total of 13 separate dates might be obtained from the range of available material. The 13 available dates are from medieval or undated sequences in trenches 1, 3, 5 and 6.

Initial recommendation

8.7.9 Given the national importance of the site, it is strongly recommended that all 13 dates are obtained. Each date would add information about the medieval (or earlier) chronology of the site, which is one of the key objectives of the project. The existing chronology of trenches 1, 3 and 5 would be enhanced; each of these sequences is currently dated by only a few sherds of pottery. The chronology of trench 6 would be revealed. It may become possible to comment on Armstrong's claim of Saxon activity at the castle (1930). Enhanced interpretation of the remains within these trenches would then be possible, and the story of Sheffield Castle would be revealed in more detail and with more certainty.

8.7.10 As is standard practice, pairs of dates should be obtained from each context in case of error or aberrative result.

Prioritisation

8.7.11 It has been requested that this assessment identify the five dates from the above 13 that would provide the maximum information.

Bayesian analysis

8.7.12 There is sufficient *a priori* relative chronological information with the stratigraphy to support statistical analysis of a small AMS dating study. The intention would be to combine the AMS determinations with the chrono-stratigraphic information using Bayesian

methods. This would refine the errors in the dating results and would allow for greater accuracy.

8.7.13 In order to maximise the potential for statistical analysis, a set of dates should be obtained which can be stratigraphically related to each other. However, contrary to this, it is desirable to obtain dates that are applicable to as wide a range of the remains as possible.

8.7.14 There are stratigraphic similarities between the sequences recorded in trenches 1, 5 and 6. These comprise chiefly the presence of similar distinctive slag layers in each trench (1073, 5039, 6050), and the presence of similar cobble surfaces in trenches 1 and 5 (1075 and 5042/5043/5044). Dates obtained from across these three trenches can therefore be related stratigraphically, and it is recommended that a selection of dates from across these three trenches be obtained. There will be some opportunity to use statistical techniques to test these stratigraphic assumptions.

8.7.15 The sequence in trench 3 cannot be stratigraphically related to the sequences in other trenches. For this reason, the statistical potential of dates from trench 3 is low. The narrative of trench 3 is well understood, and it seems reasonable to prioritise trenches 1, 5 and 6 for dating techniques. Dates obtained from trench 3 would be valuable and would greatly enhance interpretation and should be obtained if possible.

8.7.16 Context 1057 provides the only opportunity to obtain a *Terminus Ante Quem* for the slag layer and for the courtyard and should therefore be obtained. Material from contexts 1076 and 5041 should be dated to provide a *Terminus Post Quem* for the slag layer and courtyard.

8.7.17 The remaining two dates should be used in Trench 6, one late in the sequence and one early. For the late date, either 6043 or 6044 should be targeted. These contexts are almost certainly the continuation of the same layer. The environmental specialist should select either a charred cereal grain from context 6043 or a charred hazel nutshell from context 6044. The early date should be obtained from fill 6060.

Recommendation for analysis

8.7.18 Obtain five AMS dates from material from contexts 1057, 1076, 5041, 6066, and one from either 6043 or 6044.

8.7.19 If possible, obtain a further eight AMS dates from contexts 3056, 3057 (sample 3009, not sample 3002), 3062, 3072, 3079, 3045, 6055, and one from either 6047 or 6048.

Luminescence dating

Introduction

8.7.20 A range of samples were taken for the purposes of luminescence dating as detailed in Table 6 below. The samples taken were intended to be processed using two separate techniques as described below. At this assessment stage the luminescence samples have not yet been processed. The results of the luminescence dating are expected to be included in future reports.

Table 12 Luminescence samples

Trench	Context	Known date of context	Basis of established dating	Number and type of sample(s)
1	1079	Older than or equal to 13th–15th century	Stratigraphically precedes deposit 1057 containing 13th–15th century pottery	3 pOSL samples
2	2048 and 2051	Unknown		8 pOSL samples
2	2049	Unknown		1 OSL sample and gamma spectrometry measurement
2	2061	Unknown		1 pOSL sample
3	3058	13th century	Context contained 13th century pottery	1 pOSL sample
3	3070	Older than or equal to 13th century	Stratigraphically precedes deposit 3058 containing 13th century pottery	1 pOSL sample
3	3071	Older than or equal to 13th century	Stratigraphically precedes deposit 3058 containing 13th century pottery	1 pOSL sample
5	5041	13th century	Context contained 13th century pottery	3 pOSL samples
6	6066	Unknown, probably medieval?		2 pOSL samples
10	10073	Older than or equal to 13th–15th century	Stratigraphically precedes deposit 10071 containing 13th–15th century pottery	3 pOSL samples

Portable luminescence dating (pOSL)

8.7.21 This is a low cost option with low levels of intrusion for sampling. The majority of luminescence samples taken from the site are to be processed using this technique. Samples were collected in small light tight pots (film canisters). No sample preparation other than drying and disaggregation is required. Measurements give a raw luminescence count only. If it is assumed that: sediment was exposed to sunlight prior to burial, sediment mineralogy is broadly similar, and that background radiation levels are constant across the site, then the larger the measured pOSL signal, the older the sample. By collecting a profile through the sediments in trench 2 it will be possible to compare the levels of pOSL which may indicate if deposits were exposed to sunlight prior to burial. When used in conjunction with pOSL measurement of dated samples from other trenches on site, a relative chronology may be possible. The resolution of this relative chronology would be an indication that a deposit is likely older or younger than another context. For example, it may be possible to determine if undated deposits in trench 2 are older or younger than medieval deposits elsewhere on the site.

Single grain luminescence dating (OSL)

8.7.22 One sample was taken from context 2049 for examination using the single grain luminescence (OSL) technique. Single grain luminescence dating requires collection of two samples in steel tubing (50 mm diameter and 150 mm long) from which any quartz sand grains can be extracted, cleaned and prepared. Additionally, an 80 mm diameter and 400 mm long hole was augered out to allow for a field gamma spectrometer to measure background radiation. OSL measurement requires each sand grain (if any were contained within the sample) to be measured and dated separately to establish if any have been reset prior to burial and to calculate an absolute age in years.

Recommendations for analysis

8.7.23 The luminescence samples should be processed and the results analysed.

Dendrochronology

8.7.24 As outlined in the wood report above, only two timber samples have any potential for dendrochronology, and both of those with significant caveats. To repeat, timber sample 3057 1 of 3 may retain some sapwood and displays closely spaced growth rings suggesting it could retain sufficient rings for dating. However, this is an isolated sample which may lessen its potential for dating. Timber/object 6055 may be large enough for dendrochronology, and had been subjected considerable shaping that may have removed the sapwood. It is possible that pith, or close to the pith, is retained however this could only be fully determined if sectioned. The growth rings run parallel to the breadth of the object and it is therefore unlikely to provide sufficient rings for dendro dating.

8.7.25 Dating of these timbers may enhance discussion and interpretation of either the early pre-1266 de Lovetot castle or Armstrong's claims for a Saxon presence on the castle site. Dating of the timber from context 3057 has the potential to inform the narrative surrounding the 13th-century destruction of the castle. This analysis should therefore be considered a priority.

Recommendations for analysis

8.7.26 Timber objects from contexts 3057 (timber 1 of 3) and 6055 should be submitted for dendrochronological analysis. Although the success of this technique on this material is far from certain, the potential value of a successful result is high.

8.8 Summary of potential

8.8.1 There is strong potential across nearly all data categories for analysis to fulfil the aims of the investigation, to enhance understanding of the Sheffield Castle site, to enhance understanding of the region in the medieval and post-medieval periods, and to enhance understanding of the city as a whole. The castle is uniquely iconic within Sheffield and the story of the castle has the potential, beyond mere archaeology, to inform the meaning and identity of Sheffield.

8.8.2 Analysis of the medieval and early-post medieval results are of national importance and will enhance understanding of the period. Although Sheffield was based on a medieval core, it is largely an industrial city and medieval archaeological results are rare in the city (although obviously not unexpected on the castle site). The potential of the site to shed light on the Civil War siege and slighting (though not fully realised by this evaluation) is also of national importance. Analysis of the post-medieval remains will contribute to the growing corpus of information about industrial Sheffield. The growth of the castle site into an industrial zone of specific character (in part with a focus on slaughterhouses) is important.

8.8.3 The community engagement undertaken during the works has re-affirmed the public's high level of interest in Sheffield Castle and the significance to the site to the communities of Sheffield. It is likely that the reports and archive produced by this excavation will be subjected to a high level of scrutiny in future years. It is important to maximise the potential for the original excavators to interpret the results.

9 UPDATED PROJECT DESIGN

9.1 Updated project aims

General aims

9.1.1 The following aims have been identified from the aims and objectives of the initial WSI (Wessex Archaeology 2016). **Table 7** above appraises the status of the existing aims and objectives. The updated project aims:

- *to supplement the full stratigraphic account with additional figures and plates as appropriate, and including a section combining the results of trench 10 with the results of the nearby ARCUS trench;*
- *to analyse all data categories, including finds and environmental, following the recommendations of the assessment report;*
- *to finalise placement of any identified archaeological remains within a wider historical and archaeological context;*
- *to finalise the determination of the location, extent, date, character, condition, significance and quality of the archaeological remains within the site;*
- *to enhance understanding of construction of the castle's inner court and associated moat;*
- *to enhance understanding of the layout and use of the castle's inner court;*
- *to enhance understanding of post-medieval re-use of the former castle site, including steelmaking and other metal trade activities;*
- *to enhance understanding of the development of the site and its associated buildings;*
- *to use scientific dating methods (including AMS dating and luminescence dating) to enhance the chronology of the deposit sequence, particularly in areas where this is poorly understood;*
- *to produce a unified account of the development of the north of the castle site as seen in trenches 1, 5 and 6 and, if possible, also in the 2001 ARCUS trenches and in Armstrong's published results;*
- *to produce a unified account of the development of the castle site in general;*
- *to make available information about the archaeological resource within the site by producing a final grey literature archive report on the results of the evaluation;*
- *to publish the results of the evaluation as a chapter in a book under production by Sheffield University;*
- *to further disseminate the results of the work as appropriate, eg through public talks, and to continue to allow for the wider community to play a role in rediscovering the castle's remains; and,*
- *to deposit the resulting site archive with a suitable museum.*

Borehole survey aims

9.1.2 Assessment of the borehole survey has not been completed. A separate assessment of the borehole survey will be issued. This updated project design should be amended in light of the recommendations of the borehole survey assessment. The original project aims relating to the borehole survey were:

- *to evaluate the sedimentary nature of the moat, to evaluate the survival and potential of palaeoenvironmental and waterlogged organic remains;*
- *to allow a detailed deposit model for the former Castle Markets site to be developed;*
- *to review any existing geotechnical data, foundation/service plans, etc., to inform the proposed survey and augment it;*
- *to describe the sediment sequence of each core; and,*
- *to sample the two most promising sequences to obtain suitable material for scientific dating and palaeoenvironmental assessment.*

Research questions

9.1.3 The following research questions have been identified based on the results of this assessment. These questions should be considered as part of the aims of the updated project design.

- *Can the interpretation of probable earthwork defences in trench 2 (and also trench 3 and possibly 4) be refined in light of scientific dating?*
- *Can the interpretation of early cut features in trench 6 be refined in light of scientific dating?*
- *Is the slag contained within medieval strata (chiefly in the early sequences in trenches 1, 5 and 6 identified above) indicative of medieval ironworking inside the courtyard of Sheffield Castle?*
- *What can be said about the layout and development of the castle?*
- *What can the artefactual (particularly faunal) and environmental remains tell us about the lifestyle of the inhabitants of this high status site?*
- *What can the rich environmental samples and wood artefacts derived from destruction layers in trench 3 tell us about slighting of the castle, probably in 1266?*
- *What can be said about the 13th-century transition from the de Lovetot castle to the de Furnival castle in light of the results from trench 3, of the evaluation in general and of Armstrong's work?*
- *Is the industrial archaeology typical for Sheffield? How do the steelworks in particular compare with other sites in the city?*
- *To what extent did the specific character of the killing shambles (slaughterhouse district) influence development in the north and east of the site?*

- *How did the topography, the standing remains of the castle and the status of the castle site influence development in the 18th, 19th and 20th centuries?*

9.2 Proposal for final grey literature archive report

9.2.1 A final 'grey literature' archive report will be produced containing the full final results of the analysis of all data categories.

9.3 Proposals for publication

9.3.1 In light of the significance of the remains, publication is recommended.

9.3.2 The publication will take the form of a chapter in a forthcoming book in production by The University of Sheffield. The university have prepared material for inclusion in the book detailing a reappraisal of Armstrong and Butcher's archives produced during previous work on the site. Analysis of the results of this evaluation will form a natural accompaniment to this content. A summary of the results of the three ARCUS trenches will be presented alongside the results of the present work. Joint publication will mean that all of the up-to-date information about Sheffield Castle will be contained within a single volume.

9.3.3 It is estimated that the chapter will be around 30 pages long (estimated at around 10,000 words). The publication will be illustrated with line drawings and photographs in both black and white and colour as appropriate.

9.4 Programme for analysis and publication

9.4.1 Upon acceptance of this post-excavation assessment report a programme will be established for analysis and publication of the site.

9.5 Management structure

9.5.1 Wessex Archaeology operates a project management system. The team will be headed by a Post-excavation Manager, who will assume ultimate responsibility for the implementation and execution of the project specification as outlined in the Updated Project Design, and the achievement of performance targets, be they academic, budgetary, or scheduled.

9.5.2 The Post-excavation Manager may delegate specific aspects of the project to other key staff, who will both supervise others and have a direct input into the compilation of the report. They may also undertake direct liaison with external consultants and specialists who are contributing to the publication report, and the museum named as the recipient of the project archive. The Post-Excavation Manager will have a major input into how the publication report is written. They will define and control the scope and form of the post-excavation programme.

9.5.3 The Post-excavation Manager will be assisted by the Senior Research Manager, who will help to ensure that the report meets internal quality standards as defined in Wessex Archaeology's guidelines.

10 ARCHIVE STORAGE AND CURATION

10.1 Museum

10.1.1 The archive resulting from the evaluation is currently held at the offices of Wessex Archaeology in Sheffield. Museums Sheffield has agreed in principle to accept the archive

on completion of the project, under an accession code to be determined. Deposition of any finds with the museum will only be carried out with the full written agreement of the landowner to transfer title of all finds to the museum.

10.2 Preparation of the archive

10.2.1 The archive, which includes paper records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Museums Sheffield, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014c; Brown 2011; ADS 2013).

10.2.2 All archive elements will be marked with the accession code, and a full index will be prepared.

10.3 Selection policy

10.3.1 Wessex Archaeology follows national guidelines on selection and retention (SMA 1993; Brown 2011, section 4). In accordance with these, and any specific guidance prepared by the museum, a process of selection and retention will be followed so that only those artefacts or ecofacts that are considered to have potential for future study will be retained. The selection policy will be agreed with the museum, and will be fully documented in the project archive.

10.4 Security copy

10.4.1 In line with current best practice (eg, Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

10.5 OASIS

10.5.1 An OASIS online record (http://oasis.ac.uk/pages/wiki/Main) has been initiated, with key fields and a .pdf version of the final report submitted. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service ArchSearch catalogue.

11 COPYRIGHT

11.1 Archive and report copyright

11.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act* 1988 with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations* 2003. In some instances, certain regional museums may require absolute transfer of copyright, rather than a licence; this should be dealt with on a case-by-case basis.

11.1.2 Information relating to the project will be deposited with the Historic Environment Record (HER) where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research or development control within the planning process.

11.2 Third party data copyright

11.2.1 This document and the project archive may contain material that is non-Wessex Archaeology copyright (eg, Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act* 1988 with regard to multiple copying and electronic dissemination of such material.

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APPENDICES

Appendix 1: Trench summaries

Trench 1			
Context	***Interpretation***	***Fill of***	***Description***
1000	Surface		Modern concrete floor of castle market
1001	Surface		Concrete subsurface with brick inclusions. Possibly earlier surface or bedding layer for 1000
1002	Bedding		Mid grey yellow/brown silty gravelly sandy ash with stone inclusions and finds. Bedding for concrete 1001 and 1000
1003	Made Ground		Blue black ash and clinker with coal and finds
1004	Made Ground		Mid orange red crushed brick with silty ash
1005	Made Ground		Mid yellow brown silt ash clay with grey ashy lenses and stone included heat-affected stone
1006	Made Ground		Mid to dark yellow grey silt clay with stones
1007	Made Ground		Mid orange red sand with brick and stone inclusions
1008	Drain		Cut for culvert 1009 etc. 0.62 m wide, 0.48 m deep
1009	Drain	1008	Culvert lining. Handmade red brick with some firebrick bonded with lime mortar. 3 courses, 1 skin. Some sooty marks suggest re-use of bricks. 0.12 m wide, 0.23 m deep
1010	Drain	1008	Sandstone capping of drain. 0.62 m wide, 0.28 m deep.
1011	Primary fill	1008	Fill of construction cut 1008 for drain 1009 etc. Dark brown silt sand with stones
1012	Secondary fill	1008	Silting up of drain 1009 etc. Dark grey brown silt with stones
1013	Made Ground		Purple red sand and ash with stone inclusions and rubble derived from a cementation furnace (sampled)
1014	Made Ground		Mid orange brown silt clay with charcoal
1015	Made Ground		Mid blue grey clinker with stones and finds
1016	Made Ground		Mid brown grey silt ash rubble with lime mortar and red brick fragments
1017	Secondary fill	1008	Silting up of drain. Mid white ash with small (1–3 mm) stone inclusions
1018	Secondary fill	1008	Silting up of drain. Dark brown silt clay with uncommon fine stone
1019	Tumble		Angular sandstone rubble with silt matrix (1038). Demolition of 1055
1020	Wall		Large sandstone wall with rare handmade bricks. Lime mortared. 2.3 m wide, 0.5 m deep. Same phase of construction as brick wall 1022
1021	Wall		Sandstone and lime mortar wall. Max 6 courses remain. Keyed into return 1036, abutted by 1023.
1022	Wall		Handmade red brick and lime mortar wall. More than 10 courses. Cracked, possibly from weight of 1024. Forms possible access or flue to postulated cementation furnace to S
1023	Wall		Handmade red brick and lime mortar wall. 3 skins, more than 15 courses. Butts 1021. Possibly forms square enclosure with 1039 and 1036.
1024	Surface		Sandstone flag surface possibly indicating later adaptation of steelworks structures. 1.7 m long, 1.22 m wide, 0.09 m deep
1025	Made Ground		Mid grey yellow silt sand rubble with sandstone and red brick
1026	Made Ground		Mid grey brown silt rubble with common sandstone and red brick
1027	Tumble	1037	Light grey brown sandstone rubble associated with drain cut 1037; probably derived from 1020
1028	Foundation		Concrete pad associated with castle market
1029	Wall		Firebrick structure, 2 skins, unmortared. Placed on top of wall 1031, could be rubble. Perhaps demolished from postulated cementation furnace to S. No refractory function in this location
1030	Made Ground		Mid purple red ashy sand with rare stone inclusions. Heat affected deposit ex situ used as demolition backfill/made ground

Trench 1			
Context	**Interpretation**	**Fill of**	**Description**
1031	Wall		Sandstone and lime mortar wall. 1 course, 1 skin. Linear striations on stones. Capping for brick wall 1047 which it is mortared to
1032	Metal Plate		Disturbed iron plate with traces of sulphur or similar. Associated with tumble 1026. 0.55 m long, 0.23 m wide, 0.03 m deep
1033	Surface		Cobblestone surface exposed over 2.21 m long, 1.1 m wide and 0.11 m deep
1034	Made Ground		Mid red brown silt clay with red brick fragments
1035	Wall		Sandstone unmortared wall. 1 course. Associated with castle market?
1036	Wall		Sandstone and lime mortar wall. 3 courses, 2 skins. Truncated by 1037. Possibly continues beyond as 1035. Butted by 1039
1037	Construction cut		Construction cut for castle market drain and other activity. 1 m wide, 1.2 m deep
1038	Primary fill	1054	Dark grey silt clay with few inclusions
1039	Wall		Handmade red brick and lime mortar. 2 courses, 2 skins. Keyed into 1023.
1040	Made Ground		Mid yellow brown silt clay with red brick and sandstone
1041	Made Ground		Dark grey black ashy charcoal (70% charcoal)
1042	Bedding		Bedding layer and matrix for cobbles 1033. Mid brown sand silt with gravel
1043	Made Ground		Light brown silt sand. Overlies cobbles 1033. Possibly accumulated during use or abandonment of 1033.
1044	Made Ground		Black charcoal redeposited made ground
1045	Made Ground		Mid red purple sand silt with inclusions of ganister fragments, fire brick and slag likely derived from a cementation furnace thought to be immediately to the S.
1047	Wall	1070	Handmade red brick with some opportunistically used firebricks bonded with lime mortar. 7 courses seen.
1048	Made Ground		Dark yellow brown silt clay with stones, rare handmade red brick fragments and residual medieval pottery
1049	Made Ground		Mid grey yellow silt clay with stones and some rare red brick fragments. Dirty redeposited natural.
1050	Made Ground		Dark grey black ash high in stratigraphic sequence. Made ground associated with castle market
1051	Made Ground		Dark yellow black ash clay with stone and brick fragment inclusions and clay lenses
1052	Pit		Rubbish/stone disposal pit. 1.72 m diameter, 0.65 m deep
1053	Primary fill	1052	Mid yellow brown silt clay with common sandstone inclusions and finds
1054	Construction cut		Very steep cut for wall 1055. 0.93 m wide and 0.26 m deep
1055	Wall	1054	Sandstone unmortared wall. 2 courses. Somewhat disturbed by cut 1037
1056	Bedding		Mid yellow brown silt sand with 60% gravel and mortar. Bedding layer for 1020.
1057	Made Ground		Dark brown black silt with rare stone inclusions, charcoal and medieval pottery
1058	Made Ground		Mid orange brown sand silt with charcoal and lime mortar inclusions
1059	Cut		Cut seen in N-facing section of trench. Uncertain function. Possibly a robber trench? 0.44 m wide, 0.42 m deep, steep sides and flat base
1060	Fill	1059	Dump of redeposited lime mortar filling cut 1059. Uncertain function. Possibly fill of a robber trench?
1061	Made Ground		Bright orange silt clay with large stone inclusions but no finds
1062	Made Ground		Dark black brown clay with common ex situ charcoal and no finds.
1063	Made Ground		Lens within 1013. Light grey white very fine ash with charcoal
1064	Made Ground		Dark black ex situ charcoal made ground
1065	Bedding		Dark black sandy silt with 5% charcoal inclusions. Fine bedding layer below 1033
1066	Bedding		Light pinkish yellow silt clay with 5% charcoal inclusions. Bedding for 1033

Trench 1			
Context	**Interpretation**	**Fill of**	**Description**
1067	Bedding		Green yellow silt clay with sandstone inclusions. Bedding layer for 1033
1068	Construction cut		Large construction/levelling cut as part of preparation for construction of 19th century furnace structures. Evident in section 1016 and presumably much larger. At least 0.9 m wide, 0.3 m deep
1069	Primary fill	1068	Primary fill of construction/levelling cut 1068. Mid brown sand silt with 10% charcoal inclusions
1070	Construction cut		Construction cut for wall 1047. 0.15 m deep, unknown width and length
1071	Primary fill	1070	Reddish purple sand silt
1072	Made Ground		Mid blue brown sand with stones
1073	Made Ground		Red black slag up to 0.2 m with charcoal inclusions
1074	Made Ground		Mid orange brown sand clay with charcoal
1075	Tumble		Stone rubble deposit. Stones jumbled but at similar depth and stratigraphic position to courtyard surface seen in trench 5.
1076	Made Ground		Dark blue and purple grey clays with rare stones and medieval pottery
1077	Made Ground		Mid grey brown clay with sandstone, possibly intrusive from 1075
1078	Made Ground		Dark grey blow clay with sandstone and animal bone. Overlies 1075
1079	Made Ground		Pale grey green clay with stones. Redeposited dirty alluvium
1080	Made Ground		Mid brown orange sand with very rare stone. Lens within 1079
1081	Made Ground		Blue black ash and clinker with coal inclusions

Trench 2			
Context	**Interpretation**	**Fill of**	**Description**
2000	Surface		Light grey concrete slab of former castle market
2001	Surface		Pinkish red concrete with crushed brick inclusions. Bedding for 2000 or earlier surface
2002	Made Ground		Redeposited natural. Light yellow brown clay with sandstone
2003	Wall	2005	Handmade N-S red brick and lime mortar wall. 4 courses
2004	Wall	2006	Handmade red brick and lime mortar N-S wall. 4 courses, 2 skins
2005	Construction cut		Construction cut for wall 2003. 0.33 m wide, 0.17 m deep
2006	Construction cut		Construction cut for wall 2004. 0.3 m wide, 0.17 m deep
2007	Primary fill	2005	Mid yellow brown silt clay with stones
2008	Primary fill	2006	Mid yellow brown silt clay with stones
2009	Surface		Intermittently preserved sandstone surface. Broken sandstone slabs with lime mortar.
2010	Surface		sandstone surface. Broken sandstone slabs with lime mortar.
2011	Made Ground		Dark red black silt with red brick crush
2012	Made Ground		Dark red black silt with fragments of red brick
2013	Service Cut		Cut for castle market drain. Straight edges - possibly cut by machine. 0.65 m wide, 0.3 m deep.
2014	Primary fill	2013	Dark grey black sand clay with stones
2015	Drain	2013	Concrete containing ceramic drainpipe
2016	Drain	2018	Sandstone drain capping up to 0.53 m. 0.1 m deep.
2017	Secondary fill	2018	Silting up of culverted drain. Dark brown silt
2018	Cut		Construction cut for culverted drain 2016 etc. 0.48 m wide, 0.3 m deep
2019	Made Ground		Redeposited natural. Same as 2002 and 2028. Mid yellow brown clay with sandstone
2020	Made Ground		Dark yellow black ash and silt with bitumen

Trench 2			
Context	**Interpretation**	**Fill of**	**Description**
2021	Drain	2018	Lining of culvert. Handmade bricks and opportunistically re-used firebricks. Unmortared. Some lime mortar on bricks indicates re-use. 3 courses
2022	Made Ground		Dark blue black ash with bitumen and slag
2023	Made Ground		Mid yellow brown clay with red brick inclusions
2024	Made Ground		Dark brown red crushed brick
2025	Drain	2026	Ceramic drain pipe set in concrete similar to 2015. SW-NE alignment
2026	Service Cut		Cut for drain associated with castle market. 0.9 m wide and 0.38 m deep
2027	Drain	2026	Red brick lining of drain 2025
2028	Made Ground		Light yellow brown clay with sandstone. Same as 2002 and 2019
2029	Made Ground		Lump of rubble comprising degraded brick and lime mortar. Out of alignment on all three axes - large piece of rubble used as made ground.
2030	Made Ground		Lens of dark grey brown silt with brick fragments
2031	Made Ground		Dirty redeposited natural. Dark yellow brown silt clay with brick, stone, lime mortar, ash and bitumen
2032	Made Ground		Dark grey black clinker and ash with roof slates
2033	Made Ground		Light brown yellow ash with sandstone. Redeposited fuel ash
2034	Made Ground		Dark brown grit sand with brick crush and stone
2035	Drain	2037	Ceramic drain encased in concrete associated with castle market
2036	Drain	2037	Re-used machine brick set in concrete/cement as lining of drain. 3 courses
2037	Service Cut		Cut of drain associated with castle market. 0.35 m wide, 0.36 m deep. NE-SW
2038	Made Ground		Redeposited natural. Light brown yellow clay. Very few inclusions of stone, brick, ash etc. Decently clean
2039	Made Ground		Dark grey black ash and clinker with roof slate inclusions
2040	Made Ground		Light brown orange ash with stone fragments
2041	Construction cut		Construction cut for castle market foundation 2043
2042	Primary fill	2041	Dark grey black silt. Primary fill of construction cut associated with castle market
2043	Foundation	2041	Concrete beam foundation for castle market with rebar steel reinforcement
2044	Primary fill	2037	Redeposited natural. Light yellow brown clay with sandstone
2045	Made Ground		Redeposited natural. Mid yellow brown clay with sandstone
2046	Made Ground		Mid red brick crush with lime mortar inclusions
2047	Primary fill	2018	Dark brown black silt with sandstone
2048	Made Ground		Blue grey clay with sandstone
2049	Made Ground		Red brown clay with sandstone
2050	Made Ground		Orange clay with sandstone
2051	Made Ground	2054	Redeposited Natural. Yellow brown silt clay with sandstone
2052	Made Ground		Redeposited natural. Blue clay with sandstone
2053	Natural		Mid grey yellow clay with sandstone. Veined, so probably undisturbed?
2054	Cut		Possible landscaping cut truncating possible natural 2053
2055	Made Ground		Redeposited natural. Brown yellow coarse stone in clay sand matrix. Continuous with 2045 but comprising larger blocks

Trench 3			
Context	**Interpretation**	**Fill of**	**Description**
3000	Surface		Concrete slab of castle market. Light grey white concrete with red brick crush inclusions and thin rebar
3001	Made Ground		Mid red brick crush
3002	Made Ground		Dark grey black silt ash with stones and red brick crush
3003	Made Ground		Mid grey yellow silt clay with red brick crush and sandstone

Trench 3			
Context	**Interpretation**	**Fill of**	**Description**
3004	Cut		Cut for culverted drain 3006 etc. 0.82 m wide, 0.86 m deep-
3005	Primary fill	3004	Dark grey brown silt ash with stones and finds
3006	Drain	3004	Handmade red brick and black ash mortar lining of culvert drain. 5 courses, 1 skin. Contains 3013
3007	Drain	3004	Base of culvert. Sandstone slabs and black ash mortar
3008	Drain	3004	Culvert capping. Sandstone slabs. Unmortared
3009	Secondary fill	3004	Silting up of culvert. Dark brown silt clay with stones and brick fragments, pottery and coins
3010	Drain	3004	Sandstone drain lining. Unmortared. 3 courses, 1 skin
3011	Drain	3004	Sandstone culvert base with dark brown silt clay matrix
3012	Drain	3004	Handmade red brick and black ash mortar lining of culvert
3013	Drain	3004	Sandstone block forming a square basin incorporated into culvert. Perhaps a silt trap? 0.35 m by 0.26 m and 0.22 m deep
3014	Service Cut		Cut for concrete drains associated with castle market
3015	Primary fill	3014	Mid grey brown silt clay with stones
3016	Drain	3014	Re-used handmade red brick and cement lining of concrete drain associated with castle market
3017	Drain	3014	Ceramic drainpipe encased in concrete associated with castle market
3018	Made Ground		Redeposited natural. Light grey yellow silt clay with sandstone
3019	Wall		Sandstone cobbles laid to form 1 course, 1 skin wall. At S last block carved to fit wall 3024. Unmortared.
3020	Service Cut		Cut of linear feature assumed to be a service of some kind, perhaps a drain. 0.6 m wide and 1.7 m deep. Contained no service
3021	Fill	3020	Yellow clay with sandstone and grey silt inclusions
3022	Fill	3020	Dark grey brown silt with finds
3023	Surface		Flagstone surface. 1.6 m long, 0.45 m wide, 0.04 m deep. Black ash mortar. S stone cut to fit wall 3024. Poor preservation. Overlies wall 3036
3024	Wall		Handmade red brick and black ash mortar wall. 3 courses, 3 skins. N-S. Continues beyond truncation as 3025 and 3026
3025	Wall		Handmade red brick wall with both lime mortar and black ash mortar suggesting reuse of bricks or repair. 2 courses, at least 4 skins. N-S. Continues beyond truncation as 3024 and 3026
3026	Wall		Handmade red brick and lime mortar wall. 2 courses. N-S. Continues beyond truncation as 3024 and 3025.
3027	Made Ground		Same as 3055. Brown silt clay. Seen in slot investigating cut 3020.
3028	Made Ground		Grey silt clay. Seen in base of slot investigating cut 3020.
3029	Made Ground		Same as 3057. Brown silt clay with charcoal and wood. Seen in base of slot investigating 3020
3030	Cut		Construction cut for culverted drain. 0.94 m wide, 0.36 m deep
3031	Drain	3030	Sandstone culvert lining. Unmortared
3032	Drain	3030	Sandstone drain capping. Unmortared
3033	Secondary fill	3030	Yellow brown silt clay with sandstone. Silting up of drain
3034	Secondary fill	3030	Black brown silt clay with sandstone
3035	Primary fill	3030	Grey brown silt clay with sandstone
3036	Wall		Part of weighbridge. Handmade red brick and black ash mortar. 10 courses
3037	Drain	3030	Base of culvert. Randomly shaped sandstone. 0.94 m wide and 0.36 m deep.
3038	Wall		Handmade red brick wall with black ash mortar. 1 course, 2 skins. E-W. Butts 3025
3039	Made Ground		Dark grey brown silty ashy gravel with red brick rubble
3040	Wall		Handmade red brick and black ash mortar wall. 12 courses. 2 skins
3041	Wall		Handmade red brick and ash mortar wall. 9 courses, 3 skins, N-S. Keyed into

Trench 3			
Context	**Interpretation**	**Fill of**	**Description**
			3047 and 3046
3042	Structure		Door frame. E-W. Handmade red brick and black ash mortar. 1 course on iron lintel
3043	Structure		Sandstone block ledge, part of weighbridge. Ash mortar. 2 courses.
3044	Wall		Handmade red brick and ash mortar wall. 12 courses. Very rough.
3045	Foundation		Frogged machine brick and grey ash mortar wall. N-S. 2 courses visible. Part of weighbridge
3046	Wall	3081	Handmade red brick and dark grey ash mortar wall. 11 courses. E-W
3047	Wall		Handmade red brick wall. 10 courses, 3 skins. Part of weighbridge
3048	Stanchion		Handmade red brick and sandstone stanchion. 6 courses of brick capped with sandstone. Part of weighbridge
3049	Stanchion		Handmade red brick and sandstone stanchion. 6 courses of brick capped with sandstone. Part of weighbridge
3050	Stanchion		Chamfered stone block re-used as 19th century wall. Probably originated from castle. Bonded with unusual pale whitish ash mortar, not lime mortar
3051	Surface		Sandstone slab surface with black ash mortar. Lip at edge of weighbridge. Possibly old floor
3052	Surface		Handmade red brick and mid blue grey ash mortar surface. 1 course. Ledge possibly representing part of floor of weighbridge
3053	Wall		Sandstone blocks and dark grey ash mortar wall. 1 course, 1 skin.
3054	Wall		Red brick and ash mortar ledge built into weighbridge wall 3036
3055	Made Ground	3084	Dark brown humic clay with sandstone and charcoal.
3056	Made Ground		Orange yellow silt clay with sandstone, patches of blue clay and charcoal (5%)
3057	Made Ground		Reddish dark brown humic clay silt with sandstone and rich environmental material
3058	Made Ground		Redeposited natural. Bright light blue grey clay with sandstone
3059	Service Cut		Synonym for 3020
3060	Fill	3059	Backfill of archaeological intervention 3020. Recorded after subsequent re-machining.
3061	Made Ground		Yellowish orange silt clay with stone
3062	Made Ground		Brownish blue and orange yellow mixed silty clays with charcoal
3063	Made Ground		Redeposited natural. Orange yellow sand clay with sandstone and less than 1% charcoal
3064	Foundation		Unworked slabs of local bedrock laid to form a rough wall foundation. Unmortared. NW-SE
3065	Construction cut		Construction cut for weighbridge 3050
3066	Primary fill	3065	Grey white sand silt with charcoal
3067	Fill	3080	Greyish mid brown silt
3068	Made Ground		Yellow orange silt clay with sandstone
3069	Fill		Spoil created during machining. Void.
3070	Made Ground		Redeposited natural. Orange blue sand clay with sandstone and charcoal
3071	Made Ground		Redeposited natural. Yellow orange silt clay
3072	Made Ground		Redeposited natural. Blue brown silt clay with sandstone and charcoal
3073	Made Ground		Redeposited natural. Orange yellow sand clay
3074	Made Ground		Redeposited natural. Grey blue silt clay with lenses of orange sand clay and sandstone
3075	Made Ground		Redeposited natural. Grey blue clay with less than 1% charcoal
3076	Wall		Unworked sandstone slabs derived from local bedrock laid as upper course of foundation 3064. On different alignment (still NW-SE) to 3064
3077	Structure		Small sandstone blocks randomly arranged. Could not be investigated further.

Trench 3			
Context	**Interpretation**	**Fill of**	**Description**
			Possibly demolition tumble
3079	Made Ground		Demolition material? Blueish dark brown humic clay silt with sandstone, Vivianite and finds
3080	Cut		Landscaping/ground reduction event. Truncates layers 3058 and 3079.
3081	Construction cut		Construction cut for weighbridge 3046 etc.
3082	Made Ground		Synonym for 3039
3083	Surface		Sandstone setts in matrix (3002) of black ash. Road surface.
3084	Cut		Landscaping/ground reduction event. Truncates layers 3056 etc.
3085	Stanchion		Handmade red brick and sandstone stanchion. 6 courses of brick capped with sandstone. Part of weighbridge

Trench 4			
Context	**Interpretation**	**Fill of**	**Description**
4000	Surface		Light grey concrete slab with crush brick inclusions. Associated with castle market.
4001	Bedding		Mid brown red brick crush bedding for 4000
4002	Made Ground		Dark grey black ash with bitumen, slag and clinker
4003	Surface		Sandstone flag floor with black ash mortar
4004	Drain	4048	Concrete containing ceramic drain. N-S. Associated with castle market
4005	Surface		Sandstone flag surface with repairs 4045, 4046 and curb 4047
4006	Wall		Handmade red brick and lime mortar wall. 3 skins. NE-SW
4007	Made Ground		Mid yellow brown clay with rubble, slag and finds
4008	Made Ground	4105	Dark grey black ash with brick crush, slag and finds
4009	Made Ground		Orange brown sand with finds
4010	Made Ground		Light grey brown brick crush with lime mortar
4011	Structure	4061	Large base to support unknown machine or similar. Two large sandstone blocks 0.9 m by 0.4 m by 0.3 m deep.
4012	Drain	4098	Concrete containing ceramic drain associated with castle market
4013	Drain		Concrete containing ceramic drain associated with castle market
4014	Stanchion	4015	Concrete stanchion with damaged/removed metal core
4015	Construction cut		Construction cut for castle market stanchion 4014
4016	Primary fill	4015	Dark grey black ash
4017	Wall		Handmade red brick and lime mortar wall. 4 courses, 3 skins. Built on foundation 4060. E-W
4018	Wall	4102	Handmade red brick wall with lime mortar. 4 courses, 3 skins. E-W. Built on foundation 4060.
4019	Wall		Handmade red brick and lime mortar wall. 1 skin, 1 course. Bricks on edge.
4020	Drain		Handmade red brick and lime mortar probable drain or possible power transmission conduit (belt drive). 2 courses. N-S
4021	Drain		Handmade red brick and lime mortar drain or power transmission conduit (belt drive). 3 courses. N-S.
4022	Drain		Handmade red brick and lime mortar drain or power transmission conduit (belt drive). 3 courses. N-S
4023	Grindstone		Large grindstone probably deposited as imported made ground. Diameter 1.1 m, depth 0.23 m. Edge grinding.
4024	Made Ground		Mid brown grey clay with stone and brick rubble
4025	Service Cut		Cut for drain 4080. Greater than 1 m wide, 0.96 m deep.
4026	Wall		Handmade red brick and black as mortar wall. 2 courses. Lime mortar residue indicated re-use of bricks. Slightly off N-S alignment.

Trench 4			
Context	**Interpretation**	**Fill of**	**Description**
4027	Wall		Handmade red brick and lime mortar wall. E-W. 5 courses, 2 skins.
4028	Wall		Handmade red brick and sandy lime mortar wall. 4 courses. Different lime mortar on bricks indicated re-use. E-W
4029	Made Ground		Mid brown orange sand with few inclusions
4030	Made Ground	4075	Light brown yellow clay with stone and brick rubble
4031	Wall		Handmade red brick and black ash mortar wall with some opportunistically re-used firebrick. 2 courses.
4032	Foundation		Black ash mortar dump used as foundation for 4031
4033	Wall	4078	Handmade red brick and black ash mortar wall. 4 courses, 2 skins. E-W
4034	Wall		Sandstone and lime mortar wall with occasional handmade red brick. E-W
4035	Wall	4072	Handmade red brick and lime mortar wall. 2 courses, 2 skins. E-W
4036	Made Ground		Dark grey black fuel ash with brick rubble and bitumen
4037	Made Ground		Dark yellow black ash with brick and stone rubble
4038	Made Ground		Mid yellow grey clay
4039	Made Ground		Light grey brown brick and stone rubble
4040	Made Ground		Mid orange brown sand with brick rubble
4041	Made Ground		Dark grey black ash with bitumen, brick fragments, lime mortar
4042	Made Ground		Mid grey brown silt with lime mortar and stones
4043	Primary fill	4078	Dark red brown red brick rubble with charcoal
4044	Made Ground		Mid black brown ash with stones, mortar, roofing slate and brick fragments
4045	Surface		Sandstone cobbles set in black ash mortar
4046	Surface		Sandstone slabs set in black ash mortar
4047	Surface		Sandstone kerb set in black ash mortar
4048	Cut		Cut for drain
4049	Primary fill	4025	Dark black brown brick rubble and ash
4050	Made Ground		Mid brown yellow silt clay with sandstone, brick rubble and coal
4051	Made Ground	4105	Mid grey yellow ash with brick rubble, stones, mortar and coal
4052	Made Ground		Mid brown grey redeposited mortar with 20% red brick fragments
4053	Made Ground		Dark brown red brick crush with coal and mortar
4054	Made Ground		Mid brown yellow clay with brick rubble, roofing slate, stones
4055	Made Ground		Grey black ash and clinker with coal
4056	Made Ground		Mid red brown brick rubble
4057	Primary fill	4078	Dark red brown ash with brick rubble, stones, charcoal, mortar
4058	Primary fill	4078	Mid grey brown ash with stones, slag and coal
4060	Foundation		Sandstone slab foundation for wall 4017, 4018
4061	Construction cut		Construction cut for 4011. 1.2 m long, 1.1 m wide, 0.4 m deep
4062	Primary fill	4061	Brown orange clay with sandstone
4063	Made Ground		Dark black silt
4064	Made Ground		Brown silt clay
4065	Made Ground		Grey brown silt clay with stones
4066	Made Ground		Dark brown black ash with red brick, mortar, coal and stone
4067	Construction cut		Construction cut for wall 4028. 0.02 m wider than wall. 0.5 m deep.
4068	Primary fill	4067	Dark yellow brown clay
4069	Made Ground		Mid brown orange silt clay
4070	Made Ground		Dark black grey sand silt with fine gravel
4071	Made Ground		Dark grey black sand silt with fine gravel
4072	Construction cut		Construction cut for 4035. Might be same as 4078.

Trench 4			
Context	**Interpretation**	**Fill of**	**Description**
4073	Primary fill	4072	Mid orange brown sand silt with fine gravel
4074	Made Ground		Light grey sand silt with 50% coarse gravel
4075	Cut		Cut made to make repairs to walls 4027 and 4028
4076	Made Ground		Mid orange grey sand silt with 50% gravel
4077	Made Ground		Mid blue grey clay with gravel
4078	Construction cut		Construction cut for nearly all structures in trench 4 (excluding N end)
4079	Drain	4025	Re-used handmade red bricks, some exhibiting signs of former heating. Used as lining for castle market drain
4080	Drain	4025	Concrete drain presumably containing ceramic pipe. Same as other castle market drains
4081	Made Ground		Dark grey black pure fine silt
4082	Made Ground		Mid grey brown clay with slate and sandstone
4083	Made Ground		Dark brown gritty silt with brick, ash and stone inclusions
4084	Drain		Concrete drain associated with castle market
4085	Wall		Handmade red brick and lime mortar wall. E-W. Some bricks in bad condition - likely re-used
4086	Made Ground		Mid brown yellow sand clay with stone and charcoal
4087	Made Ground		Mid yellow brown sand clay with sandstone and coal
4088	Made Ground	4102	Mixed orange, grey and brown sandy clay with gravel, cobbles, brick and ash
4089	Surface	4102	Lime mortar surface or bed
4090	Made Ground		Dark yellow brown sand clay with stones
4091	Structure	4096	Handmade red brick and firebrick flue. Unmortared. Floor is red brick, sides firebrick. Interior sooty, therefore exhaust flue.
4092	Deposit	4096	Reddish purple fine loose sand. Intentional lining of base of flue 4091, possibly with a refractory function.
4093	Made Ground		Dark orange brown silt clay with sandstone inclusions
4094	Made Ground	4078	Redeposited natural. Bright yellow brown dense clay with stone
4095	Made Ground		Dark brown coarse silt with bricks and stone
4096	Construction cut		Cut for flue 4091. 1.4 m wide, greater than 0.5 m deep
4097	tertiary deposit	4096	Backfill of decommissioned flue. Dark black brown coarse silt with sandstone and brick rubble
4098	Cut		Construction cut for drain 4012
4099	Primary fill	4098	Mid orange brown sand clay with coal, sandstone, brick, mortar, slate
4100	Made Ground		Mid yellow brown sand
4101	Made Ground		Dark grey black coarse silty sand with coal, charcoal, crushed brick and sandstone
4102	Construction cut		Cut for wall 4018
4103	Made Ground		Mid yellow brown sand clay with charcoal, sandstone
4104	Made Ground		Light brown yellow sand clay with gravel, rubble
4105	Construction cut		Construction cut for surface
4106	Secondary fill		Mid green grey clay with stones and charcoal
4107	Made Ground		Yellow brown sand clay with gravel, brick, cobbles, charcoal
4108	Made Ground		Dark brown sand clay with ash, gravel and brick
4109	Made Ground		Light yellow brown sand with charcoal, gravel, cobbles
4110	Wall		Sandstone and lime mortar wall. 1 course. In line with 4034. E-W
4111	Made Ground		Light brown yellow clay with gravel and cobbles
4112	Primary fill	4096	Mid-dark brown silt clay with red brick, sandstone, ash etc.

Trench 4			
Context	**Interpretation**	**Fill of**	**Description**
4113	Layer		Mid yellow clay with sandstone. Clean
4114	Made Ground		Mid brown yellow clay with stone
4115	Made Ground		Dark black brown brick rubble in loose silty sand matrix with mortar.
4116	Made Ground		Light orange brown with stones
4117	Made Ground		Mid grey brown silt clay with stone and charcoal
4118	Primary fill		Robber deposit associated with removed wall. Dark yellow brown sand/grit with brick and stone rubble and lumps of hard yellow clay
4119	Wall		Collapsed handmade brick wall in S facing section. E-W
4122	Made Ground		Assigned in post-ex to stratigraphically isolated lower part of 4044. Dark ash with rubble

Trench 5			
Context	**Interpretation**	**Fill of**	**Description**
5000	Surface		Light grey white concrete with very fine angular stone and brick inclusions. Slab of castle market
5001	Made Ground		Mid red orange sandy silt with red brick crush
5002	Made Ground		Yellow brown silt clay with rubble
5003	Made Ground		Dark grey black ashy clinker with coal
5004	Made Ground		Pale greyish yellow cobbles in a silt sand matrix
5005	Made Ground		Mid dark yellow brown silt clay with sandstone
5006	Foundation	5011	Mid orange red concrete with brick crush inclusions. Pad for castle market
5007	Wall	5026	Handmade red brick and lime mortar wall. 2 courses, 3 skins. N-S
5008	Wall	5028	Handmade red brick and lime mortar wall. 1 course, 3 skins. Some damage to bricks. E-W
5009	Bedding		Black silt bedding for 5031 and removed flagstone surface
5010	Wall		Sandstone unmortared wall. 3 courses. N-S
5011	Construction cut		Cut for concrete pad 5006
5012	Primary fill	5011	Mid red brown rubble: brick, stone, slate, slag
5013	Made Ground		Dark grey black fine silt with brick rubble
5014	Made Ground		Redeposited natural. Dark yellow brown clay with rubble
5015	Made Ground		Dark black fine charcoal with ash
5016	Made Ground		Dark yellow brown clay with some rubble
5017	Drain	5020	Concrete containing ceramic drain pipe. Like other castle market drains
5018	Made Ground		Dark grey/black fine silt with stone
5019	Made Ground		Dark brown black ash and brick rubble
5020	Service Cut		Cut for drain associated with castle market
5026	Construction cut		Cut for wall 5007
5027	Primary fill	5026	Dark black brown clay with stone
5028	Construction cut		Cut for wall 5008
5029	Primary fill	5028	Very dark brown silt clay with stones, lime mortar
5030	Wall	5026	Handmade red brick and lime mortar wall. 2 courses. E-W
5031	Surface		Sandstone flag pierced with iron drain cover.
5032	Construction cut		Cut for drain 5033 associated with castle market
5033	Drain	5032	Concrete containing ceramic pipe drain
5034	Primary fill	5032	Dark black brown with stones and finds
5035	Drain	5032	Handmade red brick in ash matrix (not mortar). 5 courses, 2 skins. Lining of

Trench 5			
Context	**Interpretation**	**Fill of**	**Description**
			drain
5036	Made Ground		Mid orange brown clay with stone
5037	Made Ground		Mid yellow brown silt clay with stones
5038	Made Ground		Redeposited natural. Mid yellow clay with stones and pottery
5039	Made Ground	5046	Red black slag fuel ash clinker
5040	tertiary deposit		Mid red black silt clay overlying surface 5042
5041	Deposit		Matrix between surfaces 5042, 5043, 5044. Mid blue grey silt
5042	Surface		Rough sandstone surface well layed but rough slabs/blocks
5043	Surface		Rough stone surface, possibly a repair to 5042
5044	Surface		Rough stone surface. Cobble-like stones.
5045	Made Ground		Mid yellow brown silt sand with charcoal and stone
5046	Cut		Disturbance introducing deposit 5039 through surfaces 5042, 5043 below

Trench 6			
Context	**Interpretation**	**Fill of**	**Description**
6000	Foundation		Large concrete foundation for former 1980s toilet block
6001	Surface		Tarmac loading ramp surface
6002	Made Ground		Grey brown grit with brick, tarmac, stone
6003	Made Ground		Rough brick surface (wide variety of re-used brick) deposited as make up for 6001
6004	Made Ground		Redeposited natural. Yellow brown clay with sandstone
6005	Construction cut		Construction cut for foundation 6000 and inspection chamber 6021
6006	Primary fill	6005	Mid brown clay silt with brick, sandstone, lime mortar
6007	Primary fill	6005	Yellow brown clay with brick and sandstone
6008	Pit		Small pit of late date. 0.5 m diameter, 0.1 m deep
6009	Fill	6008	Mid grey brown silt with sandstone, brick and coal
6013	Primary fill	6014	Dark brown coarse silt with stone, including limestone and brick
6014	Service Cut		Cut for drain or similar service (not observed). E-W
6015	Service Cut		Cut for unseen service, probably a drain, and inspection chamber
6016	Primary fill	6015	Dark grey brown black silt with brick, sandstone
6017	Structure	6015	Inspection chamber. Machine frogged brick with modern cement. 2 skins
6018	Service Cut		Cut for drain 6019
6019	Drain	6018	Cast iron pipe 0.15 m diameter
6020	Primary fill	6018	Mid grey brown loose silt with brick, sandstone etc.
6021	Structure	6005	Inspection chamber. Frogged machine brick with modern cement
6022	Made Ground		Dark black brown sand with sandstone, coal, mortar
6023	Made Ground		Dark orange brown sand clay with sandstone, slate etc.
6024	Pit		Minor pit contemporary with 6015,ie late
6025	Primary fill	6024	Mid grey brown sand silt with stone, brick etc.
6026	Made Ground		Mid-dark grey brown coarse silt with sandstone
6027	Wall		Sandstone and lime mortar wall. Synonym for 6032
6028	Made Ground		Mid grey brown silt sand with stones
6029	Wall	6085	Sandstone and lime mortar wall. 6 courses, 2 skins
6030	Made Ground		Mid grey brown silt with lime mortar, plaster, stone etc.
6031	Wall	6085	Sandstone and lime mortar wall. 6 courses. 1 good face and rubble core
6032	Structure		Staircase. Sandstone and lime mortar. Contains keeping hole with plaster rendering and iron staining.
6033	Made Ground		Mid orange brown silt sand with stones. Same as 6030 but from within keeping

Trench 6			
Context	**Interpretation**	**Fill of**	**Description**
			hole
6035	Wall		Sandstone and lime mortar wall. 6 courses, 1 skin. Back truncated by 6014
6036	Surface		Sandstone and lime mortar floor containing square door jamb cut
6037	Surface		Sandstone and lime mortar surface
6038	Made Ground		Dark brown black ash with charcoal
6039	Made Ground		Mid grey yellow silt clay with sandstone
6040	Primary fill	6005	Sub-angular and sub-rounded sandstone within backfill of cut 6005
6041	Made Ground		Mid-dark brown clay silt with sandstone
6042	Made Ground		Grey yellow silt with stone rubble
6043	Made Ground		Mid grey yellow silt clay with sandstone and charcoal
6044	Made Ground		Mid grey brown silt clay with stones and charcoal
6045	Made Ground		Mid grey yellow silt clay with stones
6046	Made Ground		Mid grey brown silt with stones
6047	Made Ground		Dark brown black clay with charcoal and wood
6048	Made Ground		Dark brown black clay with charcoal and wood
6049	Made Ground		Lens within 6039. Dark black brown charcoal and ash
6050	Primary fill	6057	Dark brown black with red mottles. Ash with charcoal
6051	Made Ground		Mid greenish grey silt clay with large limestone block
6052	Made Ground		Dark blue black ashy clay with charcoal
6053	Made Ground		Redeposited natural. Mid greyish yellow silt clay with stones and rare charcoal
6054	Deposit		Machine disturbed rubble. Mid grey brown silt sand with stone rubble
6055	Made Ground	6067	Dark brown black silt clay with wood and stone
6056	Made Ground		Mid grey yellow silt clay with stone
6057	Pit		Shallow pit. 0.7 m wide, 0.28 m deep
6058	Fill	6057	Mid grey yellow silt clay with stones
6059	Pit		Shallow pit. 0.6 m diameter, 0.08 m deep
6060	Fill	6059	Dark brown black clay with wood
6061	Pit		Shallow pit. 0.36 m diameter, 0.05 m deep
6062	Fill	6061	Dark brown black clay with wood
6063	Gully		Gully terminal. 1.11+ m long, 0.38 m wide, 0.1 m deep
6064	Fill	6063	Dark brown black silt clay with wood
6065	Made Ground		Redeposited natural. Mid yellow grey silt clay with stones
6066	Made Ground		Redeposited natural. Alluvial appearance. Mid green grey sand clay with stones and charcoal
6067	Pit		Pit. 1.95 m wide, 0.1 m deep
6068	Cut		Modern borehole
6069	Fill	6068	Orange grey clay with pea gravel
6070	Post	6073	Timber post. 0.12 m wide, 0.17 m deep
6071	Post pad	6073	Post pad for 6070. Sandstone block
6072	Fill	6067	Dark blue/black silt clay with Vivianite, wood and charcoal
6073	Pit		Possibly posthole but post is not centrally located. 0.97 m wide, 0.49 m deep.
6074	Fill	6073	Mid greenish yellow silt clay with charcoal. Contains post 6070 and pad 6071
6075	Pit		Pit. 0.44 m wide, 0.47 m deep
6076	Fill	6075	Dark brown black silt clay with stones and wood
6077	Fill	6075	Mid greyish green silt clay with charcoal and wood
6078	Pit		Pit for disposal of large limestone block. 0.3 m wide, 0.3 m deep
6079	Secondary fill	6075	Dark brown silt loam
6080	Pit		Small pit. 0.31 m wide, 0.17 m deep
6081	Secondary fill	6080	Brown yellow clay with lighter and darker patches
6082	Pit		Small pit. 0.1+ m wide, 0.2 m deep

Trench 6			
Context	**Interpretation**	**Fill of**	**Description**
6083	Secondary fill	6082	Brown yellow clay with lighter and darker patches
6084	Primary fill	6078	Yellow disturbed clay with sandstone, ashy lenses and a large limestone block
6085	Construction cut		Large construction/landscaping cut prior to construction of walls 6029, 6031 etc.
6500	Foundation		Concrete footings for 1980s toilet block
6501	Foundation		Light blue foam insulation associated with 1980s toilet block
6502	Stanchion	6509	Grey white concrete with grey stone inclusions and rebar
6503	Wall		Frogged machine brick and cement wall. 3 skins. Base of wall at 3.95 m BGL
6504	Structure		Inspection chamber. Grey white concrete with no inclusions (ie cement). Evidence for upper courses of bricks on top of concrete
6505	Structure	6509	Inspection chamber. White grey sandy concrete with no inclusions (ie cement).
6506	Made Ground		Mid yellow brown clay silt with red brick fragments, coal, ash, mortar, stones
6507	Made Ground		Light yellow clay with stones
6508	Made Ground		Mid brown yellow clay with stone and red brick fragments
6509	Construction cut		Cut for stanchion 6502 and other structures relating to 1980s toilet block
6510	Made Ground	6509	Light grey yellow silt sand with stones
6511	Made Ground	6509	Mid brown stony sand
6512	Made Ground		Mid yellow brown clay with sandstone
6513	Service Cut		Cut for unseen service, probably a drain. 5.06 m wide, 1.27 m deep
6514	Made Ground	6513	Light grey yellow stoney sand
6515	Surface		Light brown grey concrete floor
6516	Made Ground		Light grey brown gritty sand with red brick, stone and roof slate fragments
6517	Deposit		Deposit seen below wall 6503 at a depth of 4 m. Excavation could not be entered. Yellow clay. Natural? Redeposited?

Trench 7			
Context	**Interpretation**	**Fill of**	**Description**
7000	Natural		Light brown yellow bedrock
7001	Service Cut		Cut for inspection chamber and drains
7002	Surface	7001	Concrete base for drain pipe 7003
7003	Drain	7001	Cast iron drain pipe
7004	Drain	7001	Ceramic drain pipe
7005	Drain	7001	Cast iron drain pipe
7006	Primary fill	7001	Light yellow brown clay with stone and brick rubble
7007	Made Ground		Mid to dark grey brown silt clay with brick and sandstone rubble
7008	Made Ground		Light yellow brown silt clay with sandstone and brick rubble
7009	Made Ground		Mid to dark brown coarse silt with stone
7010	Made Ground		Dark yellow clay with stone and brick rubble
7011	Made Ground		Light grey brown sine silt with brick and stone rubble
7012	Structure	7001	Inspection chamber. Machine brick and cement
7013	Service Cut		Cut for drain 7014
7014	Drain	7013	Cast iron drain pipe
7015	Foundation		Concrete foundation for castle market
7016	Made Ground		Light grey brown sand and brick and mortar crush/rubble
7017	Made Ground		Dark grey brown fine silt with brick and sandstone rubble
7018	Made Ground		Light grey white fine silt with brick and concrete rubble
7019	Surface		Concrete surface associated with castle market
7020	Service Cut		Cut for drain 7021
7021	Drain	7020	Ceramic drain pipe

Trench 7			
Context	**Interpretation**	**Fill of**	**Description**
7022	Primary fill	7020	Dark black coarse silt with some slate inclusions
7023	Wall	7024	Shallow frogged machine brick and modern cement wall.
7024	Construction cut		Cut for wall 7023. 0.4 m wide, greater than 0.4 m deep
7025	Primary fill	7024	Dark brown mixed silt with brick rubble, stone, ash etc.

Trench 8			
Context	**Interpretation**	**Fill of**	**Description**
8000	Surface		Grey white concrete with stone inclusions. Surface of castle market
8001	Foundation	8002	Light brown grey concrete wall forming foundation of castle market
8002	Construction cut		Construction cut for foundation 8001 and pipe 8004
8003	Primary fill	8002	Light yellow brown stoney sand
8004	Pipe	8002	Cast iron pipe
8005	Foundation	8013	Brown-grey concrete pile with stone and rebar inclusions
8006	Foundation	8014	Brown-grey concrete pile with stones and rebar inclusions
8007	Wall		Frogged machine brick and cement wall. 7 courses, 2 skins. N-S
8008	Natural		Mid orange yellow bedrock
8009	Made Ground		Mid orange red crushed brick
8010	Service Cut		Cut for pipe 8011
8011	Pipe	8010	Cast iron pipe
8012	Primary fill	8010	Light brown yellow stoney (90%) sand
8013	Construction cut		Cut for pile 8005
8014	Construction cut		Cut for pile 8006

Trench 9			
Context	**Interpretation**	**Fill of**	**Description**
9000	Surface		Light brown grey concrete with stone inclusions. Slab of castle market
9001	Natural		Mid brown orange bedrock
9002	Service Cut		Cut for drain 9003
9003	Drain	9002	Cast iron drain pipe
9004	Primary fill	9002	Mid red brown sand with mortar, brick fragments and stones
9005	Service Cut		Cut for removed electric cable
9006	Primary fill	9005	Mid orange brown grit sand with brick and stone rubble
9007	Ditch		Cut of moat. Over 4 m wide, over 2.4 m deep
9008	Foundation		Light brown concrete pile with stone and rebar inclusions.
9009	Foundation		Light brown concrete pile with stone and rebar inclusions.
9010	Foundation		Light brown concrete pile with stone and rebar inclusions.
9011	tertiary deposit	9007	Mid brown sand clay with some red brick rubble pressed into upper interface.
9012	Construction cut		Cut for pile 9013
9013	Foundation	9012	Light brown concrete pile with stone and rebar inclusions.
9014	Made Ground		Dark brown black grit sand with brick and stone rubble
9015	Structure	9002	Concrete inspection chamber associated with drain 9003
9016	tertiary deposit	9007	Mid-dark brown sand clay with sandstone

Trench 10			
Context	**Interpretation**	**Fill of**	**Description**
10000	Surface		Black tarmac associated with castle market
10001	Surface		Grey white concrete surface associated with castle market
10002	Made Ground		Brown silt with red brick crush
10003	Made Ground		Dark blue grey ash with 80% sandstone and 10% red brick rubble
10004	Made Ground	10034	Dark grey black ash with red brick fragments
10005	Wall	10034	Frogged machine brick and cement wall. 13 courses, 3 skins
10006	Wall		Sandstone slabs and dark grey ash mortar. 1 course, 1 skin. NE-SW
10007	Wall	10028	Sandstone slabs and dark grey ash mortar. 1 course 1 skin. E-W
10008	Wall		Handmade brick and mid blue grey ash mortar wall. 4 courses, 3 skins. E-W
10009	Wall		Handmade brick and mid blue grey ash mortar 5 courses, 3 skins. Lime mortar indicated re-use of bricks. E-W
10010	Surface		Kerb. Handmade red brick, unmortared. 1 course, 1 skin. Residual lime mortar indicated re-use
10011	Wall		Handmade red brick in yellow brown sandy mortar. 2 courses, 2 skins. N-S
10012	Surface		Cobble stone surface with brown silt and ash matrix.
10013	Surface		Cobble surface in matrix of ash
10014	Posthole		Square posthole cut 0.15 m wide and 0.3 m deep
10015	Post	10014	Square wooden post 0.15 m wide and 0.4 m deep.
10016	Primary fill	10014	Dark grey black ash
10017	Primary fill	10028	Dark brown grey ash
10018	Primary fill	10028	Dark brown grey clay and ash with gravel
10019	Wall		Frogged machine brick and handmade red brick and mid grey ash mortar wall. 8 courses, 2 skins. Lime mortar indicates re-use.
10020	Wall		Red brick, chiefly opportunistically used machine bull-nosed bricks, also handmade bricks in light blue grey ash mortar. 5 courses, 2 skins. E-W
10021	Surface		Sandstone setts in silt/ash matrix.
10022	Foundation		Concrete cap bonded to rubble below filling gap between structures 10019 and 10020.
10023	Made Ground		Mid brown yellow clay with stones
10024	Made Ground		Black fuel ash and slag
10025	Made Ground		Black fuel ash and slag with lime mortar and red brick rubble
10026	Drain	10027	Concrete encasing ceramic drain. Associated with castle market
10027	Service Cut		Cut for drain 10026
10028	Construction cut		Cut for wall 10007 etc. Major truncation prior to construction of slaughterhouse
10029	Wall		Sandstone rubble and ash mortar. E-W
10030	Primary fill	10027	Dark brown black fuel ash and slag
10031	Stanchion		Concrete stanchion with rebar. Associated with castle market
10032	Surface		Black tarmac modern surface
10033	Made Ground		Brown yellow clay with brick and stone rubble
10034	Construction cut		Cut for wall 10005
10035	Wall	10028	Sandstone and brick rubble in ash mortar. E-W
10036	Drain		Cut for 19th century drain. 3 m wide
10037	Primary fill	10036	Mid brown yellow clay with stone
10038	Wall	10028	Handmade brick and dark grey ash mortar. 2 courses, 1 skin
10039	Modern Feature		Cut of ARCUS trench
10040	Primary fill	10039	Dark grey gravel. Backfill of ARCUS trench
10041	Made Ground		Dark grey black fuel ash with lime mortar and rubble

Trench 10			
Context	**Interpretation**	**Fill of**	**Description**
10042	Wall		Sandstone slab foundation
10043	Made Ground		Black ash with fine slag
10044	Made Ground		Dark blue grey clay with gravel, lime mortar and red brick
10045	Made Ground	10028	Dark black ash
10046	Made Ground		Brown orange clay with stones
10047	Made Ground		Dark grey fuel ash with brick, lime mortar, stone
10048	Made Ground		Dark blue black silt clay with brick, ash and charcoal
10049	Made Ground		Dark brown grey clay silt with ash, slag, red brick
10050	Made Ground		Mid brown yellow clay with red brick
10051	Wall		Sandstone blocks and slab with small amounts of lime mortar and plastered on one face. NE-SW
10052	Primary fill	10057	Black fuel ash and slag
10053	Cut		
10054	Made Ground		A few ex situ cobbles in the top of deposit 10056 recorded prior to dropping trench
10055	Made Ground		Mid brown yellow clay with stone
10056	Made Ground		Dark yellow grey clay silt with frequent stone
10057	Robber trench		Cut through surface 10059 probably during demolition of slaughterhouses
10058	Bedding		Dark blue grey silt clay with ash
10059	Surface		Sandstone slab surface
10060	Wall		Sandstone blocks, slabs and other stones. Unmortared. 2 skins roughly, 6 courses approx. Unmortared. NE-SW
10063	Wall		Rough unworked sandstone bonded with lime mortar. NE-SW
10064	Wall		Unworked sandstone and lime mortar wall.
10065	Ditch		Supposed cut for moat. Moat actually formed by bank rather than a cut feature
10066	tertiary deposit	10065	Mid blue grey silt clay with brick rubble
10067	Primary fill	10065	Redeposited natural. Mid grey brown silt clay with charcoal.
10068	Cut		Cut for drain 10068
10069	Primary fill	10068	Black ash
10070	Made Ground		Mid brown yellow clay with stones
10071	Made Ground		Redeposited natural. Mid grey yellow clay
10072	Deposit		Mid blue yellow clay with stone and charcoal. Bank of moat
10073	Deposit		Mid orange yellow clay with stones and charcoal. Bank of moat
10074	tertiary deposit	10065	Mid grey brown silt clay with brick and stone rubble
10075	tertiary deposit	10065	Dark black brown silt clay
10076	Secondary fill	10065	Mid grey blue silt clay
10077	Secondary fill	10065	Light grey silt clay with stones
10078	Secondary fill	10065	Light orange blue silt clay with charcoal

Trench 11			
Context	**Interpretation**	**Fill of**	**Description**
11000	Surface		Black tarmac surface
11001	Made Ground		Black and grey ash with brick rubble
11002	Made Ground		Light brown grey rubble with mortar, brick, stone, plaster, slate
11003	Made Ground		Light brown grey rubble with brick, stone, mortar, plaster, slate
11004	Wall		Handmade brick and lime mortar wall rendered to S. E-W. Small black ash repair

Trench 11			
Context	**Interpretation**	**Fill of**	**Description**
11005	Surface		Sandstone threshold E-W
11006	Wall		Handmade red brick wall with lime mortar. 6 courses, 3 skins. Rendered to S. E-W
11007	Wall		Frogged machine brick and black ash mortar repair to 11006. No rendering. E-W
11008	Surface		Sandstone threshold. E-W
11009	Wall		Handmade brick and lime mortar wall. 3 courses, 3 skins. Some black ash mortar repair. E-W
11010	Wall		Handmade brick and lime mortar wall. Whitewashed both sides, not rendered. N-S
11011	Wall	11029	Handmade brick and lime mortar wall. Rendered to E. Black ash mortar repairs. N-S
11012	Surface		Sandstone sett surface
11013	Surface		High quality sandstone flags
11014	Surface		High quality sandstone flags
11015	Surface		High quality sandstone flags
11016	Wall		Handmade red brick and lime mortar wall supporting change in level
11017	Surface		Mid white grey concrete with pebble and brick crush inclusions. Upper surface screeded
11018	Made Ground		Dark grey brown sand clay with brick, mortar, tarmac, sandstone and concrete
11019	Made Ground		Dark brown black ash and clinker with stones and mortar
11020	Bedding		Black ash with slag, brick, sandstone
11021	Made Ground		Grey yellow clay with lenses of yellow sand (degraded sandstone), brick, stone and ash
11022	Made Ground	11028	Dark brown silt with sandstone
11023	Foundation		Unworked sandstone and lime mortar roughly made
11024	Bedding		Black grey ash with slag, sandstone and brick
11025	Made Ground		Yellow clay sand with dark grey mottling and sandstone
11027	Made Ground		Dark grey brown sand silt with humic loam
11028	Cut		Interface between two tipping layers. Not a cut
11029	Construction cut		For wall 11011. 0.05 m wider than wall
11030	Made Ground		Mid brown yellow silt clay loam with stone
11031	Foundation		Rough sandstone and lime mortar roughly made
11032	Foundation		Mid grey brown silt gravel with sandstone
11033	Made Ground		Mid grey brown silt clay with stone
11034	Made Ground		Dark brown clay with stones
11035	Cut		Interface between tipping layers. Not a cut
11036	Made Ground	11035	Mid black brown silt sand with stone

Appendix 2: All finds by context (number / weight in grammes)

Key: CBM = ceramic building material; Cu = copper alloy; Fe = iron; Pb = lead; OM = other metal

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
1001						1/2				
1002	7/92	2/6	9/126	3	4 Fe	1/2				
1003	3/23	6/13	3/68		1 Fe	26/478				1 shell
1004	1/1	1/1								
1005	1/4	2/6			7 Fe	4/140	12/142			1 CBM
1006	45/485	51/129	2/31		1 Fe	81/1184	1/447	1/5160		1 CBM
1007	174/1015	5/24	3/20		4 Fe	32/457	8/340	1/460		
1011	6/44	3/3	5/51			8/49				
1013		3/8					8/571			
1032					12 Fe					
1034		2/9			1 Fe	1/300	9/1076			1 shell
1040	12/58					10/198				1 shell
1042	7/39		1/17		4 Fe	1/16				11 CBM
1043	5/3		2/4		2 Fe	3/25				
1046			1/8		1 Fe					
1048	52/262					44/706		3/39		
1053	3/7					1/10				
1057						16/283				
1061							2/42			
1064							4/292			4 CBM
1066	10/5									
1073							21/1655			
1076	2/1				1 OM	2/17	30/25			
1078	3/19									

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
1104					1 Cu					
2001			6/24		17 Fe	6/71	2/115	1/15		
2007					2 fe		1/20			
2008					4 Fe					
2012					7 Fe					
2013		3/9								
2014			1/8		1 Fe		5/1600			
2019	2/2	1/1	6/9		1 Cu	2/12	16/796			
2020		3/6	5/20			9/186	23/864			
3002			1/21			3/5				
3003					1 Cu					
3005			1/14							
3008			19/1776		8 Fe	37/606				
3015	4/33	3/4	16/57			19/289				
3022	3/11									
3039								2/61		
3055	3/5									
3056	1/1					5/24				
3057	5/144				1 Fe	10/37			3	
3058	6/43					11/58			5	
3062	2/8							1/1094		
3078									3	
3079	2/8					2/25				
3085						1/80				
4001			8/125			3/50				
4002	1/8	1/5	3/196		5 Cu; 2 Fe	14/241				1 shell

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
4006				7						
4007	17/105	7/15	6/51	2	3 fe	19/397	12/486			
4008	20/46	18/43	4/7	1	14 Fe	54/674	15/499			
4009	24/163	14/17	2/12	99	1 Cu; 75 Fe; 19 OM	19/77			7	1 CBM
4010	5/26	19/32	11/81	4	1 Cu; 9 Fe	113/1145	1/23			
4014					8 Fe					
4016	1/1		3/15			29/136				
4017				1						
4024	2/4	11/40	5/29		1 Cu; 3 Fe	7/101	1/2	1/296		
4034	2/22					4/19				7 shell
4036	3/14	10/23	2/40		1 Cu; 3 Fe	30/1523	6/170			1 shell
4037	7/26	4/21			1 Cu; 2 Fe; 1 OM	19/597		1/15		
4039		5/25		5	3 Fe	5/28				
4040	15/749	11/35	2/50	8	12 Fe	40/525	22/865	2/776		2 shell
4042	9/46	5/11		21	53 Fe; 1 Pb	52/1540	1/50	2/3774	1	2 mortar
4043			1/1							
4044					1 Fe	1/42				
4052		5/9	7/22	1	1 Cu; 4 Fe	5/32				
4062	1/5					5/50				
4064	6/14					1/14				
4065	1/21		1/3		1 Fe	2/5	4/165			
4077						2/20				
4086	10/115	1/2			3 Cu					
4087	19/138						4/153			
4088		8/18	2/4			8/51				
4090	123/88									

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
4093					3 Fe	3/57				
4095		7/12	2/37			9/474	6/699			
4097					1 Fe	4/289			1	
4098										4 mortar
4099						4/8				
4101					2 Cu					
4104	5/28	1/1			1 Fe	5/205	81/3311			
4106		1/3				2/7				
4107	5/38				6 Fe	6/48	21/699			
4108	2/23	1/2				9/256				
4109	1/12	2/6				1/5	11/173			
4111	4/93				1 Fe	1/10				
4115	2/40	26/35	7/39			32/419	56/1929	3/1316		7 mortar
4116						8/77				
4117	6/13	2/3				4/3				
5002	2/9	1/4	3/10		2 Fe	27/469				
5005	20/105	16/46	38/161		4 Pb	72/664				
5009	21/89	17/34	4/35			11/48				
5023		1/2				1/1				
5024	1/2	12/27	1/6			4/28	2/67			
5025	62/296					3/8	1/146			
5029	4/9	4/6				3/40				
5034	12/53	3/6	159/858		9 Cu; 23 Fe; 4 Pb	172/1797	2/43			1 CBM
5038						4/9	20/28	3/1028		
5039							255/4330			
5040					1 Cu					

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
5041						3/20				
5045	5/8					1/2	11/64			
6006	14/64	29/68	14/337		6 Fe	133/3216	1/7			
6007	1/54	3/12				2/24		1/394		
6013	7/249	5/18				2/375				
6014	37/634	6/19	2/61		3 Fe	5/106		1/34		
6016	1/1	7/15	8/116		1 Cu; 2 Fe	5/117				
6026	80/770	208/589	18/203		3 Cu; 10 Fe	71/2156		8/5822	1	17 mortar; 2 shell
6029										1 CBM
6030	27/25	24/75	8/111		6 Fe; 2 Pb	17/328	1/5			2 mortar
6032										17 mortar
6033	2/4	7/17				3/235				2 mortar
6039	2/14					9/65				
6041						1/45				
6044	10/43									1 mortar
6047	1/1								2	
6050						1/7				
6051	1/49									
6055	1/24								10	
6060	1/1									
6066										1 plaster
6070									1	
6077									1	
7016	1/5				1 Cu; 1 OM					
7017		2/8						1/1299		
9011	2/24				2 Pb	5/93		1/12		

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
10004			1/13			6/116				
10017	10/48				1 Fe	12/53		1/3		
10025	27/145	13/32	7/60		1 Cu; 3 Fe	32/199		1/9		1 CBM
10041		1/3			3 Fe	10/60				13 CBM
10049							3/18	1/7		
10055		1/2								
10066						3/11	1/131			1 CBM
10067			2/1			1/3	33/346			
10071	23/512		1/4			2/34	1/138			
10075							26/539			
10076							14/134	3/212		
10078								2/303		
11002			4/99		1 OM	4/16				
11003	1/1	1/1	8/94		1 Cu; 6 Fe	1/1				
11018	9/28	1/7	17/154		13 fe	10/166				1 CBM; 1 mortar
11019			3/230			1/7				
11020	2/42	5/18	5/446			1/15				
11021	9/42	6/16								
11022	6/12	7/10			1 Fe	11/79	22/127	3/162		
11024	2/29	8/37	1/14		1 Fe; 2 Pb; 1 OM	2/11		1/245		
11025		1/1								
11036		1/2								4 CBM
Tr 1 U/S			1/5			5/25				
Tr 10 U/S	1/32	2/5						2/2		
Tr 11 U/S					1 misc					
Tr 3 U/S						1/2				

Context	Animal Bone	Clay Pipe	Glass	Leather (no.)	Metal (no.)	Pottery	Slag	Stone	Wood (no.)	Other finds
Tr 4 U/S						1/2				
Tr 5 U/S			1/137			6/181				
Tr 6 u/s	2/41									
u/s	17/266	37/82	2/34			88/1010		3/6762		
Total	**1074/7882**	**673/1739**	**455/6155**	**152**	**42 Cu; 369 Fe; 16 Pb; 25 OM**	**1608/26229**	**776/23332**	**50/29300**	**35**	

Appendix 3: List of clay tobacco pipes by context

Key: SF = small finds number; B = bowl; S = stem; M = mouthpiece

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
1002			2		***2***	1700-1820	1750-1820	-	-	Plain stems, one finely burnished.
1003		1	4	1	***6***	1750-1880	1830-1860	-	Leaf dec seams	Plain stems; one brown glazed mouthpiece all late C18th/C19th single bowl fragment has leaf decorated seams.
1004			1		***1***	1700-1800	1700-1800	-	-	Plain stem.
1005			2		***2***	1760-1850	1800-1850			Plain stems, one appears to be burnished and is C18th the other is C19th
1006		6	48		***54***	1760-1840	1800-1840	x2 GW bowl mark; x1 THO WILD stem mark; X1 cut mark on heel	x1 flute and panel	48 stems (29 of which are burnished); 1 *c*1600-1680 heel bowl with a cut mark across the heel; x3 (totalling 4 fragments) *c*1740-1780 spur bowl two marked with a GW bowl mark.; x1 C19th bowl fragment. Good group with the exception of the later mould decorated bowl, which appears to be intrusive.
1007		1	4		***5***	1650-1680	1650-1670			Consistent C17th group with a plain heel bowl and stems with large stem bores.
1008			3		***3***	1800-1900	1800-1900			Plain C19th stem fragments.
1013			1		***1***	1700-1800	1700-1800			Plain stem. Bag also has two fragments of bone.
1034		1	1		***2***	1800-1880	1830-1860			Plain spur bowl and plain stem.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
2019			1		***1***	1750-1820	1750-1820			Plain stem late C18th or early C19th
2020		1	2		***3***	1780-1840	1780-1840			Plain bowl C19th bowl fragment (highly fired); two plain stems one with traces of brown glaze, both from long-stemmed pipes.
3015			3		***3***	1640-1850+	1850+			Three plain stem fragments one C17th, C18th, and one C19th. The C19th fragment is just flaring out into a nipple mouthpiece from a short-stemmed cutty type pipe dating 1850 or later.
4002			1		***1***	1790-1820	1790-1820			Plain and very poorly executed long-stem with a ground end.
4007			7		***7***	1780-1830	1800-1830			Plain stems, one C18th fragment the rest C19th, one of which has traces of brown glaze.
4008		3	13		***16***	1760-1860	1830-1860		Leaf decorated seams	C18th heel bowl which is burnished; x2 C19th bowl fragments, most complete of which has leaf decorated seams; stems are all plain but at least two are burnished and would be contemporary with the C18th bowl fragment.
4008			2		***2***	1790-1850	1790-1850			Plain C19th stem fragments.
4009		1	10	2	***13***	1800-1900	1850-1900		Basket	C19th mould decorated basket design bowl with joining stem; rest of the stems are plain and poorly made but appear to be from long-stemmed pipes; the two mouthpieces are both nipple type from a short-stemmed cutty pipe.
4010		1	17		***18***	1780-1850	1780-1850			Plain bowl fragment and plain stems. Some of the stems are late C18th but the bulk are C19th. The bowl fragment has been sanded and would have had a meerschaum wash originally. Group includes one piece of bone.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
4024		3	8		***11***	1780-1850	1800-1850		x1 Basket; x1 ribbed seam	Two of the bowls have moulded decoration, the third is plain. The stems are also plain and most appear to be C19th some are quite long pieces clearly from long-stemmed pipes.
4036			10		***10***	1650-1840	1800-1840			Group of plain stems one is clearly C17th century, rest are late C18th or early C19th. One fragment appears to have a ground end.
4037		1	3		***4***	1800-1850	1800-1850			Large plain C19th bowl with a distinctive internal bowl cross; The stems are plain and appear to be from long-stemmed pipes.
4040		3	7		***10***	1750-1860	1850-1860	x1 moulded FC spur mark	Leaf decorated seams	C19th mould decorated bowl with elaborate leaf decorated seams and the moulded makers initials FC - likely to be Frederick Cartwright (1854-1860) - the F initial is upside-down; two other C19th spurs and plain stems. Group includes a piece of bone.
4042			6		***6***	1790-1850	1790-1850			Plain C19th stem fragments.
4052		1	4		***5***	1800-1850	1800-1850			Plain C19th spur bowl fragmnt and four plain stems two with fresh breaks but no joins.
4086			1		***1***	1740-1800	1740-1760			Plain burnished C18th stem fragment.
4088			8		***8***	1790-1850	1790-1850			Plain C19th stem fragments.
4095			7		***7***	1790-1850	1790-1850			Plain C19th stem fragments.
4104			1		***1***	1790-1850	1790-1850			Plain C19th stem fragment.
4106			1		***1***	1740-1760	1740-1760	WILD stem mark		C18th marked stem.
4108			1		***1***	1790-1850	1790-1850			Plain C19th stem fragment.
4109		1	1		***2***	1740-1800	1740-1800			Burnished bowl and stem fragment.
4115			26		***26***	1780-1850	1800-1850			Group of plain stems three with traces of brown glaze.
4117			2		***2***	1750-1850	1750-1850			Two plain stems - one C18th one

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
										C19th
5005		1	15		***16***	1640-1850	1800-1850			Single C18th bowl fragment; all stems are plain and include C17th, C18th and C19th fragments.
5023			1		***1***	1730-1800	1730-1800			Single C18th stem fragment.
5024			12		***12***	1750-1850	1750-1850			Group of plain stems from the C18th and C19th.
5029			4		***4***	1650-1850	1800-1850			Group of plain stems including C17th and C19th fragments.
5031		1	14		***15***	1660-1800	1780-1800	x1 Roll stamp stem		Small group of fragments of mixed date. C17th heel fragment with joining stem (fresh break) and a number of plain stems of late C17th, C18th and early C19th date. Includes one C18th stem fragment with a roll stamp mark.
5034			3		***3***	1750-1850	1800-1850			Plain C19th stems.
6006		3	11	1	***15***	1680-1830	1780-1830	x1 milled heel		Mixed group with x2 C17th bowl fragments and a single C19th bowl/stem junction. The stems and mouthpieces are all plain and mixed C17th-early C19th date.
6007		1	3		***4***	1750-1800	1780-1800	x1 TW bowl stamp		Nice marked C18th bowl, possibly a product of Thomas Wild of Rotherham. Stems more likely to be early C19th but from a long-stemmed pipe.
6011		2	11		***13***	1640-1800	1780-1800	1x milled heel; x2 stem stamps incl. WILL WILD		Small group of fragments of mixed date. C17th heel bowl; C18th marked stems and plain C19th stem fragments. Group includes one piece of bone.
6013			5		***5***	1750-1800	1750-1800			Plain stems mostly C18th burnished examples, but there is a single C19th plain stem.
6014			6		***6***	1680-1780	1750-1780	x1 THO WILD stem stamp		Group of stems mainly late C18th or early C19th including one marked with a THO WILD stem mark.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
6016			7		***7***	1750-1850	1750-1850			Plain stems of late C18th or early C19th date.
6026		26	167	15	***208***	1610-1800	1770-1800	x3 moulded spur marks OO and x1 ring and dot; x1 mould decorated bowl PR; x2 TW bowl stamps; x1 W bowl stamp; x1 gauntlet heel stamp; x 1 crowned IW heel stamp; x6 WILL WILD stem stamps; x1 THO WILD stem stamp; x1 SCORA stem stamp; x1 BENJAMIN MARSDEN stem stamp; x2 other stem stamps; x1 milled heel	x3 enclosed flutes (x1 with a stag's head); x1 floral decoration (mould has been altered)	Very good C18th group many of which are marked or decorated. Excavations in Tenter Street, Sheffield produced a similar bowl fragment to the mould decorated PR fragment in this group.
6030		3	22		***25***	1640-1830	1800-1830	x1 milled heel; x1 moulded heel marks OO; x1 stamped stem	floral bowl with LDS	Small group of fragments of mixed date. C17th bowl with a milled heel and x2 plain stems; C18th bowl fragment with a moulded OO mark and a x1 roll stamp stem; rest plain stems of early C19th date.
6033		1	6		***7***	1750-1830	1800-1830	x1 Moulded bowl mark WILL WILD	Armorial bowl with WILL WILD moulded lettering	Nice armorial bowl fragment marked WILL WILD which has an internal bowl cross; the rest of this group is made up of late C18th-early C19th plain stems.
7017		1	1		***2***	1750-1860	1830-1860	x1 WILL WILD stem stamp		Single C18th marked stem and a plain C19th bowl.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
10025		1	12		***13***	1650-1850	1800-1850		x1 mould decorated bowl ?acorn/hoof	Small fragment of C19th mould decorated bowl; rest of group plain stems of mixed late C17th to C19th date.
10041			1		***1***	1610-1700	1640-1700			Plain C17th stem fragment.
10055			1		***1***	1800-1850	1800-1850			Plain C19th stem fragment.
11003			1		***1***	1780-1830	1780-1830			Plain stem fragment of late C18th or early C19th.
11018			1		***1***	1700-1800	1700-1800			Stem of possible C18th date; heavily encrusted.
11020		3	2		***5***	1750-1800	1780-1800			Three joining bowl fragments from a late C18th bowl; the stem fragments are both plain and could be late C18th or early C19th.
11021		1	5		***6***	1650-1830	1800-1830	x1 moulded ring and dot spur mark		Small mixed group of fragments. Single stem that is likely to be C17th; x2 plain stems and a bowl fragment with a moulded ring and dot mark from the C18th and x2 plain C19th stems.
11022	11001	1	6		***7***	1610-1800	1700-1800			Small group of tiny fragments but all appear to be C18th although there is one burnt stem fragment that could be C17th or C18th.
11024		3	5		***8***	1780-1840	1820-1840		x1 enclosed flutes bowl with a stag's head; x2 floral decorated bowls (possibly from the same mould)	Three mould decorated bowls x1 late C18th and x2 C19th; all the stems are plain and of C19th date from long-stemmed pipes.
11025			1		***1***	1750-1800	1750-1800			Plain late C18th stem.
11036	11002		1		***1***	1750-1850	1750-1800			Plain stem of late C18th or early C19th date.
u/s			2		***2***	1800-1900	1800-1900			Plain C19th stem fragments.
u/s		1	9		***10***	1800-1850	1800-1850			C19th group which includes a spur fragment and a piece of stem with traces of moulded decoration; all

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
										other stems are plain.
u/s			1		***1***	1800-1850	1800-1850			Plain C19th stem.
u/s			1		***1***	1780-1850	1780-1850			Plain late C18th or early C19th stem.
u/s			3		***3***	1800-1850	1800-1850			Plain C19th stems.
u/s			6		***6***	1800-1920	1870-1920			Plain stems mostly C19th; one fragment is from a short-stemmed pipe and has traces of brown varnish dating it to late C19th or early C20th.
u/s			12	1	***13***	1650-1850	1800-1850			Plain stems dating from mid to late C18th to C19th; one fragment has traces of brown glaze. The single mouthpiece is most likely from a long-stemmed pipe.
U/S TR3			1		***1***	1800-1850	1800-1850			Plain C19th stem.
u/s TR4			1		***1***	1790-1830	1790-1830			Plain late C18th or early C19th stem.
u/s TR5			1		***1***	1700-1800	1750-1800			Plain C18th stem.
Totals:		***73***	***569***	***20***	***662***					

Appendix 4: Environmental data

Trench 1

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
Cereals and other economic plants*								
cf. *Avena* sp. (oat) grain			-				-	
Hordeum vulgare/distichum (hulled barley) grain							-	
Hordeum indet. (indeterminate barley) grain							+	
cf. *Hordeum* sp. grain							-	
Secale cereale (rye) grain			+					
Secale cereale rachis node			-					
cf. *Secale cereale* grain			++					
Triticum aestivum / turgidum s.l. (free threshing wheat) grain			-					
Triticum cf. *aestivum / turgidum* s.l. grain			-					
Triticum sp. (indeterminate wheat) grain							-	
Cereal sp. indet. grain			-				-	
>2mm culm node (cereal straw)			-				-	
Wild / weed plant seeds*								
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)			-			- (uc)		
Ranunculus flammula (lesser spearwort)			-					
Vicia spp. / *Lathyrus* spp. (vetches / wild peas)			-					
Rubus fruticosus agg. (bramble / blackberry)	- (uc)		-				++++ + (uc)	++ (uc)
Rubus idaeus (raspberry)							++++ (uc)	+ (uc)
Urtica dioica (common nettle)							++++ + (uc)	++++ (uc)
Betula pendula (birch) seed		- (uc)					+ (uc)	- (uc)
Corylus avellana (hazel) nutshell			- (uc)				++ (uc) +	
Viola sp. (violet)							+ (uc)	- (uc)

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
Malva sp. (mallow)			++					
Persicaria maculosa / lapathifolia (redshank / pale persicaria)			-					
Polygonum aviculare agg. (knotgrass)			++					
Rumex spp. (docks)			-				++ (uc)	++ (uc)
Rumex acetosella (sheep's sorrel)			++					
Spergula arvensis (corn spurey)			-					
Agrostemma githago (corncockle)			-					
Hyoscyamus niger (henbane)							- (uc)	
Lamiaceae (dead nettle family)							++ (uc)	
Centaurea sp. (knapweed)			-					
Sambucus nigra (elder)							++ (uc)	- (uc)
Conium maculatum (hemlock)			-					
Schoenoplectus sp. (club-rush)			-					
Carex spp. (sedges)			++				+++ (uc)	- (uc)
Bromus spp. / *Lolium* spp. (brome / rye grass)			+					
Poaceae (grasses)			+++				-	
Other plant material*								
Tuber / rhizome							-	
Wood and wood charcoal*								
>4mm wood fragments							++++	++
2-4 mm wood fragments							++++	+
<2 mm wood fragments							++++ +	+++
> 4mm wood charcoal fragments	+++	-	++++		+	-	++++	++
2-4 mm wood charcoal fragments	++++	+++	++++ +		++	+	++++ +	-
<2mm wood charcoal fragments	++++ +	+++++	++++ +	+++	+++++	++++ +	++++ +	++++

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
>1mm vitrified charcoal fragments	++++	+++	++++	+	+	-		
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	DP	RP	Indet.	DP	DP & RP	DP & RP	DP & RP
Non plant material*								
Mollusca (land snails)	++					-		
Cecilioides (intrusive burrowing snail)		-			-			
Coleoptera (beetle macrofossils)	+						++	+
Invertebrate puparia					-			
Slag / metallurgical debris	++++	++++				++		

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 3 part 1

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Cereals and other economic plants*					
Vitis vinifera (grape)		- (uc)			
Ficus carica (fig)		- (uc)			
Avena sp. (oat) grain					+
cf. *Avena* sp. grain					+
Hordeum vulgare/distichum (hulled barley) grain					-
cf. *Hordeum vulgare/distichum* grain					
Secale cereale (rye) grain					
cf. *Secale cereale*					

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Triticum aestivum / turgidum s.l. (free threshing wheat) grain	-				-
Triticum cf. *aestivum / turgidum* s.l. grain					
Cereal indeterminate grain					-
Wild / weed plant seeds*					
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)	- (uc)				+ (uc)
Ranunculus sardous (hairy buttercup)					
Ranunculus flammula (lesser spearwort)					+ (uc)
Vicia spp. / *Lathyrus* spp. (vetches / wild peas)					
Rubus fruticosus agg. (bramble / blackberry)	+ (uc)	++ (uc)	- (uc)		+++ (uc) -
Rubus idaeus (raspberry)	- (uc)	++ (uc)			
Potentilla spp. (cinquefoils)					+ (uc)
Urtica dioica (common nettle)	- (uc)				+ (uc)
Betula pendula (birch) seed		- (uc)			
Betula pendula (birch) bract			- (uc)		
Alnus glutinosa (alder)					
Corylus avellana (hazel) nutshell	- (uc)				+ (uc)
Viola sp. (violet)					
Hypericum sp. (St John's-wort)	+ (uc)				- (uc)
Brassica sp. (cabbage)	- (uc)				
Persicaria maculosa / lapathifolia (redshank / pale persicaria)					- (uc)
Persicaria hydropiper (water pepper)					- (uc)
Polygonum aviculare agg. (knotgrass)					
Fallopia convolvulus (black bindweed)					- (uc)
Rumex spp. (docks)	- (uc)				++ (uc)
Rumex acetosella (sheep's sorrel)					++ (uc)
Stellaria media (chickweed)					
Atriplex spp. (oraches)					
Chenopodium spp. (goosefoots)					
Chenopodium album (fat hen)					- (uc)

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)					
Hyoscyamus niger (henbane)					
Plantago major (greater plantain)					
Plantago lanceolata (ribwort plantain)					
Lamiaceae (dead nettle family)	- (uc)		- (uc)		+ (uc)
Cardus / Cirsium spp. (thistles)					
Lapsana communis (nipplewort)					
Picris hieracioides (hawkweed oxtongue)					+ (uc)
Anthemis cotula (stinking chamomile)					
Glebionis segetum (corn marigold)					++++ (uc) +
Sambucus nigra (elder)	++ (uc)		+++ (uc)	- (uc)	++++ (uc)
Conium maculatum (hemlock)					- (uc)
Juncus spp. (rushes)				++ (uc)	
Carex spp. (sedges)	- (uc)	- (uc)	- (uc)	- (uc)	++++ (uc) +
Bromus spp. / *Lolium* spp. (brome / rye grass)					
Poaceae (grasses)					-
Other plant material*					
Bryophyta fragments (mosses)					
Leaf buds					
Wood and wood charcoal*					
>4mm round wood fragments					+
>4mm wood fragments				+++	++++
2-4 mm round wood fragments					+
2-4 mm wood fragments				+++	+++++
<2 mm wood fragments				+++++	+++++
> 4mm round wood charcoal fragments					
> 4mm wood charcoal fragments	+			-	++++
2-4 mm wood charcoal fragments	+++	-			+++++

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
<2mm wood charcoal fragments	+++++	++++ +	+++++	+++	+++++
>1mm vitrified charcoal fragments		+++	-		
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	RP		RP	RP
Non plant material*					
Coleoptera (beetle macrofossils)		+++		+	++
Slag / metallurgical debris		+++	++		

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 3 part 2

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Cereals and other economic plants*						
Vitis vinifera (grape)						
Ficus carica (fig)						
Avena sp. (oat) grain			++			
cf. *Avena* sp. grain			++			
Hordeum vulgare/distichum (hulled barley) grain			-			
cf. *Hordeum vulgare/distichum* grain			-			
Secale cereale (rye) grain			+			
cf. *Secale cereale*			++			
Triticum aestivum / turgidum s.l. (free threshing wheat) grain			-			
Triticum cf. *aestivum / turgidum* s.l. grain			-			
Cereal indeterminate grain			-			
Wild / weed plant seeds*						

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)	++ (uc)	++ (uc)	- (uc)			+ (uc)
Ranunculus sardous (hairy buttercup)	+ (uc)					
Ranunculus flammula (lesser spearwort)						
Vicia spp. / *Lathyrus* spp. (vetches / wild peas)			-			
Rubus fruticosus agg. (bramble / blackberry)	+ (uc)	- (uc)	++ (uc)	- (uc)	++ (uc)	
Rubus idaeus (raspberry)			+ (uc)	+ (uc)	+++ (uc)	
Potentilla spp. (cinquefoils)	- (uc)					
Urtica dioica (common nettle)	++ (uc)	+ (uc)	++++ (uc)	+++ (uc)	++++ + (uc)	++ (uc)
Betula pendula (birch) seed				++ (uc)		
Betula pendula (birch) bract				+ (uc)		
Alnus glutinosa (alder)	- (uc)					
Corylus avellana (hazel) nutshell	+++ (uc)	+++++ (uc)			+ (uc)	++++ (uc)
Viola sp. (violet)				- (uc)	- (uc)	
Hypericum sp. (St John's-wort)						
Brassica sp. (cabbage)						
Persicaria maculosa / lapathifolia (redshank / pale persicaria)						
Persicaria hydropiper (water pepper)						
Polygonum aviculare agg. (knotgrass)	++ (uc)	+++ (uc)	- (uc)			++ (uc)
Fallopia convolvulus (black bindweed)						
Rumex spp. (docks)	++ (uc)	++ (uc)	- (uc)			++ (uc)
Rumex acetosella (sheep's sorrel)		- (uc)				- (uc)
Stellaria media (chickweed)	- (uc)		- (uc)			
Atriplex spp. (oraches)			-			
Chenopodium spp. (goosefoots)		- (uc)	+ (uc)			
Chenopodium album (fat hen)	- (uc)	- (uc)	- (uc)			
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)	++ (uc)	+ (uc)				
Hyoscyamus niger (henbane)			- (uc)			
Plantago major (greater plantain)	- (uc)	+ (uc)				- (uc)

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Plantago lanceolata (ribwort plantain)			-			
Lamiaceae (dead nettle family)		- (uc)	- (uc)	- (uc)	++ (uc)	
Cardus spp. / *Cirsium* spp. (thistles)		- (uc)	- (uc)			- (uc)
Lapsana communis (nipplewort)		- (uc)				
Picris hieracioides (hawkweed oxtongue)						
Anthemis cotula (stinking chamomile)			-			
Glebionis segetum (corn marigold)		+ (uc)	+			- (uc)
Sambucus nigra (elder)	- (uc)		+ (uc)	+ (uc)	++++ (uc)	
Conium maculatum (hemlock)						
Juncus spp. (rushes)	++ (uc)	++ (uc)	- (uc)			++ (uc)
Carex spp. (sedges)	++ (uc)	+ (uc)	++ (uc)	- (uc)	+ (uc)	+ (uc)
Bromus spp. / *Lolium* spp. (brome / rye grass)			-			
Poaceae (grasses)	++ (uc)	++ (uc)	-			++ (uc)
Other plant material*						
Bryophyta fragments (mosses)		++++ (uc)				++++ (uc)
Leaf buds	+ (uc)	- (uc)				- (uc)
Wood and wood charcoal*						
>4mm round wood fragments	+	++				-
>4mm wood fragments	++++	++++				
2-4 mm round wood fragments		+				
2-4 mm wood fragments	+++++	+++++				
<2 mm wood fragments	+++++	+++++				
> 4mm round wood charcoal fragments					-	
> 4mm wood charcoal fragments	+	+++	+++	+	++	+
2-4 mm wood charcoal fragments	++	++	++		++	++
<2mm wood charcoal fragments	++++	++++	++++ +	++++ +	++++ +	+++++
>1mm vitrified charcoal fragments						
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP & DP	RP & DP	RP & DP	RP & DP	RP & DP	RP & DP

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Non plant material*						
Coleoptera (beetle macrofossils)	+++	++++	+			+++
Slag / metallurgical debris						

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 4

Context number	4008	4009	4113	4064
Feature number	4105			
Sample number	4002	4000	4003	4001
Context type	Made ground	Made ground	Layer	Made ground
Date	late 19th – early 20th C	late 19th – early 20th C	12th – 15th C	mid – late 19th C
Sample volume (litres)	20	24	40	23
Flot volume (ml)	650	40	1	100
Wild / weed plant seeds*				
Urtica dioica (common nettle)			- (uc)	
Betula pendula (birch) seed			+ (uc)	
Betula pendula (birch) bract			- (uc)	
Sambucus nigra (elder)			- (uc)	
Wood and wood charcoal*				
> 4mm wood charcoal fragments	-	-		
2-4 mm wood charcoal fragments	+	+		-
<2mm wood charcoal fragments	++++	+		+
>1mm vitrified charcoal fragments	+++++	++++		++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	DP	DP & RP		RP
Non plant material*				
Coleoptera (beetle macrofossils)		++		
Slag / metallurgical debris	+++++	-		+++++

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 5

Context number	5039	5038	5041	5045
Feature number	5046			
Sample number	5001	5002	5004	5003
Context type	Made ground	Made ground (redeposited natural)	Matrix between stone surfaces (medieval courtyard)	Made ground (medieval courtyard)
Date	uncertain	uncertain	13th C	13th C
Sample volume (litres)	15	38	38	5
Flot volume (ml)	30	3	4	5
Cereals and other economic plants*				
cf. *Avena* sp. (oat) grain			-	
Triticum aestivum / turgidum s.l. (free threshing wheat) grain				+
Triticum sp. (indeterminate wheat) grain			-	
Wild / weed plant seeds*				
cf. *Fragaria vesca* (strawberry)	-			
Betula pendula (birch)		+ (uc)		- (uc)
Corylus avellana (hazel) nutshell			- (uc)	
Stellaria media (chickweed)		- (uc)		
Galium aparine (cleavers)			-	
Hyoscyamus niger (henbane)	- (uc)	- (uc)		
Lamiaceae (dead nettle family)			- (uc)	
Anthemis cotula (stinking chamomile)			-	
Glebionis segetum (corn marigold)			-	
Sambucus nigra (elder)		- (uc)		- (uc)
Carex spp. (sedges)			-	
Poaceae (grasses)		-	+	
Wood and wood charcoal*				
> 4mm wood charcoal fragments	+++	-	+	++
2-4 mm wood charcoal fragments	++++	+	++	++
<2mm wood charcoal fragments	+++++	++++	++++	++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	DP	RP	RP

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 6 part 1

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
Cereals and other economic plants*					
Avena sp. (oat) grain				-	
cf. *Avena* sp. grain			-	-	
Triticum sp. (indeterminate wheat) grain	-		-		
Cereal sp. indet. grain					
Awn fragments				-	
Wild / weed plant seeds*					
Papaver somniferum (opium poppy)					
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)					
Ranunculus flammula (lesser spearwort)					
Prunus spinosa (blackthorn / sloe)					
Rubus fruticosus agg. (bramble / blackberry)	- (uc)	+ (uc)	+++ (uc)	++ (uc)	
Rubus idaeus (raspberry)		- (uc)	++ (uc)	- (uc)	
Potentilla spp. (cinquefoils)				- (uc)	
Aphanes arvensis (parsley piert)					
Urtica dioica (common nettle)			+++ (uc)		
Betula pendula (birch) seed	++ (uc)	++ (uc)			
Betula pendula (birch) bract		++ (uc)			
Corylus avellana (hazel) nutshell		-	-		
Viola sp. (violet)					
Hypericum sp. (St John's-wort)	- (uc)			- (uc)	
Raphanus raphanistrum spp. *raphanistrum* (wild radish) seed pod fragment					
Persicaria maculosa / lapathifolia (redshank / pale persicaria)					

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
Persicaria hydropiper (water pepper)					
Polygonum aviculare agg. (knotgrass)					
Fallopia convolvulus (black bindweed)					
Rumex spp. (docks)			- (uc)		
Rumex acetosella (sheep's sorrel)					
Stellaria media (chickweed)					
Agrostemma githago (corncockle)					
Atriplex spp. (oraches)					
Chenopodium spp. (goosefoots)					
Chenopodium album (fat hen)					
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)					
Solanum nigrum (black nightshade)					
Lamiaceae (dead nettle family)	- (uc)	- (uc)		- (uc)	
Galeopsis sp. (hemp-nettle)					
Ajuga reptans (bugle)					
Cardus / Cirsium spp. (thistles)					
Lapsana communis (nipplewort)					
Anthemis cotula (stinking chamomile)					
Glebionis segetum (corn marigold)			- (uc)	-	
Sambucus nigra (elder)		- (uc)			
Aethusa cynapium (fool's parsley)					
Conium maculatum (hemlock)		- (uc)		- (uc)	
Juncus spp. (rushes)	++ (uc)	++ (uc)			
Carex spp. (sedges)	- (uc)	- (uc)	- (uc)	++++ (uc)	
Poaceae (grasses)			- (uc)	+ (uc) -	

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
Other plant material*					
Bryophyta (mosses)					
Wood and wood charcoal*					
>4mm round wood fragments			-		
>4mm wood fragments			++++		
2-4 mm round wood fragments					
2-4 mm wood fragments			++		
<2 mm wood fragments			++++		
> 4mm round wood charcoal fragments			-		
> 4mm wood charcoal fragments	-	++	++++	+	++
2-4 mm wood charcoal fragments		+	++	++	++++
<2mm wood charcoal fragments	++++	+++++	++++	+++++	+++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	RP	RP some DP	RP	RP & DP
Non plant material*					
Coleoptera (beetle macrofossils)		-		+	
Invertebrate puparia					

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 6 part 2

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Cereals and other economic plants*					
Avena sp. (oat) grain					
cf. *Avena* sp. grain					

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Triticum sp. (indeterminate wheat) grain			-		
Cereal sp. indet. grain				-	
Awn fragments					
Wild / weed plant seeds*					
Papaver somniferum (opium poppy)	- (uc)				
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)	+ (uc)	- (uc)	- (uc)	- (uc)	- (uc)
Ranunculus flammula (lesser spearwort)	- (uc)	+ (uc)			+ (uc)
Prunus spinosa (blackthorn / sloe)			- (uc)		
Rubus fruticosus agg. (bramble / blackberry)	- (uc)	+ (uc)	++++ (uc)	++++ (uc)	++ (uc)
Rubus idaeus (raspberry)	- (uc)	- (uc)	++ (uc)	+ (uc)	- (uc)
Potentilla spp. (cinquefoils)		- (uc)	+ (uc)		- (uc)
Aphanes arvensis (parsley piert)				+ (uc)	
Urtica dioica (common nettle)	++++ (uc)	- (uc)	+ (uc)		
Betula pendula (birch) seed					
Betula pendula (birch) bract			- (uc)		
Corylus avellana (hazel) nutshell		- (uc)	- (uc)		+ (uc)
Viola sp. (violet)		- (uc)	+ (uc)	- (uc)	- (uc)
Hypericum sp. (St John's-wort)					
Raphanus raphanistrum spp. *raphanistrum* (wild radish) seed pod fragment			- (uc)		- (uc)
Persicaria maculosa / lapathifolia (redshank / pale persicaria)				- (uc)	- (uc)
Persicaria hydropiper (water pepper)		- (uc)	- (uc)	+ (uc)	- (uc)
Polygonum aviculare agg. (knotgrass)	+ (uc)		+ (uc)	- (uc)	
Fallopia convolvulus (black bindweed)	- (uc)				

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Rumex spp. (docks)	+++ (uc)	+ (uc)	++++ (uc)	++++ (uc)	+++ (uc)
Rumex acetosella (sheep's sorrel)	+ (uc)				
Stellaria media (chickweed)		- (uc)			- (uc)
Agrostemma githago (corncockle)			++ (uc)	- (uc)	
Atriplex spp. (oraches)			+ (uc)		
Chenopodium spp. (goosefoots)	- (uc)		+ (uc)	- (uc)	
Chenopodium album (fat hen)	+ (uc)		++ (uc)	- (uc)	
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)					+ (uc)
Solanum nigrum (black nightshade)	- (uc)				
Lamiaceae (dead nettle family)			- (uc)		
Galeopsis sp. (hemp-nettle)	+ (uc)	- (uc)	- (uc)		- (uc)
Ajuga reptans (bugle)			- (uc)		
Cardus / Cirsium spp. (thistles)	+ (uc)		- (uc)		
Lapsana communis (nipplewort)		- (uc)	- (uc)	- (uc)	
Anthemis cotula (stinking chamomile)		+ (uc)	+ (uc)		
Glebionis segetum (corn marigold)	+ (uc)	+ (uc)	- (uc)	- (uc)	+ (uc)
Sambucus nigra (elder)		- (uc)	+ (uc) -	- (uc)	
Aethusa cynapium (fool's parsley)				- (uc)	
Conium maculatum (hemlock)	+ (uc)	- (uc)		- (uc)	- (uc)
Juncus spp. (rushes)					+++ (uc)
Carex spp. (sedges)	++ (uc)	+ (uc)	+++ (uc)	++ (uc)	- (uc)
Poaceae (grasses)				+	
Other plant material*					
Bryophyta (mosses)		- (uc)			
Wood and wood charcoal*					
>4mm round wood fragments	+	-	-	-	
>4mm wood fragments	+++++	++++	++++	+++	++++

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
2-4 mm round wood fragments		-	-	-	
2-4 mm wood fragments	++++	++++	+++++	++++	+++++
<2 mm wood fragments	+++++	+++++	+++++	+++++	+++++
> 4mm round wood charcoal fragments					
> 4mm wood charcoal fragments		-		-	+
2-4 mm wood charcoal fragments		-	+	++	++
<2mm wood charcoal fragments	+++	+++	++++	+++	++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)		DP		RP & DP	DP
Non plant material*					
Coleoptera (beetle macrofossils)	+++	+++	+++	+++	+++
Invertebrate puparia		-			

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 9

Context number	9011
Feature number	9007
Sample number	9000
Context type	Moat fill
Date	Medieval
Sample volume (litres)	40
Flot volume (ml)	3
*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (ch = charred)	
Wild / weed plant seeds*	
Betula pendula (birch) seed	-
Hyoscyamus niger (henbane)	+
Lamiaceae (dead nettle family)	-
Sambucus nigra (elder)	++
Wood and wood charcoal*	
2-4 mm wood charcoal fragments	+
<2mm wood charcoal fragments	++++

Context number	9011
Feature number	9007
Sample number	9000
Context type	Moat fill
Date	Medieval
Sample volume (litres)	40
Flot volume (ml)	3
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP
Non plant material*	
Mollusca (land snails)	++++

Trench 10

Context number	10049	10067	10071	10072	10073	10075	10076	10078
Feature number		10065				10065	10065	10065
Sample number	10000	10006	10004	10003	10005	10007	10008	10009
Context type	Made ground	Redeposited natural	Made ground (bank of moat)	Deposit (bank of moat)	Deposit (bank of moat)	Tertiary deposit in moat	Secondary fill in moat	Secondary fill in moat
Date	18th – 19th C	17th C?	13th – 15th C	13th – 15th C	13th – 15th C	17th C?	Late medieval	Late medieval
Sample volume (litres)	10	15	40	40	40	15	27	36
Flot volume (ml)	10	2	5	8	1	3	20	5
Cereals and other economic plants*								
Cereal indeterminate grain					-			
Wild / weed plant seeds*								
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)						- (uc)		
Rubus fruticosus agg. (bramble / blackberry)						- (uc)	+ (uc)	- (uc)
Urtica dioica (common nettle)						++ (uc)	+++ (uc)	++ (uc)
Betula pendula (birch) seed		- (uc)	+ (uc)	- (uc)	- (uc)	- (uc)	+ (uc)	+ (uc)
Betula pendula (birch) bract							- (uc)	- (uc)
Rumex spp. (docks)						+ (uc)		
Lamiaceae (dead nettle family)			- (uc)			+ (uc)	- (uc)	
Glebionis segetum (corn marigold)							- (uc)	
Sambucus nigra (elder)		++ (uc)		- (uc)	- (uc)	+ (uc)	++ (uc)	+ (uc)

Context number	10049	10067	10071	10072	10073	10075	10076	10078
Feature number		10065				10065	10065	10065
Sample number	10000	10006	10004	10003	10005	10007	10008	10009
Context type	Made ground	Redeposited natural	Made ground (bank of moat)	Deposit (bank of moat)	Deposit (bank of moat)	Tertiary deposit in moat	Secondary fill in moat	Secondary fill in moat
Date	18th – 19th C	17th C?	13th – 15th C	13th – 15th C	13th – 15th C	17th C?	Late medieval	Late medieval
Sample volume (litres)	10	15	40	40	40	15	27	36
Flot volume (ml)	10	2	5	8	1	3	20	5
Carex spp. (sedges)						- (uc)	- (uc)	
Wood and wood charcoal*								
>4mm wood fragments							+	-
2-4mm wood fragments							++	
> 4mm wood charcoal fragments	-						+	-
2-4 mm wood charcoal fragments			-	++			-	
<2mm wood charcoal fragments	++	++	++++	+++++	++++	++	++	+++
>1mm vitrified charcoal fragments	++	+	+		-	+	-	
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	DP	Indet.	RP	RP	Indet.	Indet.	RP some DP	RP
Non plant material*								
Slag / metallurgical debris	-					-		

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Trench 11

Context number	11022	11036
Feature number	11028	11035
Sample number	11001	11002
Feature type	Made ground	Made ground
Date	19th C	19th C
Sample volume (litres)	40	40
Flot volume (ml)	60	20
Wild / weed plant seeds*		
Rubus fruticosus agg. (bramble / blackberry)		- (uc)
Urtica dioica (common nettle)		+ (uc)

Context number	11022	11036
Feature number	11028	11035
Sample number	11001	11002
Feature type	Made ground	Made ground
Date	19th C	19th C
Sample volume (litres)	40	40
Flot volume (ml)	60	20
Betula pendula (birch) seed		- (uc)
Hyoscyamus niger (henbane)		- (uc)
Lamiaceae (dead nettle family)	++ (uc)	++ (uc)
Sambucus nigra (elder)	+++ (uc)	++ (uc)
Carex spp. (sedges)	+ (uc)	
Wood and wood charcoal*		
2-4 mm wood charcoal fragments	+	
<2mm wood charcoal fragments	+++++	
>1mm vitrified charcoal fragments	++++	+
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	
Non plant material*		
Mollusca (land snails)	+	+++
Slag / metallurgical debris	+	

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Appendix 5: Geoarchaeological sample data

Sediment descriptions sample 3010

Location:201540 Sheffield Castle	Monolith sample:3010	Drawing: 3010	Comments: Sample through series of redeposited natural layers	
Depth	**Context**	**Sediment description**	**Interpretation**	
0-0.07m	-	VOID		
0.07-0.31m	3058	Fairly firm 2.5Y 4/3 olive brown, clay silt. Occasional small-large subangular siltstone pebbles and small stones, very occasional flint. Some iron staining present. Clear, wavy lower boundary. Troels-Smith classification: Argilla granosa (Ag)3, Argilla steatodes (As)1 Nigror (Nig.)1 Stratificatio (Str.)0 Elasticitas (Elas.)0 Siccitas (Sicc.)3	Some redoximorphic activity, low energy deposition	Construction layers associated with earthwork
0.31-0.62m	3074	Firm 2.5Y 4/3 olive brown, clay silt. Occasional small-large subangular siltstone pebbles and small stones, very occasional flint, occasional-moderate medium grey clay patches. Some iron staining present. Clear, wavy lower boundary. Slightly greyer than unit above. Troels-Smith classification: Ag3, As1 Nig.1 Str.0 Elas.0 Sicc.3 Limes superior (Lim.)0	As above but the clay patches suggest higher energy or anthropogenic intervention	
0.62-0.72m	3070	Fairly firm 2.5Y 4/3 olive brown, clay silt. Occasional charcoal flecks and fragments, occasional medium subrounded sandstone pebbles. Some iron staining. Gradual, wavy lower boundary. Troels-Smith classification: Ag3, As1 Nig.1 Str.0 Elas.0 Sicc.3 Lim.0	As above and charcoal suggests human activity, at least in the vicinity	

Location:201540 Sheffield Castle	Monolith sample:3010	Drawing: 3010	Comments: Sample through series of redeposited natural layers	
Depth	**Context**	**Sediment description**	**Interpretation**	
0.72-0.85m	3070	Fairly firm 2.5Y 4/3 olive brown, clay silt. Occasional charcoal flecks, occasional large subrounded sandstone pebbles, occasional-moderate large grey clay patches. Occasional iron staining. Abrupt, wavy lower boundary. Troels-Smith classification: Ag3, As1 Nig.1 Str.0 Elas.0 Sicc.3 Lim.0	As above	
0.85-0.95m	3063	Firm 2.5Y 4/4 olive brown, clay silt. Occasional medium-large subangular sandstone pebbles. Occasional iron staining. Troels-Smith classification: Ag3, As1, Grana minora+ Nig.1 Str.0 Elas.0 Sicc.3 Lim.0	As above	

Troels-Smith (1955) classification: Argilla steatodes (As), Argilla granosa (Ag), Grana minora (Gmin), Grana majora (Gmaj) - 0=absence of, 4=maximum; Nigror (Nig.), Stratificatio (Str.), Elasticitas (Elas.), Siccitas (Sicc.), Limes superior (Lim.); Nig. 0=white, 4=black; Str. 0=homogeneous, 4=strong laminations; Elas. 0=clay, 4=peat, Sicc. 0=water, 4=dry; Lim. 0=>1cm, 1=<1cm and >2mm, 2=<2mm and >1mm, 3=<1mm and >0.5mm, 4=<0.5mm.

Sediment descriptions sample 3011

Location: 201540 Sheffield Castle	**Monolith sample:3011**	**Drawing: 3008**	**Comments: Sample through redeposited natural layers**	
Depth	**Context**	**Sediment description**	**Interpretation**	
0-0.13m	-	VOID		
0.13-0.24m	3039	Fairly friable 7.5YR 2.5/1 black, silty clay. Frequent cream, sandy clay mortar inclusions, occasional charcoal flecks, occasional layers of 5YR 3/2 dark reddish brown, clay silt. Sharp, smooth lower boundary. Troels-Smith classification: Argilla steatodes (As)2 Argilla granosa (Ag)2 Nigror (Nig.)4 Stratificatio (Str.)0 Elasticitas (Elas.)0 Siccitas (Sicc.)3	Inclusions are anthropogenically derived. Layers suggest separate events.	19th–century demolition/backfill layer
0.24-0.27m	3055	Friable 7.5YR 2.5/1 black, silty fine sand. Possible laminations of silt and sand. Sharp, smooth lower boundary. Troels-Smith classification: Ag2, Grana minora (Gmin)2 Nig.4 Str.0 Elas.0 Sicc.3 Limes superior (Lim.)3	Possible laminations suggest separate events	Material redeposited after destructive event

Location: 201540 Sheffield Castle	**Monolith sample:3011**	**Drawing: 3008**	**Comments: Sample through redeposited natural layers**	
Depth	**Context**	**Sediment description**	**Interpretation**	
0.27-0.34m	3056	Fairly friable 2.5Y 4/4 olive brown, sandy silt. Mottled light yellow and light grey, sand inclusions from degraded sandstone. Occasional small-large subrounded sandstone pebbles, occasional uncharred wood (large fragment at 0.32m). Increasing sand towards base of unit. Clear, wavy lower boundary. Troels-Smith classification: Ag3, Gmin1, As+ Nig.4 Str.0 Elas.0 Sicc.3 Lim.3	Mottling is indicative of redeposited natural. Increase in sandiness is mixing with sandstone inclusions from unit below. Uncharred wood suggests human activity	
0.34-0.61m	3057/3079/3062	Fairly friable 10YR 2/1 black, clay silt. Occasional small-large degraded sandstone pebbles, moderate uncharred wood fragments, occasional vivianite flecks. Troels-Smith classification: Ag2, As2 Nig.4 Str.0 Elas.0 Sicc.3 Lim.2	Uncharred wood may be from wooden structure nearby and therefore deliberate. Vivianite indicates the presence of organic material and iron-rich sediment.	13th-century destructive event

Sediment descriptions sample 3012

Location: 201540 Sheffield Castle	Monolith sample:3012	Drawing: 3007	Comments: Sample through redeposited natural layers	
Depth	**Context**	**Sediment description**	**Interpretation**	
0.-0.10m	-	VOID		
0.10-0.17m	3055	Fairly friable 10YR 3/2 very dark greyish brown, silty clay. Very occasional small-large rounded sandstone pebbles. Clear, wavy lower boundary. Troels-Smith classification: Argilla steatodes (As)2 Argilla granosa (Ag)2 Nigror (Nig.)3 Stratificatio (Str.)0 Elasticitas (Elas.)0 Siccitas (Sicc.)4		Material redeposited after destructive event
0.17-0.26m	3056	Friable 2.5Y 4/3 olive brown, clay silt. Very occasional charcoal flecks, very occasional small-large rounded sandstone pebbles. Sharp, smooth lower boundary. Troels-Smith classification: As2, Ag2 Nig.2 Str.0 Elas.0 Sicc.4 Limes superior (Lim.)0		
0.26-0.44m	3057	Fairly friable 7.5YR 2.5/1 black, clay silt. Frequent uncharred wood fragments (large fragment at 0.26m, flat fragment at 0.43m), occasional vivianite flecks. Clear, wavy lower boundary. Troels-Smith classification: As2, Ag2 Nig4. Str.0 Elas.0 Sicc.4 Lim.4	Uncharred wood may be associated with nearby structure and therefore deliberate. Vivianite indicates presence of organic material and iron-rich sediment.	13th-century destructive event
0.44-0.54m	3079	Friable 7.5YR 2.5/1 black, clay silt. Occasional small fragments of degraded sandstone, occasional uncharred wood fragments, occasional vivianite flecks. Troels-Smith classification: As2, Ag2 Nig.4 Str.0 Elas.0 Sicc.4 Lim.0	As above	

Sediment descriptions sample 10001

Location: 201540 Sheffield Castle	Monolith sample:10001	Drawing: 10004	Comments: Sample through moat	
Depth	**Context**	**Sediment description**	**Interpretation**	
0-0.05m	-	VOID		
0.05-0.59m	10048	Firm 2.5Y 3/3 dark olive brown, silty clay. Occasional charcoal flecks, occasional manganese flecks and fragments increasing with depth. occasional clay patches (light orangeish yellow), occasional small-large sandstone pebbles. Troels-Smith classification Argilla granosa (Ag)3, Argilla steatodes (As)1, Grana minora (Gmin)+ Nigror (Nig.)3 Stratificatio (Str.)0 Elasticitas (Elas.)1 Siccitas (Sicc.)3	Mixing of inclusions and clay patches suggests higher energy deposition (possibly human)	18th-century levelling layers
0.59-0.89m	10050	Firm 2.5Y 4/4 olive brown, silty clay. Mottled light brown and mid orange with small clay patches (light grey and light yellow). Occasional charcoal flecks, very occasional small-large sandstone pebbles and large subrounded sandstone stones. Abrupt, smooth lower boundary. Troels-Smith classification: Ag2, As2, Gmin+ Nig.2/3 Str.0 Elas.0 Sicc.4 Lim.3	As above	
0.89-0.93m	10050	Stiff 10YR 4/6 dark yellowish brown, silty clay. No inclusions. Abrupt, wavy lower boundary. Troels-Smith classification: As3, Ag1 Nig.2 Str.0 Elas.0 Sicc.4 Lim.2		
0.93-0.98m	10050	Stiff 2.5Y 4/4 olive brown, silty clay. Very occasional small pebbles/pea gravel. Troels-Smith classification: Ag2, As2 Nig.2/3 Str.0 Elas.0 Sicc.3 Lim.3		

Sediment descriptions sample 10002

Location: 201540 Sheffield Castle		**Monolith sample:10002**	**Drawing: 10006**	**Comments: Sample through moat**	
Depth	**Context**	**Subsamples**	**Sediment description**	**Interpretation**	
0-0.40m	10066/10067	Microfossils (pollen, diatoms) Macrofossils	Homogeneous stiff 2.5Y 4/4 olive brown, silty clay. Occasional charcoal flecks and fragments, moderate clay patches, moderate small-large sandstone and siltstone pebbles, occasional degraded sandstone, occasional manganese flecks and fragments. Troels-Smith classification: Argilla granosa (Ag)2, Argilla steatodes (As)2, Grana minora (Gmin)+ Nigror (Nig.)3 Stratificatio (Str.)0 Elasticitas (Elas.)1 Siccitas (Sicc.) 3	Colour indicates oxidation. Inclusions suggest deliberate infilling. Manganese concretions indicate gleying/ wetting & drying	17th-century slighting debris

Appendix 6: OASIS form

OASIS ID: wessexar1-322479

Project details

Project name	Sheffield Castle, Sheffield
Short description of the project	Wessex Archaeology were commissioned by Sheffield City Council to undertake an archaeological evaluation and borehole survey at the site of Sheffield Castle. Clean clay deposits likely represented earthwork defences including the bank of the moat and a possible motte. The courtyard surface of the castle was excavated. A substantial medieval sandstone foundation was accompanied by layers of redeposited clay. Medieval layers post-dating the partial demolition of the foundation were rich in organic material. Medieval moat fills were reached only below 5.75 m BGL. The outer side of the moat was formed by a bank of clay at a lower level than the rock-cut inner side recorded by previous excavation. Demolition deposits perhaps associated with the civil war were recorded in the moat. However, the majority of the depth of moat fills comprised 19th century material. The base of the moat was not reached. An assemblage of medieval pottery was recovered. 18th century levelling layers and walls were probably associated with a bowling green known from historic maps. The remains of 19th-century structures chiefly included walls but also surfaces and other structures associated with steelworks, a tea warehouse and a wheelwright's shop. Structures in the east of trench 1 were likely associated with an adjacent but unexcavated cementation furnace.
Project dates	Start: 13-08-2018 End: 19-10-2018
Previous/future work	Yes / Not known
Any associated project reference codes	201540 - Contracting Unit No.
Type of project	Field evaluation
Site status	Listed Building
Current Land use	Vacant Land 1 - Vacant land previously developed
Monument type	CASTLE Medieval
Monument type	MOAT Medieval
Monument type	STEELWORKS Post Medieval
Significant Finds	POTTERY Medieval
Significant Finds	EAR SCOOP Medieval
Methods and techniques	''Environmental Sampling'',''Sample Trenches'',''Targeted Trenches''
Development type	Not recorded
Prompt	Voluntary/self-interest
Position in the planning process	Pre-application

Project location

Country	England
Site location	SOUTH YORKSHIRE SHEFFIELD SHEFFIELD Sheffield Castle
Postcode	S1 2AD
Study area	1.34 Hectares
Site coordinates	435788 387680 435788 00 00 N 387680 00 00 E Point
Height OD / Depth	Min: 49m Max: 56m

Project creators

Name of Organisation	Wessex Archaeology
Project brief originator	Wessex Archaeology
Project design originator	Wessex archaeology
Project director/manager	Milica Rajic
Project supervisor	Ashley Tuck
Type of sponsor/funding body	City Council
Name of sponsor/funding body	Sheffield City Council

Project archives

Physical Archive recipient	Museums Sheffield
Physical Contents	''Animal Bones'',''Ceramics'',''Glass'',''Industrial'',''Leather'',''Metal'',''Wood'',''Worked bone'',''Worked stone/lithics''
Digital Archive recipient	Museums Sheffield
Digital Contents	''none''
Digital Media available	''Images raster / digital photography'',''Text''
Paper Archive recipient	Museums Sheffield
Paper Contents	''none''
Paper Media available	''Context sheet'',''Diary'',''Drawing'',''Matrices'',''Miscellaneous Material'',''Notebook - Excavation',' Research',' General Notes'',''Photograph'',''Plan'',''Report'',''Section''

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)

Title	Sheffield Castle, Sheffield: Archaeological Evaluation Interim Report
Author(s)/Editor(s)	Tuck, A.
Other bibliographic details	201540.02
Date	2018
Issuer or publisher	Wessex Archaeology
Place of issue or publication	Sheffield
Description	A4 laser printed report
Entered by	Ashley Tuck (a.tuck@wessexarch.co.uk)
Entered on	9 November 2018

Appendix 7: Unedited external specialist reports

Chris Cumberpatch
Pottery

Sheffield Castle 2018

Preliminary notes and observations

The medieval pottery included Hallgate A ware (present but rare in the Butcher Archive) and small quantities of Humberware and other regional types, but consisted primarily of white-firing Coal Measures wares, most probably of local origin, which have been classified as Sheffield-type ware, based on comparison with sherds from the Norfolk Street pottery. The problem with this is that the Norfolk Street assemblage was very small and as a result the range of variation in the products of this pottery is unknown (compare Brackenfield with nineteen fabric variants). It is not impossible that the products of other potteries (which were also exploiting Coal Measures clays) resembled the Sheffield type wares; there is certainly a high degree of similarity with the Coal Measures Finewares found elsewhere in South Yorkshire. These matters are discussed in the report on the Butcher Archive and will be revisited in more detail in the final report.

The medieval assemblage included several hand-made sherds – further evidence of a phase of hand-made pottery production in northern England in the mid 11th to early mid 12th century, also identified in Durham, Wetherby, Doncaster, Ripon and elsewhere but as yet not incorporated into the overall regional narrative. There is an unresolved issue of the relationship between these wares and the more technically sophisticated Yorkshire Gritty wares and Pontefract Stamford wares. Related to this is the problem of the dating of the Hallgate wares. Date ranges cited in the tables follow the traditional scheme but there is increasing evidence that this is unsatisfactory and this will be discussed in the final report.

The assemblage consists primarily of medieval and late early modern to recent material. Although not entirely absent, pottery dating to the later post-medieval period (C17th) is sparse, in direct contrast to the situation with the Butcher Archive in which deposits interpreted as post-civil war demolition were very prominent and contained large quantities of pottery.

The 18th and 19th century component shows characteristics similar to those seen in many assemblages from Sheffield. Some of these are the results of the distinctive patterns of discard and reuse which result from the use of refuse depots and the reuse of waste as building material although the nature of the site might have introduced other factors into the processes of site formation. These will be discussed in the full report.

SD White and DA Higgins
Clay tobacco pipe

Assessment of the Clay Tobacco Pipes from Sheffield Castle, Sheffield, South Yorkshire (Project Code 201540)

Dr S D White & Dr D A Higgins
University of Liverpool Hon. Res. Fellows
23 January 2019

1. Background

1.1 This assessment considers the clay tobacco pipes recovered by Wessex Archaeology from excavations at Sheffield Castle (Project Code 201540).

1.2 In their *Research Priorities for Post-Medieval Archaeology*, the Society for Post-Medieval Archaeology have identified the systematic collection of clay tobacco pipes as an area of particular importance where more work is needed (Anon 1988, 6).

1.3 For many years the North-east of England, and in particular Yorkshire, remained little studied so far as pipe research is concerned. This has been partly remedied by PhD research focussing on certain aspects of the clay tobacco pipe industry in Yorkshire during the seventeenth and eighteenth centuries (White 2004). Excavations carried out in more recent years in and around Sheffield are starting to provide more material from the end of the eighteenth century and nineteenth century, allowing pipe researchers to draw up a clearer picture of pipe production and usage in the city at this time. Regional synthesis and discussion of the late eighteenth and nineteenth century material from elsewhere in Yorkshire however, remains poorly represented.

2. Description of the Finds

2.1 The excavations at Sheffield Castle produced a total of a total of 662 clay tobacco pipe fragments consisting of 73 bowls, 569 stems and 20 mouthpieces. This material was recovered from 59 pipe-bearing contexts and 10 unstratified deposits.

2.2 The majority of the pipe fragments are plain stems, but there are a number of eighteenth-century roll-stamped name marks that can be attributed to makers from Rotherham such as William Wild, Thomas Wild, Benjamin Marsden and Richard Scorah (White 2015).

2.3 A small number of the plain bowls from the excavations have makers' initials stamped on the bowl facing the smoker. These include the initials TW which is almost certainly Thomas Wild of Rotherham (*fl. c.*1777). One of the roll-stamped stems from Context 6026 is a rare survival in that it joins with a bowl, allowing the associated bowl form to be determined.

2.4 Context 6026 is the largest group from the excavation. This context contains some mid- to late-seventeenth century material including one bowl with a milled heel and two with stamped marks (a gauntlet and a crowned IW). The gauntlet mark is particularly unusual for Yorkshire and may represent a local attempt to copy one of the famous Gauntlet pipes from Wiltshire. There is also a seventeenth century stem that has been repaired during manufacture, leaving a distinctive flaw in the stem. The majority of the finds, however, date from the eighteenth century and include some bowls of *c*1710-50 with long surviving stems suggesting fresh and little disturbed deposits of this date. The group also contains a number of different eighteenth century roll-stamped stems and a very early glazed mouthpiece, supporting the suggestion from other excavations that the use of glazed tips originated in this area. Many of the eighteenth-century pipes are finely burnished, showing that good quality pipes were in use on the site at this time.

2.5 A total of 17 of the bowl fragments from the excavations are decorated. Some of these simply have a band of leaves along the bowl seams, but others are more elaborately decorated, for example, the Armorial bowl from Context 6033, which also bears the name of the maker WILL WILD. The earliest mould decorated bowl from the site includes a series of enclosed scallops with a stag's head on the seam facing the smoker. Pipes decorated with this particular motif appear throughout Yorkshire and this is a design that is known to have been produced by Samuel Lumley of Doncaster *c*1790. Context 6026 also produced an elaborately decorated late eighteenth century bowl with the moulded maker's initials PR that provides the full design for a type that was previously only known from fragments.

2.6 The following table gives a context summary showing the number of bowls (B), stems (S) and mouthpieces (M) from each context as well as the number of marked (Marks) or decorated fragments (Dec). In addition, a broad date range is given for each context followed by the most likely date of deposition. General comments relating to each individual context are also given.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
1002			2		***2***	1700-1820	1750-1820	-	-	Plain stems, one finely burnished.
1003		1	4	1	***6***	1750-1880	1830-1860	-	Leaf dec seams	Plains stems; one brown glazed mouthpiece all late C18th/C19th single bowl fragment has leaf decorated seams.
1004			1		***1***	1700-1800	1700-1800	-	-	Plain stem.
1005			2		***2***	1760-1850	1800-1850			Plain stems, one appears to be burnished and is C18th the other is C19th
1006		6	48		***54***	1760-1840	1800-1840	x2 GW bowl mark; x1 THO WILD stem mark; X1 cut mark on heel	x1 flute and panel	48 stems (29 of which are burnished); 1 *c*1600-1680 heel bowl with a cut mark across the heel; x3 (totalling 4 fragments) *c*1740-1780 spur bowl two marked with a GW bowl mark.; x1 C19th bowl fragment. Good group with the exception of the later mould decorated bowl, which appears to be intrusive.
1007		1	4		***5***	1650-1680	1650-1670			Consistent C17th group with a plain heel bowl and stems with large stem bores.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
1008			3		***3***	1800-1900	1800-1900			Plain C19th stem fragments.
1013			1		***1***	1700-1800	1700-1800			Plain stem. Bag also has two fragments of bone.
1034		1	1		***2***	1800-1880	1830-1860			Plain spur bowl and plain stem.
2019			1		***1***	1750-1820	1750-1820			Plain stem late C18th or early C19th
2020		1	2		***3***	1780-1840	1780-1840			Plain bowl C19th bowl fragment (highly fired); two plain stems one with traces of brown glaze, both from long-stemmed pipes.
3015			3		***3***	1640-1850+	1850+			Three plain stem fragments one C17th, C18th, and one C19th. The C19th fragment is just flaring out into a nipple mouthpiece from a short-stemmed cutty type pipe dating 1850 or later.
4002			1		***1***	1790-1820	1790-1820			Plain and very poorly executed long-stem with a ground end.
4007			7		***7***	1780-1830	1800-1830			Plain stems, one C18th fragment the rest C19th, one of which has traces of brown glaze.
4008		3	13		***16***	1760-1860	1830-1860		Leaf decorated seams	C18th heel bowl which is burnished; x2 C19th bowl fragments, most complete of which has leaf decorated seams; stems are all plain but at least two are burnished and would be contemporary with the C18th bowl fragment.
4008			2		***2***	1790-1850	1790-1850			Plain C19th stem fragments.
4009		1	10	2	***13***	1800-1900	1850-1900		Basket	C19th mould decorated basket design bowl with joining stem; rest of the stems are plain and poorly made but appear to be from long-stemmed pipes; the two mouthpieces are both nipple type from a short-stemmed cutty pipe.
4010		1	17		***18***	1780-1850	1780-1850			Plain bowl fragment and plain stems. Some of the stems are late C18th but the bulk are C19th. The bowl fragment has been sanded and would have had a meerschaum wash originally. Group includes one piece of bone.
4024		3	8		***11***	1780-1850	1800-1850		x1 Basket; x1 ribbed seam	Two of the bowls have moulded decoration, the third is plain. The stems are also plain and most appear to be C19th some are quite long pieces clearly from long-stemmed pipes.
4036			10		***10***	1650-1840	1800-1840			Group of plain stems one is clearly C17th century, rest are late C18th or early C19th. One fragment appears to have a ground end.
4037		1	3		***4***	1800-1850	1800-1850			Large plain C19th bowl with a distinctive internal bowl cross; The stems are plain and appear to be from long-stemmed pipes.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
4040		3	7		***10***	1750-1860	1850-1860	x1 moulded FC spur mark	Leaf decorated seams	C19th mould decorated bowl with elaborate leaf decorated seams and the moulded makers initials FC - likely to be Frederick Cartwright (1854-1860) - the F initial is upside-down; two other C19th spurs and plain stems. Group includes a piece of bone.
4042			6		***6***	1790-1850	1790-1850			Plain C19th stem fragments.
4052		1	4		***5***	1800-1850	1800-1850			Plain C19th spur bowl fragmnt and four plain stems two with fresh breaks but no joins.
4086			1		***1***	1740-1800	1740-1760			Plain burnished C18th stem fragment.
4088			8		***8***	1790-1850	1790-1850			Plain C19th stem fragments.
4095			7		***7***	1790-1850	1790-1850			Plain C19th stem fragments.
4104			1		***1***	1790-1850	1790-1850			Plain C19th stem fragment.
4106			1		***1***	1740-1760	1740-1760	WILD stem mark		C18th marked stem.
4108			1		***1***	1790-1850	1790-1850			Plain C19th stem fragment.
4109		1	1		***2***	1740-1800	1740-1800			Burnished bowl and stem fragment.
4115			26		***26***	1780-1850	1800-1850			Group of plain stems three with traces of brown glaze.
4117			2		***2***	1750-1850	1750-1850			Two plain stems - one C18th one C19th
5005		1	15		***16***	1640-1850	1800-1850			Single C18th bowl fragment; all stems are plain and include C17th, C18th and C19th fragments.
5023			1		***1***	1730-1800	1730-1800			Single C18th stem fragment.
5024			12		***12***	1750-1850	1750-1850			Group of plain stems from the C18th and C19th.
5029			4		***4***	1650-1850	1800-1850			Group of plain stems including C17th and C19th fragments.
5031		1	14		***15***	1660-1800	1780-1800	x1 Roll stamp stem		Small group of fragments of mixed date. C17th heel fragment with joining stem (fresh break) and a number of plain stems of late C17th, C18th and early C19th date. Includes one C18th stem fragment with a roll stamp mark.
5034			3		***3***	1750-1850	1800-1850			Plain C19th stems.
6006		3	11	1	***15***	1680-1830	1780-1830	x1 milled heel		Mixed group with x2 C17th bowl fragments and a single C19th bowl/stem junction. The stems and mouthpieces are all plain and mixed C17th-early C19th date.
6007		1	3		***4***	1750-1800	1780-1800	x1 TW bowl stamp		Nice marked C18th bowl, possibly a product of Thomas Wild of Rotherham. Stems more likely to be early C19th but from a long-stemmed pipe.
6011		2	11		***13***	1640-1800	1780-1800	1x milled heel; x2 stem stamps incl. WILL WILD		Small group of fragments of mixed date. C17th heel bowl; C18th marked stems and plain C19th stem fragments. Group includes one piece of bone.
6013			5		***5***	1750-1800	1750-1800			Plain stems mostly C18th burnished examples, but there is

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
										a single C19th plain stem.
6014			6		***6***	1680-1780	1750-1780	x1 THO WILD stem stamp		Group of stems mainly late C18th or early C19th including one marked with a THO WILD stem mark.
6016			7		***7***	1750-1850	1750-1850			Plain stems of late C18th or early C19th date.
6026		26	167	15	***208***	1610-1800	1770-1800	x3 moulded spur marks OO and x1 ring and dot; x1 mould decorated bowl PR; x2 TW bowl stamps; x1 W bowl stamp; x1 gauntlet heel stamp; x 1 crowned IW heel stamp; x6 WILL WILD stem stamps; x1 THO WILD stem stamp; x1 SCORA stem stamp; x1 BENJAMIN MARSDEN stem stamp; x2 other stem stamps; x1 milled heel	x3 enclosed flutes (x1 with a stag's head); x1 floral decoration (mould has been altered)	Very good C18th group many of which are marked or decorated. Excavations in Tenter Street, Sheffield produced a similar bowl fragment to the mould decorated PR fragment in this group.
6030		3	22		***25***	1640-1830	1800-1830	x1 milled heel; x1 moulded heel marks OO; x1 stamped stem	floral bowl with LDS	Small group of fragments of mixed date. C17th bowl with a milled heel and x2 plain stems; C18th bowl fragment with a moulded OO mark and a x1 roll stamp stem; rest plain stems of early C19th date.
6033		1	6		***7***	1750-1830	1800-1830	x1 Moulded bowl mark WILL WILD	Armorial bowl with WILL WILD moulded lettering	Nice armorial bowl fragment marked WILL WILD which has an internal bowl cross; the rest of this group is made up of late C18th-early C19th plain stems.
7017		1	1		***2***	1750-1860	1830-1860	x1 WILL WILD stem stamp		Single C18th marked stem and a plain C19th bowl.
10025		1	12		***13***	1650-1850	1800-1850		x1 mould decorated bowl ?acorn/hoof	Small fragment of C19th mould decorated bowl; rest of group plain stems of mixed late C17th to C19th date.
10041			1		***1***	1610-1700	1640-1700			Plain C17th stem fragment.
10055			1		***1***	1800-1850	1800-1850			Plain C19th stem fragment.
11003			1		***1***	1780-1830	1780-1830			Plain stem fragment of late C18th or early C19th.
11018			1		***1***	1700-1800	1700-1800			Stem of possible C18th date; heavily encrusted.

Ctxt	SF	B	S	M	*Tot*	Range	Deposit	Marks	Dec	Comments
11020		3	2		***5***	1750-1800	1780-1800			Three joining bowl fragments from a late C18th bowl; the stem fragments are both plain and could be late C18th or early C19th.
11021		1	5		***6***	1650-1830	1800-1830	x1 moulded ring and dot spur mark		Small mixed group of fragments. Single stem that is likely to be C17th; x2 plain stems and a bowl fragment with a moulded ring and dot mark from the C18th and x2 plain C19th stems.
11022	11001	1	6		***7***	1610-1800	1700-1800			Small group of tiny fragments but all appear to be C18th although there is one burnt stem fragment that could be C17th or C18th.
11024		3	5		***8***	1780-1840	1820-1840		x1 enclosed flutes bowl with a stag's head; x2 floral decorated bowls (possibly from the same mould)	Three mould decorated bowls x1 late C18th and x2 C19th; all the stems are plain and of C19th date from long-stemmed pipes.
11025			1		***1***	1750-1800	1750-1800			Plain late C18th stem.
11036	11002		1		***1***	1750-1850	1750-1800			Plain stem of late C18th or early C19th date.
u/s			2		***2***	1800-1900	1800-1900			Plain C19th stem fragments.
u/s		1	9		***10***	1800-1850	1800-1850			C19th group which includes a spur fragment and a piece of stem with traces of moulded decoration; all other stems are plain.
u/s			1		***1***	1800-1850	1800-1850			Plain C19th stem.
u/s			1		***1***	1780-1850	1780-1850			Plain late C18th or early C19th stem.
u/s			3		***3***	1800-1850	1800-1850			Plain C19th stems.
u/s			6		***6***	1800-1920	1870-1920			Plain stems mostly C19th; one fragment is from a short-stemmed pipe and has traces of brown varnish dating it to late C19th or early C20th.
u/s			12	1	***13***	1650-1850	1800-1850			Plain stems dating from mid to late C18th to C19th; one fragment has traces of brown glaze. The single mouthpiece is most likely from a long-stemmed pipe.
U/S TR3			1		***1***	1800-1850	1800-1850			Plain C19th stem.
u/s TR4			1		***1***	1790-1830	1790-1830			Plain late C18th or early C19th stem.
u/s TR5			1		***1***	1700-1800	1750-1800			Plain C18th stem.
Totals:		***73***	***569***	***20***	***662***					

3. Assessment of the Pipes

3.1 Pipe fragments offer one of the most accurate and reliable classes of artefact for dating deposits of this period. The excavated pipes should be able to provide a valuable contribution to the identification and phasing of these contexts.

3.2 Clay tobacco pipes also have two other significant attributes; their regional diversity allows them to be used to study trade and marketing contacts while differing qualities allow for an examination of social status. Although only a relatively small number of marked pipes are present in this assemblage they should be able to go some way towards assessing the catchment area from which services and supplies were drawn.

3.3 The earliest bowl fragments recovered from the site date from *c*1660-1680. All the other bowls from the site appear to date from the early eighteenth century through to the mid to late nineteenth century and include some interesting decorated fragments.

3.4 A number of the stems recovered from the excavation are nicely burnished eighteenth-century types with makers' names included on them.

4. Recommendations for Study

4.1 The pipe fragments should be individually examined to check for any further marked or decorated pieces and to check the provisional dating given above. The context summary should be updated as necessary.

4.2 There is probably little more that can be said about the plain stems from the assemblage than has already been presented in the table in section 2.6 above. However, the assemblage from excavations as a whole, and in particular context 6026, does include a number of interesting marked and decorated bowl fragments ranging from the seventeenth to early nineteenth century, some of which are previously unrecorded. It would therefore be worth examining and recording all the bowl fragments and any marked stems in more detail so as to make them directly comparable with other excavated finds from the region.

4.3 Illustrations for publication at 1:1 should be prepared of selected marks, bowl forms and decorated fragments, particularly those that are previously unrecorded. It is estimated that approximately ten drawings will be required for the final report.

4.4 A publication report should be prepared to describe the assemblage as a whole, highlight the most important elements and set the group as a whole in its broader context. This report should describe the work carried out and present a synthesis of the pipe evidence from the site.

11.3 References

Anon, (1988) *Research Priorities for Post-Medieval Archaeology*¸ Society for Post-Medieval Archaeology, 9pp.

White, S. D., (2004) *The Dynamics of Regionalisation and Trade: Yorkshire Clay Tobacco Pipes c1600-1800*, in P. Davey and D. A. Higgins (eds.) The Archaeology of the Clay Tobacco Pipe, **XVIII**, British Archaeological Reports (British Series 374), Oxford, 567pp.

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Morgan Windle
Animal bone

Sheffield Castle faunal remains: preliminary assessment

1.1 Material and Methods

Excavations at Sheffield Castle yielded a very small assemblage of faunal remains consisting of 1074 fragments (7.9kg). Due to the small amount of material, the entire assemblage was analyzed at once and entered into a Microsoft Access database. Fields for the database included, but were not limited to: trench, context, preservation, element, side, taxon, taphonomic modifications (i.e butchery and/or gnawing), ageing, as well as measurements and a notes field. This was concurrent with the recording protocol established at the outset of analysis and loosely follows Davis (1992) and Albarella & Davis (1994). A 'diagnostic zone approach' was used, which means that only a pre-determined list of specific anatomical zones were regularly recorded; when 50% or more of that area was preserved (cf. Watson 1979; Serjeantson 1991; Davis 1992). Specimens that were regarded of interest but did not belong to a 'diagnostic zone' were still recorded (as 'non-countable') but not used in quantifications. Zones used for recording will be provided in the final report.
Due to the very small size of the assemblage, it was agreed that it was not worthwhile to produce a formalized assessment report, that all material would be studied in one go, and preliminary observations would be provided in the current report. Once the full contextual information will become available, it will be possible to move observations in this preliminary report to the final one.

1.2 Preliminary Observations

A variety of species were identified across the stratigraphic phases at Sheffield Castle (**Table 1**). The assemblage was primarily associated with post-medieval and early modern deposits. A small number of specimens were attributed to the medieval occupation of the site.
The three main domesticates (cattle, sheep, and pig) were represented by post-cranial bones and teeth in all phases. Teeth of domesticates were better represented than post-cranial bones and a high proportion of teeth were isolated. Though faunal remains from medieval contexts were few, they notably yielded fallow deer (4111), and woodcock (3057) remains. To comment more fully on the presence of these species and their relevance to the Medieval occupation, more detailed contextual information on the deposits will be needed. Canids (i.e. Dog/fox) species and horse were also present specifically in the 13th-15th century moat bank deposits (10071).
A high proportion of bone in post-medieval and early modern contexts was not identifiable to species due to anthropogenic modification. This was evidenced by sawing and cutting on a variety of post-cranial bones, a worked antler (6026), working debris (E.g. 4090), and incomplete or broken implements (2007; 4024; 4036; 4040; 4108). The 20th century contexts 6026 and 6033 yielded Galliformes (probably chicken) and contexts 1002 and 1003 Gadidae (cod) species in addition to cattle, sheep, and pig.

1.3 Final Report Recommendations

In addition to the small sample of bones produced from the excavation, anthropogenic modification and other taphonomic processes meant that preservation of the faunal remains was variable. This very small sample size limits the analysis of animal husbandry and management practices throughout the occupation of the site, but other points of interest can be raised.

An important aspect of the post-medieval and early modern components of the assemblage is the presence of Cervidae post-crania in 18th/19th century and 20th century deposits. This may suggest residual bones from earlier occupations are present in later phases at Sheffield Castle, but requires further investigation. The species present in medieval deposits indicate a potential to comment on status related activity of the site. A more comprehensive analysis and interpretation of the observations (1.2) will be completed for the final report.

References

Albarella U. & Davis S.J.M. 1994. *The Saxon and Medieval animal bones excavated 1985-1989 from West Cotton, Northamptonshire*. AML Report 17/94.

Davis S.J.M. 1992. *A rapid method for recording information about mammal bones from archaeological sites*. AML Report 19/92.

Serjeantson, D. (1991). 'Rid Grasse of Bones': a taphonomic study of the bones from midden deposits at the Neolithic and Bronze Age site of Runnymede, Surrey, England. *International Journal of Osteoarcheology*. 1, 73-89.

Watson, J.P.N. (1979). The estimation of the relative frequencies of mammalian species: Khirokitia 1972. *Journal of Archaeological Science*. 6, 127-137.

Table 1: List of specimens recorded according to trench. U/S= unstratified.

Species	Tr. 1	Tr. 2	Tr. 3	Tr. 4	Tr. 5	Tr. 6A	Tr. 9?	Tr. 10	Tr. 11	U/S	Total
Bos taurus (cattle)	24			4	3	15	1	22		2	71
cf. *Bos/Cervus* (cattle/red deer)						1					1
cf. *Bos/Equus* (cattle/horse)						1					1
Ovis aries (sheep)				1		2					3
cf. *Ovis/Capra* (sheep/goat)	1			1	2	5		2	2	1	14
Equus caballus (horse)				4				8	2		14
Sus domesticus (pig)	7			9	1	7					24
Cervus elaphus (red deer)				1							1
Dama dama (fallow deer)	2	2		2						1	7
cf. *Cervus/Dama* (red/fallow)						3		1			4
Canis familiaris (dog)			1								1
cf. *Canis/Vulpes* (dog/fox)	1				1			1			3
Felis cf. *catus* (cat)					1						1
Lepus europeus (hare)						2					2
Oryctolagus cuniculus (rabbit)				2	2	1					5
Rattus cf. *rattus* (black rat)						2		1	6		9
Anser anser (domestic goose)					1						1
Anser cf. anser						1					1
cf. Gallus/Numida (chicken/grouse)						1					1
cf. Gallus/Numida/Phasianus (chicken/grouse/pheasant)						9					9
Scolopax rusticola (woodcock)			1								1
Gadidae			1								1
Gadus morhua (cod)	1										1
Unidentified	1	1		31	12	12			1	1	59
Total	37	3	3	55	23	62	1	35	11	5	**235**

Ellen Simmons and Glynis Jones environmental

Assessment of plant macrofossils, wood and wood charcoal from Sheffield Castle, Sheffield, South Yorkshire (201540)

By Ellen Simmons and Glynis Jones[1].

Introduction

A comprehensive archaeobotanical sampling strategy was implemented during an archaeological evaluation at the site of Sheffield Castle, Sheffield, South Yorkshire (NGR: 435805, 387684) in 2018 by Wessex Archaeology. Forty eight samples were processed for the recovery of plant macrofossils and wood charcoal. The samples were then assessed in order to determine the concentration, diversity, state of preservation and suitability for use in AMS dating, of any palaeoenvironmental material present. A further aim of this assessment is to evaluate the potential of any palaeoenvironmental material present in the samples to aid in an interpretation of the sampled contexts and an understanding of the economy of the site or the local environment.

Methodology

The samples were processed by Liz Chambers of Wessex Archaeology using a water separation machine. Floating material was collected in a 250µm mesh, and the remaining heavy residue retained in a 500µm mesh. Flots and heavy residues were air dried. Where potential for the preservation of organic remains by anoxic waterlogging was noted, one litre sub-samples were processed using a water separation machine, with the heavy residues being passed through a stack of sieves of mesh size 5.6mm, 2mm, 1mm and 500µm. The flots and heavy residues from potential waterlogged samples were kept wet.

The samples were assessed in accordance with Historic England guidelines for environmental archaeology assessments (Historic England 2011). A preliminary assessment of the samples was made by scanning using a stereo-binocular microscope (x10 - x65) and recording the abundance of the main classes of material present. Macroscopic plant material, wood and wood charcoal was quantified using a scale of abundance (- = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items).

Preliminary identifications of plant material were carried out by comparison with material in the reference collections at the Department of Archaeology, The University of Sheffield and various reference works (e.g. Cappers *et al*, 2006). Cereal identifications and nomenclature follow Jacomet (2006). Other plant nomenclature follows Stace (2010). Information relating to the ecology of various plant taxa was sourced from Stace (2010) and Preston *et al* (2002). The composition of the samples is recorded in tables 1 – 8. The seed, in the broadest sense, of the plant is always referred to in the tables, unless stated otherwise. The abbreviation *cf*. means 'compares with' and denotes that a specimen most closely resembles that particular taxon more than any other.

Preservation

Preservation of plant macrofossils and wood is by both charring and probable anoxic waterlogging. Preservation of charred plant material is relatively poor, with the majority of cereal grains being distorted and identifiable by gross morphology only. Preservation of wood charcoal is relatively good, with minimal evidence for vitrification, whereby charcoal takes on a glassy appearance resulting in anatomical features becoming fused and difficult to identify.

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Preservation of uncharred plant material and wood present in contexts 3056,3057 and 3079 from the lower layers of a sequence of rich organic deposits in Trench 3 is good, with a rich and diverse assemblage of plant material being present. Preservation of uncharred plant material and wood present in pit fills 6060, 6062, 6072, gully fill 6064 and layer 6055 in Trench 6 is also good. Uncharred seeds were also found in other contexts from Trench 3 and Trench 6, as well as in contexts from other trenches. It is not however generally possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

Results

Probable medieval deposits

Trench 6
Sample 6009 (from pit fill 6060) and sample 6011 (from pit fill 6072), which are amongst the earliest cut features in Trench 6, along with sample 6006 (from made ground layer 6055), which seals these early cut features, were processed for the recovery of waterlogged plant macrofossils. Rich and diverse assemblages of uncharred seeds were found in these samples, along with rich assemblages of uncharred wood. Similar assemblages of uncharred seeds and abundant wood fragments were also found in sample 6007 (from gully fill 6064) and sample 6008 (from pit fill 6062), which are associated with pit fill 6060 and pit fill 6072 and form part of the group of early cut features in Trench 6 which are sealed by layer 6055. The similar composition of these plant assemblages, particularly the presence of uncharred wood fragments (>4mm) which are less likely to represent modern intrusion, and the fact they were found in a sealed deposit, indicate that they are likely to date to the period of the features in which they were found and to have been preserved by anoxic waterlogging.

The taxa noted in these uncharred seed assemblages include the crop weed corncockle (*Agrostemma githago*), along with plants commonly associated with fertile disturbed soils but which may also be representative of crop weeds such as wild radish (*Raphanus raphanistrum* ssp. *raphanistrum*), redshank / pale persicaria (*Persicaria maculosa / lapathifolia*), knotgrass (*Polygonum aviculare* agg.), chickweed (*Stellaria media*), goosefoots (*Chenopodium* spp.), hemp-nettle (*Galeopsis* sp.), nipplewort (*Lapsana communis*), stinking chamomile (*Anthemis cotula*) and corn marigold (*Glebionis segetum*). Hemlock (*Conium maculatum*) is a plant of fertile disturbed soils and damp ground. Common nettle (*Urtica dioica*) is a plant of nutrient enriched soils. Grassy habitats are represented by buttercups (*Ranunculus acris* / *repens* / *bulbosus*) and sheep's sorrel (*Rumex acetosella*). Plants commonly associated with damp soils include lesser spearwort (*Ranunculus flammula*), rushes (*Juncus* spp.) and sedges (*Carex* spp.). Scrub type vegetation is represented by bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), birch (*Betula pendula*), blackthorn (*Prunus spinosa*), hazel nutshell (*Corylus avellana*) and elder (*Sambucus nigra*).

Low concentrations of less than thirty wood charcoal fragments (>2mm) were found in samples 6007, 6008, 6009 and 6011. Preliminary observation of the charcoal fragments using low power microscopy indicates that both diffuse porous and ring porous taxa are present.

Samples 6009 and 6006 both contain between one and ten fragments of waterlogged round wood (>4mm) which would be suitable for AMS dating, particularly as round wood is of short duration and so accurately datable. Sample 6011 contains between one and five hundred fragments of waterlogged wood (>4mm) and sample 6008 contains between one and five fragments of wood charcoal (>4mm) which is of a suitable size for AMS dating, although no round wood was noted, which may limit the accuracy of the dating result. Between five and ten smaller charcoal fragments (2-4mm) were found in sample 6007, which may be of a suitable size for AMS dating. Between one and five fragments of round wood (>4mm) were also found in samples 6007 and 6008, although it would not be possible to taxonomically identify this material as it had not been kept wet.

Low concentrations of between one and five charred cereal grains were found in sample 6001 (from made ground layer 6043), sample 6004 (from made ground layer 6047) and sample 6003 (from made ground layer 6048), which are a series of closely related deposits stratigraphically later than cut feature fills 6060, 6064, 6062 and 6072. The crop types present in these contexts are indeterminate wheat (*Triticum* sp.) and oat (*Avena* sp.), although it could not be determined whether the oat grains are representative of crops or crop weeds due to a lack of diagnostic chaff. Less than five charred seeds of corn marigold (*Glebionis segetum*) and grasses (Poaceae) were also found. Low concentrations of between one and five charred hazel nutshell fragments (*Corylus avellana*) are present in sample 6002 (from made ground layer 6044), which is closely related to made ground layer 6043. Charred hazel nutshell is also present in made ground layer 6047. The charred cereal grains and hazel nutshell from all these deposits would be suitable for AMS dating. The low density of charred material in samples 6001, 6002 and 6003 does however increase the likelihood that it may be intrusive.

Less diverse assemblages of uncharred seeds were also found at low density in samples 6001, 6002, 6003 and 6004 (from made ground layers 6043, 6044, 6048 and 6047). These assemblages include common nettle (*Urtica dioica*), corn marigold (*Glebionis segetum*) and hemlock (*Conium maculatum*) along with rushes (*Juncus* spp.) and sedges (*Carex* spp.). Bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*) and birch (*Betula pendula*) are also relatively abundant. A rich assemblage of wood fragments is also present in sample 6004 (from made ground layer 6047). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. It is interesting to note that no uncharred seeds are present in sample 6005 (from made ground layer 6049) which is stratigraphically later than made ground layers 6043, 6044, 6047 and 6048.

Rich assemblages of over one hundred wood charcoal fragments (>2mm) were found in sample 6004 (from made ground layer 6047) and in sample 6005 (from stratigraphically later made ground layer 6049). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that made ground layer 6047 is composed primarily of ring porous taxa while made ground layer 6049 is composed of both ring porous and diffuse porous taxa. Diffuse porous taxa which are frequently represented in archaeological charcoal assemblages include hawthorn / apple / pear / whitebeams (Pomoideae), willow / poplar (*Populus / Salix*), birch (*Betula* sp.), alder (*Alnus glutinosa*), hazel (*Corylus avellana*), field maple (*Acer campestre*), blackthorn (*Prunus spinosa*) and cherry (*Prunus padus / avium*) while frequently represented ring porous taxa include oak (*Quercus* sp.), ash (*Fraxinus excelsior*) and elm (*Ulmus* sp.). Identification using high power microscopy would however be necessary in order to confirm which taxa are present. The round wood charcoal (>4mm) in sample 6004 (from made ground layer 6047) would be suitable for AMS dating. No round wood was noted in sample 6005 (from made ground layer 6049) although it is possible that wood charcoal with strong ring curvatures indicative of small diameter round wood would be identified as a result of further analysis of this rich and diverse charcoal assemblage.

Made ground layers 6043 and 6044 may be the same deposit in two separate sondages, as may probable medieval made ground layers 6047 and 6048. These contexts all contain similar assemblages of charred plant macrofossils which support this interpretation, although sample 6004 (from made ground layer 6047) produced a rich assemblage of wood and wood charcoal which is composed of both ring porous and diffuse porous taxa, while the other contexts contain low concentrations of wood charcoal, which is predominantly composed of a ring porous taxon morphologically similar to oak. This indicates a possibility that context 6047 may relate to a different depositional event than contexts 6048, 6043 and 6044. Probable medieval made ground layer 6049, is later stratigraphically than made ground layers 6043, 6044, 6047 and 6048 and it is at present uncertain whether this context is part of the medieval palimpset or a later deposit. Context 6049 is largely devoid of charred or uncharred plant macrofossils and contains a wood charcoal assemblage composed of ring porous and diffuses porous taxa. This suggests that context 6049 may relate to a

different depositional event or phase than made ground layers 6043, 6044, 6047 and 6048.

Trench 9
Sample 9000 (from the lower fill 9011 of the moat) was the only sample taken from the moat fills and was found to contain a low concentration of uncharred seeds including birch (*Betula pendula*), henbane (*Hyoscyamus niger*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. A low concentration of wood charcoal fragments (2-4 mm), which are morphologically similar to oak (cf. *Quercus* sp.), was also found. These charcoal fragments may potentially be of a suitable size for AMS dating, although their low density in this deposit increases the likelihood that they may be intrusive. A rich assemblage of over one hundred land snail shells (Mollusca) was also found in sample 9000. The position of fill 9011 in the sequence of moat fills is unknown at this location which limits the utility of this sample.

13th – 15th century deposits

Trench 1
A moderate concentration of between ten and fifty charred cereal grains and chaff fragments was found in sample 1003 (from made ground layer 1057). The crop types present in this context are probable oat grain (cf. *Avena* sp.), rye grain and chaff (*Secale cereale*) and free threshing wheat (*Triticum aestivum* / *turgidum* s.l.) grain. A low concentration of charred wild or weed plant seeds was also found, including the crop weed corn cockle (*Agrostemma githago*) as well as seeds of plants commonly associated with fertile disturbed soils or cultivation, such as mallow (*Malva* sp.), redshank / pale persicaria (*Persicaria maculosa / lapathifolia*), knotgrass (*Polygonum aviculare* agg.), corn spurrey (*Spergula arvensis*) and brome / rye grass (*Bromus* spp. / *Lolium* spp.). Seeds of plants commonly associated with damp soils such as lesser spearwort (*Ranunculus flammula*), club-rush (*Schoenoplectus* sp.) and sedges (*Carex* spp.) were also found. Hemlock (*Conium maculatum*) is a plant of fertile disturbed soils and damp ground. A low concentration of charred cereal grains was also found in sample 1009 (from made ground layer 1076). The crop types present in this context are probable oat (cf. *Avena* sp.), hulled barley (*Hordeum* vulgare/distichum) and indeterminate wheat (*Triticum* sp.). Charred hazel (*Corylus avellana*) nutshell, and less than five charred grass (Poaceae) seeds were also found. The charred cereal grain in both these samples would be suitable for AMS dating.

Relatively rich assemblages of uncharred seeds, hazel nutshell and wood fragments were found in sample 1009 (from made ground layer 1076) and in sample 1010 (from made ground layer 1079). Taxa present in the assemblage of uncharred seeds include common nettle (*Urtica dioica*), henbane (*Hyoscyamus niger*), sedges (*Carex* spp.), bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), birch (*Betula pendula*), elder (*Sambucus nigra*) and fragments of hazel nutshell (*Corylus avellana*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Uncharred hazel nutshell from the relatively rich assemblage of between fifty and one hundred nutshell fragments in sample 1009 would be suitable for AMS dating, which may also provide some insight as to whether the uncharred material in this deposit is likely to be ancient or modern intrusive material.

A rich assemblage of over five hundred wood charcoal fragments (>2mm) was found in sample 1003 (from made ground layer 1057). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Vitrified charcoal and slag / metallurgical debris were also abundant in this sample. A rich assemblage of over one hundred wood charcoal fragments (>2mm) was found in sample 1009 (from made ground layer 1076) and small assemblages of ten to fifty wood charcoal fragments (>2mm) were found in sample 1008 (from made ground layer 1064) and in sample 1010 (from made ground layer 1079). Preliminary examination of the wood charcoal

fragments using low power microscopy indicates that these assemblages are composed of both ring porous and diffuse porous taxa. Charcoal fragments (>4mm) of a suitable size for AMS dating are present in sample 1003, 1008, 1009 and 1010 although no round wood was noted, which may limit the accuracy of the dating result and the low density of charred material in sample 1008 increases the likelihood that charred material in this sample may be intrusive.

Trench 3

Low concentrations of charred cereal grain and charred wild or weed plant seeds, along with rich assemblages of uncharred wild or weed plant seeds, were found in samples from two probable phases of activity in Trench 3. The probable early phase is represented by samples 3003 (from context 3062), 3004 (from context 3070) and 3014 (from context 3072), from a series of earthwork deposits associated with stone foundation 3064/3076. Samples 3013 (from context 3079), 3002 and 3009 (from context 3057) and 3008 (from context 3056), are from a series of deposits associated with a probable second phase of activity relating to the demolition or destruction of earlier structures.

In the 'earlier' phase, a moderate concentration of between fifty and one hundred charred cereal grains was found in sample 3003 (from made ground layer 3062). The crop types present in this context are oat (*Avena* sp.), hulled barley (*Hordeum* vulgare/distichum), rye (*Secale cereale*) and free threshing wheat (*Triticum aestivum / turgidum* s.l.). A low concentration of charred wild or weed plant seeds was also found, including seeds of plants commonly associated with fertile disturbed soils or cultivation, such as orache (*Atriplex* sp.), stinking chamomile (*Anthemis cotula*), corn marigold (*Glebionis segetum*) and brome / rye grass (*Bromus* spp. / *Lolium* spp.). Seeds of plants more commonly associated with grassland include vetch / vetchling (*Vicia* spp. / *Lathyrus* spp.), ribwort plantain (*Plantago lanceolata*) and grasses (Poaceae) although these may also have been of crop weeds. The charred cereal grain in sample 3003 would be suitable for AMS dating.

Sample 3003 also produced a relatively rich and diverse assemblage of uncharred seeds including common nettle (*Urtica dioica*), knotgrass (*Polygonum aviculare* agg.), chickweed (*Stellaria media*), goosefoots (*Chenopodium* spp.), henbane (*Hyoscyamus niger*), rushes (*Juncus* spp.), sedges (*Carex* spp.), bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*) and elder (*Sambucus nigra*). Relatively rich assemblages of uncharred seeds including common nettle (*Urtica dioica*), sedges (*Carex* spp.) bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), birch (*Betula pendula*), hazel nutshell (*Corylus avellana*) and elder (*Sambucus nigra*), were also found in samples 3004 and 3014 (from made ground layers 3070 and 3072), although the diversity of taxa was low and dominated by robust seed types, that survive particularly well. It is possible that these seeds are of ancient origin and were preserved by anoxic waterlogging (as described below for the 'later' phase) or they may represent modern intrusive material.

Between fifty and one hundred wood charcoal fragments (>2mm) were found in sample 3003 (from made ground layer 3062). Low concentrations of between five and thirty wood charcoal fragments (2-4 mm) were found in sample 3004 (from made ground layer 3070) and in sample 3014 (from made ground layer 3072). Preliminary examination of these charcoal fragments using low power microscopy indicates the presence of both ring porous and diffuse porous taxa. Charcoal fragments (>4mm) of a suitable size for AMS dating are present in samples 3003, 3004 and 3014, although no round wood was noted, which may limit the accuracy of the dating result and the low density of charred material in sample 3004 increases the likelihood that charred material in this sample may be intrusive.

In the 'later' phase, a moderate concentration of between ten and fifty charred cereal grains was found in sample 3008 (from demolition/destruction layer 3056). The crop types represented in this context are oat (*Avena* sp.), hulled barley (*Hordeum* vulgare/distichum) and free threshing wheat (*Triticum aestivum / turgidum* s.l.). Low concentrations of charred wild or weed plant seeds were also found, including corn marigold (*Glebionis segetum*), sedges (*Carex* spp.) and bramble (*Rubus fruticosus*).

The charred cereal grains present in this sample would be suitable for AMS dating.

Sub-samples of samples 3002 and 3009 (from demolition/destruction layer 3057) and 3013 (from demolition / destruction layer 3079) were processed for the recovery of waterlogged plant macrofossils, and provided rich and diverse assemblages of uncharred seeds, along with rich assemblages of uncharred wood in samples 3002 and 3009. A similar assemblage of uncharred seeds and wood fragments was also found in sample 3008 (from layer 3056 which overlays layer 3057), which may indicate that this assemblage too was preserved by anoxic waterlogging. Samples 3002 and 3009 contain between five and thirty fragments of waterlogged round wood (>4mm) which would be suitable for AMS dating. Sample 3013 contains between one and five fragments of waterlogged round wood (>4mm) which would be suitable for AMS dating.

The taxa noted in these uncharred seed assemblages include plants commonly associated with fertile disturbed soils and cultivation such as redshank / pale persicaria (*Persicaria maculosa / lapathifolia*), knotgrass (*Polygonum aviculare* agg.), black bindweed (*Fallopia convolvulus*), chickweed (*Stellaria media*), fat hen (*Chenopodium album*) and corn marigold (*Glebionis segetum*). Common nettle (*Urtica dioica*) and oak-leaved goosefoot / red goosefoot (*Chenopodium glaucum / rubrum*) indicate nutrient enriched soils. Grassy habitats are represented by buttercups (*Ranunculus acris* / *repens* / *bulbosus*), sheep's sorrel (*Rumex acetosella*), greater plantain (*Plantago major*), hawkweed oxtongue (*Picris hieracioides*) and grasses (Poaceae). Damp soils are represented by lesser spearwort (*Ranunculus flammula*), water pepper (*Persicaria hydropiper*), rushes (*Juncus* spp.) and sedges (*Carex* spp.). Scrub type vegetation is represented by bramble (*Rubus fruticosus*), alder (*Alnus glutinosa*) and elder (*Sambucus nigra*) as well as a particularly high concentration of hazel nutshell (*Corylus avellana*) in samples 3002 and 3009 from made ground layer 3057 and sample 3013 from made ground layer 3079.

A rich assemblage of over one hundred wood charcoal fragments (>2mm) was found in sample 3008 (from demolition / destruction layer 3056). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Between fifty and one hundred wood charcoal fragments (>2mm) were found in sample 3009, and between ten and thirty wood charcoal fragments (>2mm) were found in sample 3002 (from demolition / destruction layer 3057). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that both diffuse porous and ring porous taxa are present.

Demolition / destruction layer 3055 is of an uncertain date and it is suggested that this context may be of a later date than demolition / destruction layers 3057 and 3079 which are dated to the 13th century. Sample 3007 (from context 3055) contains a low concentration of uncharred plant remains, while sample 3009 (from context 3057) and sample 3013 (from context 3079) are rich in organic material. Moderately rich wood charcoal assemblages are also present in contexts 3057 and 3079, while a very low concentration of wood charcoal fragments is present in context 3055. These differences in sample composition support an interpretation that contexts 3057 and 3079 may relate to a different depositional event or phase than 3055. It is also suggested that demolition / destruction layer 3056 may be representative of a separate depositional event than neighbouring contexts 3055 and 3057. However, layer 3056 produced a similar assemblage of plant macrofossils to layers 3057 and 3079 which may indicate that these contexts are representative of similar depositional events.

Trench 5

Low concentrations of charred cereal grains were found in sample 5004 (from the matrix 5041 between a cobbled surface) and in sample 5003 (from made ground layer 5045). The crop types present are probable oat (cf. *Avena* sp.), free threshing wheat grain (*Triticum aestivum / turgidum* s.l.) and indeterminate wheat grain (*Triticum* sp.). A low concentration of charred wild or weed plant seeds was also found in sample 5004 (from cobbled surface matrix 5041), including seeds of plants

commonly associated with fertile disturbed soils and cultivation such as cleavers (*Galium aparine*), stinking chamomile (*Anthemis cotula*) and corn marigold (*Glebionis segetum*). Charred seeds of sedges (*Carex* spp.) and grasses (Poaceae) are also present. The charred cereal grains in both these samples would be suitable for AMS dating although thelow density of charred material in these samples does however increase the likelihood that it may be intrusive. Uncharred seeds of birch (*Betula pendula*), dead nettle family (Lamiaceae) and elder (*Sambucus nigra*) were also found in these deposits along with uncharred hazel nutshell (*Corylus avellana*) in sample 5004. It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

Between ten and thirty wood charcoal fragments (>2mm) were found in sample 5004 (from cobbled surface matrix 5041) and in sample 5003 (from made ground layer 5045). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblages are composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present, although no round wood is noted, which would limit the accuracy of the dating result.

Trench 10
Very low concentrations of uncharred plant seeds consisting of birch (*Betula pendula*) and elder (*Sambucus nigra*) were found in sample 10004 (from moat bank deposit 10071), sample 10003 (from moat bank deposit 10072) and sample 10005 (from moat bank deposit 10073). A low density and diversity of uncharred plant seeds including common nettle (*Urtica dioica*), corn marigold (*Glebionis segetum*), sedges (*Carex* spp.), birch (*Betula pendula*) and elder (*Sambucus nigra*) were found in samples 10008 and 10009 (from secondary moat fills 10076 and 10078). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging

Between ten and thirty wood charcoal fragments (>2mm) were found in sample 10003 (from moat bank deposit 10072). Preliminary examination low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Both ring porous and diffuse porous taxa are present in the small assemblage of between five and ten wood charcoal fragments (>2mm) in samples 10008 and 10009 (from secondary moat fills 10076 and 10078). Charcoal of a suitable size for AMS dating is present although no round wood is noted as present which would limit the accuracy of the dating result.

15th – early 16th century deposits

Trench 1
An assemblage of fifty to one hundred wood charcoal fragments (>2mm) present in sample 1006 (from bedding layer and matrix 1042 of cobblestone surface 1003) and an assemblage of ten to fifty wood charcoal fragments (>2mm) present in sample 1007 (from the same context), were composed primarily of diffuse porous taxa. Charcoal of a suitable size for AMS dating is present although no round wood is noted as present which would limit the accuracy of the dating result.

17th century deposits

Trench 10
Sample 10007 (from tertiary moat deposit 10075) produced a low concentration of uncharred plant seeds including common nettle (*Urtica dioica*), docks (*Rumex* spp.) buttercup (*Ranunculus acris/repens/bulbosus*), sedges (*Carex* spp.), birch (*Betula pendula*) and elder (*Sambucus nigra*). Sample 10006 (from redeposited natural deposit 10067) produced uncharred seeds of birch (*Betula pendula*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Low

concentrations of wood charcoal fragments (<2mm) were also found which would not be of a suitable size for AMS dating.

18th – 19th century deposits

Trench 1
A rich assemblage of over one hundred wood charcoal fragments (>2mm) was found in sample 1000 (from culverted drain fill 1018). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Vitrified charcoal and slag / metallurgical debris are also abundant in this sample. Charcoal of a suitable size for AMS dating is present although no round wood is noted as present which would limit the accuracy of the dating result. No food plants were found in this deposit.

Trench 3
Sample 3000 (from culverted drain fill 3034) produced a low concentration of uncharred seeds including grape (*Vitis vinifera*), fig (*Ficus carica*), bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*) and birch (*Betula pendula*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Wood charcoal fragments (<2mm) were also found which would not be of a suitable size for AMS dating. Vitrified charcoal and slag / metallurgical debris were also abundant in this sample.

Trench 4
Very low concentrations of wood charcoal fragments (>2mm) were found in samples 4000, 4001 and 4002 (from made ground layers 4009, 4064 and 4008). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that both ring porous and diffuse porous taxa are present. Charcoal of a suitable size for AMS dating (>4mm) is present although no round wood is noted as present which would limit the accuracy of the dating result.

Trench 10
Sample 10000 (from made ground layer 10049) produced a low concentration of wood charcoal fragments (>2 mm), along with a low concentration of vitrified charcoal. Preliminary examination of the wood charcoal assemblage indicates that predominantly diffuse porous taxa are present. Charcoal of a suitable size for AMS dating (>4mm) is present, although no round wood is noted as present which would limit the accuracy of the dating result.

Trench 11
Samples 11001 and 11002 (from 18th century pre-slaughterhouse layers 11022 and 11036) produced low concentrations of uncharred plant seeds including common nettle (*Urtica dioica*), henbane (*Hyoscyamus niger*), sedges (*Carex* spp.), birch (*Betula pendula*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Between five and ten wood charcoal fragments (>2mm) were found in sample 11001. Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). These charcoal fragments may potentially be of a suitable size for AMS dating although their low density in this deposit increases the likelihood that they may be intrusive. A moderately rich assemblage of between fifty and one hundred land snail shells (Mollusca) was also found in sample 11002.

Uncertain date

Trench 3
Sample 3006 (from made ground (redeposited natural) layer 3018) was found to contain between fifty

and one hundred wood charcoal fragments (>2mm). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present although no round wood is noted, which would limit the accuracy of the dating result. Sample 3006 also produced low concentrations of uncharred plant seeds including buttercup (*Ranunculus bulbosus/acris/repens*), bramble (*Rubus fruticosus* agg.), raspberry (*Rubus idaeus*), nettle (*Urtica dioica*), elder (*Sambucus nigra*) and sedges (*Carex* spp.). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging

Sample 3007 (from demolition / destruction layer 3055) produced between one and five wood charcoal fragments (>2mm). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present although no round wood is present, which would limit the accuracy of the dating result. This sample was also found to contain low concentrations of uncharred plant seeds including bramble (*Rubus fruticosus* agg.), birch (*Betula pendula*), elder (*Sambucus nigra*), rushes (*Juncus* ssp.) and sedges (*Carex* spp.) It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. Sample 3001 (from the same deposit) did not produce any remains other than wood charcoal fragments which were all less than 2mm in size.

Trench 4
Sample 4003 (from yellow clay layer 4113) produced a low concentration of uncharred wild or weed plant seeds including common nettle (*Urtica dioica*) birch (*Betula pendula*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging. There was no evidence for anthropogenic activity and no datable material was found.

Trench 5
A rich assemblage of over one hundred wood charcoal fragments (>2mm) was found in sample 5001 (from made ground layer 5039). Preliminary examination of the wood charcoal fragments using low power microscopy indicates that the assemblage is composed primarily of a ring porous taxon which is morphologically similar to oak (cf. *Quercus* sp.). Charcoal of a suitable size for AMS dating is present although no round wood is present, which would limit the accuracy of the dating result. This sample also produced a low concentration of uncharred wild or weed plant seeds as did sample 5002 (from made ground layer 5038), including birch (*Betula pendula*), chickweed (*Stellaria media*), henbane (*Hyoscyamus niger*) and elder (*Sambucus nigra*). It is not however possible to determine with confidence whether this is modern intrusive material or ancient material preserved by anoxic waterlogging.

Discussion
The Sheffield Castle assemblage of plant remains included (a) uncharred wood and other macrofossil material, (b) charred seeds and (c) wood charcoal, as follows. Rich assemblages of uncharred plant macrofossils, some of which are likely to have been preserved by anoxic waterlogging, were found in a series of 13th century demolition / destruction layers in Trench 3 and, in Trench 6, a series of cut feature fills and a made ground layer 6055 which seals these cut features all of which probably date to the medieval period. These assemblages have potential to provide evidence for the nature of the environment at the site during the medieval period, as well as potential evidence for human activity and food consumption. Low concentrations of charred seeds, consisting primarily of cereal grain and wild or weed plant seeds, were found in 13th century made ground layer 3062 and demolition / destruction layer 3056 in Trench 3, 13th century cobbled surface matrix 5041 and medieval courtyard made ground layer 5045 in Trench 5, and probable medieval made ground layers 6043, 6047 and

6048 in Trench 6. Despite the low concentrations of material, these assemblages have potential to provide evidence for crop types, cultivation and crop husbandry practices. Relatively rich assemblages of at least fifty wood charcoal fragments (>2mm) were found in 13th century demolition/destruction layers 3056 and 3057, 13th century made ground layer 3062, 13th – 15th century made ground layers 1057 and 1076, probable medieval made ground layers 6047 and 6049, 15th – early 16th century cobbled surface bedding layer 1042, 19th century culverted drain deposit 1018 and made ground layers 3018 and 5039 which are of uncertain date. These assemblages have potential to provide evidence for the availability of local woodland and scrub, and to investigate changes through time.

Uncharred seeds from a range of different taxa occurred frequently throughout the site. Taxa commonly associated with damp, muddy or wet soils are consistently present, as is often the case with material preserved by waterlogging. As these seeds primarily occurred in deposits that were not waterlogged at the time of excavation, however, it remains uncertain whether they represent activities contemporary with the excavated features, preserved by anoxic waterlogging, or the intrusion of more recent plant material. The frequent occurrence in medieval deposits of uncharred seeds from a range of taxa commonly associated with disturbed and nitrogen enriched soils is consistent with human activity at a site of this type. The rich assemblages of uncharred wood in samples from Trenches 3 and 6 may represent building material brought to the site, though it is equally possible that at least some of this wood represents scrub vegetation growing in the vicinity of the sampled features. Unlike the uncharred seeds, it is relatively unlikely to represent modern intrusion. The presence of uncharred seeds from a number of woody taxa (e.g. elder (*Sambucus nigra*), birch (*Betula pendula*), raspberry (*Rubus idaeus*) and blackberry (*Rubus fruticosus* agg.) may support this latter possibility. The plentiful seeds of birch (*Betula pendula*) could, however, have travelled from some distance, as they are easily dispersed by wind.

The seeds of raspberry (*Rubus idaeus*) and blackberry (*Rubus fruticosus* agg.) may also have been brought to the site as collected food plants. The presence of seeds from a range of edible fruits is a typical feature of medieval waterlogged plant macrofossil assemblages (Moffett 2006, 54). Seeds of bramble and raspberry are particularly associated with garderobe pits and cess deposits, raising the possibility that some of these edible fruit remains represent of the dumping of cess. The presence of a relatively rich assemblage of uncharred (whole and fragmented) seeds of corncockle (*Agrostemma githago*) in sample 6007 (from gully fill 6062) may support this interpretation as it was a common crop weed found in medieval cess deposits (Kenward and Hall 1995, 758; Smith 2013). This poisonous weed of cereal crops was progressively eradicated in Britain from the 19th century onwards, and so is unlikely to be a modern intrusion. The rich deposits of uncharred hazel nutshells (*Corylus avellana*) in 13th century contexts 3057 and 3079 are also likely to represent the debris of collected food, and they are frequently present in medieval archaeobotanical assemblages (Grieg 1996). The seeds of figs (*Ficus carica*) and grapes (*Vitis vinifera*) that were found in sample 3000 from 19th century culverted drain fill 3034, are typical of post medieval urban waterlogged plant macrofossil assemblages (Grieg 1996), although they could also represent intrusive modern material.

The charred cereal grains found in a series of 13th century and probable medieval deposits provide evidence for cultivated food plants. The crop types present are oat (*Avena* sp.), hulled barley (*Hordeum vulgare/disticum*), rye (*Secale cereale*) and free threshing wheat (*Triticum aestivum/turgidum*), which are typical crops of the medieval period in England. Free threshing wheat is the most frequently represented wheat type in medieval archaeobotanical assemblages, with barley, oats and rye also present as important crops (Moffett 2006). Rye was increasingly cultivated in northern England during the medieval period, possibly due to an increase in temperatures during the 13th century which provided more favourable conditions for the cultivation of this crop (Huntley 1995). Archaeobotanical finds of oat grains cannot usually be distinguished as wild or cultivated, however, in the absence of chaff.

Many of the wild taxa present in the assemblages of charred seeds, such as corn spurrey (*Spergula arvensis*), corn cockle (*Agrostemma githago*), corn marigold (*Glebionis segetum*), stinking chamomile (*Anthemis cotula*) and brome / rye grass (*Bromus* spp. / *Lolium* spp.) are typical crop weeds which are likely to have been harvested along with the crops and charred as waste removed during crop processing. The increasing presence of stinking chamomile (*Anthemis cotula*) in assemblages dating to the medieval period in England has been related to changes in cultivation practices such the expansion of cultivation onto heavier clay soils (Jones 1981), facilitated by deep plough agriculture (Jones 1981, 1988). The presence of taxa commonly associated with damp soils such as sedges (*Carex* spp.) in the charred wild or weed seed assemblage may also indicate the cultivation of poorly drained fields, although the seeds of these taxa may also be representative of plants collected for use as fodder, roofing, bedding or flooring material.

Wood charcoal provides evidence for the utilisation of local woodland and scrub for the collection of fuel (or building material where there is evidence of destruction by fire). Preliminary examination of the wood charcoal assemblages indicates that, throughout the 13th to 15th century, a ring porous taxon morphologically similar to oak predominates in many contexts while others are composed of a mix of both ring porous and diffuse porous taxa. Sample 1006 (from a 15th – early 16th century cobbled surface bedding layer 1042) is composed of primarily diffuse porous taxa, while sample 1000 (from 19th century drain fill 1018) is primarily composed of probable oak. These differences in charcoal assemblage composition may be related to many factors, such as changes in woodland availability over time and context type (for example where contexts may be associated with potential industrial activity).

Palynological and documentary evidence from northern England indicates that woodland clearance was sustained throughout the medieval period and that any remaining woodland would likely have been extensively managed in order to provide sustainable resources (Huntley 1995, 74). Large numbers of wood charcoal fragments from excavations at Sandal Castle near Wakefield, dated to the 12th to 17th centuries, include both ring porous taxa such as oak and diffuse porous taxa such as hazel, birch and hawthorn/apple/pear/whitebeams (Smith *et al* 1983). Huntley (2010, 38) also notes that an increase in diversity of taxa over time is evident in the assemblage from Sandal Castle, possibly indicating the exploitation of a wider range of woodlands (Huntley 2010, 38). Full analysis of the wood charcoal assemblage from Sheffield Castle could provide comparable evidence for changing exploitation of woodland.

Recommendations

Assemblages of charred and waterlogged plant remains from medieval contexts have been analysed from a number of urban sites in the region such as Doncaster, Hull, Beverly and York (Hall and Huntley 2007). Archaeobotanical assemblages from medieval castle sites in the region are however relatively sparse (Hall and Huntley 2007, 172 & 174). The assemblage from Sheffield Castle therefore represents an important new dataset. Full analysis of this dataset would provide quantitative results which could be compared with published data from other sites. Van der Veen *et al* (2013, 174) have also highlighted the need for the recovery of archaeobotanical data, especially waterlogged and mineralised plant remains, from medieval contexts in urban centres other than London. This analysis would be of local and regional significance in providing palaeoenvironmental evidence from a medieval castle site and urban centre.

Full sorting, identification and analysis of the uncharred seeds is recommended for deposits that have been identified as likely to have been preserved by anoxic waterlogging. It is likely that full sorting of these samples would result in the identification of additional taxa which were not identified during preliminary assessment and it would also be possible to identify some taxa to species which are currently only identified to family or genera. These deposits are listed in the following table.

TABLE seeds likely to be waterlogged

Trench	Context number	Sample number	Date
3	3057	3009	13th century
3	3079	3013	13th century
3	3056	3008	13th century
6	6060	6009	Probable medieval
6	6064	6007	Probable medieval
6	6062	6008	Probable medieval
6	6072	6011	Probable medieval
6	6055	6006	Probable medieval

Full identification and analysis of the waterlogged wood assemblages is recommended for samples that were processed as waterlogged (and have been kept wet). These deposits are listed in the following table.

TABLE wood from samples processed as waterlogged

Trench	Context number	Sample number	Date
3	3057	3009	13th century
6	6055	6006	Probable medieval
6	6060	6009	Probable medieval
6	6072	6011	Probable medieval

Full sorting, identification and analysis of the charred seeds for all deposits in which they were found is recommended, to provide a fully quantified record of crop types and wild taxa present at the site, for comparison with published material from other sites. These deposits are listed in the following table.

TABLE charred seeds

Trench	Context number	Sample number	Date
3	3062	3003	13th century
5	5041	5004	13th century
5	5045	5003	13th century
1	1057	1003	13th – 15th century
1	1076	1009	13th – 15th century

Full identification of the wood charcoal assemblages from all samples with more than 50 fragments (>2 mm) is recommended, to provide evidence for the use of wood as fuel and (if there is evidence for destruction by fire) as building material. Detailed examination of the wood charcoal assemblage would also provide further information regarding whether large or small diameter wood was utilised, and for what purpose, and would be useful for comparison with the charcoal assemblage from Sandal Castle.

TABLE charcoal

Trench	Context number	Sample number	Date
3	3057	3009	13th century
3	3056	3008	13th century
3	3070	3003	13th century
1	1057	1003	13th – 15th century
1	1076	1009	13th – 15th century
6	6047	6004	Probable medieval
6	6049	6005	Probable medieval
5	5039	5001	Uncertain (possible 18th century)
1	1018	1000	19th century

It is also recommended that a retained borehole core (BH1) be processed for all types of palaeoenvironmental material in order to further investigate the potential motte in Trench 2.

Processing by paraffin flotation for the recovery of invertebrate macrofossils, and assessment of the assemblage by a plaeoentomologist, is recommended for deposits that were processed as waterlogged. These deposits are listed in the following table.

Trench	Context number	Sample number	Date
3	3057	3009	13th century
3	3079	3013	13th century
6	6060	6009	Probable medieval
6	6072	6011	Probable medieval
6	6055	6006	Probable medieval

The small assemblage of land snail shells (Mollusca) present in sample 9000 from 14th – early 15th century moat fill 9011 may also provide some palaeoenvironmental information on the immediate environment, and it is recommended that this assemblage be assessed by a molluscan specialist.

Should further analysis of wood charcoal, uncharred plant macrofossils or invertebrate macrofossils be carried out, it is also recommended that AMS dates be obtained for the studied features where dating is uncertain, and no other dating evidence is available. Deposits from which suitable material for AMS dating is present are listed below. Where charcoal is present, but no round wood, cereal grain or hazel nutshell is present, the accuracy of the dating result may however be limited.

Trench	Context	Sample number	Material suitable for AMS dating	Quantity
1	1018	1000	Wood charcoal (>4mm)	50-100 charcoal fragments
1	1042	1006	Wood charcoal (>4mm)	1-5 charcoal fragments
1	1057	1003	Charred cereal grain	10-50 grains
1	1064	1008	Wood charcoal (>4mm)	1-5 charcoal fragments
1	1065	1007	Wood charcoal (>4mm)	5-10 charcoal fragments

Trench	Context	Sample number	Material suitable for AMS dating	Quantity
1	1076	1009	Charred cereal grain, hazel nutshell	10-50 grains, 50-100 nutshell fragments
1	1079	1010	Wood charcoal (>4mm)	10-50 charcoal fragments
3	3018	3006	Wood charcoal (>4mm)	5-10 charcoal fragments
3	3055	3007	Wood charcoal (>4mm)	1-5 charcoal fragments
3	3056	3008	Cereal grain, wood charcoal (>4mm)	10-50 grains, 100-500 charcoal fragments
3	3057	3002	Waterlogged round wood (>4mm), hazel nutshell	5-10 wood fragments, 50-100 nutshell fragments
3	3057	3009	Waterlogged round wood (>4mm), hazel nutshell	10-50 wood fragments, >500 nutshell fragments
3	3062	3003	Charred cereal grain	50-100 grains
3	3070	3004	Wood charcoal (>4mm)	5-10 charcoal fragments
3	3072	3014	Round wood charcoal (>4mm)	1-5 charcoal fragments
3	3079	3013	Waterlogged round wood (>4mm), hazel nutshell	1-5 wood fragments, 100-500 nutshell fragments
4	4008	4002	Wood charcoal (>4mm)	1 – 5 fragments
4	4009	4000	Wood charcoal (>4mm)	1 – 5 fragments
4	4064	4001	Wood charcoal (2-4mm)	1 – 5 fragments
5	5038	5002	Wood charcoal (>4mm)	1 – 5 fragments
5	5039	5001	Wood charcoal (>4mm)	50-100 charcoal fragments
5	5041	5004	Cereal grain	2-5 grains
5	5045	5003	Cereal grain	5-10 grains
6	6043	6001	Charred cereal grain	1-5 grains
6	6044	6002	Charred hazel nutshell	1-5 nutshell fragments
6	6047	6004	Charred cereal grain, charred hazel nutshell, round wood charcoal (>4mm)	1-5 grains, 1-5 nutshell fragments, 1-5 charcoal fragments
6	6048	6003	Charred cereal grain	1-5 grains
6	6049	6005	Wood charcoal (>4mm)	10-50 charcoal fragments

Trench	Context	Sample number	Material suitable for AMS dating	Quantity
6	6055	6006	Waterlogged round wood (>4mm)	5 – 10 wood fragments
6	6060	6009	Waterlogged round wood (>4mm)	1-5 wood fragments
6	6062	6008	Wood charcoal (>4mm)	1 – 5 charcoal fragments
6	6064	6007	Wood charcoal (2-4mm)	5-10 charcoal fragments
6	6072	6011	Waterlogged wood (>4mm)	100-500 wood fragments
9	9011	9000	Wood charcoal (2-4mm)	5-10 charcoal fragments
10	10049	10000	Wood charcoal (>4mm)	1-5 charcoal fragments
10	10071	10004	Wood charcoal (2-4mm)	1-5 charcoal fragments
10	10072	10003	Wood charcoal (2-4mm)	10-50 charcoal fragments
10	10076	10008	Wood charcoal (>4mm)	5-10 charcoal fragments
10	10078	10009	Wood charcoal (>4mm)	1-5 charcoal fragments
11	11022	11001	Wood charcoal (2-4mm)	5-10 charcoal fragments

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Appendix 1 – Tables

Table 1 - Archaeobotanical sample assessment, Trench 1, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
Cereals and other economic plants*								
cf. *Avena* sp. (oat) grain			-				-	
Hordeum vulgare/distichum (hulled barley) grain							-	
Hordeum indet. (indeterminate barley) grain							+	
cf. *Hordeum* sp. grain							-	
Secale cereale (rye) grain			+					
Secale cereale rachis node			-					
cf. *Secale cereale* grain			++					
Triticum aestivum / turgidum s.l. (free threshing wheat) grain			-					
Triticum cf. *aestivum / turgidum* s.l. grain			-					
Triticum sp. (indeterminate wheat) grain							-	
Cereal sp. indet. grain			-				-	
>2mm culm node (cereal straw)			-				-	
Wild / weed plant seeds*								
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)			-			- (uc)		
Ranunculus flammula (lesser spearwort)			-					
Vicia spp. / *Lathyrus* spp. (vetches / wild peas)			-					

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
Rubus fruticosus agg. (bramble / blackberry)	- (uc)		-				+++++ (uc)	++ (uc)
Rubus idaeus (raspberry)							+++ + (uc)	+ (uc)
Urtica dioica (common nettle)							+++++ (uc)	+++ + (uc)
Betula pendula (birch) seed		- (uc)					+ (uc)	- (uc)
Corylus avellana (hazel) nutshell			- (uc)				++ (uc) +	
Viola sp. (violet)							+ (uc)	- (uc)
Malva sp. (mallow)			++					
Persicaria maculosa / lapathifolia (redshank / pale persicaria)			-					
Polygonum aviculare agg. (knotgrass)			++					
Rumex spp. (docks)			-				++ (uc)	++ (uc)
Rumex acetosella (sheep's sorrel)			++					
Spergula arvensis (corn spurey)			-					
Agrostemma githago (corncockle)			-					
Hyoscyamus niger (henbane)							- (uc)	
Lamiaceae (dead nettle family)							++ (uc)	

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
Centaurea sp. (knapweed)			-					
Sambucus nigra (elder)							++ (uc)	- (uc)
Conium maculatum (hemlock)			-					
Schoenoplectus sp. (club-rush)			-					
Carex spp. (sedges)			++				+++ (uc)	- (uc)
Bromus spp. / *Lolium* spp. (brome / rye grass)			+					
Poaceae (grasses)			+++				-	
Other plant material*								
Tuber / rhizome							-	
Wood and wood charcoal*								
>4mm wood fragments							++++	++
2-4 mm wood fragments							++++	+
<2 mm wood fragments							+++++	+++
> 4mm wood charcoal fragments	+++	-	++++		+	-	++++	++
2-4 mm wood charcoal fragments	++++	+++	+++++		++	+	+++++	-
<2mm wood charcoal fragments	+++++	++++	+++++	+++	++++	+++++	+++++	++++
>1mm vitrified charcoal fragments	++++	+++	++++	+	+	-		

Context number	1018	1042	1057	1062	1065	1064	1076	1079
Feature number	1008	1033			1033			
Sample number	1000	1006	1003	1004	1007	1008	1009	1010
Feature type	Drain	Bedding layer for cobbles	Made ground	Made ground	Bedding layer for cobbles	Made ground	Made ground	Made ground
Date	19th C	15th – early 16th C	13th – 15th C	13th – 15th C	15th – early 16th C	13th – 15th C	13th – 15th C	13th – 15th C
Sample volume (litres)	15	30	10	5	5	18	40	40
Flot volume (ml)	120	40	200	1	3	5	500	60
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	DP	RP	Indet.	DP	DP & RP	DP & RP	DP & RP
Non plant material*								
Mollusca (land snails)	++					-		
Cecilioides (intrusive burrowing snail)		-			-			
Coleoptera (beetle macrofossils)	+						++	+
Invertebrate puparia					-			
Slag / metallurgical debris	++++	++++				++		

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 2 - Archaeobotanical sample assessment, Trench 3, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Cereals and other economic plants*					

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Vitis vinifera (grape)		- (uc)			
Ficus carica (fig)		- (uc)			
Avena sp. (oat) grain					+
cf. *Avena* sp. grain					+
Hordeum vulgare/distichum (hulled barley) grain					-
cf. *Hordeum vulgare/distichum* grain					
Secale cereale (rye) grain					
cf. *Secale cereale*					
Triticum aestivum / turgidum s.l. (free threshing wheat) grain	-				-
Triticum cf. *aestivum / turgidum* s.l. grain					
Cereal indeterminate grain					-
Wild / weed plant seeds*					
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)	- (uc)				+ (uc)
Ranunculus sardous (hairy buttercup)					
Ranunculus flammula (lesser spearwort)					+ (uc)
Vicia spp. / *Lathyrus* spp. (vetches / wild peas)					
Rubus fruticosus agg. (bramble / blackberry)	+ (uc)	++ (uc)	- (uc)		+++ (uc) -
Rubus idaeus (raspberry)	- (uc)	++ (uc)			
Potentilla spp. (cinquefoils)					+ (uc)
Urtica dioica (common nettle)	- (uc)				+ (uc)
Betula pendula (birch) seed		- (uc)			
Betula pendula (birch) bract			- (uc)		

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Alnus glutinosa (alder)					
Corylus avellana (hazel) nutshell	- (uc)				+ (uc)
Viola sp. (violet)					
Hypericum sp. (St John's-wort)	+ (uc)				- (uc)
Brassica sp. (cabbage)	- (uc)				
Persicaria maculosa / lapathifolia (redshank / pale persicaria)					- (uc)
Persicaria hydropiper (water pepper)					- (uc)
Polygonum aviculare agg. (knotgrass)					
Fallopia convolvulus (black bindweed)					- (uc)
Rumex spp. (docks)	- (uc)				++ (uc)
Rumex acetosella (sheep's sorrel)					++ (uc)
Stellaria media (chickweed)					
Atriplex spp. (oraches)					
Chenopodium spp. (goosefoots)					
Chenopodium album (fat hen)					- (uc)
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)					
Hyoscyamus niger (henbane)					
Plantago major (greater plantain)					
Plantago lanceolata (ribwort plantain)					
Lamiaceae (dead nettle family)	- (uc)		- (uc)		+ (uc)
Cardus / Cirsium spp. (thistles)					
Lapsana communis (nipplewort)					
Picris hieracioides (hawkweed oxtongue)					+ (uc)
Anthemis cotula (stinking chamomile)					

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Glebionis segetum (corn marigold)					++++ (uc) +
Sambucus nigra (elder)	++ (uc)		+++ (uc)	- (uc)	++++ (uc)
Conium maculatum (hemlock)					- (uc)
Juncus spp. (rushes)				++ (uc)	
Carex spp. (sedges)	- (uc)	- (uc)	- (uc)	- (uc)	++++ (uc) +
Bromus spp. / *Lolium* spp. (brome / rye grass)					
Poaceae (grasses)					-
Other plant material*					
Bryophyta fragments (mosses)					
Leaf buds					
Wood and wood charcoal*					
>4mm round wood fragments					+
>4mm wood fragments				+++	++++
2-4 mm round wood fragments					+
2-4 mm wood fragments				+++	+++++
<2 mm wood fragments				+++++	+++++
> 4mm round wood charcoal fragments					
> 4mm wood charcoal fragments	+			-	++++
2-4 mm wood charcoal fragments	+++	-			+++++
<2mm wood charcoal fragments	+++++	++++	+++++	+++	+++++
>1mm vitrified charcoal fragments		+++	-		
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	RP		RP	RP

Context number	3018	3034	3055	3055	3056
Feature number		3030	3084	3084	
Sample number	3006	3000	3001	3007	3008
Context type	Made ground (redeposited natural)	Drain	Demolition /destruction layer	Demolition /destruction layer	Demolition /destruction layer
Date	uncertain	19th C	13th C	13th C	13th C
Sample volume (litres)	40	40	20	1	40
Flot volume (ml)	10	60	10	50	300
Non plant material*					
Coleoptera (beetle macrofossils)		+++		+	++
Slag / metallurgical debris		+++	++		

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 2 continued - Archaeobotanical sample assessment, Trench 3, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Cereals and other economic plants*						
Vitis vinifera (grape)						
Ficus carica (fig)						
Avena sp. (oat) grain			++			
cf. *Avena* sp. grain			++			
Hordeum vulgare/distichum (hulled barley) grain			-			
cf. *Hordeum vulgare/distichum* grain			-			
Secale cereale (rye) grain			+			

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
cf. *Secale cereale*			++			
Triticum aestivum / turgidum s.l. (free threshing wheat) grain			-			
Triticum cf. *aestivum / turgidum* s.l. grain			-			
Cereal indeterminate grain			-			
Wild / weed plant seeds*						
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)	++ (uc)	++ (uc)	- (uc)			+ (uc)
Ranunculus sardous (hairy buttercup)	+ (uc)					
Ranunculus flammula (lesser spearwort)						
Vicia spp. / *Lathyrus* spp. (vetches / wild peas)			-			
Rubus fruticosus agg. (bramble / blackberry)	+ (uc)	- (uc)	++ (uc)	- (uc)	++ (uc)	
Rubus idaeus (raspberry)			+ (uc)	+ (uc)	+++ (uc)	
Potentilla spp. (cinquefoils)	- (uc)					
Urtica dioica (common nettle)	++ (uc)	+ (uc)	+++ + (uc)	+++ (uc)	+++ ++ (uc)	++ (uc)
Betula pendula (birch) seed				++ (uc)		
Betula pendula (birch) bract				+ (uc)		
Alnus glutinosa (alder)	- (uc)					
Corylus avellana (hazel) nutshell	+++ (uc)	+++++ (uc)			+ (uc)	++++ (uc)
Viola sp. (violet)				- (uc)	- (uc)	
Hypericum sp. (St John's-wort)						
Brassica sp. (cabbage)						

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Persicaria maculosa / lapathifolia (redshank / pale persicaria)						
Persicaria hydropiper (water pepper)						
Polygonum aviculare agg. (knotgrass)	++ (uc)	+++ (uc)	- (uc)			++ (uc)
Fallopia convolvulus (black bindweed)						
Rumex spp. (docks)	++ (uc)	++ (uc)	- (uc)			++ (uc)
Rumex acetosella (sheep's sorrel)		- (uc)				- (uc)
Stellaria media (chickweed)	- (uc)		- (uc)			
Atriplex spp. (oraches)			-			
Chenopodium spp. (goosefoots)		- (uc)	+ (uc)			
Chenopodium album (fat hen)	- (uc)	- (uc)	- (uc)			
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)	++ (uc)	+ (uc)				
Hyoscyamus niger (henbane)			- (uc)			
Plantago major (greater plantain)	- (uc)	+ (uc)				- (uc)
Plantago lanceolata (ribwort plantain)			-			
Lamiaceae (dead nettle family)		- (uc)	- (uc)	- (uc)	++ (uc)	
Cardus spp. / *Cirsium* spp. (thistles)		- (uc)	- (uc)			- (uc)
Lapsana communis (nipplewort)		- (uc)				
Picris hieracioides (hawkweed oxtongue)						
Anthemis cotula (stinking chamomile)			-			
Glebionis segetum (corn marigold)		+ (uc)	+			- (uc)
Sambucus nigra (elder)	- (uc)		+ (uc)	+ (uc)	+++ + (uc)	
Conium maculatum (hemlock)						

Context number	3057	3057	3062	3070	3072	3079
Feature number						
Sample number	3002	3009	3003	3004	3014	3013
Context type	Demolition /destruction layer	Demolition /destruction layer	Made ground	Made ground	Made ground	Demolition /destruction layer
Date	13th C	13th C	13th C	13th C	13th C	13th C
Sample volume (litres)	1	1	8	40	30	1
Flot volume (ml)	200	700	60	20	60	400
Juncus spp. (rushes)	++ (uc)	++ (uc)	- (uc)			++ (uc)
Carex spp. (sedges)	++ (uc)	+ (uc)	++ (uc)	- (uc)	+ (uc)	+ (uc)
Bromus spp. / *Lolium* spp. (brome / rye grass)			-			
Poaceae (grasses)	++ (uc)	++ (uc)	-			++ (uc)
Other plant material*						
Bryophyta fragments (mosses)		++++ (uc)				++++ (uc)
Leaf buds	+ (uc)	- (uc)				- (uc)
Wood and wood charcoal*						
>4mm round wood fragments	+	++				-
>4mm wood fragments	++++	++++				
2-4 mm round wood fragments		+				
2-4 mm wood fragments	+++++	+++++				
<2 mm wood fragments	+++++	+++++				
> 4mm round wood charcoal fragments					-	
> 4mm wood charcoal fragments	+	+++	+++	+	++	+
2-4 mm wood charcoal fragments	++	++	++		++	++
<2mm wood charcoal fragments	++++	++++	+++ ++	+++ ++	+++ ++	+++++
>1mm vitrified charcoal fragments						
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP & DP	RP & DP	RP & DP	RP & DP	RP & DP	RP & DP
Non plant material*						
Coleoptera (beetle macrofossils)	+++	++++	+			+++
Slag / metallurgical debris						

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 3 - Archaeobotanical sample assessment, Trench 4, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	4008	4009	4113	4064
Feature number	4105			
Sample number	4002	4000	4003	4001
Context type	Made ground	Made ground	Layer	Made ground
Date	late 19th – early 20th C	late 19th – early 20th C	12th – 15th C	mid – late 19th C
Sample volume (litres)	20	24	40	23
Flot volume (ml)	650	40	1	100
Wild / weed plant seeds*				
Urtica dioica (common nettle)			- (uc)	
Betula pendula (birch) seed			+ (uc)	
Betula pendula (birch) bract			- (uc)	
Sambucus nigra (elder)			- (uc)	
Wood and wood charcoal*				
> 4mm wood charcoal fragments	-	-		
2-4 mm wood charcoal fragments	+	+		-
<2mm wood charcoal fragments	++++	+		+
>1mm vitrified charcoal fragments	+++++	++++		++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	DP	DP & RP		RP
Non plant material*				
Coleoptera (beetle macrofossils)		++		
Slag / metallurgical debris	+++++	-		+++++

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 4 - Archaeobotanical sample assessment, Trench 5, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	5039	5038	5041	5045
Feature number	5046			
Sample number	5001	5002	5004	5003

Context type	Made ground	Made ground (redeposited natural)	Matrix between stone surfaces (medieval courtyard)	Made ground (medieval courtyard)
Date	uncertain	uncertain	13th C	13th C
Sample volume (litres)	15	38	38	5
Flot volume (ml)	30	3	4	5
Cereals and other economic plants*				
cf. *Avena* sp. (oat) grain			-	
Triticum aestivum / turgidum s.l. (free threshing wheat) grain				+
Triticum sp. (indeterminate wheat) grain			-	
Wild / weed plant seeds*				
cf. *Fragaria vesca* (strawberry)	-			
Betula pendula (birch)		+ (uc)		- (uc)
Corylus avellana (hazel) nutshell			- (uc)	
Stellaria media (chickweed)		- (uc)		
Galium aparine (cleavers)			-	
Hyoscyamus niger (henbane)	- (uc)	- (uc)		
Lamiaceae (dead nettle family)			- (uc)	
Anthemis cotula (stinking chamomile)			-	
Glebionis segetum (corn marigold)			-	
Sambucus nigra (elder)		- (uc)		- (uc)
Carex spp. (sedges)			-	
Poaceae (grasses)		-	+	
Wood and wood charcoal*				
> 4mm wood charcoal fragments	+++	-	+	++
2-4 mm wood charcoal fragments	++++	+	++	++
<2mm wood charcoal fragments	+++++	++++	++++	++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	DP	RP	RP

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 5 - Archaeobotanical sample assessment, Trench 6, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
Cereals and other economic plants*					
Avena sp. (oat) grain				-	
cf. *Avena* sp. grain			-	-	
Triticum sp. (indeterminate wheat) grain	-		-		
Cereal sp. indet. grain					
Awn fragments				-	
Wild / weed plant seeds*					
Papaver somniferum (opium poppy)					
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)					
Ranunculus flammula (lesser spearwort)					
Prunus spinosa (blackthorn / sloe)					
Rubus fruticosus agg. (bramble / blackberry)	- (uc)	+ (uc)	+++ (uc)	++ (uc)	
Rubus idaeus (raspberry)		- (uc)	++ (uc)	- (uc)	
Potentilla spp. (cinquefoils)				- (uc)	
Aphanes arvensis (parsley piert)					
Urtica dioica (common nettle)			+++ (uc)		
Betula pendula (birch) seed	++ (uc)	++ (uc)			

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
Betula pendula (birch) bract		++ (uc)			
Corylus avellana (hazel) nutshell		-	-		
Viola sp. (violet)					
Hypericum sp. (St John's-wort)	- (uc)			- (uc)	
Raphanus raphanistrum spp. *raphanistrum* (wild radish) seed pod fragment					
Persicaria maculosa / lapathifolia (redshank / pale persicaria)					
Persicaria hydropiper (water pepper)					
Polygonum aviculare agg. (knotgrass)					
Fallopia convolvulus (black bindweed)					
Rumex spp. (docks)			- (uc)		
Rumex acetosella (sheep's sorrel)					
Stellaria media (chickweed)					
Agrostemma githago (corncockle)					
Atriplex spp. (oraches)					
Chenopodium spp. (goosefoots)					
Chenopodium album (fat hen)					
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)					

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
Solanum nigrum (black nightshade)					
Lamiaceae (dead nettle family)	- (uc)	- (uc)		- (uc)	
Galeopsis sp. (hemp-nettle)					
Ajuga reptans (bugle)					
Cardus / Cirsium spp. (thistles)					
Lapsana communis (nipplewort)					
Anthemis cotula (stinking chamomile)					
Glebionis segetum (corn marigold)			- (uc)	-	
Sambucus nigra (elder)		- (uc)			
Aethusa cynapium (fool's parsley)					
Conium maculatum (hemlock)		- (uc)		- (uc)	
Juncus spp. (rushes)	++ (uc)	++ (uc)			
Carex spp. (sedges)	- (uc)	- (uc)	- (uc)	++++ (uc)	
Poaceae (grasses)			- (uc)	+ (uc) -	
Other plant material*					
Bryophyta (mosses)					
Wood and wood charcoal*					
>4mm round wood fragments			-		
>4mm wood fragments			++++		
2-4 mm round wood fragments					
2-4 mm wood fragments			++		

Context number	6043	6044	6047	6048	6049
Feature number					
Sample number	6001	6002	6004	6003	6005
Context type	Made ground	Made ground	Made ground	Made ground	Made ground
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	40	40	40	1	1
Flot volume (ml)	4	10	200	12	10
<2 mm wood fragments			++++		
> 4mm round wood charcoal fragments			-		
> 4mm wood charcoal fragments	-	++	++++	+	++
2-4 mm wood charcoal fragments		+	++	++	++++
<2mm wood charcoal fragments	++++	+++++	++++	+++++	+++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	RP	RP some DP	RP	RP & DP
Non plant material*					
Coleoptera (beetle macrofossils)		-		+	
Invertebrate puparia					

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 5 continued - Archaeobotanical sample assessment, Trench 6, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Cereals and other economic plants*					
Avena sp. (oat) grain					
cf. *Avena* sp. grain					

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Triticum sp. (indeterminate wheat) grain			-		
Cereal sp. indet. grain				-	
Awn fragments					
Wild / weed plant seeds*					
Papaver somniferum (opium poppy)	- (uc)				
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)	+ (uc)	- (uc)	- (uc)	- (uc)	- (uc)
Ranunculus flammula (lesser spearwort)	- (uc)	+ (uc)			+ (uc)
Prunus spinosa (blackthorn / sloe)			- (uc)		
Rubus fruticosus agg. (bramble / blackberry)	- (uc)	+ (uc)	++++ (uc)	++++ (uc)	++ (uc)
Rubus idaeus (raspberry)	- (uc)	- (uc)	++ (uc)	+ (uc)	- (uc)
Potentilla spp. (cinquefoils)		- (uc)	+ (uc)		- (uc)
Aphanes arvensis (parsley piert)				+ (uc)	
Urtica dioica (common nettle)	++++ (uc)	- (uc)	+ (uc)		
Betula pendula (birch) seed					
Betula pendula (birch) bract			- (uc)		
Corylus avellana (hazel) nutshell		- (uc)	- (uc)		+ (uc)
Viola sp. (violet)		- (uc)	+ (uc)	- (uc)	- (uc)
Hypericum sp. (St John's-wort)					

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Raphanus raphanistrum spp. *raphanistrum* (wild radish) seed pod fragment			- (uc)		- (uc)
Persicaria maculosa / lapathifolia (redshank / pale persicaria)				- (uc)	- (uc)
Persicaria hydropiper (water pepper)		- (uc)	- (uc)	+ (uc)	- (uc)
Polygonum aviculare agg. (knotgrass)	+ (uc)		+ (uc)	- (uc)	
Fallopia convolvulus (black bindweed)	- (uc)				
Rumex spp. (docks)	+++ (uc)	+ (uc)	++++ (uc)	++++ (uc)	+++ (uc)
Rumex acetosella (sheep's sorrel)	+ (uc)				
Stellaria media (chickweed)		- (uc)			- (uc)
Agrostemma githago (corncockle)			++ (uc)	- (uc)	
Atriplex spp. (oraches)			+ (uc)		
Chenopodium spp. (goosefoots)	- (uc)		+ (uc)	- (uc)	
Chenopodium album (fat hen)	+ (uc)		++ (uc)	- (uc)	
Chenopodium glaucum / rubrum (oak leaved / red goosefoot)					+ (uc)
Solanum nigrum (black nightshade)	- (uc)				
Lamiaceae (dead nettle family)			- (uc)		
Galeopsis sp. (hemp-nettle)	+ (uc)	- (uc)	- (uc)		- (uc)
Ajuga reptans (bugle)			- (uc)		

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
Cardus / Cirsium spp. (thistles)	+ (uc)		- (uc)		
Lapsana communis (nipplewort)		- (uc)	- (uc)	- (uc)	
Anthemis cotula (stinking chamomile)		+ (uc)	+ (uc)		
Glebionis segetum (corn marigold)	+ (uc)	+ (uc)	- (uc)	- (uc)	+ (uc)
Sambucus nigra (elder)		- (uc)	+ (uc) -	- (uc)	
Aethusa cynapium (fool's parsley)				- (uc)	
Conium maculatum (hemlock)	+ (uc)	- (uc)		- (uc)	- (uc)
Juncus spp. (rushes)					+++ (uc)
Carex spp. (sedges)	++ (uc)	+ (uc)	+++ (uc)	++ (uc)	- (uc)
Poaceae (grasses)				+	
Other plant material*					
Bryophyta (mosses)		- (uc)			
Wood and wood charcoal*					
>4mm round wood fragments	+	-	-	-	
>4mm wood fragments	+++++	++++	++++	+++	++++
2-4 mm round wood fragments		-	-	-	
2-4 mm wood fragments	++++	++++	+++++	++++	+++++
<2 mm wood fragments	+++++	+++++	+++++	+++++	+++++
> 4mm round wood charcoal fragments					
> 4mm wood charcoal fragments		-		-	+
2-4 mm wood charcoal fragments		-	+	++	++

Context number	6055	6060	6064	6062	6072
Feature number	6067	6059	6063	6061	6067
Sample number	6006	6009	6007	6008	6011
Context type	Made ground	Pit fill	Gully fill	Pit fill	Pit fill
Date	Medieval?	Medieval?	Medieval?	Medieval?	Medieval?
Sample volume (litres)	1	1	32	10	1
Flot volume (ml)	300	100	150	100	100
<2mm wood charcoal fragments	+++	+++	++++	+++	++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)		DP		RP & DP	DP
Non plant material*					
Coleoptera (beetle macrofossils)	+++	+++	+++	+++	+++
Invertebrate puparia		-			

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 6 - Archaeobotanical sample assessment, Trench 9, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	9011
Feature number	9007
Sample number	9000
Context type	Moat fill
Date	Medieval
Sample volume (litres)	40
Flot volume (ml)	3
*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (ch = charred)	
Wild / weed plant seeds*	
Betula pendula (birch) seed	-
Hyoscyamus niger (henbane)	+
Lamiaceae (dead nettle family)	-
Sambucus nigra (elder)	++
Wood and wood charcoal*	
2-4 mm wood charcoal fragments	+

Context number	9011
Feature number	9007
Sample number	9000
Context type	Moat fill
Date	Medieval
Sample volume (litres)	40
Flot volume (ml)	3
<2mm wood charcoal fragments	++++
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP
Non plant material*	
Mollusca (land snails)	++++

Table 7 - Archaeobotanical sample assessment, Trench 10 Sheffield Castle, Sheffield, South Yorkshire 201540)

Context number	10049	10067	10071	10072	10073	10075	10076	10078
Feature number		10065				10065	10065	10065
Sample number	10000	10006	10004	10003	10005	10007	10008	10009
Context type	Made ground	Redeposited natural	Made ground (bank of moat)	Deposit (bank of moat)	Deposit (bank of moat)	Tertiary deposit in moat	Secondary fill in moat	Secondary fill in moat
Date	18th – 19th C	17th C?	13th – 15th C	13th – 15th C	13th – 15th C	17th C?	Late medieval	Late medieval
Sample volume (litres)	10	15	40	40	40	15	27	36
Flot volume (ml)	10	2	5	8	1	3	20	5
Cereals and other economic plants*								
Cereal indeterminate grain					-			
Wild / weed plant seeds*								
Ranunculus bulbosus/acris/repens (bulbous/meadow/creeping buttercup)						- (uc)		
Rubus fruticosus agg. (bramble / blackberry)						- (uc)	+ (uc)	- (uc)

Context number	10049	10067	10071	10072	10073	10075	10076	10078
Feature number		10065				10065	10065	10065
Sample number	10000	10006	10004	10003	10005	10007	10008	10009
Context type	Made ground	Redeposited natural	Made ground (bank of moat)	Deposit (bank of moat)	Deposit (bank of moat)	Tertiary deposit in moat	Secondary fill in moat	Secondary fill in moat
Date	18th – 19th C	17th C?	13th – 15th C	13th – 15th C	13th – 15th C	17th C?	Late medieval	Late medieval
Sample volume (litres)	10	15	40	40	40	15	27	36
Flot volume (ml)	10	2	5	8	1	3	20	5
Urtica dioica (common nettle)						++ (uc)	+++ (uc)	++ (uc)
Betula pendula (birch) seed		- (uc)	+ (uc)	- (uc)	- (uc)	- (uc)	+ (uc)	+ (uc)
Betula pendula (birch) bract							- (uc)	- (uc)
Rumex spp. (docks)						+ (uc)		
Lamiaceae (dead nettle family)			- (uc)			+ (uc)	- (uc)	
Glebionis segetum (corn marigold)							- (uc)	
Sambucus nigra (elder)		++ (uc)		- (uc)	- (uc)	+ (uc)	++ (uc)	+ (uc)
Carex spp. (sedges)						- (uc)	- (uc)	
Wood and wood charcoal*								
>4mm wood fragments							+	-
2-4mm wood fragments							++	
> 4mm wood charcoal fragments	-						+	-
2-4 mm wood charcoal fragments			-	++			-	
<2mm wood charcoal fragments	++	++	+++	+++ ++	+++ +	++	++	+++
>1mm vitrified charcoal fragments	++	+	+		-	+	-	

Context number	10049	10067	10071	10072	10073	10075	10076	10078
Feature number		10065				10065	10065	10065
Sample number	10000	10006	10004	10003	10005	10007	10008	10009
Context type	Made ground	Redeposited natural	Made ground (bank of moat)	Deposit (bank of moat)	Deposit (bank of moat)	Tertiary deposit in moat	Secondary fill in moat	Secondary fill in moat
Date	18th – 19th C	17th C?	13th – 15th C	13th – 15th C	13th – 15th C	17th C?	Late medieval	Late medieval
Sample volume (litres)	10	15	40	40	40	15	27	36
Flot volume (ml)	10	2	5	8	1	3	20	5
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	DP	Indet.	RP	RP	Indet.	Indet.	RP some DP	RP
Non plant material*								
Slag / metallurgical debris	-					-		

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Table 8 - Archaeobotanical sample assessment, Trench 11, Sheffield Castle, Sheffield, South Yorkshire (201540)

Context number	11022	11036
Feature number	11028	11035
Sample number	11001	11002
Feature type	Made ground	Made ground
Date	19th C	19th C
Sample volume (litres)	40	40
Flot volume (ml)	60	20
Wild / weed plant seeds*		
Rubus fruticosus agg. (bramble / blackberry)		- (uc)
Urtica dioica (common nettle)		+ (uc)
Betula pendula (birch) seed		- (uc)

Context number	11022	11036
Feature number	11028	11035
Sample number	11001	11002
Feature type	Made ground	Made ground
Date	19th C	19th C
Sample volume (litres)	40	40
Flot volume (ml)	60	20
Hyoscyamus niger (henbane)		- (uc)
Lamiaceae (dead nettle family)	++ (uc)	++ (uc)
Sambucus nigra (elder)	+++ (uc)	++ (uc)
Carex spp. (sedges)	+ (uc)	
Wood and wood charcoal*		
2-4 mm wood charcoal fragments	+	
<2mm wood charcoal fragments	+++++	
>1mm vitrified charcoal fragments	++++	+
Charcoal (DP = predominantly diffuse porous. RP = predominantly ring porous)	RP	
Non plant material*		
Mollusca (land snails)	+	+++
Slag / metallurgical debris	+	

*key - = < 5 items, + = > 5 items, ++ = > 10 items, +++ = > 50 items, ++++ = > 100 items, +++++ = > 500 items (uc = uncharred)

Lucy Allott
Wood species identification and suitability for dendrochronology

Wessex Archaeology – 201540: Sheffield Castle wood assessment

Lucy Allott

Introduction

Twenty samples of waterlogged wood and two fragments of dry wood were submitted to Archaeology South-East for taxonomic identification and to assess their suitability for dendrochronology. The following report does not provide a full timber record.

Methods

Wood fragments were hand sectioned along three planes (transverse, radial and tangential), temporarily mounted on slides and viewed under a transmitted light microscope at magnifications up to 500x to facilitate identification. Taxonomic identifications were assigned by comparing suites of anatomical characteristics visible with those documented in reference atlases (Hather 2000; Schoch *et al.* 2004; Schweingruber 1990).

Results

Taxonomic identifications and notes regarding their suitability for dendrochronological work, presence of sapwood, pith, bark and overall form, are outlined in Table 1.

The majority of wood samples submitted were small fragments, some of which were subsamples, of waterlogged wood deriving from larger oak timbers. Almost all of the oak displayed tightly spaced growth rings, suggesting they derive from mature, slow grown components of the trees, consistent with the presence of timber. By contrast, eastern-most 'timber' sample [3078] was a subsample of small branch oak wood and differed from the majority of the assemblage. Other roundwood included a small fragment of alder [3057A] and hazel [3057] (Timber sample 3 of 3) revealing the presence of taxa other than oak. Two wood samples [4009 A and B], retrieved from site in a dry condition, were identified as common spruce/ European larch. This identification could not be satisfactorily refined due to inherent difficulties in distinguishing the two taxa (Schweingruber 1990) which is further compounded by the effects of drying.

Suitability for dendrochronological dating

Very few fragments were large enough or retained sufficient growth rings, pith or sap that could make them suitable for dendrochronology. One exception is timber sample [3057] (T 1of 3) which may retain some sapwood (see notes in Table 1) and displays closely spaced growth rings suggesting it could retain sufficient rings for dating. It should be noted, however, that this is an isolated sample, which may lessen its potential for dating. The only other timber that was superficially large enough for dendro work was timber/object [6055], which measured approximately 33x27x13cm in length/width/depth. It appears to be box-halved with considerable further conversion and shaping that have removed the sapwood. It is possible that pith, or close to the pith, is retained however this could only be fully determined if sectioned. The growth rings run parallel to the breadth of the object and it is therefore unlikely to provide sufficient rings for denrdo dating.

References

Hather, J. G. 2000. The Identification of the Northern European Woods: A Guide for archaeologists and conservators. Archetype Publications Ltd, London.

Schoch, W., Heller, I., Schweingruber, F. H., & Kienast, F. 2004. Wood anatomy of central European Species. Online version: www.woodanatomy.ch

Schweingruber, F.H. 1990. *Microscopic Wood Anatomy: structural variability of stems and twigs in recent and subfossil woods from Central Europe.* Swiss Federal Institute for Forest, Snow and Landscape Research

Table 1: Wood Identification and suitability for dendrochronology

Timber Context Number	Context/timber sample notes	Notes	Roundwood	Knotwood	rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
3057A		small fragment of roundwood	Y			Y	N	Alnus sp.	alder	N
3057B		subsample from larger piece of timber? (no corresponding photo for this one). Depending on original size and presence of bark or sap wood this could be suitable for dendro				N	N	Quercus sp.	oak	N? (see notes)
3057	T 1 of 3	closely spaced growth rings and possibly sufficient for dendro work but as an isolated sample it is unlikely to be suitable, edge may retain some sapwood although difficult to tell as drying may be causing colour differentiation.				poss sapwood	IMGP5390.3057. Timber 1 of 3	Quercus sp.	oak	? (see notes)
3057	T2 of 3	Subsample submitted - very dark, but not charred, fragment from larger timber submitted for identification. Original doesn't look large enough for dendro work				N	IMGP5380.3057. Timber 2 of 3	Quercus sp.	oak	N

Timber Context Number	Context/timber sample notes	Notes	Roundwood	Knotwood	rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
3057	T3 of 3	twisted piece of possible roundwood. It is either compressed and twisted, or this is the natural growth form. From the wood anatomy, it looks like the growth form is twisted. ?root wood?	?		?		IMGP5373.3057. timber 3 of 3	Corylus avellana	hazel	N
3078	E-most timber	sub-sample submitted - cross section of part of a branch with knotwood where it attaches to a larger branch/stem, too small for dendro	Y	Y		Y	IMGP5375.3078. E-most timber	Quercus sp.	oak	N
3078	central timber	sub-sample submitted - fragment of larger piece - see photo, possibly from roundwood, not large enough for dendro	?				IMGP5371.3078. central timber	Quercus sp.	oak	N
3078	W-most timber	sub-sample submitted - although fragment from large original piece the original appears fairly thin and without sap or pith from the photo so unlikely to be suitable for dendro work				N	IMGP5364.3078. W-most timber	Quercus sp.	oak	N
6055A		close growth rings, small flat fragment from timber				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055B		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N

Timber Context Number	Context/timber sample notes	Notes	Roundwood	Knotwood	rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
6055C		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055D		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055E		close growth rings, lumps possibly originating from larger timbers				N	IMGP5368.6055 fragments A-E	Quercus sp.	oak	N
6055F		Small fragments displaying poor preservation (difficult to section)				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055G		med-close growth rings, blocky fragment probably from a larger timber, very poor preservation of anatomical features				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055H		close growth rings, blocky fragment possible from a plank?				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N
6055I		close growth rings, wedge shaped fragment				N	IMGP5370.6055 fragments F-I	Quercus sp.	oak	N

Timber Context Number	Context/timber sample notes	Notes	Roundwood	Knotwood	rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
6055		large timber/object(?) approx. measurements 33lx27wx13d. With Fe rich mineral encrusting on several surfaces. Some mineral replacement has also occurred. Although large, the growth rings run parallel to the breadth of the object and it is therefore unlikely to provide sufficient rings for denrdo dating. The edges have been removed in shaping the piece and no sap wood is evident. Pith or close to pith may be present but this is difficult to determine without sectioning the object.				? Pith (see notes)	IMGP5386.6055 J	Quercus sp.	oak	N (see notes)
6070		medium spaced growth rings (wider spaced than in other specimens), no evidence of sapwood although difficult to tell as preservation poor, wood flaking and drying. Blackened from surrounding soils? Not charred				N	IMGP5384.6070	Quercus sp.	oak	N
6077		Subsample submitted - small fragments from possible plank - shown in photo, original doesn't look to retain sufficient rings, sapwood or pith so not suitable for dendro				N	IMGP5376.6077	Quercus sp.	oak	N

Timber Context Number	Context/timber sample notes	Notes	Roundwood	Knotwood	rootwood	Bark/ Sapwood/ Heartwood	Wessex Archaeology Photos	Taxonomic ID.	English Name	Suitable for dendro
4009A		sample recovered dry, retained dry, Identification has not been refined to genus because larch and spruce can be difficult to differentiate on basis of wood anatomy and this is compounded by the effects of drying and collapsing of cell structures.				N	IMGP5383.4009	Picea/ Larix sp.	Common spruce/ European Larch	N
4009B		sample recovered dry, retained dry, Identification has not been refined to genus because larch and spruce can be difficult to differentiate on basis of wood anatomy and this is compounded by the effects of drying and collapsing of cell structures.				N	IMGP5383.4009	Picea/ Larix sp.	Common spruce/ European Larch	N

Peter Ryder stone

Lapidary Material from Sheffield Castle Excavation

Recording January 2019

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Sheffield Castle. Lapidary Material inspected and recorded Monday 7th January 2019

On the morning of Monday 7th January a selection of stone artefacts from the Castle excavation, mostly small and being kept in the Wessex Archaeology North Offices in Healey (Sheffield) , were inspected, and ten pieces photographed and drawn; in the afternoon a collection of twenty to thirty larger stones, stored on site, were examined.

Stones drawn

(the numbering is my own; any context number or label is referenced in bold type with the individual descriptions)

(1) **201540 Unstratified Stone**. Fragment of grinding stone of whitish grit, 130 x 110 x 40mm. Original diameter c240 mm. Slightly bevelled edges.

(2) **201540 (6026**). (Stones 2 and 3 in same bag). 12mm long segment of a well-finished moulded stone ring, in section 97 x 80mm. Original external diameter c210 mm. Level top, outer face with a sophisticated moulding of Classical nature, inner face with fine grooving, possibly produced by friction. It is not at all clear what this stone is, but it has the feel of being post-medieval rather than medieval.

(3) Piece of stone roof slate, 155 x 92 mm and 35 mm thick, with peg hole, only 8 mm wide in centre but splaying to c 30 mm on both faces.

(4) **201540 (4042**) (Stones 4 and 5 in same bag) Rather more than half of a small grindstone, 217 mm in external diameter and 62 mm thick, with central hole 55 m square. One face smooth, the other much rougher although with a smoothed border .

(5) Fragment of grindstone 160 x 85 mm and 52 mm thick, original external diameter c 230 mm. One face is probably one side of a central hole 60mm square. One face smooth, the other rougher with smoothed border. The edge has an incised criss-cross pattern.

(6**) 201540 (7017)** Fragment of window tracery in fine-grained buff sandstone, overall 143 x 125 x 68 mm. Head of a bifurcating mullion between two lights or sub-lights, chamfered on one side and hollow-chamfered on the other. Cusping

to the lights on both faces. In form this is very much a medieval piece -more specifically between the late 14th and early 16th century - but the facts that it was apparently found with relatively modern material, and that it is sharp-edged and absolutely unweathered, must make one suspicious that it is a piece of Gothic revival work from the 19th century. Alternatively it may have been part of some internal feature such as a screen (there is no evidence for any glazing, which rather supports this) but given that it is known that there were Victorian Gothic buildings in the immediate vicinity, it seems unlikely that this is a genuinely medieval piece.

(7) **201540 4042** (Stones 7 and 8 in same bag). Fragment of grindstone 125 x 110 mm and 46 mm thick, original diameter c. 220 mm, of grey silt stone with carbonaceous plant remains. Incised criss-cross pattern on top, except for border, and similar pattern on edge.

(8) About half a grindstone c 220 mm in diameter and 58 mm thick, with central hole 55 mm square, of whitish grit. One smooth face, one rough and raised within a smoothed border 16 mm wide.

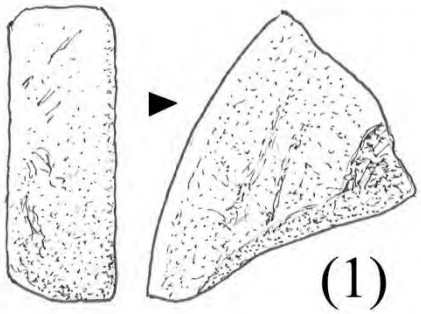
(9) 4040 Small fragment of a grindstone 100 x 84 mm x 55 mm thick, original diameter perhaps c 220 mm, and of orange/brown millstone grit.

(10) **(Loose in Office)** Large block, apparently a voussoir from a large arch (at least 3 m wide), overall 460 x 350 x 260 mm, of buff medium-grained sandstone, quite badly weathered; there is some evidence that this weathering, or at least some of it, may have taken place when the stone was in a secondary context (ie the joints, which one would expect to be protected when the voussoir was in situ, are weathered). Despite erosion light diagonal tooling is still discernible in some areas. The voussoir is moulded with a square step and two hollow chamfers, and stylistically would appear to be of 14th or 15th century date. It is difficult to see this as being anything other than a genuinely medieval piece.

(11) **A block currently in store on the Castle site**. Overall 440 x 350 x 240 mm, rectangular, with a broad chamfer on one angle. This may well be medieval, although there is nothing really diagnostic of date; it could have formed part of the plinth of a substantial building, although where undamaged the faces are relatively unweathered

Lapidary Material from Sheffield Castle Excavation

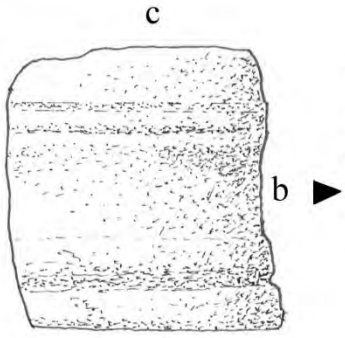
Stones drawn at 1:2

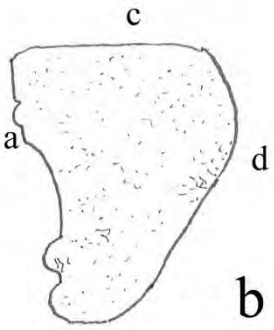


(1)

0 5 10 cm

(2)





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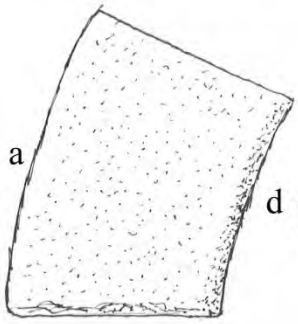

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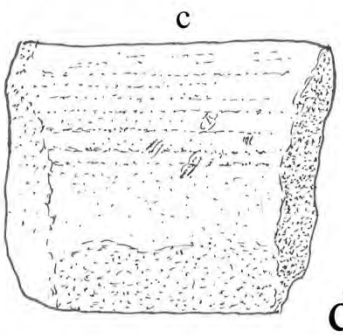
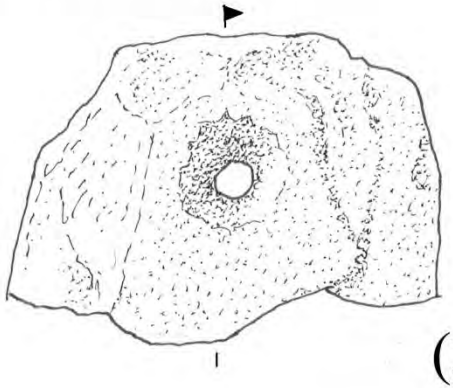


d

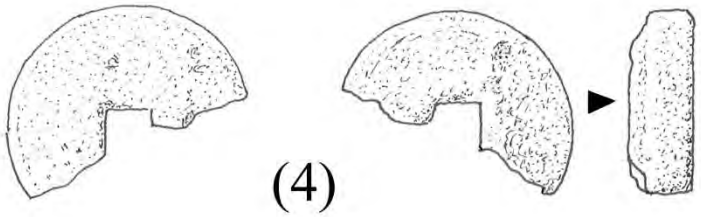


(3)

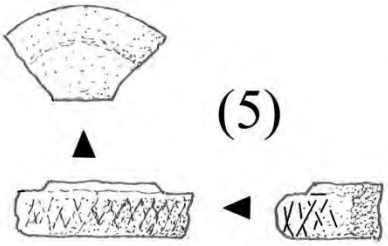
PFR Jan 2019

Lapidary Material from Sheffield Castle Excavation

Stones drawn at 1:5



(4)



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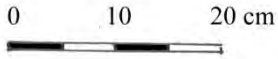
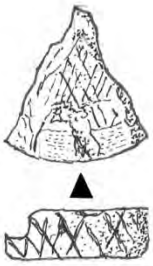
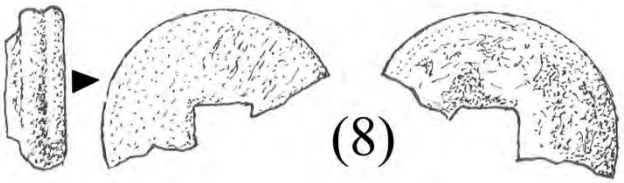
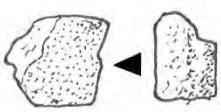




(7)



(8)

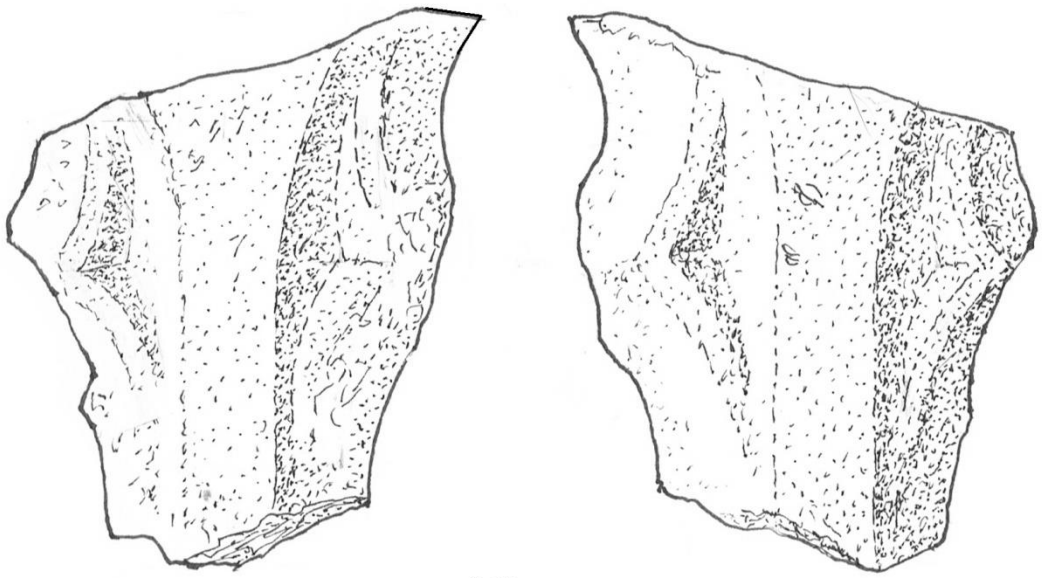


(9)

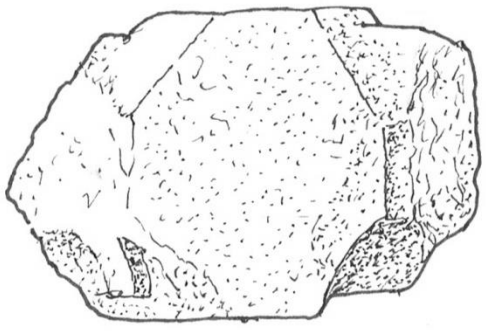
PFR Jan 2019

Lapidary Material from Sheffield Castle Excavation

Stones drawn at 1:2



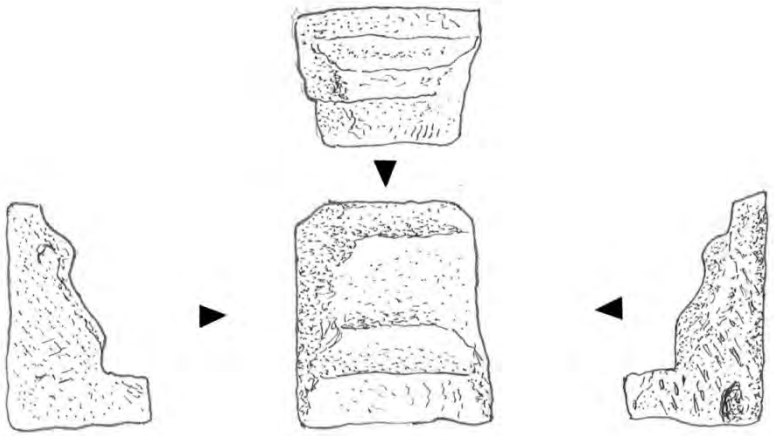
(6)



PFR Jan 2019

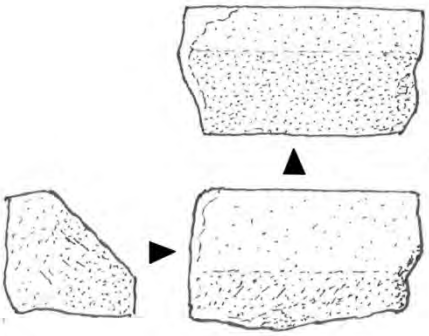
Lapidary Material from Sheffield Castle Excavation

Stones drawn at 1:10



(10)

0 50 cm



(11)

PFR Jan 2019

Comments on other material that was not drawn (not an exclusive list)

(1002) Spherule 1.5 m in diameter, perhaps of ceramic material – a stopped from a drink bottle?

(1005) brick fragment with slag.

(1007) triangular piece of flagstone 195 x 100 mm and 20 mm thick. Natural?

(1017) Flake of ?chert 35 x 18 mm

(1034) Slag, three pieces.

(2001) Another fragment of probably Welsh slate 80 x 40 mm x 3 mm thick.

201540 (3062). Fossil, piece of Stigmaria (tree root). (see photograph)

(4024) Welsh slate 165 x 11 mm by 7 mm thick, broken. 19th or 20th century (this material only came into common use with the development of the railway network in the mid-19th century)

(4040) Fragment 90 x 40 x 10 mm thick, one smooth face with scratches (see photograph)

201540 (4115). Two irregular stones, 130 x 12 x 33 mm and 80 x 80 x 30 mm.

(6007) Stone with carbonaceous material, probably natural.

201540 (6026) Bag of material, including four stone slates, the largest 200 x 180 x 20 mm. One includes fossil plant remains (see photograph, below) Stone slates such as this were a ubiquitous roofing material (in areas in which they were available before the Industrial Revolution; their pierced holes are for pegs, either of wood or sometimes the more durable sheep bone (hence ‘sheepshank roofs’).

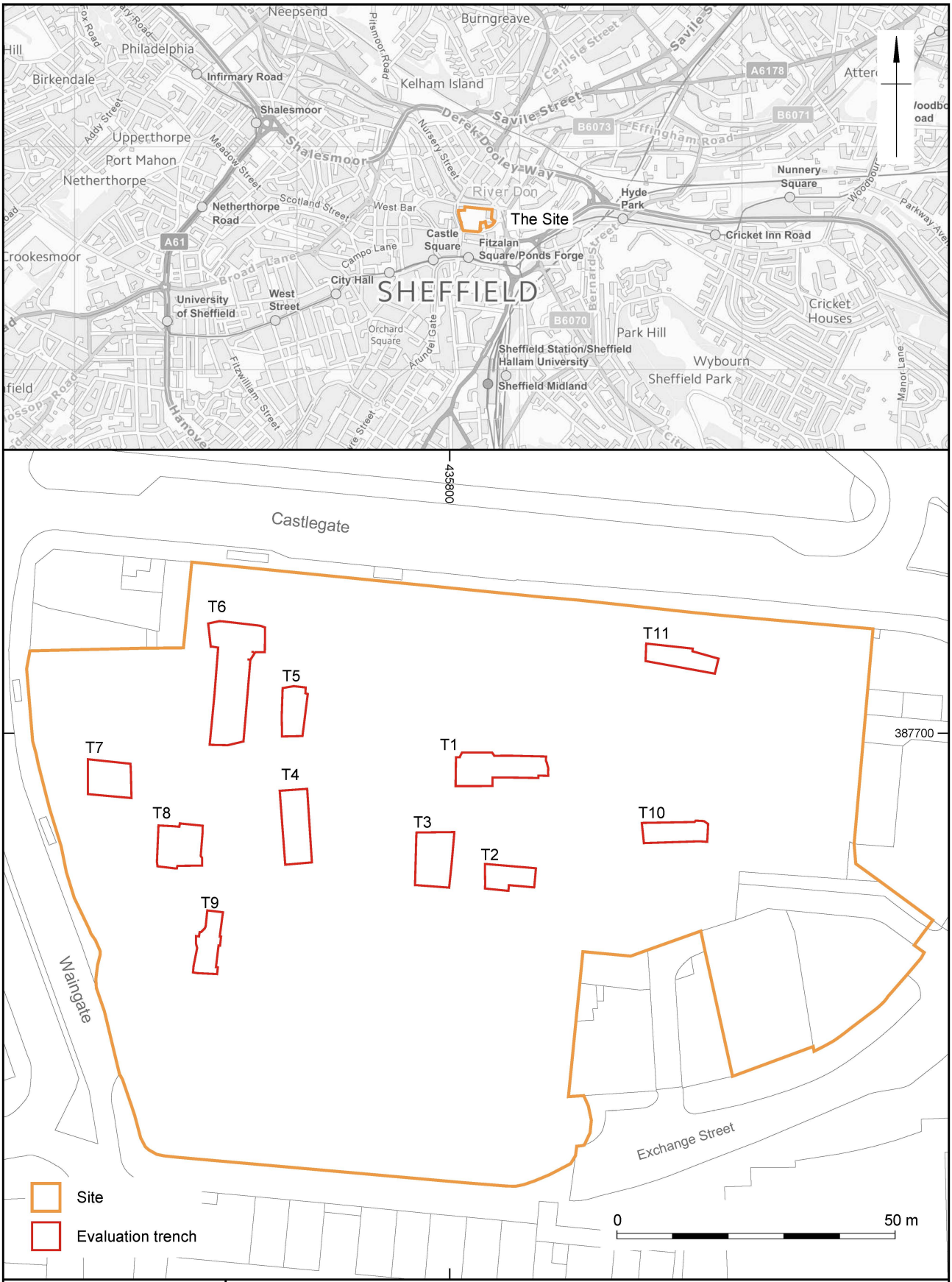
(9011) Fragment of fossil 46 x 24 mm

(10025) Half spherule 23 mm diameter. See comment on 1002540 (9011)

(11024) stone slate 10 x 85 mm and 15 mm thick with peghole.

201540 ’UnstratIfied’ stone slate 180 x 160 mm x 15 mm thick with peghole, burned in part.

Peter F Ryder January 23rd 2019



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Scale:	1:25,000 and 1:1000 at A4	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Site location

Figure 1

435800

435850

387700

T11

T1

T3

T2

T10

Site

Evaluation trench

Slot

Wall

Concrete

387650

0

100 m

Date:	2/8/19	Revision Number:	1
Scale:	1:250 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Overview plan - part 1

Figure 2

435750

387700

T6

T5

T7

T4

T8

T9

Site

Evaluation trench

Slot

Wall

Concrete

0

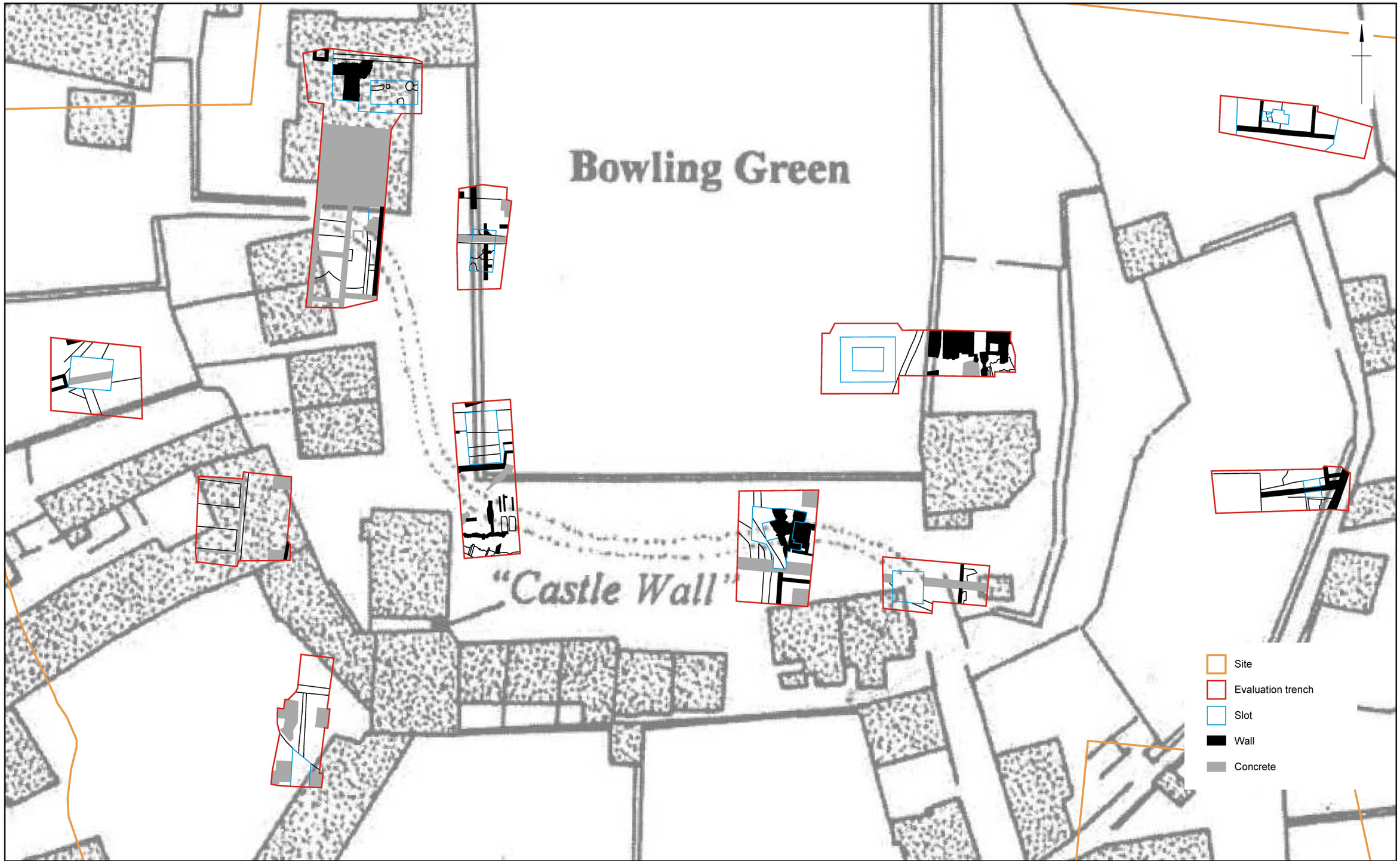
100 m

387650

Date:	1/21/19	Revision Number:	1
Scale:	1:250 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Overview plan - part 2

Figure 3



Base mapping provided by client

Date:	2/8/19	Revision Number:	1
Scale:	Not to scale	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Site plan superimposed on composite map c.1760 (Belford 1998)

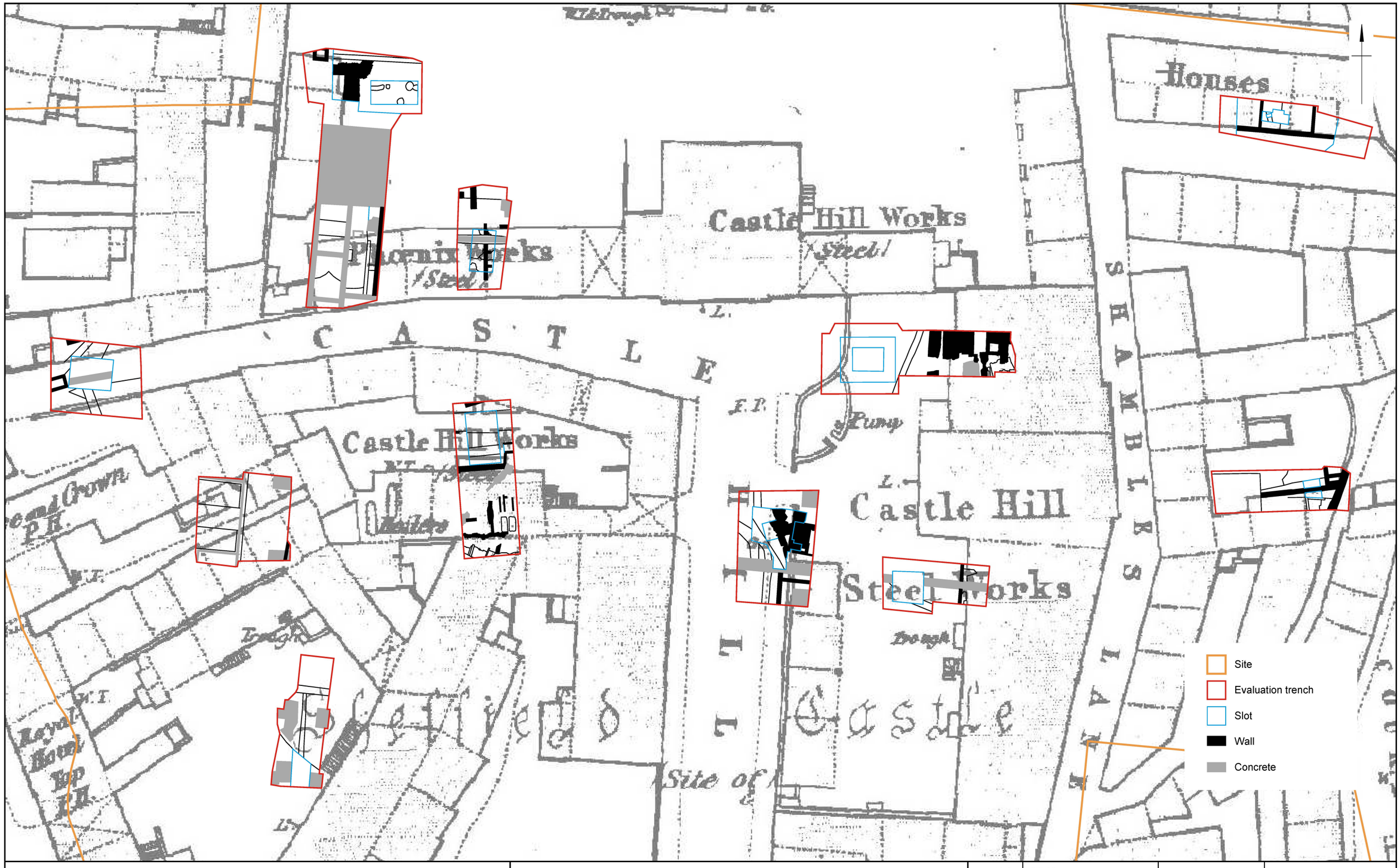
Figure 4

Site
Evaluation trench
Slot
Wall
Concrete

Date:	2/8/19	Revision Number:	1
Scale:	Not to scale	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Site plan superimposed on composite map c.1800 (Belford 1998)

Figure 5



Date:	2/8/19	Revision Number:	1
Scale:	Not to scale	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

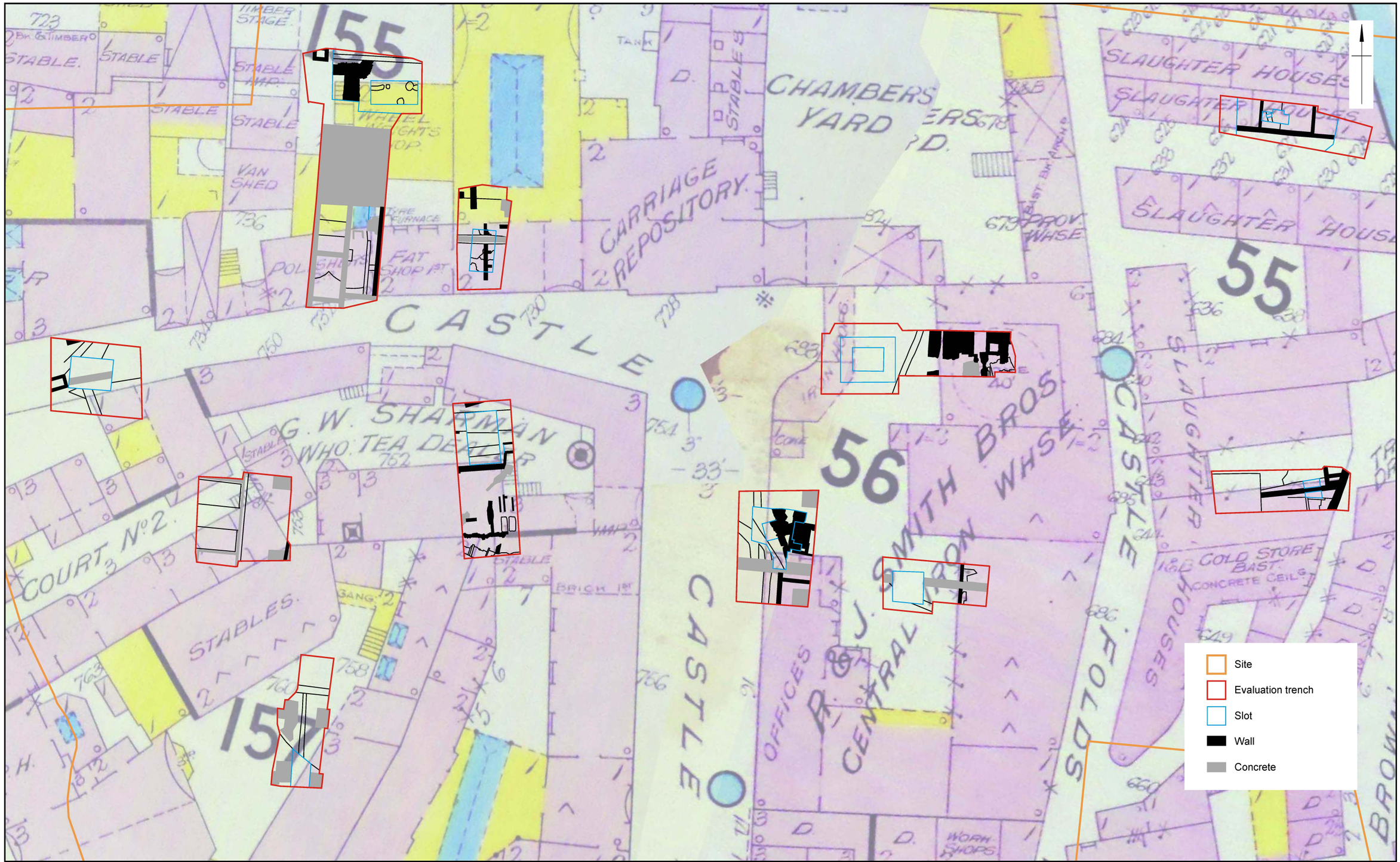
Site plan superimposed on Ordnance Survey map of 1853

Figure 6

Date:	2/8/19	Revision Number:	1
Scale:	Not to scale	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Site plan superimposed on Ordnance Survey map of 1892

Figure 7

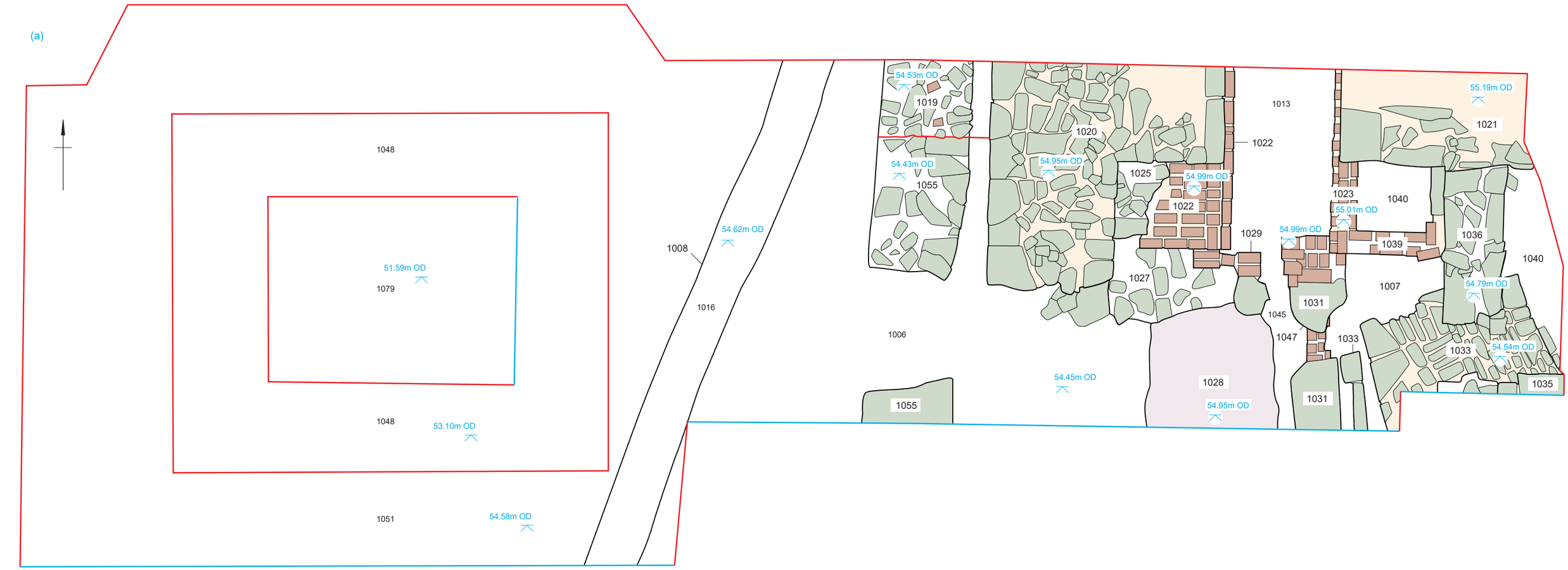


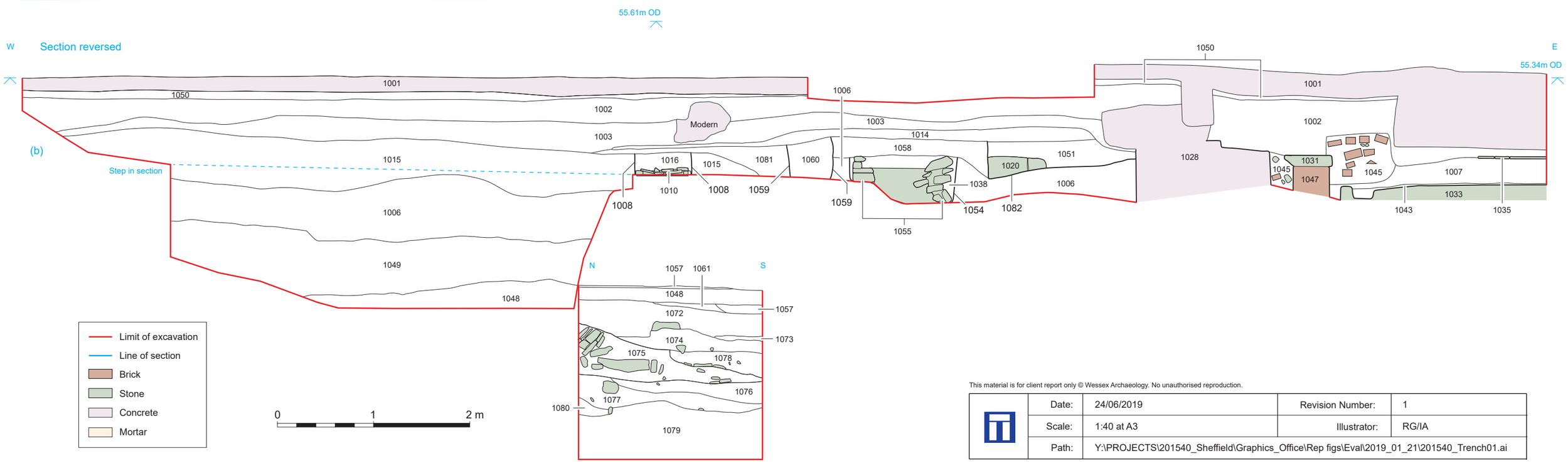
Date:	1/21/19	Revision Number:	1
Scale:	Not to scale	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21		

Site plan superimposed on Goad Fire Insurance plan of 1896

Figure 8

(a)





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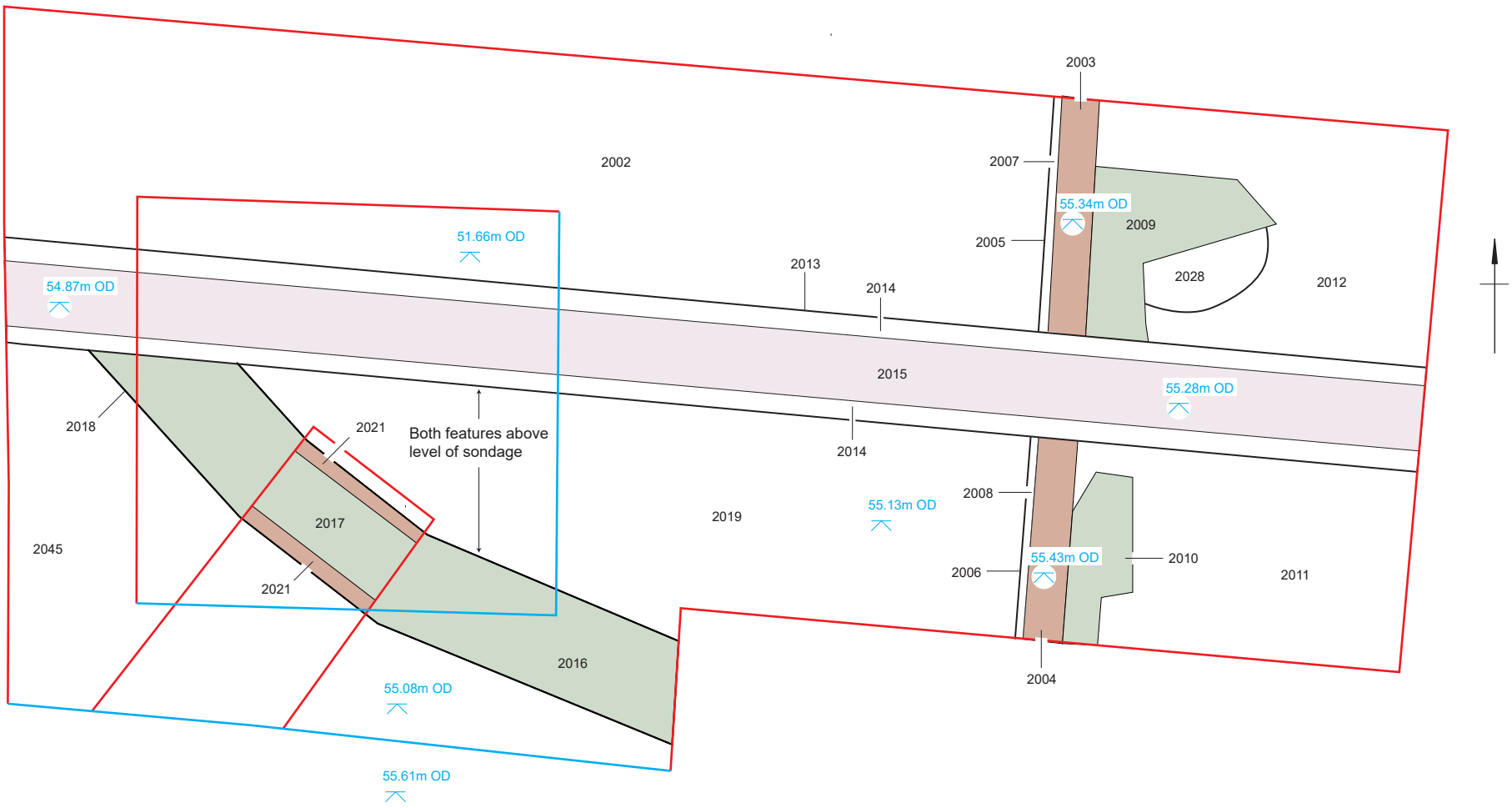
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench01.ai		

Trench 1 plan (a) and composite section (b)

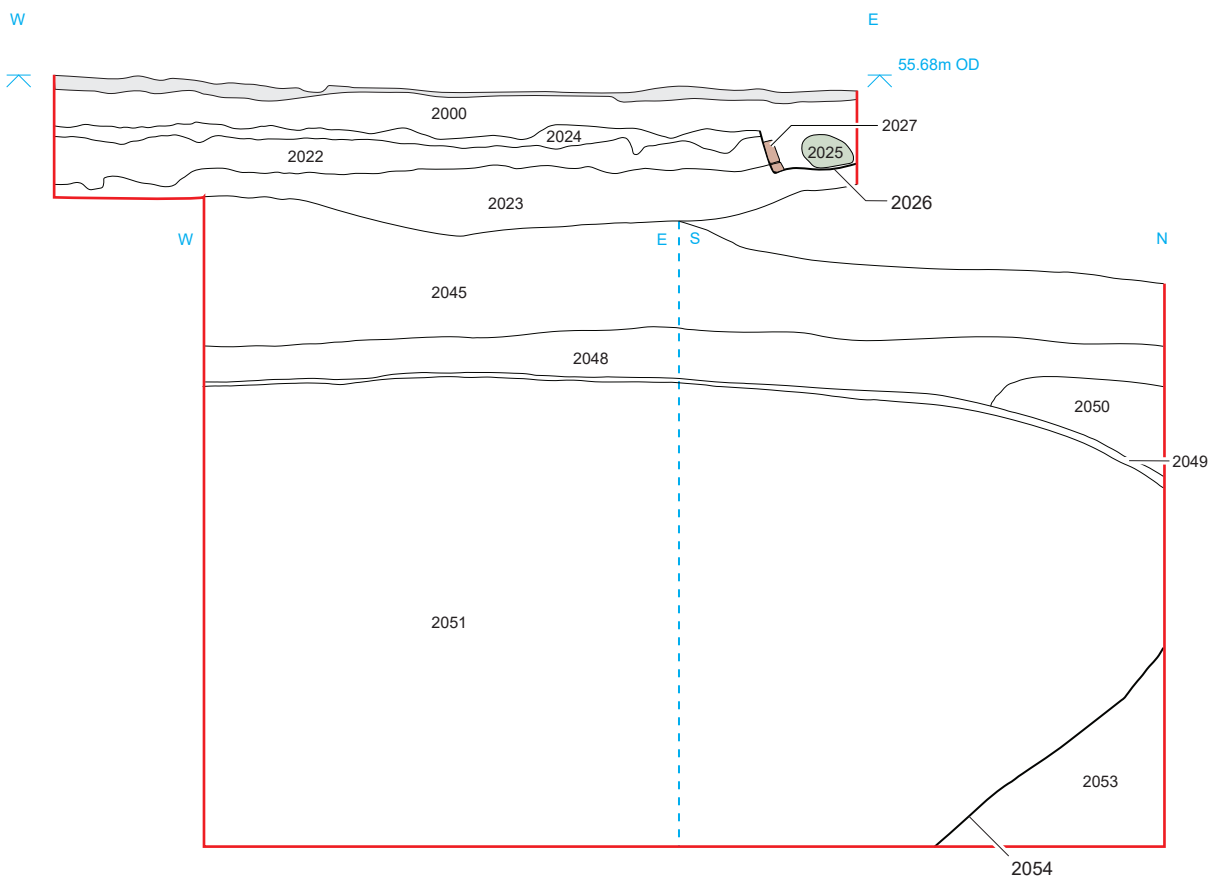
Figure 9

(a)



(b)

Section reversed



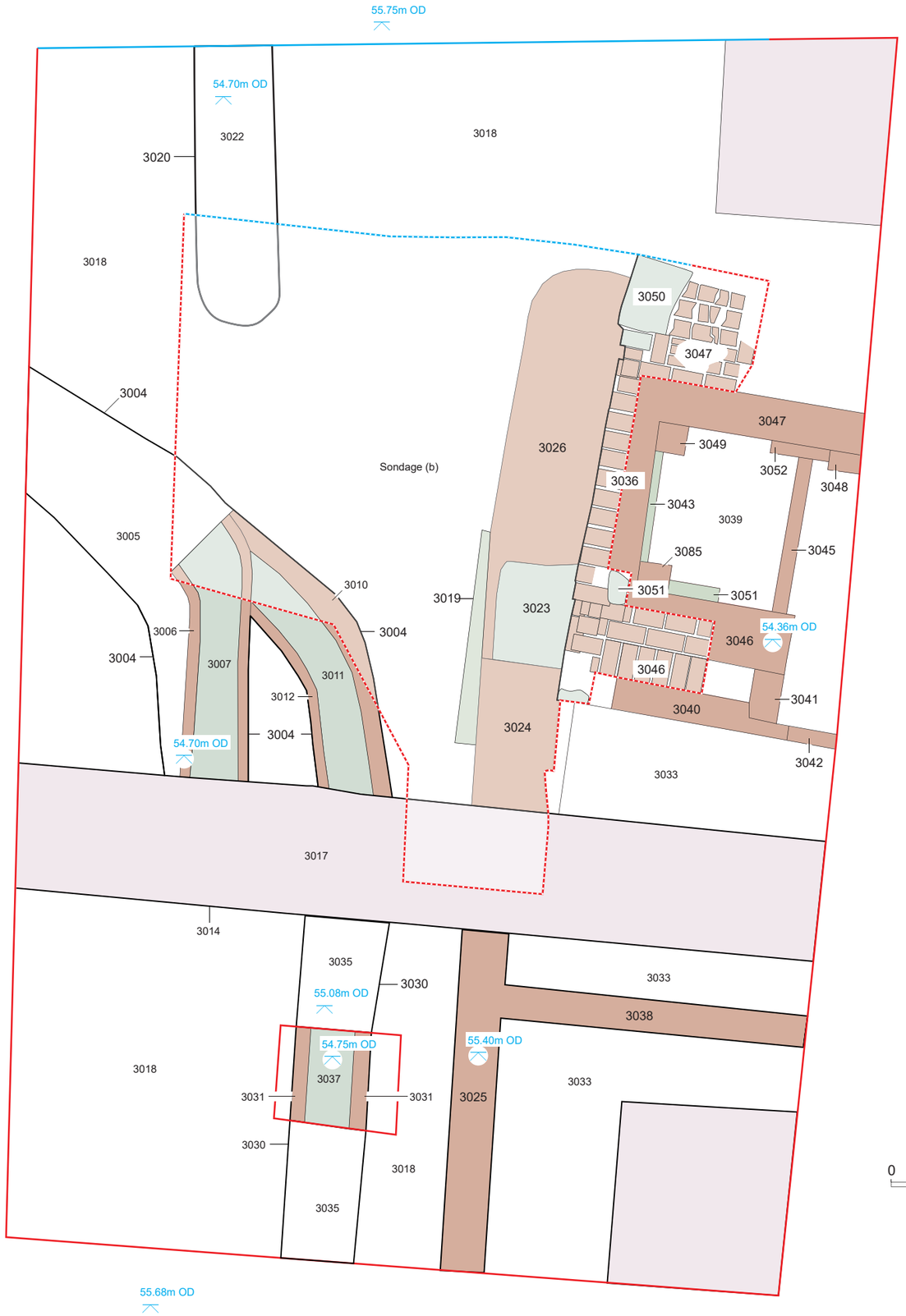
Limit of excavation
Line of section
Brick
Stone
Concrete

0 1 2 m

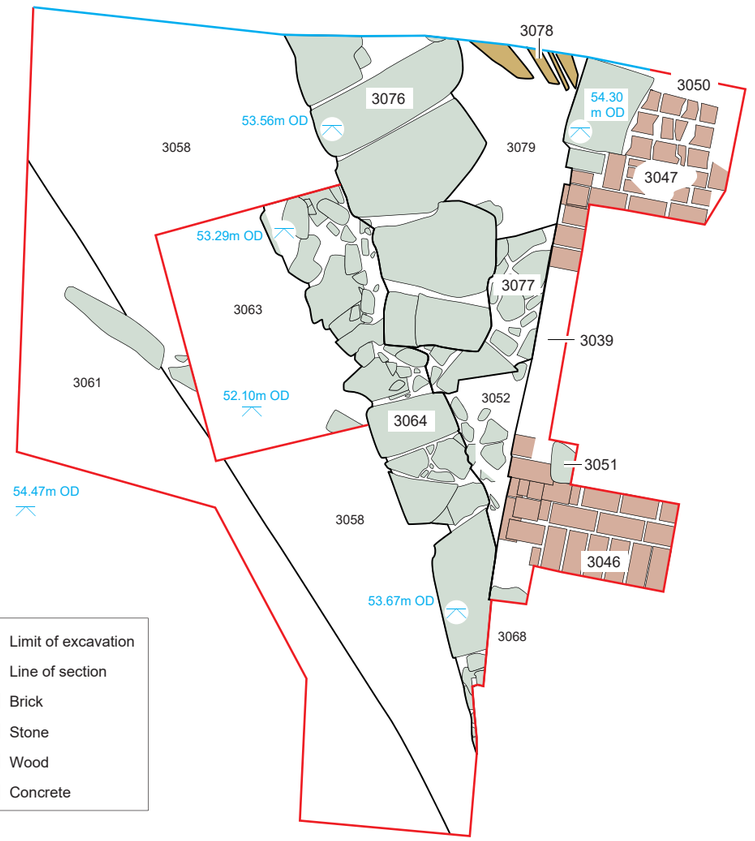
Date:	24/06/2019	Revision Number:	1
Scale:	1:40 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench02.ai		

Trench 2 plan (a) and composite section (b) Figure 10

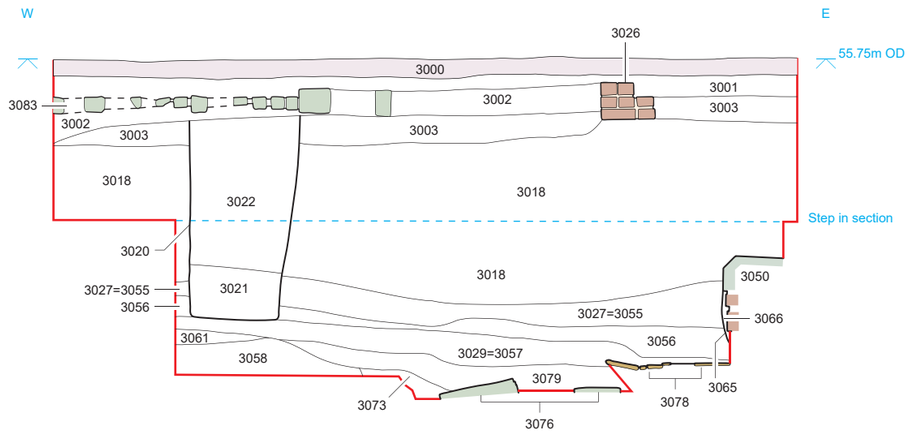
(a)



(b)



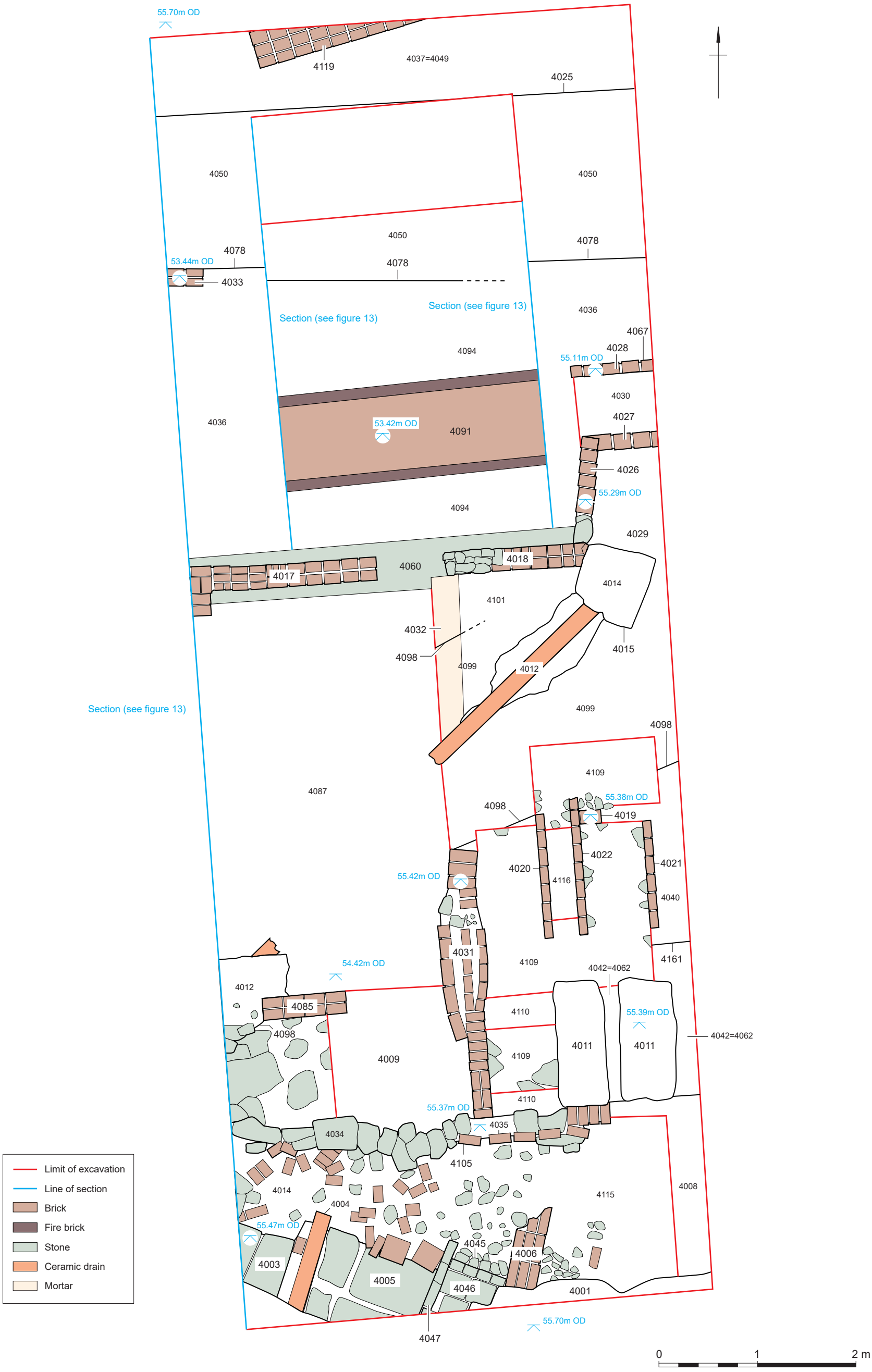
(c)



0 1 2 m

Date:	24/06/2019	Revision Number:	1
Scale:	1:40 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench03.ai		

Trench 3 plan (a), plan of lower level (b) and composite section (c) Figure 11



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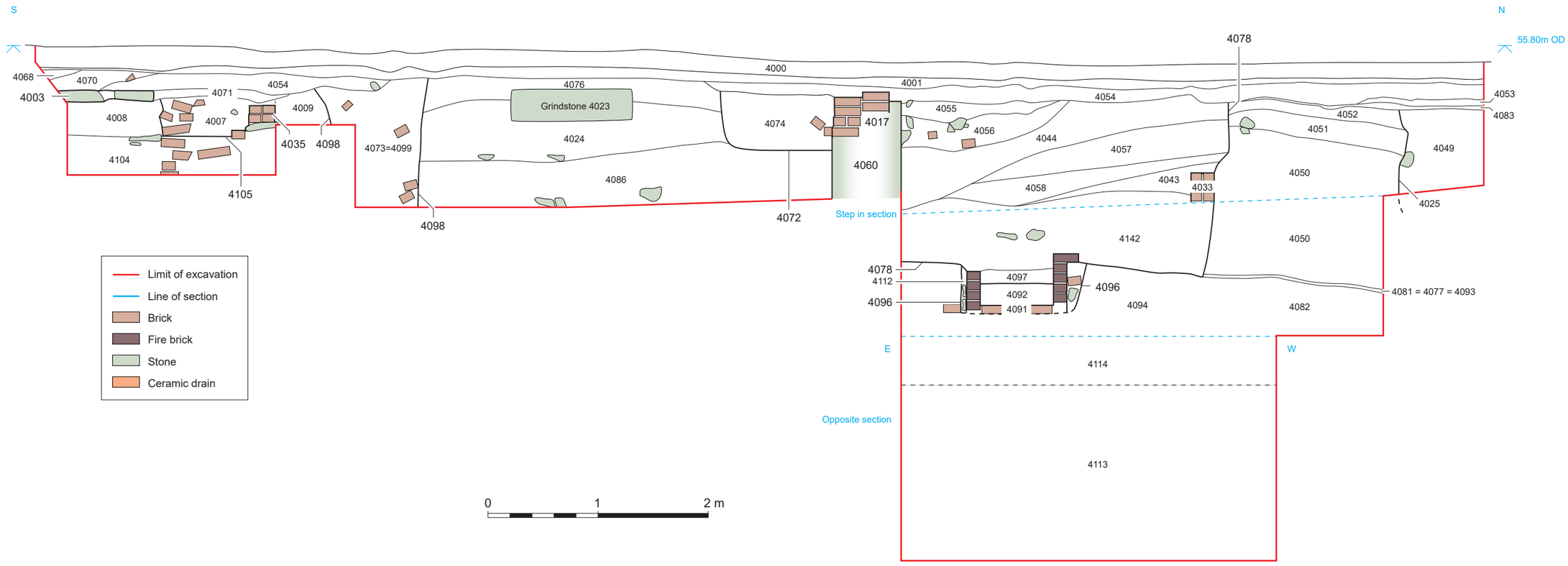
	Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench04.ai		

Trench 4 plan

Figure 12



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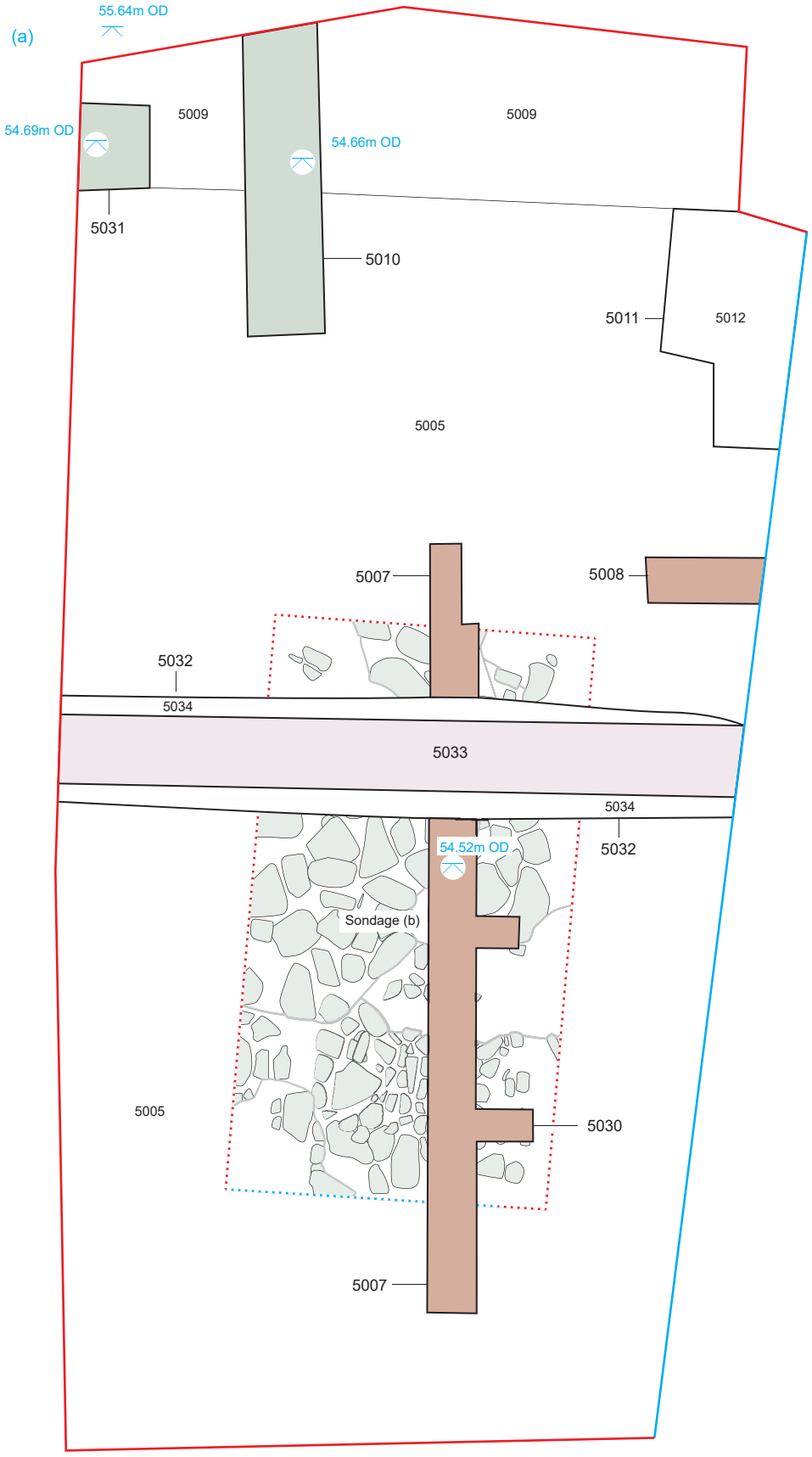
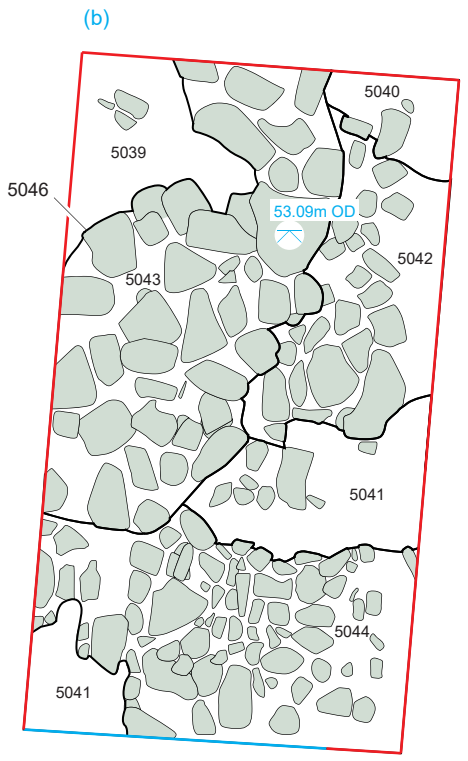
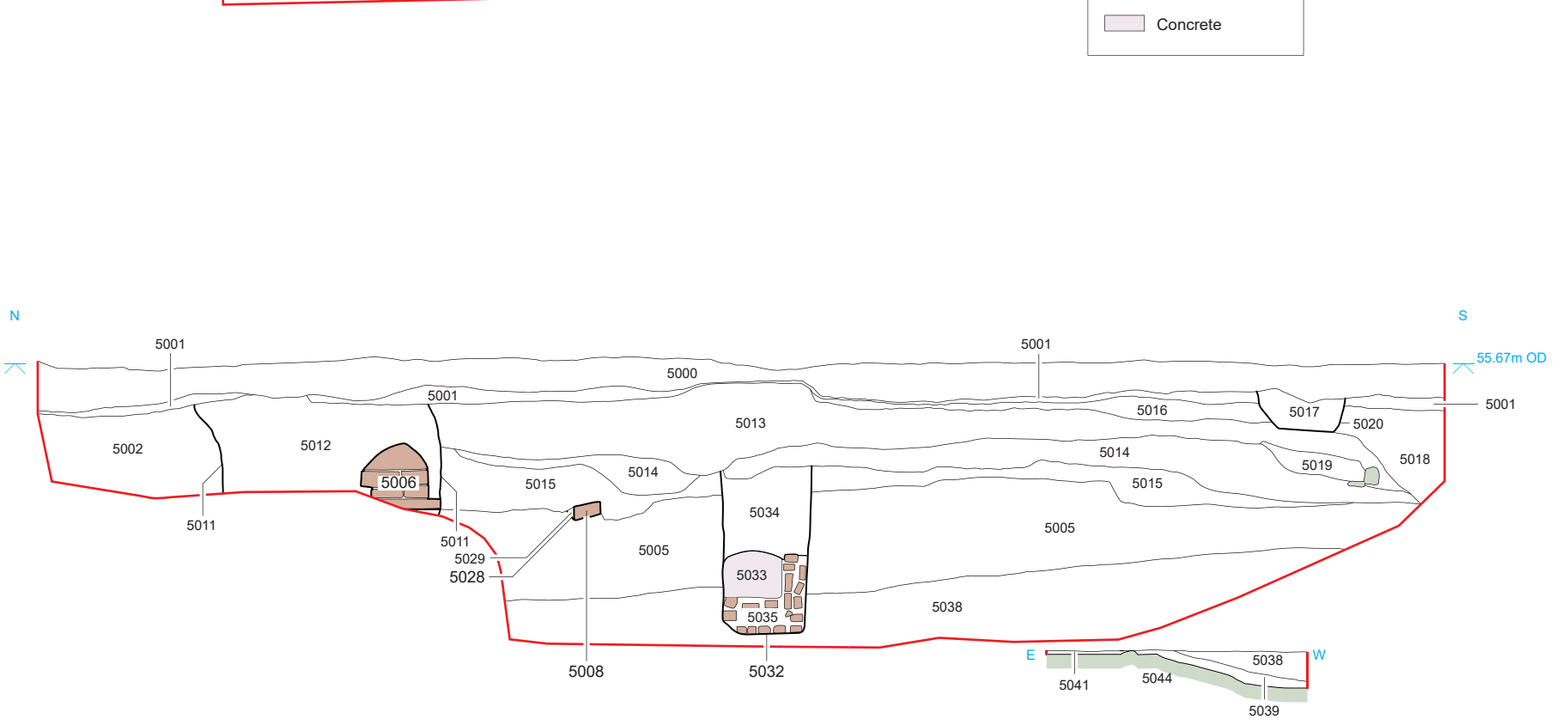
Trench 4 composite section

Figure 13







0 1 2 m

	Date:	24/06/2019	Revision Number:	1
	Scale:	1:40 at A3	Illustrator:	RG/IA
	Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench05.ai		

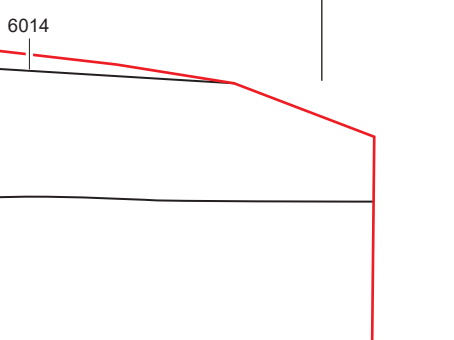
Trench 5 plan (a), plan of lower level (b) and composite section (c) Figure 14

(a)

6004
6014
54.45m OD
6017
6013
6015
6014
6016
6004
6022
53.68m OD
6024
Position of Section (b)
(at a higher level)
53.73m OD
6023
6023
6019
6018
6005
6027=6035
54.40m OD
6022
6021
6020
6005
6019
6006
6000

Plan continues on figure 16

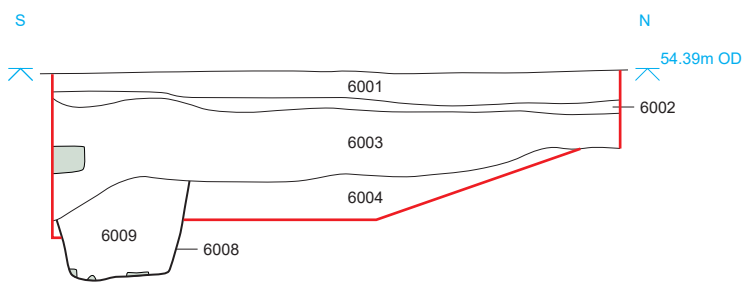
Trench 6 @ 1:200



Area of main figure

Section

(b)



Limit of excavation
Line of section
Brick
Stone
Concrete
Metal

0 1 2 m

Date:	01/02/2019	Revision Number:	0
Scale:	1:40 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench06.ai		

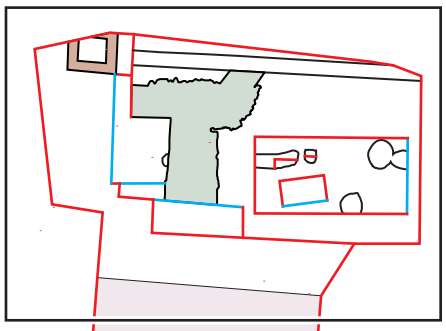
Trench 6A plan of upper levels (a) and section of upper level (b) Figure 15

(a)

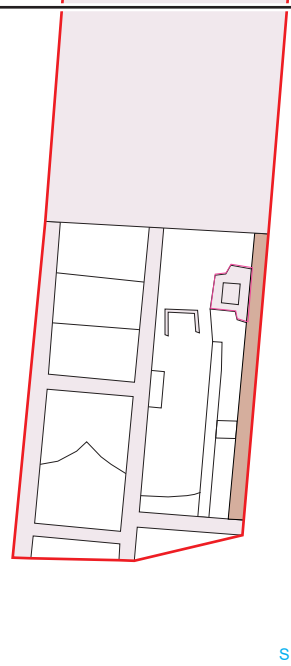
6004
6017
6017
54.45m OD
6014
6013
6035
6037
6036
6031
52.93m OD
6014
6048
51.46m OD
6039
52.62m OD
6016
52.42m OD
6041
6027=6032
6062
6064
6060
6072
50.37m OD
6026
Section (b)
6039
6063
6061
6059
6067
6066
6006
51.45m OD
6047
Section (c)
Section (d)
6069
6068 (previous borehole)
53.02m OD
6029
Section (e)
6021
6000

Plan continues on figure 16

Trench 6 @ 1:200



Area of main figure



W
Section (b)
Section (c)
E
53.86m OD
53.47m OD
6006
6007
6029
6029
6085
6042
6026
6027=6035
6046
6039
6049

Section reversed

Section (d)
W
E
6038
6007
52.68m OD
6039
6045
6044
6047

Section reversed

N
S
51.56m OD
6051
6078
6084
6052
6052
6065
6082
6065
6070
6081
6083
6079
6074
6071
6055
6077
6055
6066
6076
6066
6080
6072
6073
6075
6067

Section (e)

Limit of excavation
Line of section
Brick
Stone
Concrete

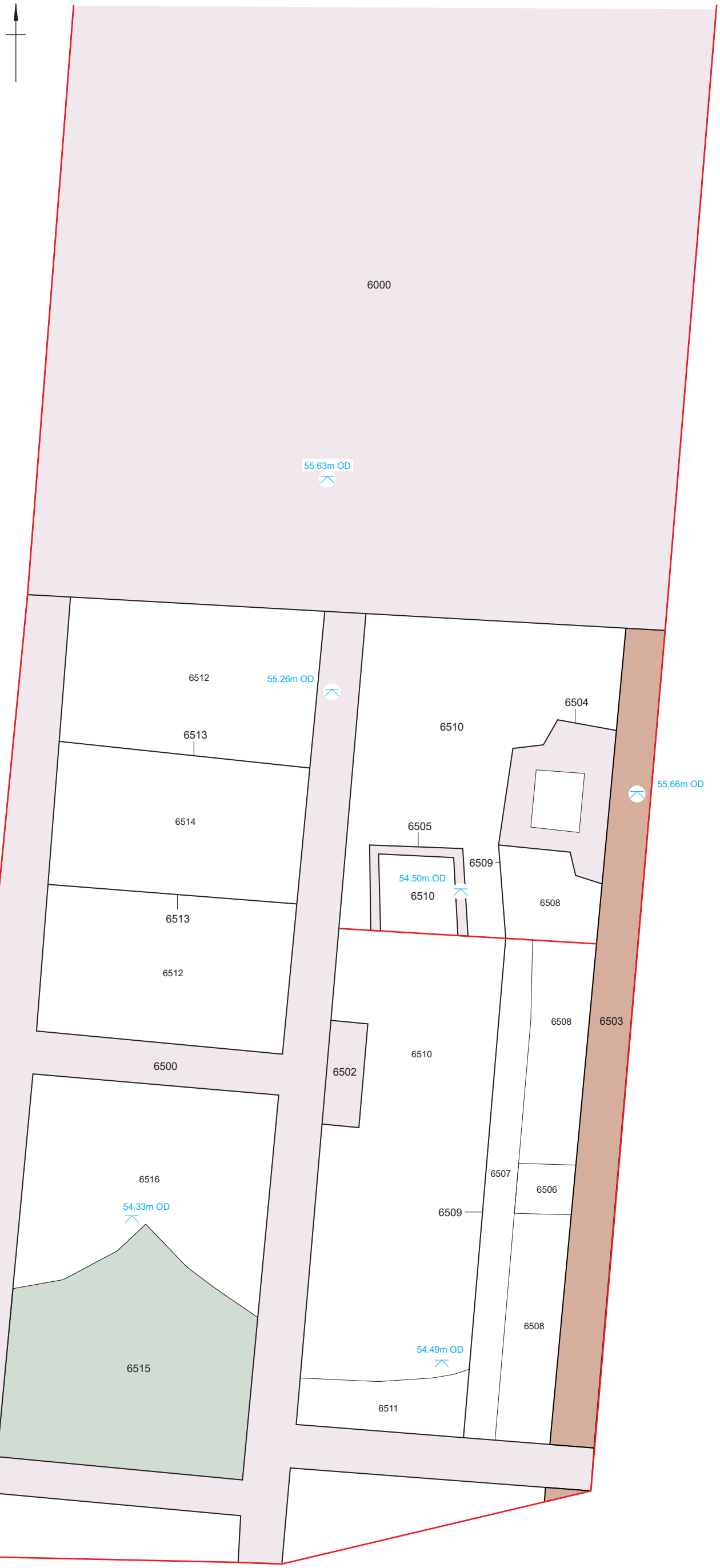
0
1
2 m

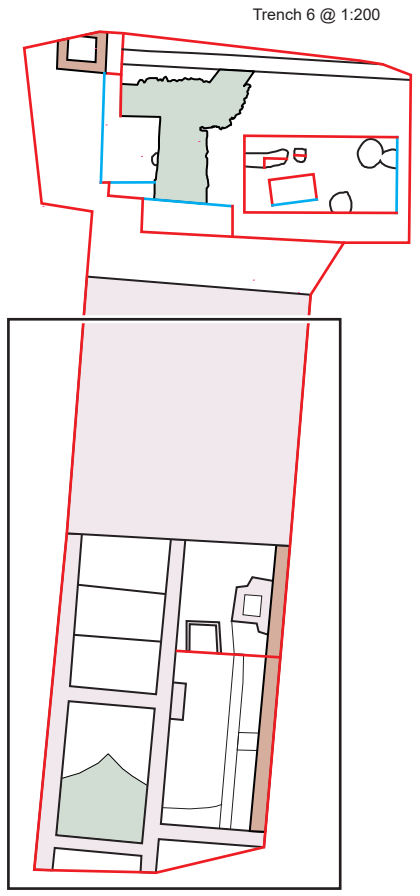
Date:	24/06/2019	Revision Number:	1
Scale:	1:40 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench06.ai		

Trench 6A plan of lower levels (a) and sections (d–e)

Figure 16

Plan continued from figure 15





Limit of excavation
Brick
Stone
Concrete

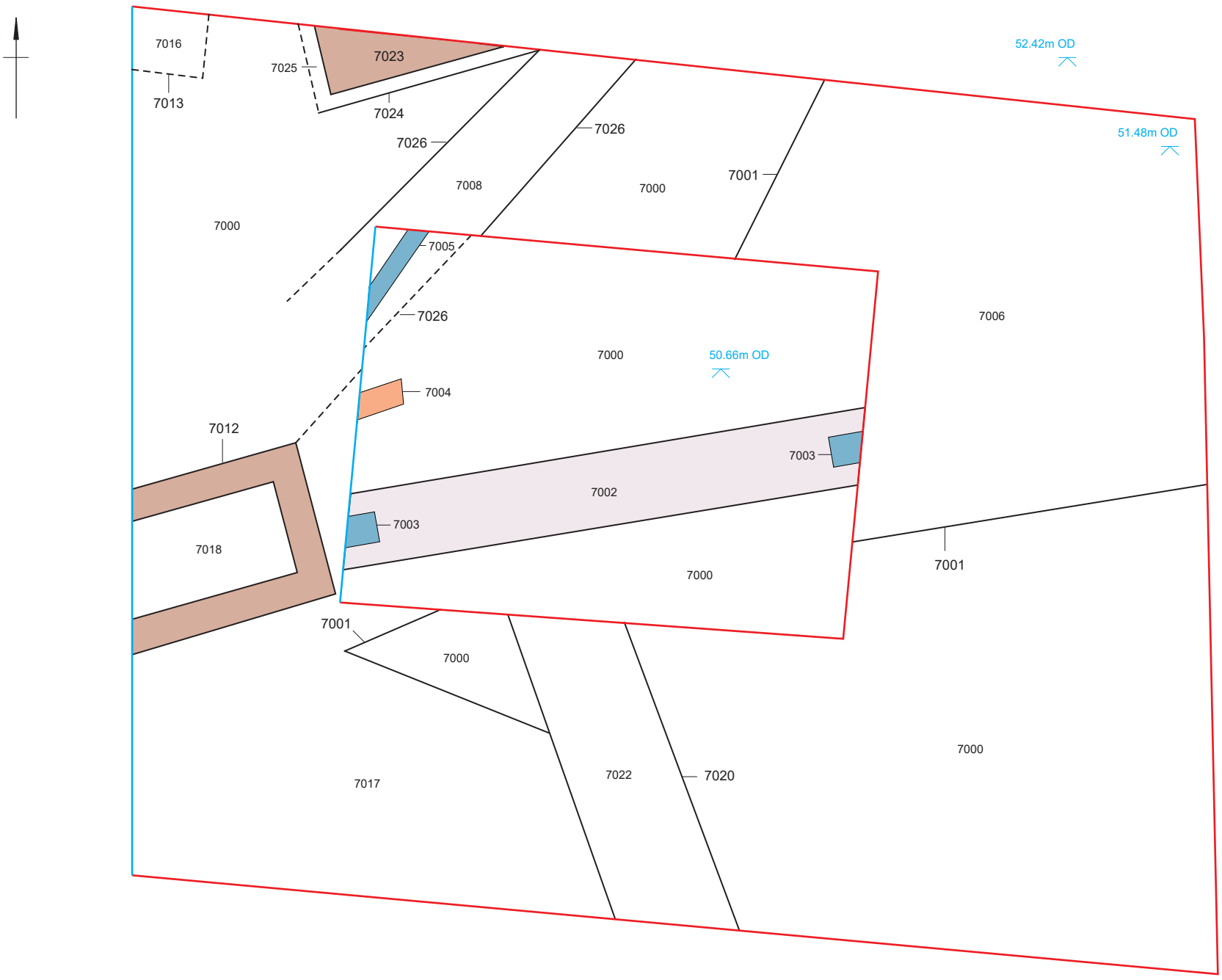
0 1 2 m

Date:	24/06/2019	Revision Number:	1
Scale:	1:40 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trench06.ai		

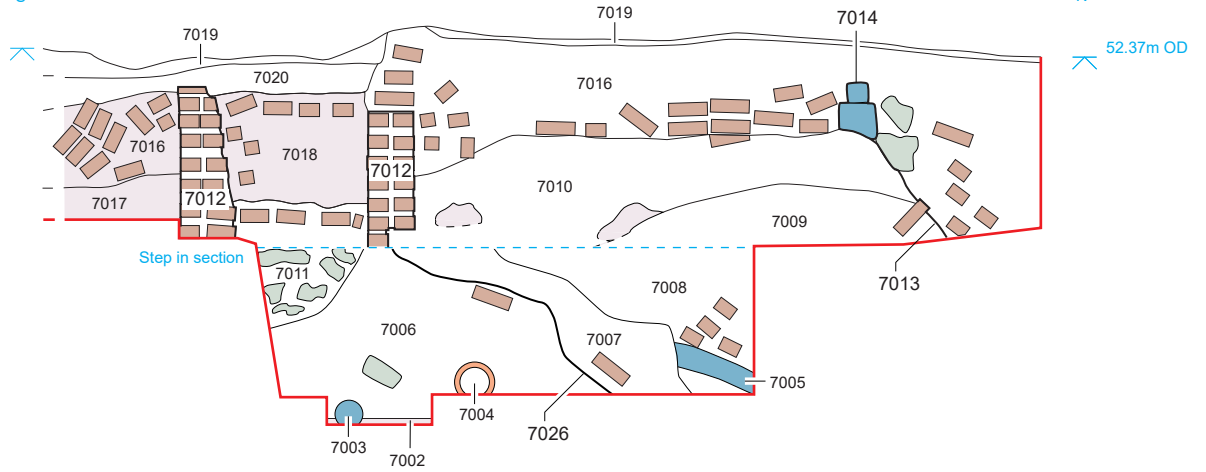
Trench 6B plan

Figure 17

(a)



(b)



Limit of excavation
Line of section
Brick
Stone
Ceramic pipe
Concrete
Metal

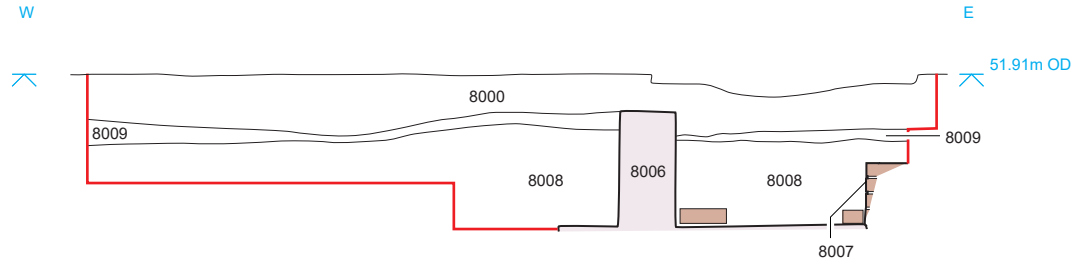
0 1 2 m

Date:	24/06/2019	Revision Number:	1
Scale:	1:40 at A3	Illustrator:	RG/IA
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trenches07-09.ai		

Trench 7 plan (a) and composite section (b) Figure 18

(a)

(b) Section reversed



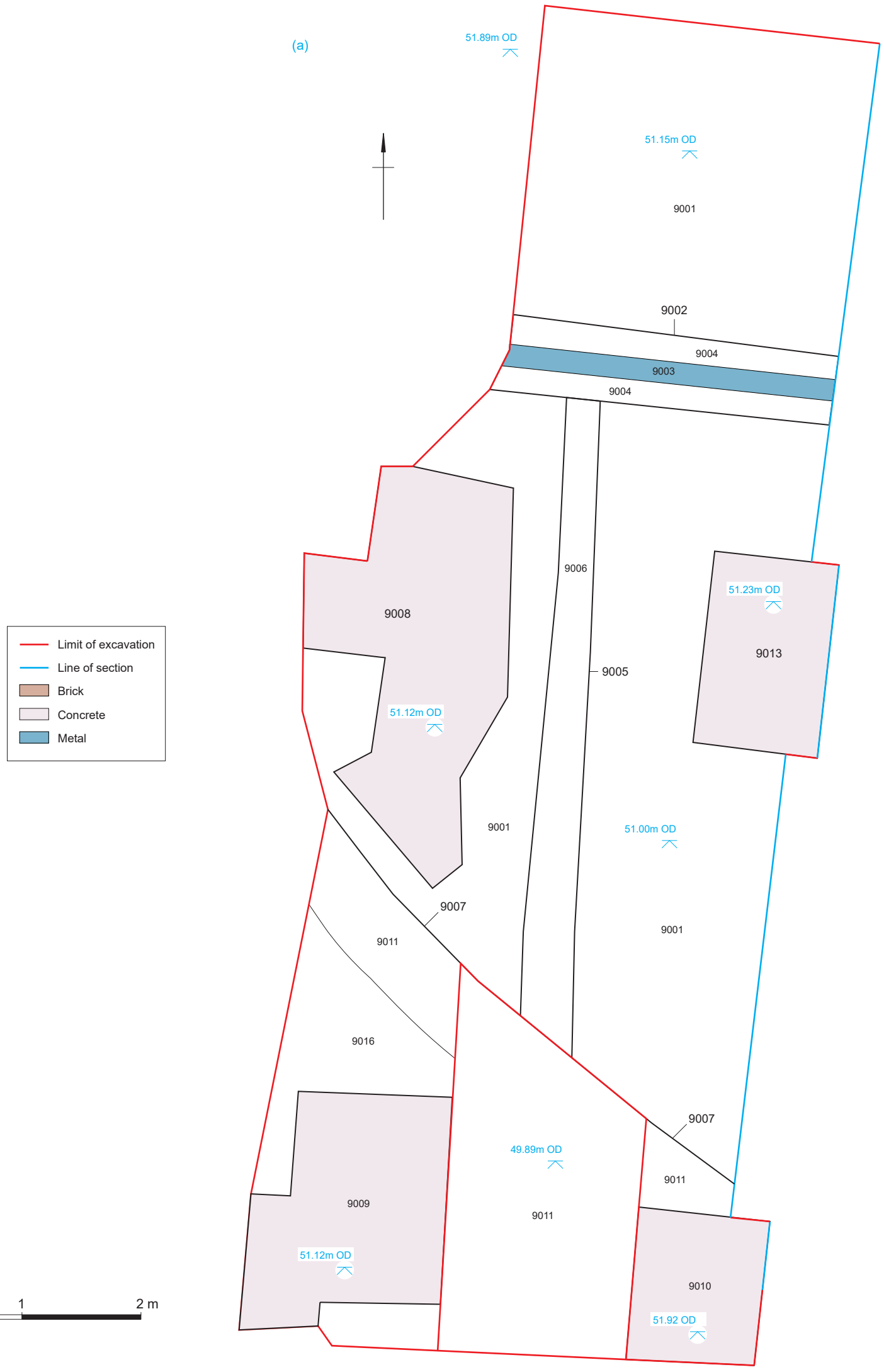
Limit of excavation
Line of section
Brick
Concrete
Metal

0 1 2 m

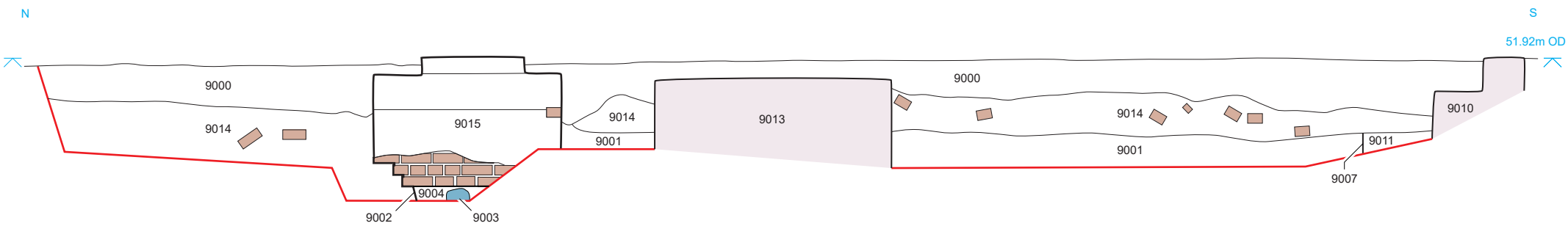
	Date:	31/01/2019	Revision Number:	0
	Scale:	1:40 at A3	Illustrator:	RG/IA
	Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trenches07-09.ai		

Trench 8 plan (a) and section (b) Figure 19

(a)



(b)

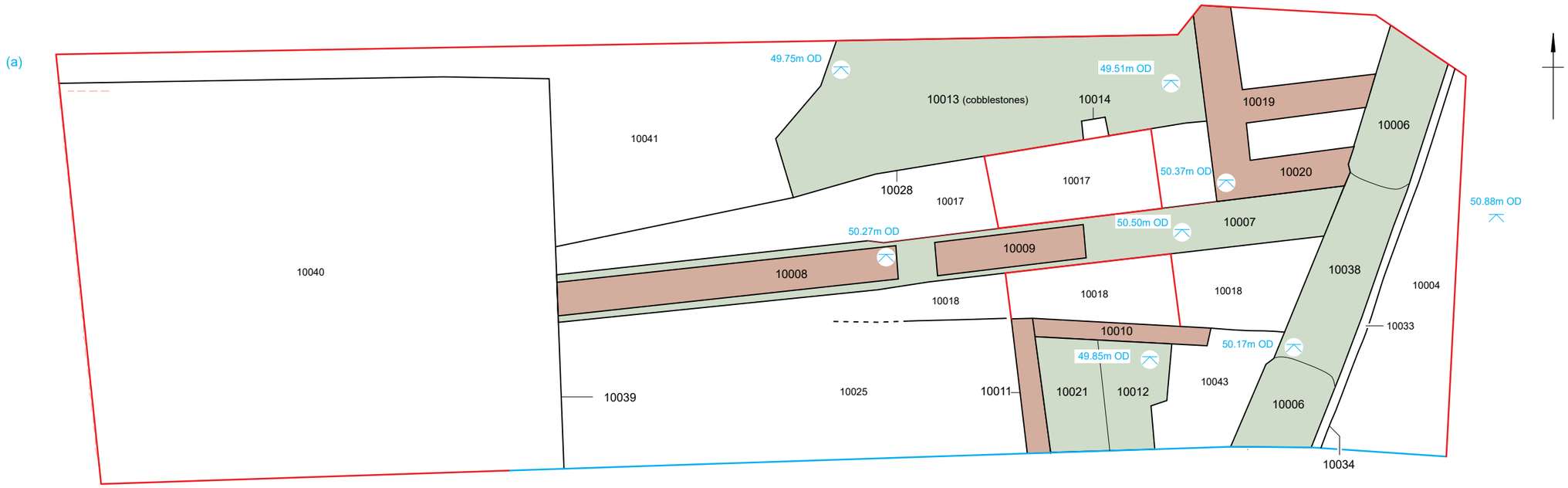


	Date:	24/06/2019	Revision Number:	1
	Scale:	1:40 at A3	Illustrator:	RG/IA
	Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Trenches07-09.ai		

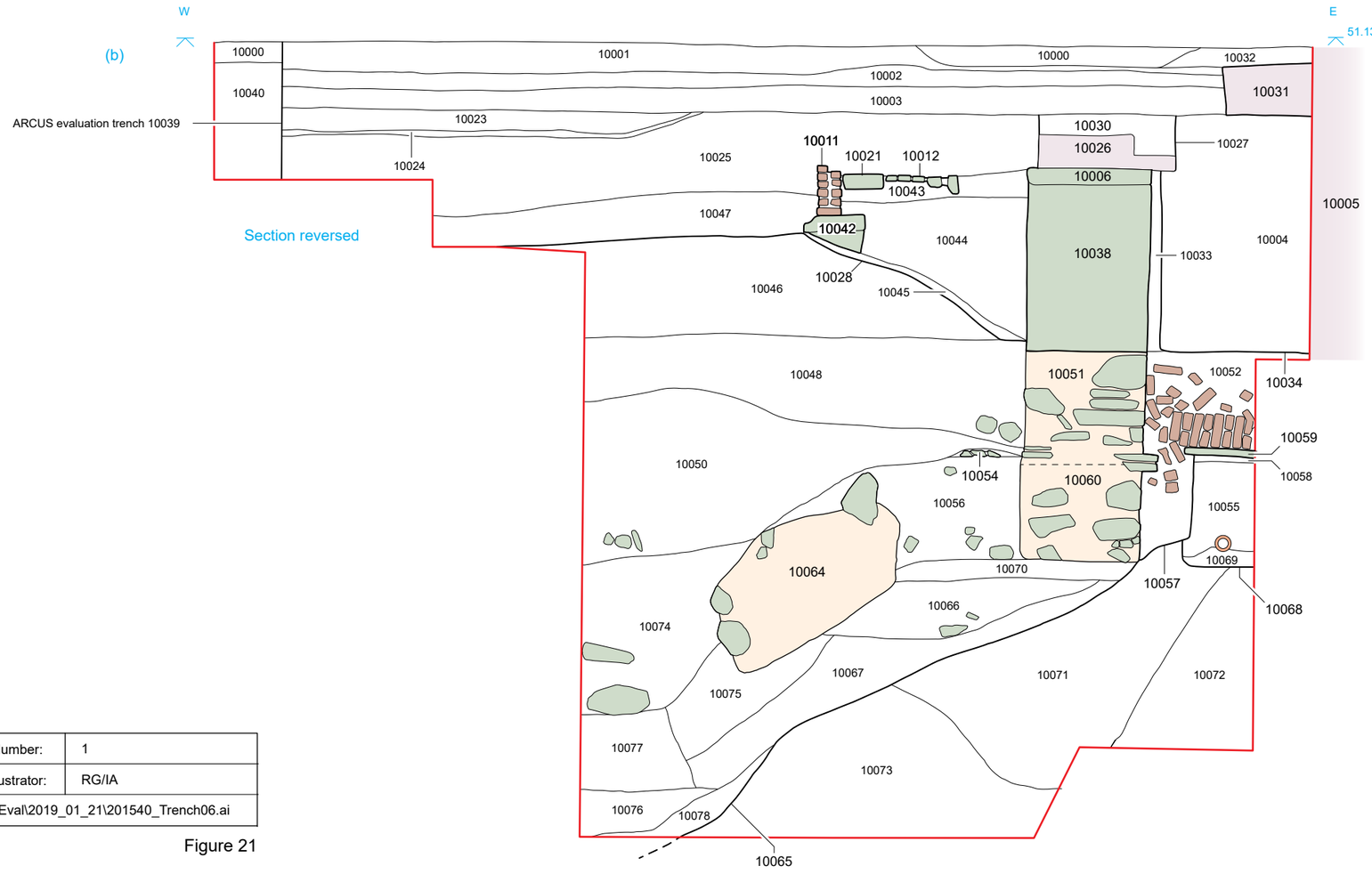
Trench 9 plan (a) and section (b)

Figure 20

(a)



(b)



Limit of excavation
Line of section
Brick
Stone
Ceramic pipe
Concrete
Mortar

0 1 2 m

Date:	24/06/2019	Revision Number:	1
Scale:	1:40 at A3	Illustrator:	RG/IA
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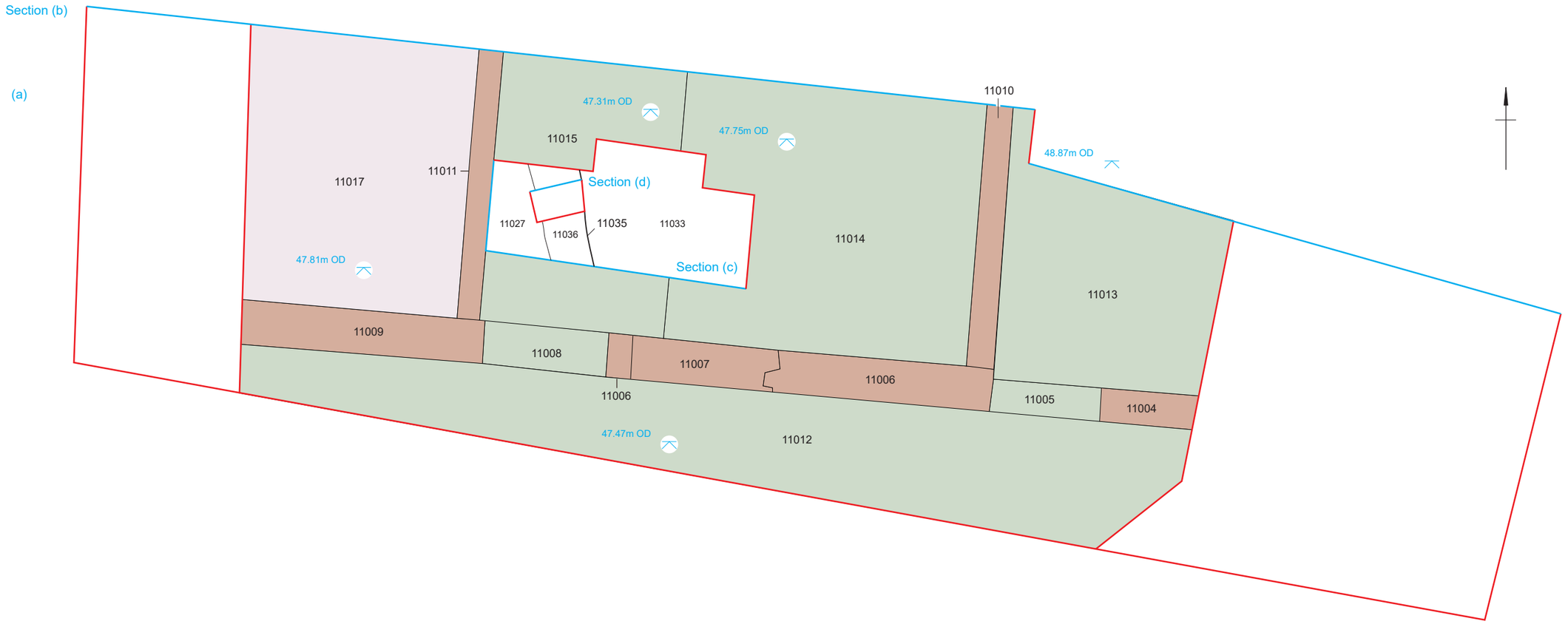
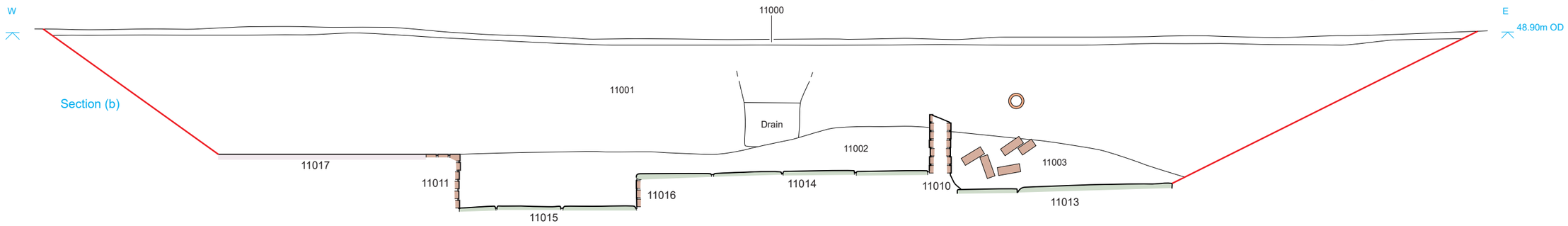
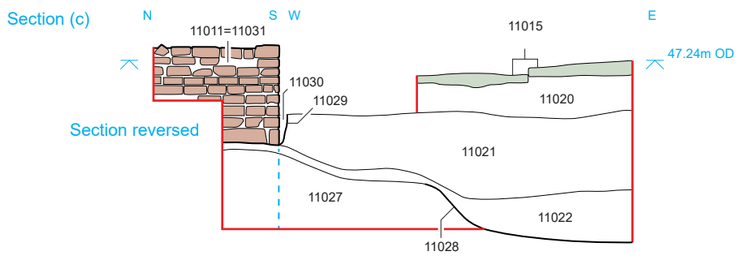
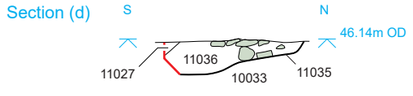
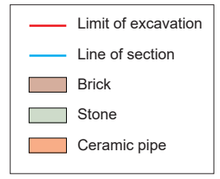
Trench 10 plan (a) and composite section (b) Figure 21

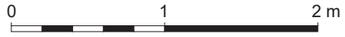












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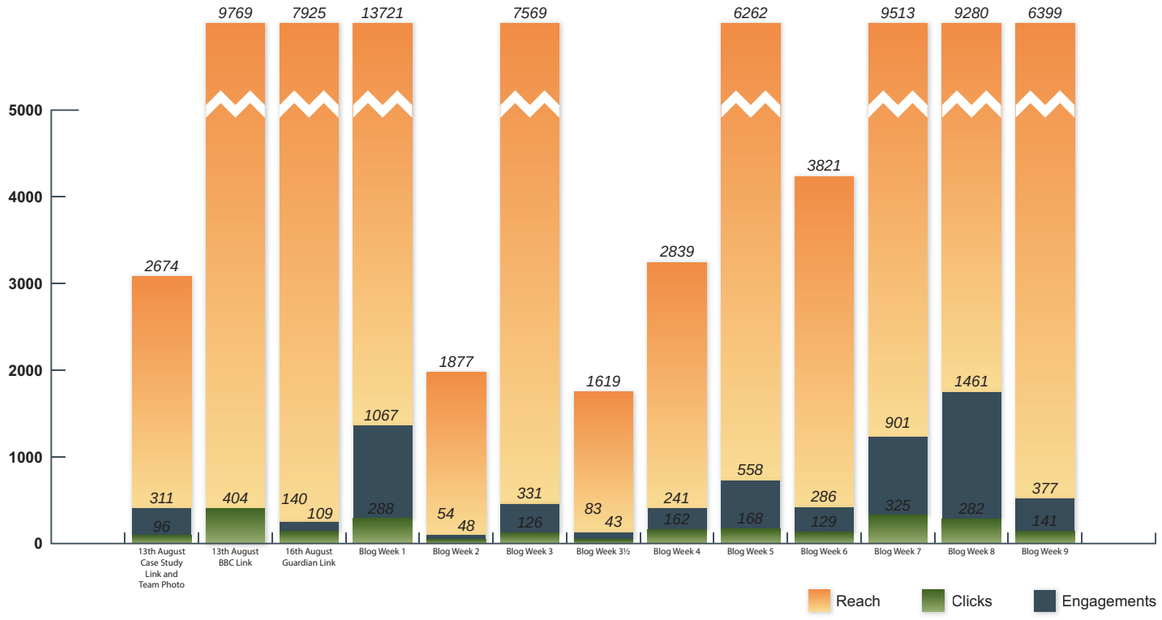
Trench 11 plan (a) and sections (b–d) Figure 22



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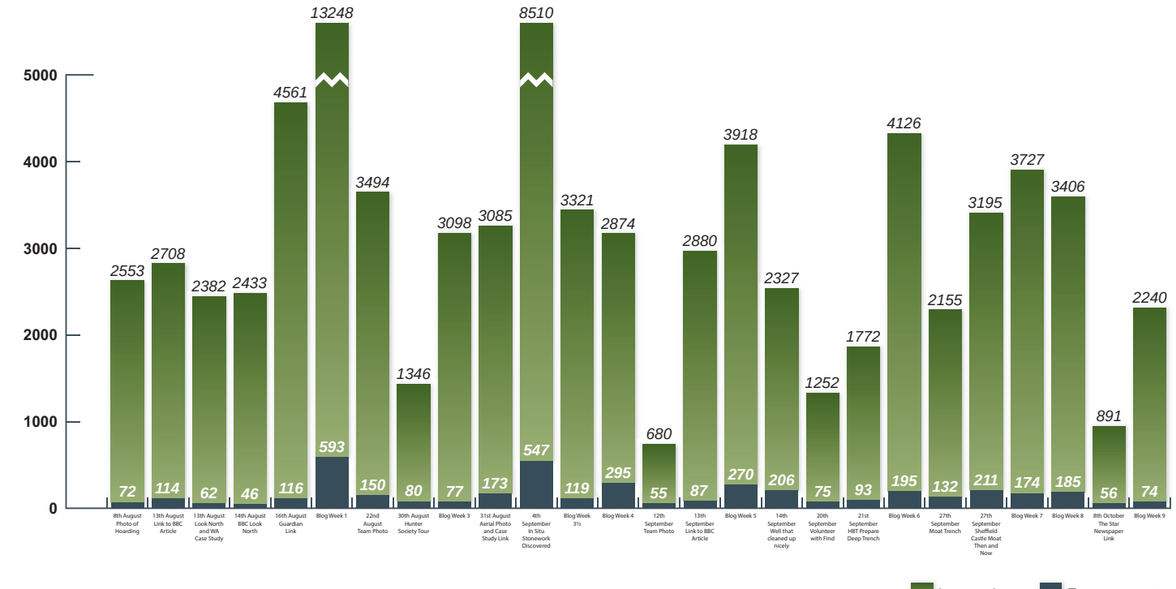

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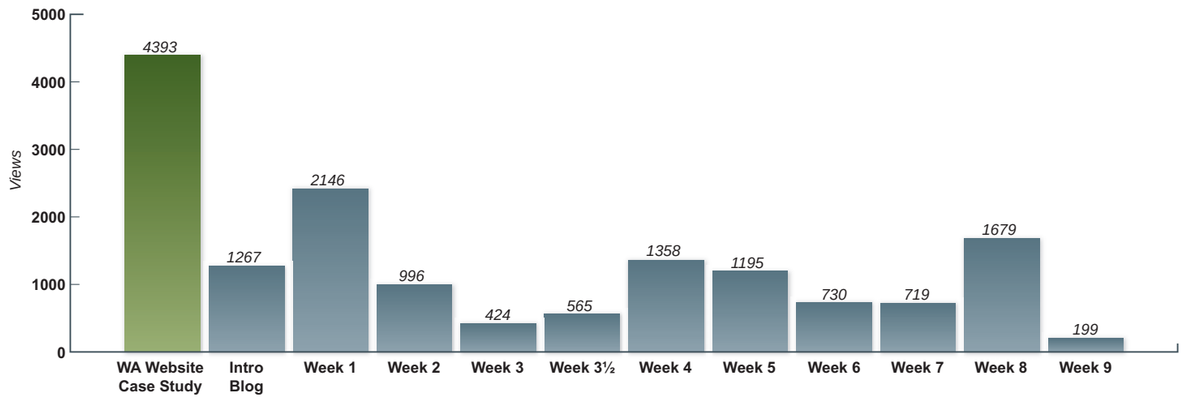
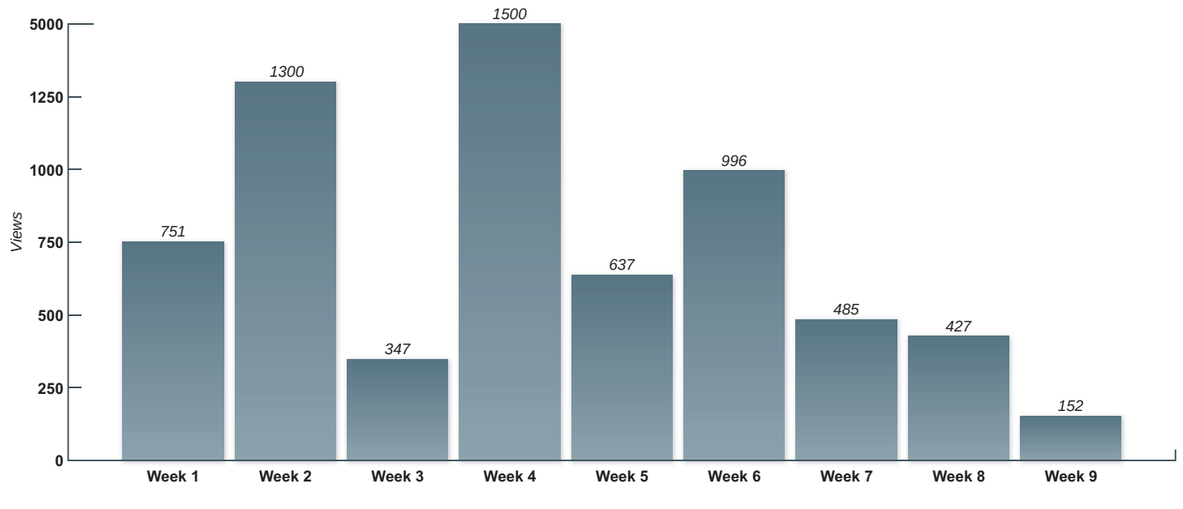


WA Blog



Youtube views

Date:	11/02/2019	Revision Number:	0
Scale:	NTS	Illustrator:	RG
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Figure23.ai		

Outreach statistics

Figure 23

Plate 1: Uncleaned sondage in trench 2 showing clean clay earthwork deposits (2051 etc) from the west. Possible undisturbed natural below diagonal interface in bottom left

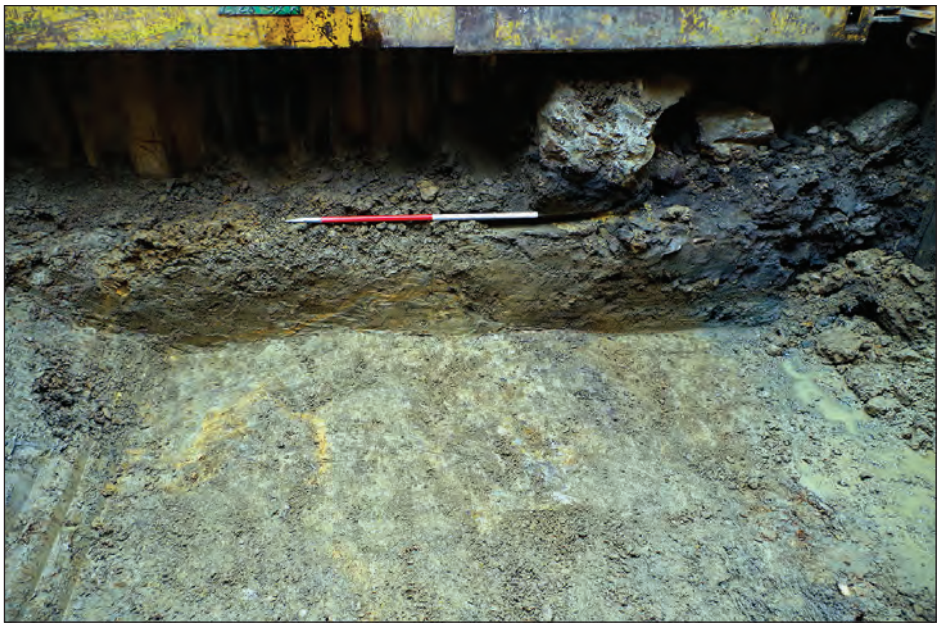


Plate 2: Trench 10 deep excavation showing clay bank of moat (left) and moat fills (right) with large piece of castle tumble above right end of scale. From the north

Date:	07/02/2019	Revision Number:	0
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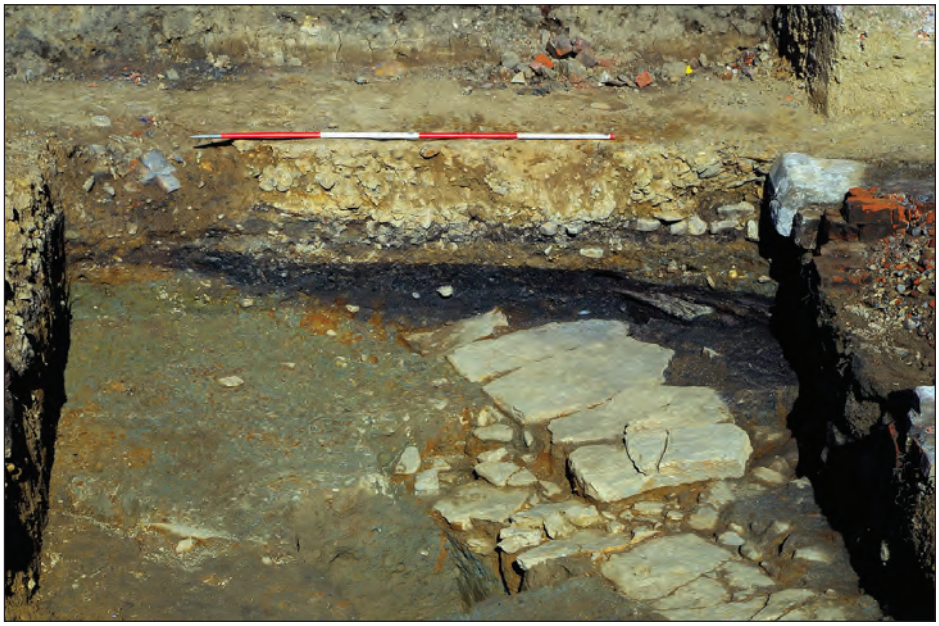

Plate 3: Trench 3 showing medieval wall foundations 3064 and 3076 overlaid by a series of richly organic layers. From the south

Plate 4: Medieval surfaces in trench 5 from the south

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Scale:	Not to scale	Illustrator:	IA/RG
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Plate_1_14.ai		

Plate 5: Deepest excavation in trench 6 showing cut features in section and plan. From the east

Plate 6: Possible furnace-related access or flue, trench 1 from the north

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Plate 7: South-facing section of trench 3 showing sandstone sett surface 3083 (top left)

Plate 8: Exhaust flue 4091, trench 4 from the north-west

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Scale:	Not to scale	Illustrator:	IA/RG
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Plate 9: Drain or power supply conduit 4020 (foreground) and base 4011 (background) from the north

Plate 10: Structures in trench 6 including staircase 6032 from the north-east

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Scale:	Not to scale	Illustrator:	IA/RG
Path:	Y:\PROJECTS\201540_Sheffield\Graphics_Office\Rep figs\Eval\2019_01_21\201540_Plate_1_14.ai		

Plate 11: Trench 11 overview from the east

Plate 12: Trench 7 overview from the east

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Scale:	Not to scale	Illustrator:	IA/RG
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Plate 13: Trench 8 overview from the east-north-east

Plate 14: Trench 9 overview from south showing moat 9007 running diagonally in the foreground pre-excavation

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