ANALYSIS OF PLANT MACROFOSSIL REMAINS IN THEIR STRATIGRAPHIC SEQUENCE FROM 42-48 SCOTCH STREET, CARLISLE: WITH SPECIAL REFERENCE TO THE MEDIAEVAL PERIOD WITH A BRIEF EVALUATION OF THE MATERIAL IN RELATION TO OTHER MEDIAEVAL REMAINS FROM CARLISLE

SHAW, PATRICIA

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WITH SPECIAL REFERENCE TO THE MEDIAEVAL PERIOD WITH A BRIEF EVALUATION OF THE MATERIAL IN RELATION TO OTHER MEDIAEVAL REMAINS FROM CARLISLE

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ABSTRACT

ANALYSIS OF PLANT MACROFOSSIL REMAINS IN THEIR STRATIGRAPHIC SEQUENCE FROM 42-48 SCOTCH STREET, CARLISLE: WITH SPECIAL REFERENCE TO THE MEDIAEVAL PERIOD WITH A BRIEF EVALUATION OF THE MATERIAL IN RELATION TO OTHER MEDIAEVAL REMAINS FROM CARLISLE.

In 2003 The North Pennines Heritage Trust, now North Pennines Archaeology Limited undertook a programme of archaeological works at 42-48 Scotch Street, Carlisle, in advance of building redevelopment. Multiple phases of archaeological activity were identified and recorded, possibly dating from the prehistoric period to the present day. The area exhibited continuity of use throughout the Roman Period, becoming a backwater of Carlisle in the late Hadrianic/early Antonine period. After the late Roman Period archaeology was found dating through from the late fourth to the twelfth century.

The following Mediaeval sequence begins in the early twelfth century with numerous rubbish pits over the site. The most significant Mediaeval activity present was defined by a series of fourteenth century pottery kilns that had gone out of use by the late fourteenth century when the site was covered with other rubbish pits. The late Mediaeval and Early Modern Period in the area witnessed very little activity; the next phase of activity corresponding to the late eighteenth to early nineteenth century redevelopment of Scotch Street; these buildings for the most remaining extant to the present day, most having modern modifications.

Analysis of plant macrofossils concentrated on the site at 42-48 Scotch Street, Carlisle and information retrieved from it for the Mediaeval Period. Preserved botanical remains from contexts dating to the Mediaeval Period of the site were used to determine whether there was a correlation between them and the ethnohistorical evidence available for the period. Preliminary assessment conducted previously had led to this study; more in depth analysis leading to these results. The Mediaeval phase for the site was examined using ethno historical sources in conjunction with the botanical material.

The results proved the botanical material retrieved reflected the social and economic changes for the period studied. The study concludes with a discussion of the practices leading to the recovery of the botanical material and the relevance of the ethnohistorical data to the interpretations produced.

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First and foremost I would like to thank my supervisors Jacqui Huntley and Pam Graves for all their help and guidance, and for pointing me in the right direction when I got lost. Thanks also to Dr Charlotte O'Brien for her help and support and Jenny Jones for the artefactual analysis. For the provision of copious information regarding the Mediaeval Period and the archaeology recovered from the excavation, I would like to thank Frank Giecco, the site director, who was also responsible for the illustrations used in the report. Thanks must also go to all the staff of the North Pennines Heritage Trust Archaeology Unit who took part in the excavation and religiously recovered the material used in this study. I would also like to thank the staff of Thomas Armstrong, without whose patience and enthusiasm this work would not have been possible.

Thanks go to the on site archaeological team who carried out the work as Frank Giecco (site director), Joanne Beaty, Ken Denham, Chris Jones, Chris Jones, Gill Kirkley-Allsop, Faye McNamara, Dan Miller, Sarah Morton, Kevin Mounsey, Laura Scott and Fiona Wooler. Thanks to Joanne Beaty and Fay McNamara who processed the finds, and Fiona Wooler who provided clues to historical sources. The author carried out the environmental assessment and also took part in the excavation. Thanks also to Julia Cussans for analysing the mammal bone recovered from the site.

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1 INTRODUCTION

> *"History, then, is human behaviour controlled and empowered by environment. More starkly reduced, it can be categorised as the dynamic relationship between the organism and its ecological niche. That niche is the landscape: the capes and bays, the prominent landmarks and valleys, the tides and currents, and the very rock itself and the weather that sculpts it. In different combinations, these provide the microenvironments within which the human community creates its history."*
>
> Cunliffe 2001: 1.

If enquired of, people frequently remark that Carlisle is 'somewhere in Scotland'. They rarely know that it comprises the most northwesterly city in England. There have been considerable changes though throughout its history. Occupied by the Romans between the first and the fifth centuries, the eras after the Romans left were often turbulent. The transition between English and Scottish rule over the following millennia almost certainly had a drastic effect on the economy and settlement of the area. Burials, structures, features and artefacts from various Prehistoric periods have been discovered in and around the area of Carlisle over the years (Bewley *et al* 1992: 325-354; Clare *et al* 2001: 83-105; Collingwood 1933: 163-200; Frodsham 1989: 1-19; Hoaen & Loney 2003: 51-65). Earlier settlements are almost certain to be found under the Roman and Mediaeval remains within the city limits and beyond in the surrounding environs but to date remain largely undetected.

From as early as the first to second centuries Roman records contained written descriptions of Carlisle life (Handford 1970). Historical evidence is well documented for some periods. Carlisle was frequently written of, especially in relation to the Roman and the Post-Mediaeval Periods (Charlesworth 1978; Creighton 1889; Perriam 1992; Summerson 1993), daily life being fairly well recorded for these times. Mediaeval life is vividly (if sometimes fancifully) described by many authors (Creighton 1889; Fetherston 1872; Nicholson & Burn 1777; Wilson 1968), providing a good basis for the factual evidence and documentary investigation of this study.

The main eras that have been studied in depth in relation to Carlisle are the Roman Period and the industrial age of the Post-Mediaeval (Charlesworth 1978; Embleton & Graham 1984; Ferguson 1893; Giecco & Zant 2001; Goodwin 1989; Hogg 1964; LUAU

2001; Miller 2002; McCarthy 1984, 1987, 1990, 1991, 2000, 2003; Perriam 1992; Redfearn 1921; Zant 1996). This pilot study aimed to redress the balance to a degree by being based on material mainly from the Mediaeval Period contexts recovered from the excavation of the site at 42-48 Scotch Street.

The main aim of this study then was to determine whether the Mediaeval Period in Carlisle was a place of unrest and turmoil or a thriving hub of enterprise. Both plant remains recovered from the excavation at 42-48 Scotch Street and the historical documentary evidence were examined with this aim in mind. The study should then in part be able to identify the research strategies that need to be targeted in the future to augment the information from the Mediaeval Period via archaeological projects. These can in turn then help target, as per The Archaeology of North West England Research Agenda and Strategy (Brennand *et al* 2007), the strategies needed to fill in the voids of knowledge for the Mediaeval Period, particularly in relation to Carlisle.

1.1 THE SITE ON WHICH THE STUDY WAS BASED

North Pennines Heritage Trust (now North Pennines Archaeology Ltd) was commissioned by E. C. Harris to carry out an archaeological excavation on land at 42-48 Scotch Street, Carlisle. The work was carried out between April and July 2003. This work followed a desk-based study carried out by Lancaster University Archaeological Unit in 2001 (Town 2002). E. C. Harris prepared the archaeological project brief. The brief required an initial intensive watching brief over an area of approximately 19m by 8.3m, followed by the total excavation of archaeological deposits down to a formation level of 19.43m Above Ordnance Datum (AOD). Removal of modern surfaces across the remainder of the development area had revealed extensive cellaring in some sections where no archaeological strata had survived. However, several areas of intact archaeological deposits were observed which required total excavation down to the desired formation levels.

1.1.1 Location of the Site Studied

The area of the excavation was situated at 42-48 Scotch Street in the heart of the former Roman and Mediaeval city of Carlisle at NGR NY 404 533. It lay to the rear of the present nineteenth century retail premises that have been continually refurbished to the present day, hence the archaeological intervention prior further to redevelopment. Significant Roman remains had been discovered previously in the vicinity of the

development site, including a probable bathhouse, a possible *praetorium* and a high status *mansio*. Known areas of recovered archaeology therefore surrounded the site of the excavation. These other excavations had yielded evidence of high status and high intensity occupation in the Roman Period.

Below can be seen a series of maps defining the position of the excavation site in its context within the former Mediaeval City of Carlisle and also the wider area of the modern city boundaries. Figure 1 (p 4) shows the area location with the region of the site highlighted. The highlighted area of Figure 1 has been zoomed in on in Figure 2 (p5) to show the context of the excavation site within the modern city. Figures 3 (p6) and 4 (p7), although exhibiting a difference in date of over 200 years between them, from the first at about AD1560, to the second of AD1774, show basically the same footprint of the city and show little change over that period. Figure 5 (p8) (Asquith 1855; Giecco *et al* 2004) was taken from an AD1853 survey and Figure 6 (p9) from the first Ordnance Survey Map of AD1864 (Ordnance Survey 1864). These again show very similar footprints for buildings and road systems. Details are less clear on the OS map of 1901 in Figure 7 (p 10), but are still recognisable as the same footprint. Figure 8 (p10) shows the location of the excavation in detail and denotes the actual areas used during the excavation.

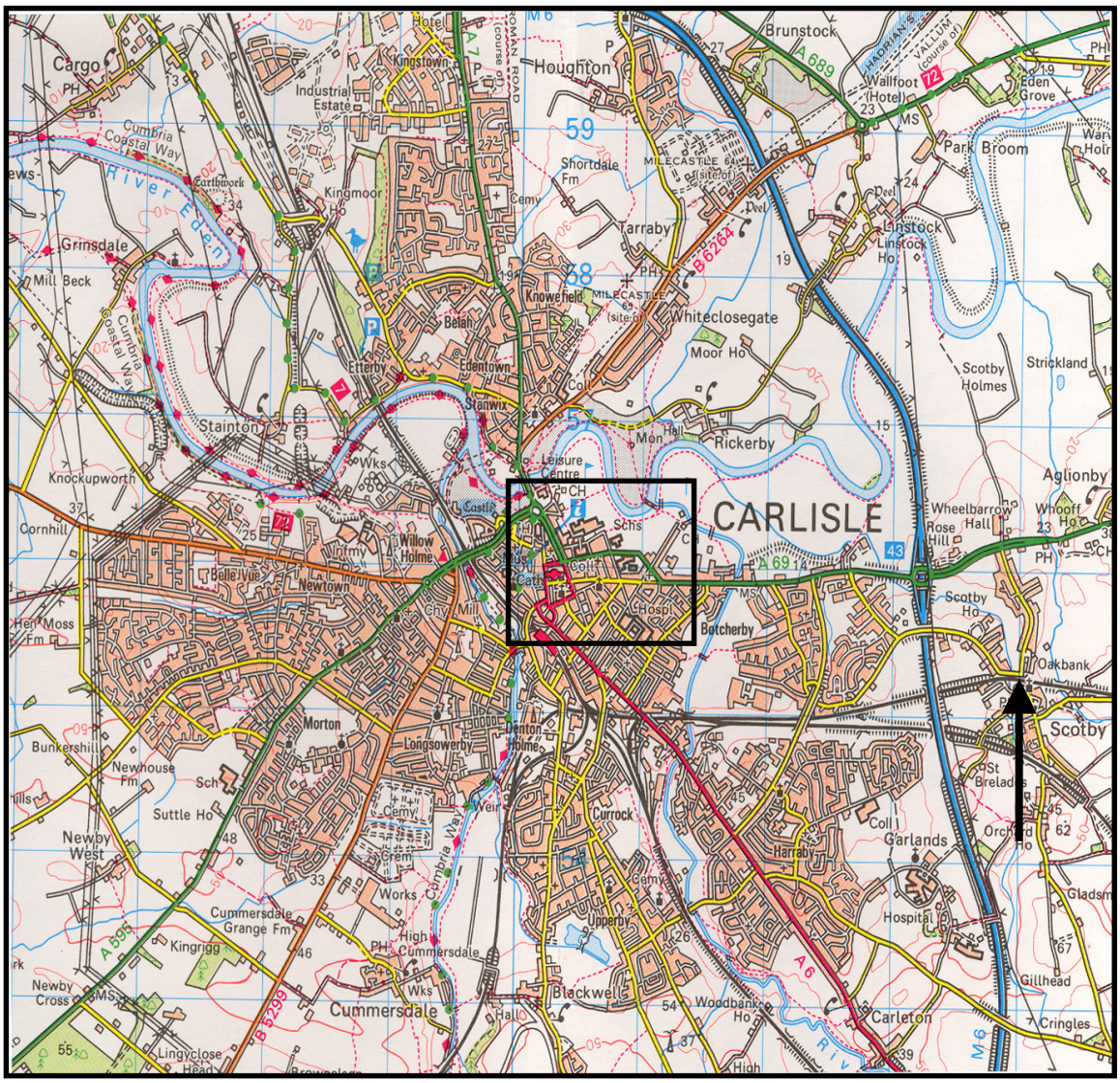


Figure 1: Area Location (Giecco *et al* 2004; OS 1997).

NGR: NY 404 533

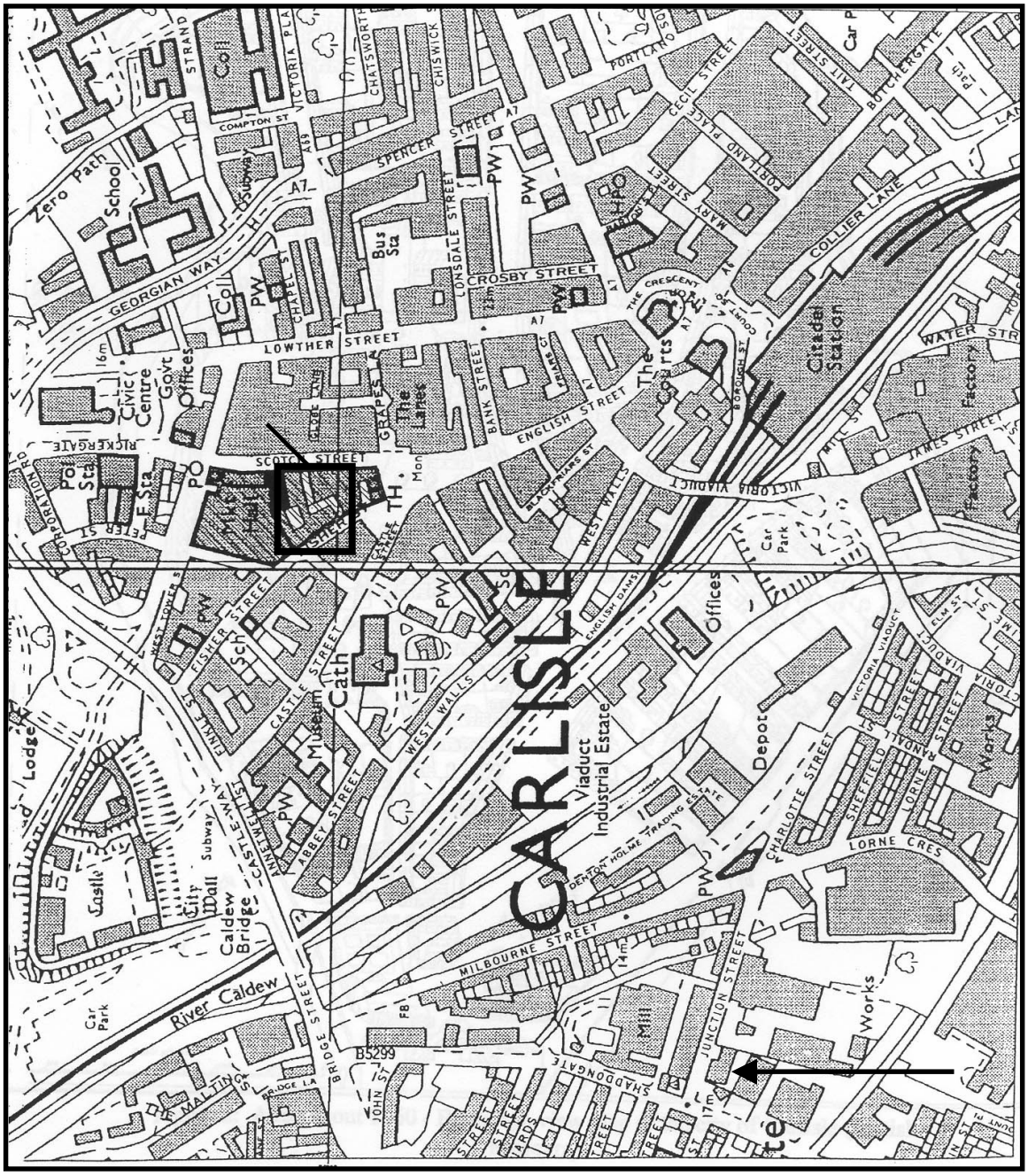


Figure 2: Site Location (Giecco *et al* 2004).

NGR: NY 404 533

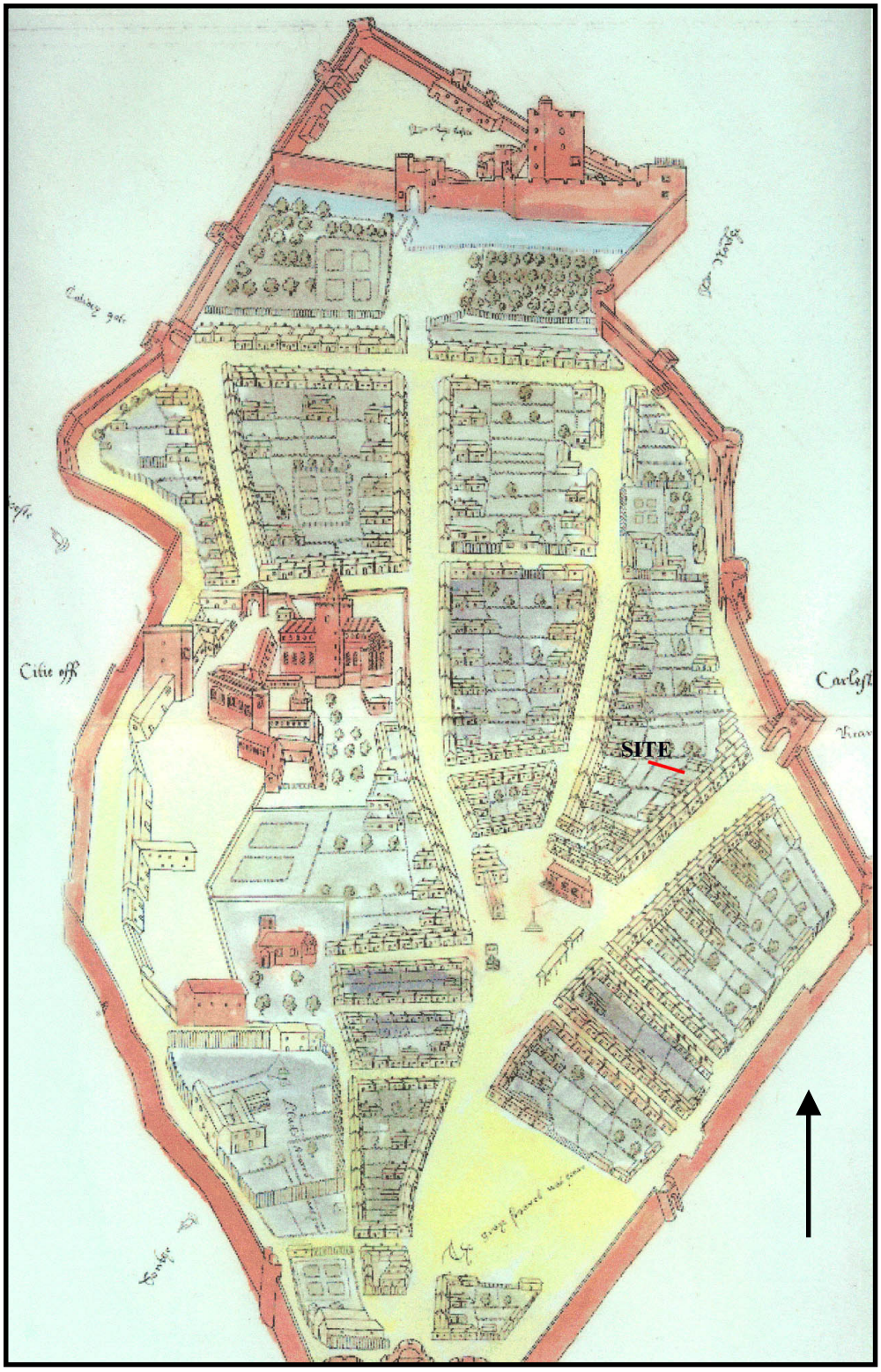


Figure 3: City Plan of About AD1560: Bird's Eye View of Carlisle
(Anon c1560; Giecco *et al* 2004).
Scale unknown

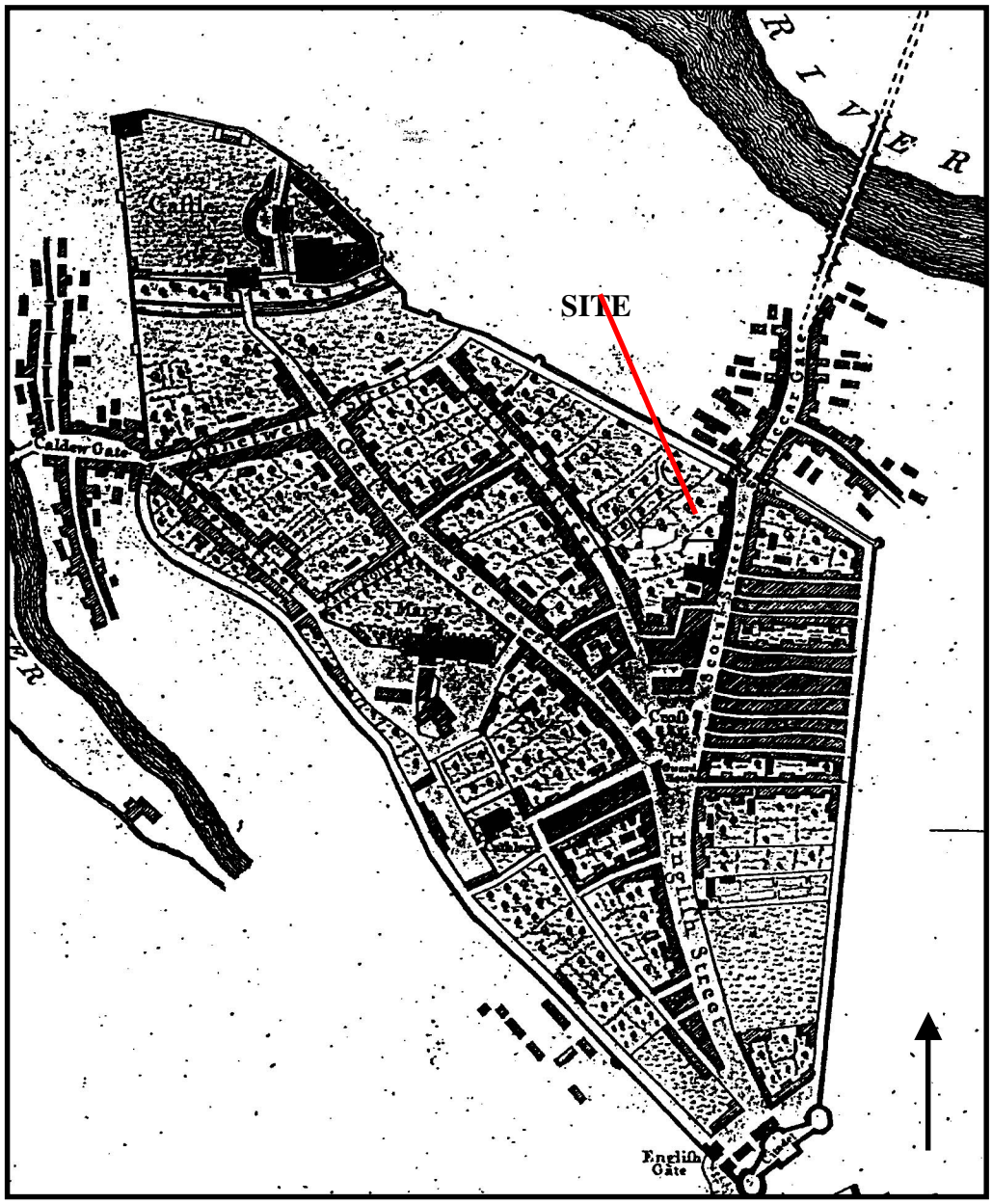


Figure 4: Map of Carlisle AD1774
(Giecco *et al* 2004; Hodskinson & Donald 1802).
Scale unknown

Figure 5: From a Survey by Richard Asquith in AD1853
(Asquith 1855; Giecco *et al* 2004).
Scale 10 feet to one mile

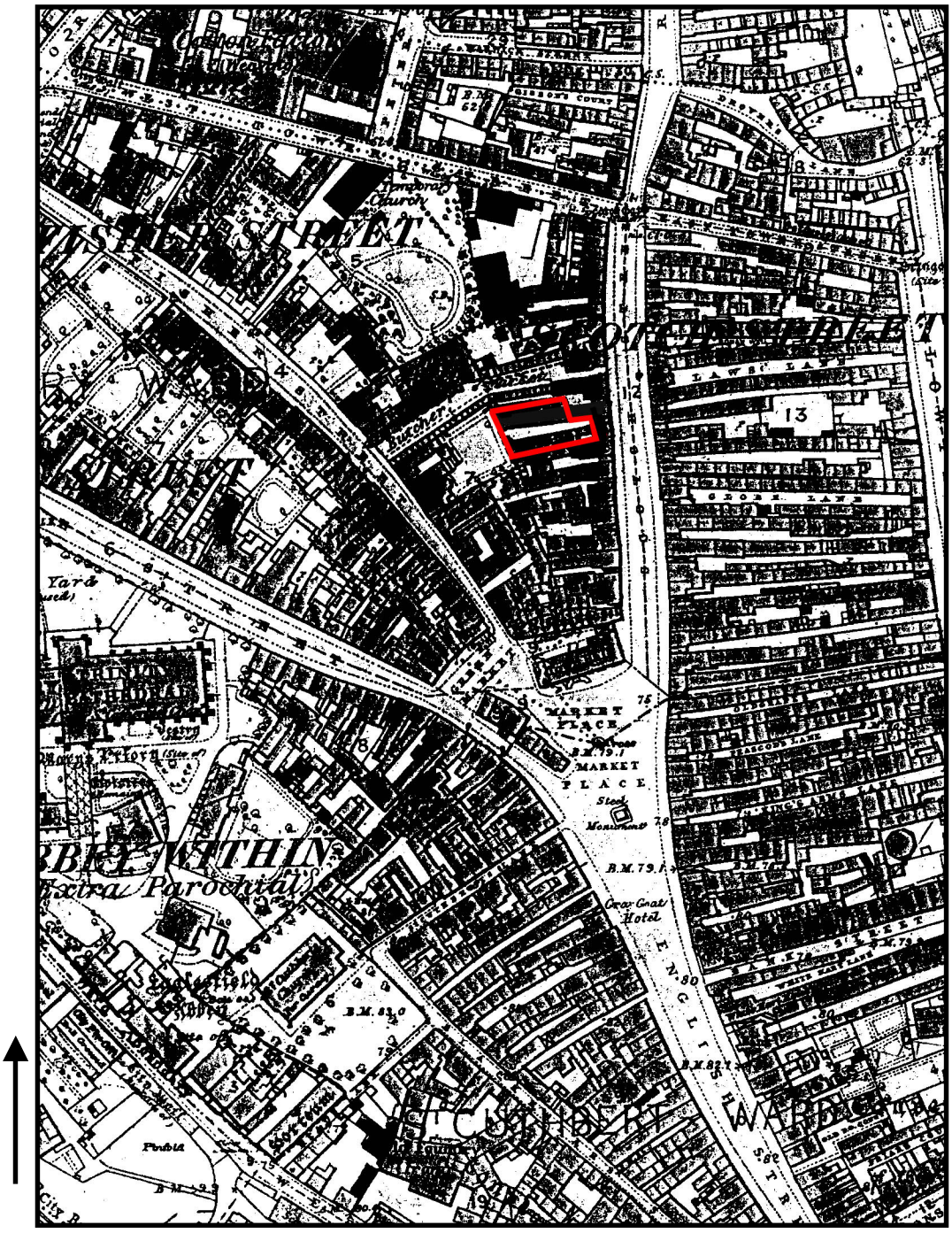


Figure 6: From the First Edition Ordnance Survey (OS) map of Carlisle AD1864 (Giecco *et al* 2004; Ordnance Survey 1864) Scale unknown.

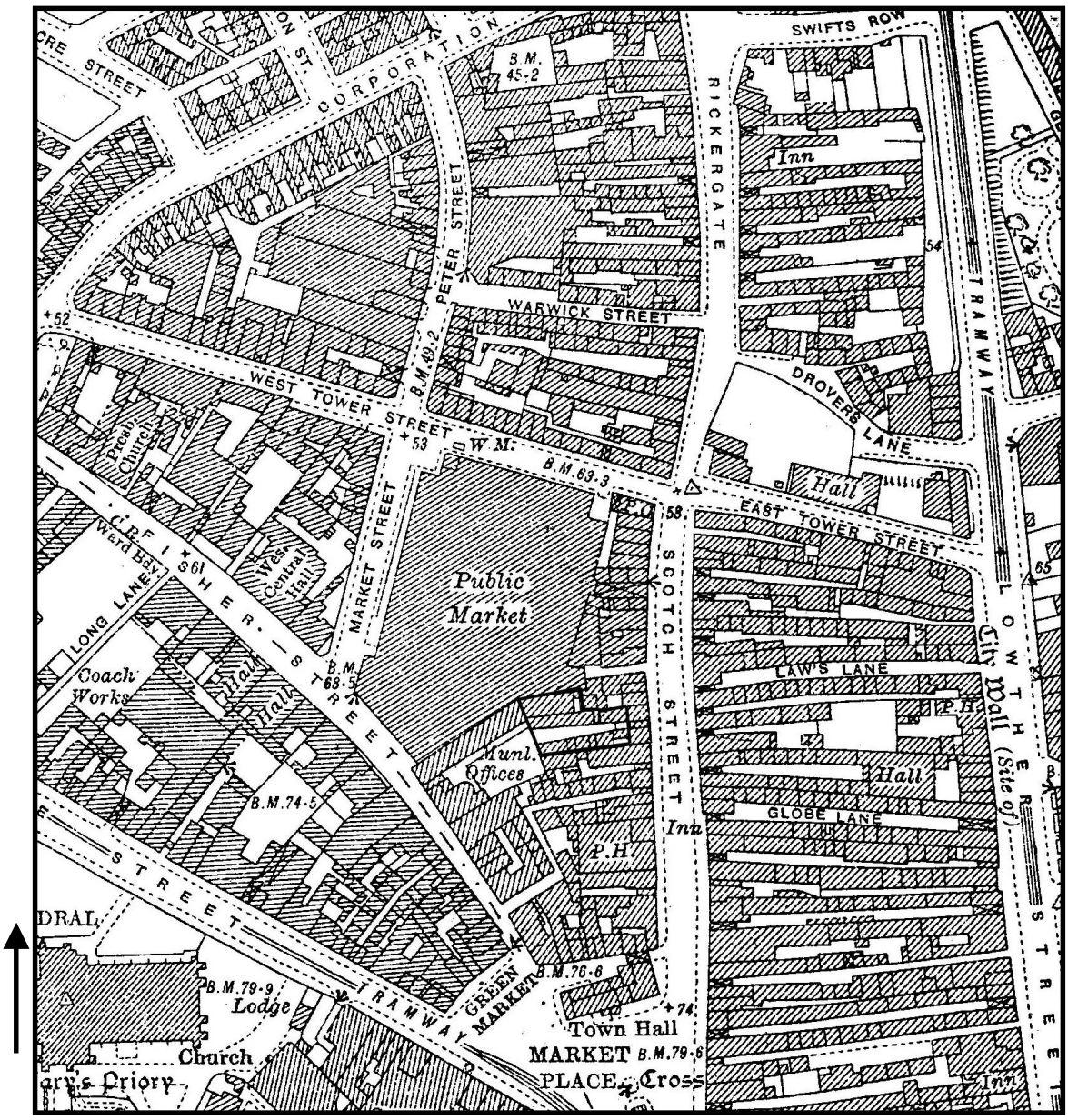


Figure 7: From the Second Edition Ordnance Survey Map of Carlisle AD1901
(Giecco *et al* 2004; OS 1901).
Scale unknown

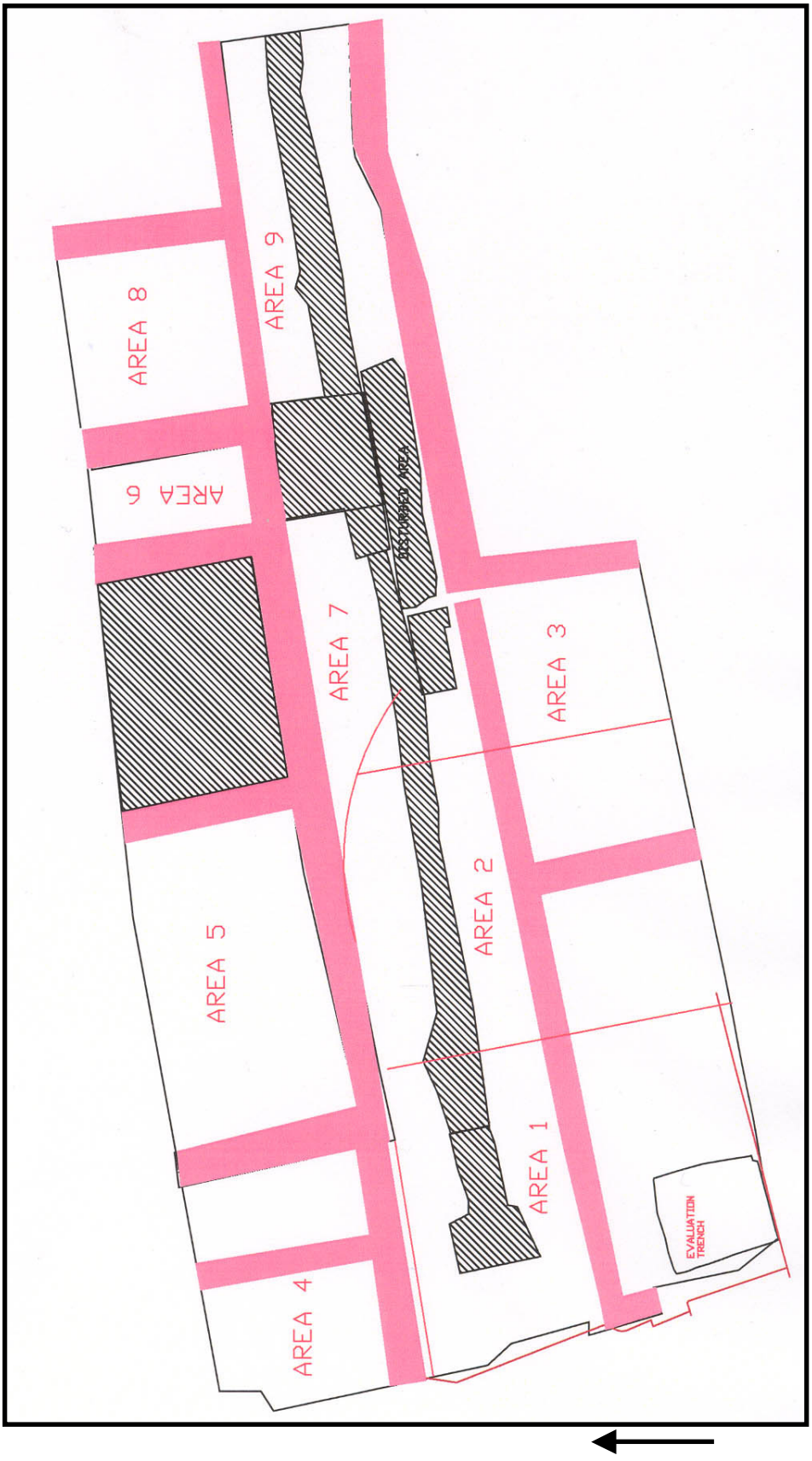


Figure 8: Definition of Areas Within the Excavation Limits. (Giecco *et al* 2004).
Hatched areas indicate no surviving archaeology Scale 1:200

1.1.2 Topography of the Area

The historic City of Carlisle sits on the Carlisle Plain, approximately 18m AOD, and is located on the valley floor of the River Eden. Here the city developed between the River Eden and its tributaries, the Caldew and Petteril. The study area lies within a landscape of high significance, both topographically and historically. The area is adjacent to the Hadrian's Wall World Heritage Site, and so borders Scotland closely.

Scotch Street itself lies outside the area of the former Roman Fort of Luguvalium. The area the excavation site covers is to the rear of what is now a modern thoroughfare in the centre of the retail area of Carlisle. The site of the excavation comprises a block of land, currently still built upon, on the western side of Scotch Street, immediately to the southeast of the Market Hall. The study area lies within the range of the Mediaeval City walls. The Mediaeval Period map seen above in Figure 3 (p 6) shows the excavation site close to the east gate within the Mediaeval city wall. The site was bounded by a lane to the rear running approximately north-south and now unnamed, but formerly known as Old Blue Bell Lane or Butcher Market; to the west it is bounded by Treasury Court and to the south by the buildings of 50 Scotch Street.

1.1.3 Underlying Geology of the Area

The solid geology of the area consists of reddish sandstones, siltstones and mudstones of Permo-Triassic strata, which are mostly concealed beneath drift deposits consisting primarily of boulder clay or till (Davis 1979). The Mediaeval city walls on the west side were positioned along the top of the scarp slope above the River Caldew. The Roman and Mediaeval towns of Carlisle stood on raised boulder clay glacial drift deposits that overlie the alluvial silts and clays of the Rivers Caldew and Eden; the excavation site then lying directly upon these glacial drift deposits (Young 1990: 2-4). The area around all three rivers is made up of deposited silts and clays from millennia of floodwaters, each river changing its course when the flow determined it as the floodwaters subsided.

1.2 AIMS OF THE STUDY

In the initial Project Design (Giecco 2003) for the commercial work undertaken at 42-48 Scotch Street, as a Watching Brief and Open Area Excavation, the aims and objectives were as follows in 1.2.1.

1.2.1 Aims of the Initial Excavation and Watching Brief in Summary

The aims of the initial excavation and watching brief in summary were as follows:

- to supervise topsoil stripping, excavation for footings and/or service trenches, clean and record any putative archaeological features and produce a stratigraphic record;
- to record archaeological deposits;
- to establish, wherever possible, the depth of archaeological remains;
- to establish, wherever possible, the condition of the remains;
- to recover artefactual material, especially that useful for dating purposes;
- to recover palaeoenvironmental material, especially that useful for dating purposes.

The initial academic aims of the excavation and post-excavation programme were as follows:

- to produce a record of the excavation site prior to the construction programme;
- to establish the extent, complexity and depth of buried archaeological remains;
- to establish whether pre-Roman activity could be identified during the excavation;
- to supplement existing records of Roman and Mediaeval activity in Carlisle;
- to determine whether any trace of Early Mediaeval activity could be identified;
- to establish the condition of the remains for future management purposes;
- to recover artefactual material, especially that useful for dating purposes;
- to recover palaeoenvironmental material, especially that useful for dating purposes;
- to prepare an assessment report for the Client and County Archaeological Service.

The resultant report (Giecco *et al* 2004) also included any recommendations for further work as well as details of the method of final publication.

The aims of the initial assessment of the plant macrofossils and other environmental material were as follows:

- to define the excavation site in the context of the City of Carlisle;
- to detail previous work carried out in the area;
- to explain the methodology of processing and analysis used in the study;
- to determine the periods and phases encountered during the excavation;
- to narrate the history of the site location and its environs;
- to analyse the plant macrofossils in terms of methodology;
- to analyse the plant macrofossils in terms of sampling strategy;
- to analyse the plant macrofossils in terms of species encountered;
- to analyse the plant macrofossils in terms of statistical analysis.

The initial academic aims of the post-excavation study of the plant macrofossils and other environmental material were as follows:

- to produce an archive record of the material used in the study;
- to establish the types of plants encountered and state their habitats;
- to analyse them statistically to determine trends and patterns;
- to explain the presence of the exotic species if any are recovered;
- to analyse material from the Mediaeval Period as previous evidence is sparse;
- to compare the analysis to other material from the Mediaeval Period;
- to establish the condition of the remains for future management;
- to recover plant and other material, especially that useful for dating purposes;
- to prepare an analysis report for the Client and County Archaeological Service;
- to create an archive of the material and a report for the Client and County Archaeological Service, stating its whereabouts.

The resultant report (Giecco *et al* 2004) also included any recommendations for further work as well as details of the method of final publication.

1.2.2 Aims and Objectives Pertinent to this Study of Plant Macrofossils

The aims and objectives, with particular reference to this study, are defined here. Information relating to the Mediaeval Period for Cumbria was mainly gleaned from documentary sources found in the County Record Offices. The archaeological assessments for Cumbria of the period are relatively few, but are addressed on various levels in Ferguson (1878), Giecco (2004, 2006), Giecco *et al* (2004), Huntley & Stallibrass (1995), Jones (1976), McCarthy (1987, 1990, 2000), McCarthy *et al* (1990) and Railton (2007, 2008, 2009). Excavations previously undertaken within the city boundaries of Carlisle, as well as the local environs surrounding it are numerous, however, a definite targeting of material recovered from the Roman Period is seen.

In terms of artefact and ecofact recovery, contexts from this period are known to be rich in remains and so are capable of providing good post-excavation analytical results. The Mediaeval Period remains though, are more ephemeral in both signature in the archaeological record as well as the variety and number of elements recovered from them. They therefore present more of a challenge in terms of post-excavation analysis, and there are fewer comparisons to be made with the sporadic and sometimes incomplete archaeological datasets recovered from the period.

This study then addressed only some of the aims and objectives that are listed above, as taken from the initial Project Design relating to the commercial work carried out at 42-48 Scotch Street, Carlisle. The initial assessment of plant macrofossil remains from that work though considered data recovered from all the historic periods encountered. The work carried out here is then seen as a pilot study, as it delivered the full analysis and resultant data, discussion and conclusions, drawn from only some of the contexts, mainly those of the Mediaeval Period, from the excavation. Controls were included from a Roman and a pre-Roman context. The aims and objectives of this study then were less rigid and can be summarised in the four points below.

Firstly, 42-48 Scotch Street had to be defined in the context of the city of Carlisle by chronicling both the history of the excavation site and the city. Achieved through both map regression and the study of archival and ethnohistorical evidence, this provided a comprehensive chronology and history of the excavation site and wider environs. Its aim was to incorporate localised, as well as the more widely reaching manipulations, and their effects on both economy and settlement for the area as a whole.

An account of all previous archaeological work carried out throughout the area was also narrated, relating any information recovered in the accomplishment of this work that may enhance the understanding of the background knowledge of this study. All periods were considered in the narration of this information as they may reflect patterns of settlement and change throughout the area.

With regard to the critical analysis of the plant macrofossils retrieved from the excavation and used in this study, it was necessary to define the reasoning and methodology used. This was especially important in terms of sampling strategy and selection, as well as defining any traits and characteristics observed, and ultimately determining whether statistical analysis was relevant to the results.

The ultimate intention of the study was also to evaluate the project in its entirety with reference to the Resource Assessment (Brennand *et al* 2006), and the Research Agenda and Strategy (Brennand *et al* 2007), of the Archaeological Research Framework, particularly in its application to the North West Region and to the Mediaeval Period.

The objectives of the study were also to distribute the information gleaned from it to a wider audience, both in the archaeological forum as well as to other interested parties.

1.3 BACKGROUND TO THE INITIAL PROJECT

Following the excavation of the site at 42-48 Scotch Street during the early part of 2003, a substantial amount of material requiring post excavation work was recovered and recorded. The results of the fieldwork form the basis of the total archive as both paper and extant material, in accordance with current English Heritage and IFA guidelines (Brown 2007; English Heritage 1991). The project archive represents the collation and indexing of all the data and material gathered and recovered during the course of the project. It also includes summary processing and assessment of the features, finds and samples recovered during the excavation. The collective archive included a paper archive of context sheets, plans, sections, environmental sample sheets, finds records and other pertinent material.

This was complemented by the physical archive of recovered material such as finds, animal bone and soil samples. The total of this information was narrated as an assessment report. Each section was assessed individually and the results were collated in the Assessment Report (Giecco *et al* 2004), copies of which are held at NPAL. Post excavation material fell into several categories for further analysis, recording and also conservation work in some cases. Contexts and features associated with the excavation were interpreted. Finds were analysed by period and type, referring also to the contextual information from which they were recovered. Full analysis and interpretation of this material will result in the final publication document being produced.

1.4 PREVIOUS ARCHAEOLOGICAL WORK CARRIED OUT IN THE AREA

Many archaeological studies have been undertaken in Carlisle and Cumbria as a whole, mainly as a result of planning strategies in relation to developments (Davies 2005; DoE 1990a, b & c; Edwards 1979; EH 1991, 2006; IfA 2001a, b, c, d, e). Other projects carried out have purposely involved the public as Community Projects, a remit of their funding process. Many projects were listed here that relate to the study; others are absent due to their inaccessibility or incompletion in post-excavation or chronicling.

Mediaeval Period features and sites have been discovered all over Cumbria of various types in both rural and urban settings (Railton 2007, 2008, 2009). A wealth of evidence

for the study area exists from previous archaeological work in the vicinity of 42-48 Scotch Street and Carlisle in general. This section provides only a brief summary of the results obtained from these interventions, most of which have not as yet been published. No archaeological work was previously undertaken directly on this development site, but in relation to archaeological work done formerly in close proximity, the three or four letter codes used were given by the site director at the time of excavation.

An extensive desk based assessment of previous interventions, and related information associated with this project, was carried out by Lancaster University Archaeology Unit (LUAU, now Oxford Archaeology North) as they had been commissioned to carry out that work by the developers of the site in 2001. Additional material from all readily available cartographic, documentary, and aerial photographic sources were gathered as part of the desk based assessment in order to appraise the archaeological potential of the resource within the study area. This resulted in a number of features of archaeological interest being detected prior to archaeological intervention. (Town 2002). Some of the following text is revised from Giecco *et al* 2004.

1.4.1 Archaeological Work in the City of Carlisle Hazard Area

There have been a number of archaeological investigations of various types within the area defined as the City of Carlisle Hazard Area (Sites and Monuments Record or SMR No. 3560). These include major excavations at The Lanes (McCarthy 2000; McCarthy *et al* 1982; Zant 1997); Annetwell Street (McCarthy Date Unknown); Carlisle Cathedral (McCarthy 1987: 270-1); Castle Street (McCarthy 1991); Collier Lane (Zant 1997); St Nicholas Yard (Howard-Davis & Leah 1999: 89-115); an evaluation at Botchergate by Carlisle Archaeology Ltd 1998-99 (Giecco 2001; McCarthy & Flynn 1994) and Lancaster University Archaeology Unit (LUAU) in May-July 2001 (LUAU 2001); an evaluation at King Street (Reeves 2000); an assessment of 7-9 Fisher Street (CFA Archaeology Ltd 2002) and an assessment of 63 Scotch Street, Globe Lane, and Old Bush Lane (National Monuments Record 2002); a watching brief at Cumbria College of Art and Design (Oxford Archaeology North/ The Archaeological Practice July 2001); a watching brief at 46-52 Lowther Street (Flynn 1995); Blackfriars Street (McCarthy 1990); and various excavations at Rickergate for The Lanes extension (McCarthy 2000). A building recording and watching brief/evaluation (E. C. Harris & Partners 2003a and b), prior to the main excavation work, were carried out at 42-48 Scotch Street.

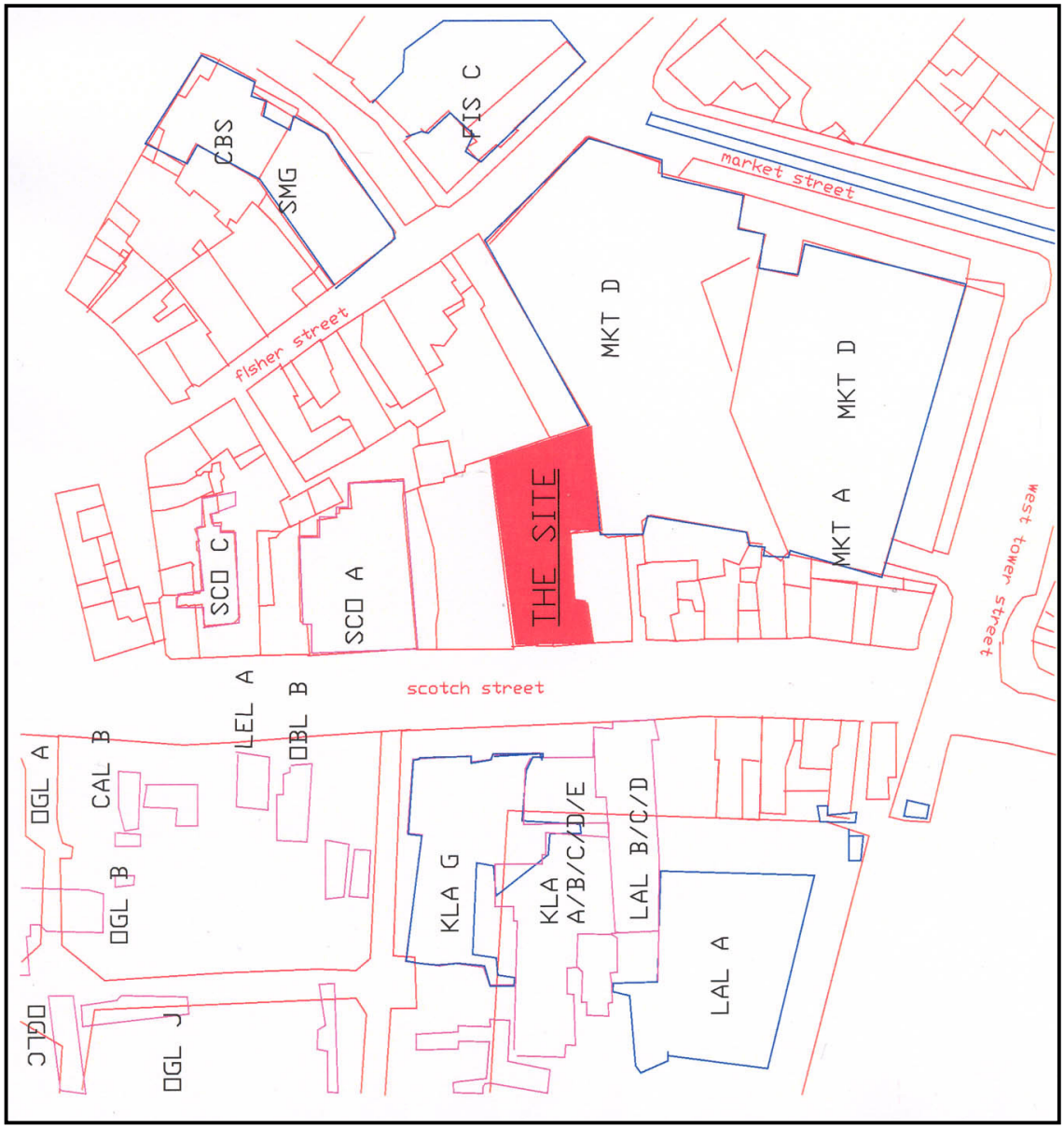


Figure 9: Location of Previous Archaeological Investigations (Giecco *et al* 2004).
Areas highlighted in magenta indicate excavations
Areas highlighted in blue indicate watching briefs
Scale 1:1000
Letters in Figure 9 denote the site code for the excavation

1.4.2 Archaeological Work Undertaken at The Lanes, Scotch Street

Investigations by the former Carlisle Archaeological Unit in The Lanes (1979-83) included more than 30 separate excavations and watching briefs, Site Codes KLA-G, LAL A-D, LEL B, OBL B, OGL A-C, and J at NY 4012 5608 (McCarthy 1984; McCarthy *et a1* 1982; Webster & Cherry 1980). The South Lanes excavations were published in McCarthy (2000). The North Lanes excavations remain unpublished, but phasing is summarised in Zant & Padley (1996), and Zant (1996). Each of the interventions encountered buildings or other deposits of Roman date, with a full sequence of deposits up to the Post-Mediaeval Period. The largest excavation took place in the former Keays and Laws Lanes and Union Court, opposite the present development area (Zant 1996; Zant & Padley 1996).

***Prehistoric Periods*.** No pre-Roman structures were confirmed for this period, although a metalled track-way crossing the excavation site at The Lanes may have been prehistoric, as it was associated with plough-marks attesting to agricultural activity. These remains were contrary to the present road alignments (McCarthy 2000). A watching brief at 46-52 Lowther Street also saw ard marks exposed, and although the old ground surface is undated, it precedes the construction of an early road surface (Flynn 1995). A circular structure was found at Old Grapes Lane, dating of which placed it within the early Roman sequence, possibly the late first century (Reference not found, site code OGL A). Several isolated finds, including barbed-and-tanged arrowheads, attest to prehistoric activity within the area (McCarthy 2000).

The Early Roman Period. A possible *praetorium*, dating from the first century was discovered, set within a ditched enclosure and found in association with a possible temple complex to the east (Site codes LAL D, KLA F and KLA G) (Zant 1996). A shallow, but carefully levelled, foundation trench contained large oak sill beams and the whole structure was coated with a thick layer of whitewashed or plastered daub (McCarthy 1984: 68). This substantial building was 10.25m wide and at least 55m long. Fragments of *opus signinum* and large stone *pilae* almost certainly indicate the presence of a building containing a hypocaust close by (McCarthy 1984: 70). The buildings were deliberately demolished, with the walls covered by thick deposits of burnt material, containing molten and shapeless lumps of lead, attesting to a destruction phase (Zant & Giecco 1999).

The temple complex was thought to post-date the *praetorium*, though phasing was difficult, and it could possibly be from the same period. Column bases on the eastern and western sides indicate the presence of porticos, with identical ranges of rooms on the other side. (Zant & Giecco 1999). There then followed a series of open areas in this part during the second and third centuries, a simple rectangular building was then progressively enlarged (site code KLA-D) (Zant 1996). Another wooden building, yards, and a stone-lined well were associated with it (site code KLA C) (Zant 1996). Land to the south appears to have been open (Zant & Padley 1996) with another property on the northern side (site code LAL D). A skeleton was recovered from this area, and a large quantity of leather shoes (McCarthy 1984).

Near Crown and Anchor Lane, a major Roman road was identified (site code OGL J) (McCarthy 1984, 2000; McCarthy *et al* 1982). Probably the principal access into Carlisle from the east this became the main east/west axis within the settlement as far as the east end of the Cathedral, after which it turned north-west and was aligned on the gate of the fort (McCarthy 2000). The road was exposed again during the watching brief at 46-52 Lowther Street (Flynn 1995). Within The Lanes, however, this road probably formed a right-angled junction with Scotch Street, the Roman equivalent of which was seen in a watching brief (site code SCO B, reference unknown).

The frontage along Roman Scotch Street was not excavated but is thought to have been equally densely occupied. Buildings, initially of timber, then with clay and cobble foundations, were compact in the angle of Scotch Street and Crown and Anchor Lane (site code CAL B), extending back about halfway to Lowther Street on evidence from excavations in Grapes Lanes (site code OGL A) (McCarthy 2000). Several hearths and areas of burning, possibly industrial, were seen north of Crown and Anchor Lane (site code CAL B); most of the other buildings were probably domestic (McCarthy 2000).

The Later Roman Period. Buildings excavated in the Keays and Laws Lane areas possibly endured through the first half of the fourth century to the reign of Valentinian I (364-375), buildings were abandoned before the end of the fourth century though. Two sections across the Roman roads of Scotch Street and Crown and Anchor Lane (site code OGL J) appear to show an unbroken sequence of metalled surfaces from the Roman Period through to more recent times, probably then continuing in use. (McCarthy 1984; McCarthy *et a1* 1982).

The Mediaeval Period. Largely abandoned after the departure of the Romans, or evidence becomes less archaeologically visible, black soil deposits were found across the localised area seen in Figure 9, with ephemeral structural features such as post-holes and surfaces recorded but little else (McCarthy 2000: 64; Zant 1996). A two-piece clay strap-end mould of a late Saxon date was assigned to the ninth century after being found in a pit at excavations on Crown and Anchor Lane (Taylor & Webster 1984).

An enamel disc brooch of tenth century date was recovered from Old Grapes Lane (site code OGL A) (McCarthy 2000: 47). Features of pits, post-holes and gullies cutting the soil were recorded as possible agricultural activity. Metalled road surfaces were laid out along lines formerly established by pit alignments; these surfaces followed the course of present known lanes, such as Keays Lane and Hodgson's Court (Zant & Giecco 1999).

From the thirteenth century or earlier, insubstantial structures were built fronting onto these lanes (site code KLA B) (Zant 1996), comprising of double bayed structures with stone pads, ground sill beams, earth-fast posts and hearths that probably continued in use into the seventeenth century. A three-bay Mediaeval Period hall occupied Lewthwaites Lane, Trench A about that time (site code LEL A; McCarthy 2000: 51); a large ditch was observed during a watching brief at 46-52 Lowther Street and, although no dating evidence was recovered, it was interpreted as the Mediaeval town ditch.

The Post-Mediaeval Period. From the seventeenth century onwards, Mediaeval buildings appear to have been cleared, especially those fronting onto Scotch Street, to make way for further more modern development. Most timber buildings were cleared to make way for brick structures between AD1690 and AD1750, that were then embellished with decorative sandstone features displaying elevated social standing (McCarthy 2000: 66). Most of these buildings survived into the twentieth century, when they were demolished to build The Lanes shopping centre.

1.4.3 Archaeological Work Undertaken on Other Minor sites in the vicinity

For the location of these sites using the unique site code, see Figure 9 (p19).

Vasey's Department Store, 58-62 Scotch Street (site code SCO A, excavation at NY 4007 5601). The site of 58-62 Scotch Street was subject to a rescue excavation in 1976 prior to the building of Vasey's Department Store. Tom Clare carried out the work, which remains unpublished but is summarised within SMR 5065 (Appendix 6).

Redfearn (1921) undertook an earlier rescue excavation at 62 Scotch Street in 1920. The 1976 intervention consisted of small areas dictated by building operations; evidence is then, difficult to interpret. A layer across the whole excavation site had an unclear date. The earliest dateable feature of a turf bank was between the late first and mid second centuries AD, probably associated with a ditch on the north side (SMR 5065, Appendix 6). The feature possibly related to a late first century AD ditch identified during the Lanes excavations at Keays Lane, Laws Lane and Globe Lane (site codes KLA D/C/G; LAL C; GLL A respectively) (Zant & Padley 1996). This bank was demolished in the second century AD and a timber building erected (SMR 5065). Other late second century AD buildings were possibly associated as well as a gravel floor or road. Timber Roman Period buildings were identified as being roughly parallel to Scotch Street, suggesting the existence of a Roman road on a similar alignment to the present one.

A minor road with ditches to the side had a surface overlain by mid second to third century AD pottery, possibly contemporary with the above wooden structures. It was almost certainly out of use in the Roman Period and may have been a street *insula* (a unit or block within a town or city) (SMR 5065, Appendix 6). Most of the Roman pottery was of late second/early third century AD date and three Roman coins were also recovered, one of Hadrian (AD118-138) and another later of Constantine II (AD337-340). Mediaeval pottery was also recovered as mostly thin-walled, well-fired cooking vessels with about ten per cent jugs or pitchers. In 1920 a well was recorded, supposedly of Roman date (Redfearn 1921). The well had been backfilled and three pump-trees were recovered, one larch, and two of oak; one had been fitted with an iron collar and two pieces of chain.

Market Hall (MKT C at NY 40035607)

A watching brief by Carlisle Archaeological Unit on works being undertaken in the Market Hall in 1990 (Appendix 6) sees the results not yet published in detail, although a very brief summary has been included in *Britannia* (Frere 1991). This information was based on the primary archive and the recollection of Frank Giecco, formerly of Carlisle Archaeological Unit. A metalled street dating to the mid-Roman Period was uncovered running east/west, adjacent to a large stone building, thought to be a bathhouse or *mansio*, since it contained hypocaust systems. It appears to have linked street-lines previously noted at St Mary's Gate, Market Street and Scotch Street (Frere 1991). Removal of existing floor surfaces revealed that most of the archaeology lay directly

below ground level. This building lay immediately northwest of, and adjacent to, the present study area. From its alignment, it would appear that some part of the building extended within the boundaries of the development at the rear of 42-48 Scotch Street.

St Alban's Chapel, 66-68 Scotch Street (SCO C at NY 40065598)

These excavations were directed by G. D. Keevill and funded by Cordwell Property Ltd in 1988 and have been summarily published in Gaimster *et al* (1989). They revealed the foundations of the Mediaeval chapel of St Alban, discussed in 1.4, which was in existence by AD1201 but disappeared when the Dissolution took place. Having at least three constructional phases it was ultimately at least 17m long. The cemetery surrounding it contained graves, forty of which were excavated. The earliest archaeological activity on this site was Roman. Sampled deposits, where Mediaeval features had cut the Roman layers, gave a date range of the fourth to the fifth centuries AD, one coin was recovered from the third century AD. A Roman building was recorded with an associated hypocaust, though the exact plan is unclear. A coin of Valentinian II, dated to AD380-90 was found in the hypocaust. It continued in use into the fifth century AD. The site gradually decayed after the fifth century.

Dark earth deposits, possibly to provide gardens, from the ninth century AD, then covered the area of the site. Three stycas, a glass bead, and a pair of tweezers were recovered, with a strap-end and mould found in later deposits. The dark earth may also have been laid to assist grave digging in the cemetery of a timber pre-Conquest chapel. One grave of the timber chapel was cut by the earliest phase of the thirteenth century AD stone chapel, an indication that the grave pre-dated this stone phase. The stone-built chapel was known to have existed by AD1201, the pottery found associated with the building was of twelfth century date or slightly earlier, suggesting earlier foundations existed with several phases and additions. The cemetery possibly extended beyond Rosemary Lane to the north and the Town Hall to the south. (Keevill forthcoming).

After the Suppression of the Chantries in AD1549, the land on which the chapel was built passed to Thomas Dalton and William Denton (Gaimster *et al* 1989). The west tower was probably retained but the rest was demolished, and the area was cobbled. The excavation of cellared stores behind the main street frontage in the mid eighteenth century continued until the nineteenth century and eventually the land was shared out with properties on Scotch Street and Saint Albans Row.

1.5 INITIAL EXCAVATION METHODOLOGY IN BRIEF

The work at 42-48 Scotch Street was undertaken under the overall direction of Frank Giecco BA, Dip Arch AIFA, North Pennines Heritage Trust Archaeologist at the time of the excavation, with assistance from a full team of qualified archaeological supervisors and excavation assistants, highly experienced in excavating urban sites.

The archaeological work involved the supervision of all intrusive ground works in the locations specified in the brief and seen in Figure 8 (p10). The boundaries of the excavation site were mainly formerly delineated by the surrounding extant building and walled area to the back of this structure where the main excavation took place. Other limitations to the area of the excavation (Orton 2000: 128) were the cellaring that had been carried out adjacent to the extant building on the site of 42-48 Scotch Street, as well as the modern intrusions within the area of a large gas tank and concrete sub structure associated with the cylinder. When deposits of archaeological significance were encountered they were cleaned by hand, excavated and recorded in detail, in accordance with the guidelines set out in the North Pennines Heritage Trust's Excavation Manual and both English Heritage (EH) and Department of the Environment (DOE) Guidelines (DOE 1987; DOE 1990a, b and c; EH 1991).

Frank Giecco managed the finds. The North Pennines Heritage Trust archaeological staff undertook first aid conservation, whilst Jennifer Jones of the University of Durham carried out further conservation work and assessment. Suitably qualified experts analysed the finds and environmental evidence, as stated in the assessment report (Giecco *et al* 2004). The Environmental processing was undertaken at the Trust's premises at Nenthead under the supervision of Patricia Shaw. All environmental evidence found during the work was sampled according to the North Pennines Heritage Trust standard environmental sampling procedure (Shaw 2008), in consultation with appropriate specialists at the University of Durham and also the North West Regional Science Advisor for English Heritage, Sue Stallibrass. Samples were processed according to English Heritage guidelines (Jones 2002). A Client report of the assessment was produced that included all pertinent material and information relating to the excavation site (Giecco *et al* 2004). From this report, recommendations for further work and analysis on the remains recovered from the excavation were made. This information is available from NPAL or the County Records Office.

The results of the fieldwork form the basis of the archive, in accordance with current English Heritage guidelines (EH 1991). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It also includes summary processing and assessment of all features and finds. The archive will initially be stored at the premises of North Pennines Archaeology Ltd (NPAL), at Nenthead, in a stable and secure environment to enable further study should it be required. On completion of the final report, NPAL will deposit the archive with an appropriate repository following the publication of the information. This is critical, as other researchers may need to have access to the information, as they may be interested in adjoining areas during future interventions or analyses (Orton 2000: 122). This work can then relate to any Desk Based Assessment (DBA) carried out in the future.

1.6 Initial Macrobotanical Sample Assessment Methodology in Brief

The excavation at 42-48 Scotch Street, provided good anoxic conditions in that most of the contexts were very moist, the lower levels bordering on being waterlogged; little or no oxygen was present then to aid degradation of the organic material. Preservation of the organic remains was then expected to be quite good. Analysis of all the recovered material was known to be skewed due to factors such as non-recovery of pertinent material, degradation of originally deposited material, degradation of material during processing, and differences between the preservation of the phases of occupation.

Over 80 samples were taken during the course of the excavation. Most were considered worth sampling because of their organically rich content but that number also included a wicker or heather basket and samples of timbers removed from certain contexts as spot samples (in total 21) that may be used for dating purposes or to identify the types of wood utilised. Of the samples taken, all the whole earth samples (a total of 59) were selected for processing in order to assess their environmental potential to help provide further information as to the depositional processes involved in their formation.

The methodology employed required that the whole earth samples be broken down and split into their various different components. This was achieved by a combination of water washing and flotation. All the whole earth samples were selected for processing. They were manually floated and sieved through a ‘Siraf’ style flotation tank. The samples were completely processed. Recovered finds were removed for quantification and analysis by the relevant personnel, to add data to the contextual information.

The process of flotation, by passing the sample through a flotation tank, serves to separate the matrix of the whole earth sample into the organic fraction and the heavier mineral content of mainly sands, silts, clays and stones. The two resultant sub-samples are the flot and the retent or residue. The flot consists of the material that floats on water as the light or floating fraction. This produces organic and charred remains. Favourable preservation conditions can lead to retrieval of organic remains producing a valuable suite of information, in respect of the depositional environment of the material, thus enabling assessment of anthropogenic activity, seasonality and climate and elements of the economy associated with the features from which the samples are removed.

The heavy, retent fraction, consists of the denser material that usually sinks and includes any waterlogged material. The method relies purely on the variation in density of the recovered material to separate it from the soil matrix, allowing for the recovery of ecofacts and artefacts from the whole earth sample. It was then feasible to assess the recovered matrices for content. The more of the sample that can be processed the better the interpretation of the results from it. All the material was processed, a small sub-sample being retained from most contexts for parasite analysis. Both the retent and the flot residues were examined. The results of these appear in the client report (Giecco *et al* 2004). The results of the seed identification were expressed as diversity of taxa of seeds, where the total numbers of taxa were plotted against the context number.

Components of the retent were of denser material such as bone or other artefacts. The flot or floating fraction generally contains organic material such as plant matter, fine bones, cloth, leather and insect remains. A rapid scan at this stage allowed recommendations to be made as to the potential for further study by entomologists or palaeobotanists to aid the retrieval of vital economic information. Fitting preservation conditions can lead to the retrieval of organic remains that may produce a valuable suite of data in respect of the depositional environment of the material, which may include anthropogenic activity, seasonality and climate change and elements of the economy.

The retents were scanned for pertinent material and this was recorded for future use using a table with a ‘richness’ score. The retents were retained for any further observation. The flots were dried slowly and scanned at x40 magnification for charred and uncharred botanical remains. Identification of these was undertaken by comparison with modern reference material held in the Environmental Laboratory at NPAL. Plant taxonomic nomenclature follows Stace (1997).

Of the 59 samples, 33 produced adequate flots containing organic material of sufficient quantity, quality and diversity for further assessment. A further 5 had limited potential and 22 had no further potential. After initial assessment, the 33 samples that exhibited quantities of botanical, small mammal or invertebrate material to warrant further specialist analysis and interpretation were recorded. In this study, some of these samples dating from the Mediaeval Period will be further analysed. They are discussed in Section 4. The information recovered from the initial assessment led to the selection of the samples used here for this analysis of pertinent material that will aid the reconstruction of the conditions and habitats during various eras of the site.

1.7 PERIODISATION AND PHASING OF THE INITIAL EXCAVATION

Several periods were defined during excavation of the site to the natural geology below the archaeological strata. Periods and phases relating to them appear in Table 1 below.

PHASE OF SITE	HISTORICAL PERIOD	CHRONOLOGICAL PERIOD
PHASE 0	NATURAL	GEOLOGICAL
PHASE 1	PREHISTORIC	UNKNOWN
PHASE 2	EARLY ROMAN	1st-2nd Century
PHASE 3	MIDDLE ROMAN	2nd-3rd Century
PHASE 4	LATE ROMAN	3rd-4th Century
PHASE 5	ROMANO BRITISH	4th-5th Century
PHASE 6	EARLY MEDIAEVAL	Late 4th–11th Century
PHASE 7	MIDDLE MEDIAEVAL	12th–14th Century
PHASE 8	LATE MEDIAEVAL	14th–15th Century
PHASE 9	EARLY POST-MEDIAEVAL	15th-16th Century
PHASE 10	POST MEDIAEVAL	17th–18th Century
PHASE 11	PM/MODERN	19th–20th Century

Table 1: Phases and Periods Defined for the Site

1.7.1 Periods Excavated on the Site following Giecco *et al* (2004)

Chronological periods right through from the prehistoric to the modern twentieth century AD were excavated during the initial analysis of the site. In this pilot study though, the Mediaeval Period was selected for as little work has been carried out on plant material recovered from excavations in Carlisle from this period before. Although all phases encountered were discussed below, the analysis for the study involved mainly Mediaeval Period material, with additionally some from the Roman and Pre-Roman Periods as controls. The data recovered from this study, by targeting evidence for the Mediaeval Period, will aid the definition and focus for areas of the NWRF that still need to be addressed for the Mediaeval Period.

1.7.2 Site Phases 0-10 (for historical periods see Table 1 above)

During excavation, the site was divided into 9 distinct areas (see Figure 8). Areas 1, 2, 3, 4 and 6 were grouped together as they were stratigraphically connected. As areas 5, 7, 8 and 9 were all stratigraphically isolated they were treated individually. The finished formation level was set at 19.45m AOD. All excavated areas were taken down to that level. From bore hole evidence and the traces of natural subsoil observed during the excavation of several Mediaeval Period pits, an approximate depth of 0.60m of stratified archaeology was left in situ, which would have broadly included any Prehistoric and first to second century AD deposits.

Phase 0. The natural subsoil was recorded in two sondages and consisted of a non-weathered boulder clay at a depth of between 18.70m and 18.80m AOD.

Phase 1- Prehistoric Activity. A probable old ground surface was recorded in the deep sondage in Area 9. It comprised a light grey loamy silt measuring 0.20m in depth. No evidence of ard or plough marks, which have been identified during previous excavations in Carlisle, was recorded. The area over which this deposit was observed was limited though and dating to a narrower bandwidth is not possible without further typological or dating evidence. As the strata occurred below the first century level though, it must be before the first century and therefore was defined as Prehistoric.

Phase 2 –First Century AD (Flavian) Period. Evidence of this early Roman Period phase was only recorded in pit sections that had been dug in later periods, cutting through this matrix. It was not possible to gather enough useful information from these strata to draw any meaningful conclusions as to the activity and make up of the strata during this period. The only significant recorded context was the redeposited natural layer (134). This was a probable levelling deposit in Area 9. Datable material of any form from this period was very limited from the finds assemblage. There was not enough of the matrix exposed during the excavation to recover an environmental sample, suggesting limited activity throughout the site in this era.

Phase 3 – Second to Third Century AD Middle Roman Period. There were two areas of activity associated with this period. Phase 3a showed major activity with a clay foundation layer and a building. Phase 3b saw an extensive soil build up.

Phase 3a - Major Second Century AD Activity (Clay Foundation and Building 1). Only the uppermost layers associated with Phase 3a were encountered during the excavation. The majority of features were left unexcavated as they were below the formation level. These features appear to have been demolished in the late 90s AD.

Phase 3b - Mid to late Second Century AD. The whole site area was then subject to an extensive soil build up which produced material dating from the early to late second century, the only area which appears to have continued in use throughout this period was the cobbled area in the eastern quarter of the excavation site. Here the cobbled surfaces were renewed and kept clear of the soil build up recorded elsewhere on site. The accepted impression gained in this period is of general abandonment with limited activity on the eastern edge of the site. It is tempting to view this as less intensive use during the Antonine period in the context of the advance into Scotland, and possible downsizing of the civilian settlement.

Phase 4 – Third to Fourth Century AD Late Roman Period. This phase marks a renewed period of activity on the excavation site and construction of a small rectangular timber building, the levelling of this building and the final levelling of another building sealed beneath a significant soil build up occurred during this phase. The renewed activity here corresponds to a highly significant period in the development of Roman Carlisle with the granting of *civitas* (a town governed by the local tribes) status. This presumably involved a major rebuilding and reorganisation of the civilian settlement as the land officially designated to become a *civitas* was officially divided up. A different town plan would then emerge.

Phase 4a - Early Third to end of Early Fourth Century AD. This period was characterised by the construction of a small rectangular timber building. The highly truncated remains of a probable yard surface were recorded to the north of this building. The building appears to be of low status and was furnished with only one small hearth on its final floor surface. The structure contained no obvious drainage system and was likely to have served as some form of store or shelter rather than a domestic dwelling although this cannot be ruled out. Environmental samples and finds from the vicinity gave no clues to the use of this structure, although the lack of any military finds suggest a likely civilian rather than a military use. The structure was rebuilt at least once and appears to have remained in use well into the fourth century AD. The final soil build up

around this building butted up against the walls of the building, and contained pottery dating from the second to the early fourth centuries AD and one coin of probable early fourth century date.

Phase 4b - Early to Mid Fourth Century AD. During this phase Building 2 was levelled and the area was sealed beneath the timber Building 3, which appeared to have been constructed using a sleeper beam laid directly on the existing ground surface leaving no beam slots to define the footprint of it. This was only defined by the internal clay floor surfaces recorded. The building was of low status seeming more agricultural than domestic, although analysis of the environmental and finds assemblage did little to confirm or discount this hypothesis. The building did not appear to have been in use for any great length of time as it had only one phase of clay floor and very little associated soil build up. The final internal cobbling of Building 2 context (377) appears to have been kept clean and continued to be used as a hard surface. A relatively high percentage of coins (12 in total) was recovered from context (532), a soil build up to the north of Building 3. It is likely to have been associated with this building and partially overlay context (377) but there were no indications as to why they occurred there.

Phase 4c - Fourth Century AD Inactivity. The last stage of this phase saw Building 3 levelled and sealed beneath a major soil build up, context (371), extending over much of Areas 1, 2 and 4, but respected the roadway and did not extend to the eastern third of the site. The cobbled areas in Areas 6, 8 and 9 continued to be maintained.

Phase 5 - Construction of Buildings 4 and 7 in the Mid to Late Fourth Century AD. A new building (Building 4) was constructed over the footprint of the now demolished Building 3. The structure was of approximately the same width (3.5m) as its predecessor but extended slightly further to the north. The construction method used was as Building 3 with no obvious construction trench or post holes and is likely to have used a sleeper beam laid directly on to the levelled ground surface which would explain the highly truncated remains of Building 3. As in the previous structure no internal partitions were recorded but, unlike Building 3, Building 4 had a number of surviving features at its northern end. A series of 11 stake holes formed a sub-rounded feature measuring approximately 0.80m in diameter, possibly the remains of a wattle pen. A rectangular pit of unknown function was situated just to the side of this pen and may have once contained a wooden trough. Externally context (371) built up around this

building with very little other structural activity recorded relating to this phase. Context (371) produced large quantities of butchered animal bone, which points to this area having an agricultural rather than domestic function, possibly representing an area where animals were kept prior to butchering. It is highly likely that the earlier building may have served a similar role.

Phase 6a - Late Fourth to Eleventh Century AD. After Building 4 from Phase 5 was demolished, the dark earth context (371) appeared to overlie it in places. As with all the previous buildings, the structure appears to have been dismantled with no obvious demolition layer left in situ. The new Building 5 was constructed but only the northeast corner was observed; evidence suggests it would have been a timber building set on shallow cobble foundations, arranged on a different alignment to the previous building. It encroached onto the north-south roadway, which must have gone temporarily out of use. Again little can be said of its function as the area was heavily truncated by later Mediaeval features, the total absence of any industrial related activity strongly suggest low-level domestic/agricultural activity during this period.

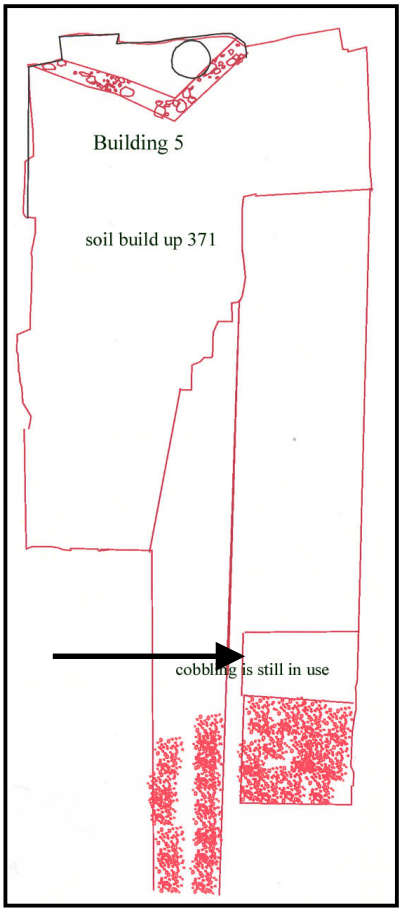


Figure 10: Phase 6a – Plan of features
Scale unknown. (Giecco *et al* 2004).

Phase 6b - Late Fourth to Eleventh Century AD. The remains of Building 5 above were cut by a series of small pits containing large post pads seen in Figure 11 below that were arranged on the same alignment as Building 5 but extended approximately 8m further to the east (Building 6). In using the large post pads to support the structural uprights of the building that would have stood there, this utilised a totally different method of construction to all the previous buildings recorded. Typical of the sub-Roman or Early Mediaeval Period this method was also common in the twelfth to fourteenth century period in Carlisle.

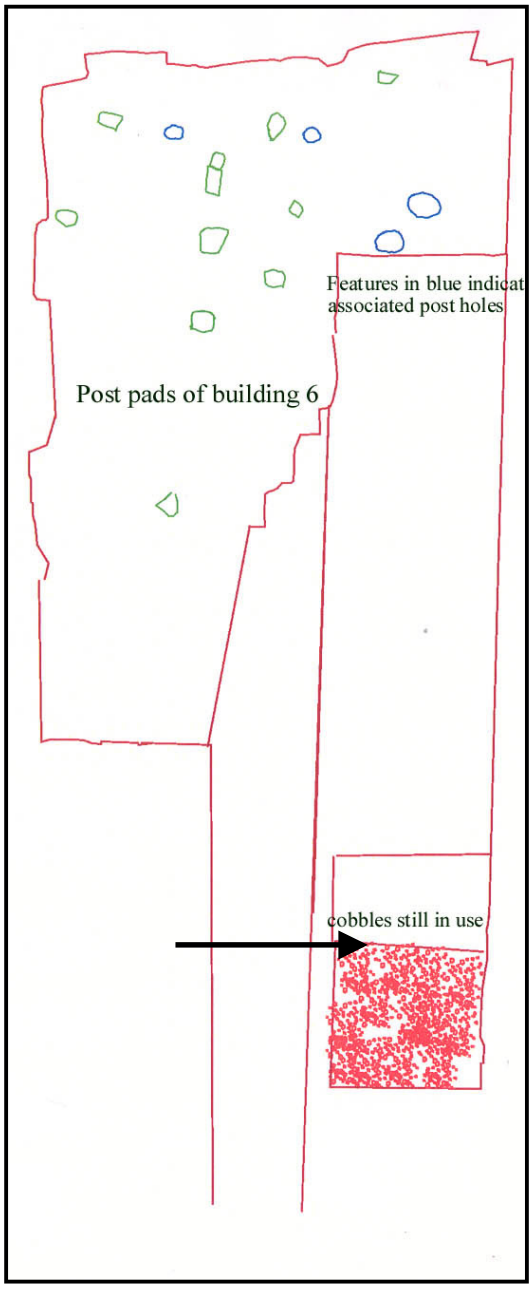


Figure 11: Phase 6b - Plan of features
Scale unknown. (Giecco *et al* 2004).

The fragmentary survival of Building 6 seen above makes any structural discussion difficult, but it is clear from the remains that this structure, measuring over 14m by 10m, makes it the largest building recorded during the excavation. Scattered patches of clay recorded above the dark earth context (371) could be the remains of a floor surface associated with this building.

Phase 6/7 – Eleventh to Twelfth Century AD. Building 6 was demolished, the area cleaned, but no significant deposits that could be interpreted as a demolition layer were observed. The north/south road was reinstated for a short while with its final cobbled surface (370). Sherds of twelfth century red gritty ware were recovered from this final road surface.

The whole of Phase 6 proved extremely hard to date but is one of the most intriguing phases of the excavation, dating from the late fourth century to the twelfth century in the period conveniently referred to as the Dark Ages or Early Mediaeval Period. Pottery from Phases 6a and 6c was exclusively Roman in date, though it may be residual and includes small quantities of late fourth to early fifth century wares.

This area could have produced evidence of the interface between Phases 6 and 7 as the reinstated road and associated cobbling were the only areas from which the red gritty ware was recovered. This then indicated that after Phase 6 secondary deposition during the beginning of the later Phase 7 occurred.

Phase 7 – Twelfth Century AD. The north-south road and cobbled surfaces to the eastern limits of the excavation site were sealed beneath an extensive dark brown soil build up (129) and the final recognised building was constructed in Area 1. This narrow building (Building 8) measured over 10m in length and 4m in width and was divided into at least two rooms by an internal partition. The crude cobble wall foundations were set in shallow trenches and measured between 0.30m and 0.45m in width. They represented the only evidence for this building as no recognisable floor surfaces or occupation layers survived.

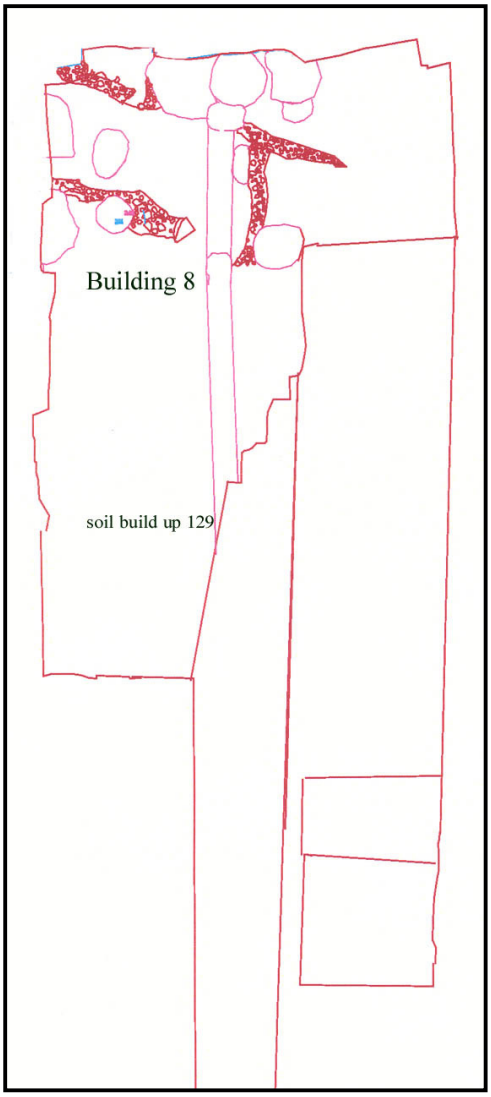


Figure 12: Plan of Building 8
Scale unknown. (Giecco *et al* 2004).

Building 8 above had a short lifespan as it sealed twelfth century deposits but was cut by pits from Phase 7a seen in Figure 13 below, that were firmly dated to the twelfth century. The pits extended throughout the site and contained cess rich domestic waste.

Phase 7a - Late Twelfth to Fourteenth Century AD Soil Build-Up. The sequence of twelfth century pitting in Figure 13 below was sealed by a build up of Mediaeval garden soil (125). The formation of these soils is still the subject of debate with two major theories on their formation. The first suggests the gradual build up in areas of wasteland, and the second theory favours the deliberate importing of soil for agricultural purposes. Contexts (125) and (129) produced the largest animal bone assemblages recovered from the site (11.3% and 7.5% respectively of the total bone assemblage), with context 125 producing 14.3% of the total Mediaeval pottery assemblage.

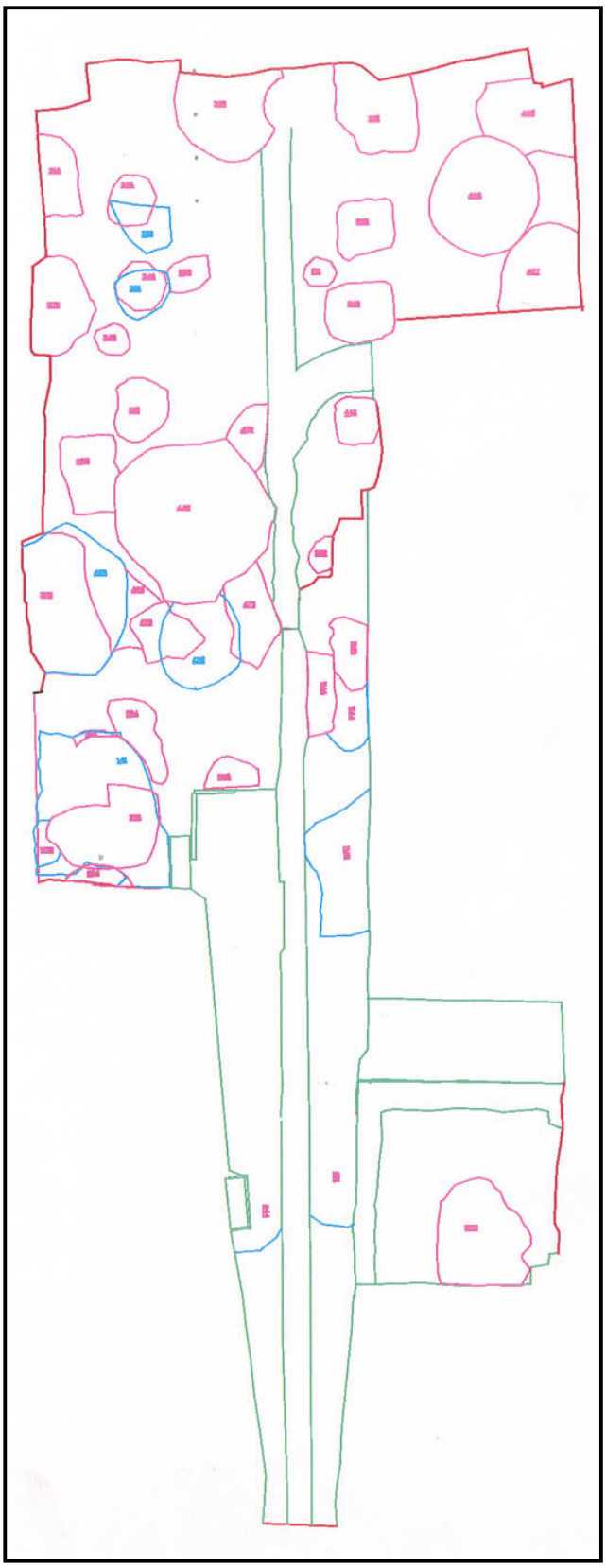


Figure 13: Phase 7a and 7b - Plan of Pitting
Scale unknown. Phase 7a pits appear in blue, Phase 7b pits appear in red, modern features appear in green. (Giecco *et al* 2004).

Phase 7b - Late Twelfth to Fourteenth Century AD Rubbish Pits. Phase 7b was characterised by the heaviest sequence of pitting, with over 30 pits excavated throughout the site, particularly in Areas 2 and 3. The pitting took place between the late twelfth and fourteenth centuries, with a date obtained using dendrochronology of AD1150 obtained from wood recovered from within one of these pits. It is clear from the intensity and distribution of pitting that they relate to a property or properties that fronted Scotch Street.

There was no archaeological evidence of any property boundaries running off Scotch Street during this period, suggesting that the area of excavation was within one property boundary during this period of activity. The contents of these rubbish pits produced a finds assemblage typical of domestic activity including large quantities of pottery, butchered animal bone, stable sweepings and night soil. The absence of any property boundaries indicative of burgage plots could indicate little pressure on land space within this part of Carlisle in the twelfth and thirteenth centuries.

Phase 8 - Fourteenth Century AD Kiln Sequence. During this period a sequence of at least 3 kilns were constructed on the site. The earliest and best preserved (305) seen in Figure 14 below had an overall diameter of approximately 2.5m. The remains of the two later kilns were too fragmentary to allow meaningful discussion other than confirming their likely presence from the remains of their bases that were typologically similar to (305). Kiln (305) was constructed in a pit, with associated evidence of a flue and small fire pit. It was probably a simple open topped single flue, up-draught kiln, which would have been wood fired.

Nothing survived above ground level of the kiln superstructure but it was evident that it was formed out of clay with a stone flagged base. Substantial amounts of charcoal including large chunks of carbonised wood were recovered from the fire pit. This kiln was probably a Ware Chamber Type I with a flue opening directly onto the floor of the kiln chamber (Musty 1974) and was primarily for pottery. Pottery wasters from this and/or later kilns of fourteenth century date were recovered from a large pit (350) excavated adjacent to the firing pit. Fragments of the clay superstructure of a probable second kiln (194) produced an archaeomagnetic date of AD1370-1400 for the final firing. This phase was therefore tightly dated by absolute scientific methods.

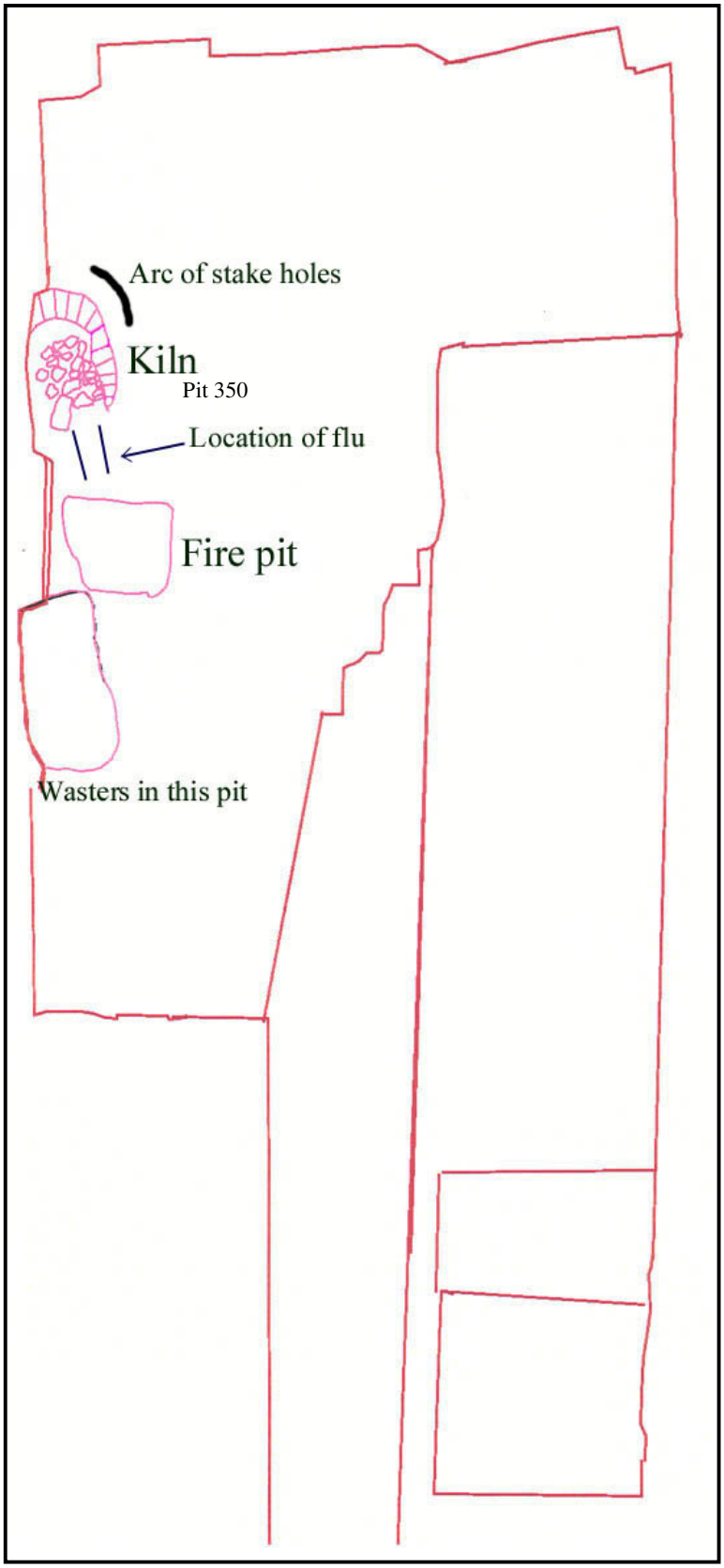


Figure 14: Phase 8 - Plan of Primary Kiln and Associated Features
Scale unknown. (Giecco *et al* 2004).

Phase 9a - 15th century inactivity. A gradual soil build up context (124) covered much of the site in this period with no obvious activity or archaeological remains in the area.

Phase 9b 15th/16th century activity. A boundary wall was constructed in this period, possibly the predecessor to Tower Lane. The surviving remains included a northwest corner and a short length of the western boundary recorded in Area 1. Later buildings that respected the same alignment obliterated the northern line of this boundary. A large well was constructed in Area 4 with an associated clay surface but this feature must have been short lived as the deliberate infilling of the well contained significant amounts of 15th century pottery as well as large amounts of animal bone. A single pit just to the east of the well also dated to this phase of activity and produced a pottery assemblage dating from the 15th and 16th centuries. No other features of the Late Mediaeval Period were recorded over the site. No structural remains survived of any of the buildings that must once have fronted Scotch Street, as they were likely to have been removed by cellaring and associated later construction work in the late eighteenth and nineteenth centuries when large areas of Scotch Street were redeveloped.

Phase 10a 17th/18th century garden soil. The whole area of the site was covered by a build up of humic garden soil (116), which appears to be Post Mediaeval in date. The presence of this garden soil fits well with the earliest cartographic evidence for Scotch Street seen in Figures 3 (p6) and 4 (p7), which show the area as open garden space with no major infilling until the late eighteenth century seen in Figure 5 (p8).

Phase 10b Sandstone well and trough. The only features of note to date from this period were the sandstone well, context (201) and a water trough in Area 1, with a single pit in Area 2, context (102). Constructed of fine dressed sandstone blocks the well still housed a timber tree pump of oak that was left in situ. It is likely to be similar to a tree pump recorded in a well at 62 Scotch Street in the 1920s (Redfearn 1921).

Phase 11. Late 18th and 19th century development. The area was extensively built over on either side of Tower Lane during this period (See Figures 5, 6 and 7, pages 8, 9, and 10 respectively). All the extant buildings belonging to this phase, including the majority of cellar walls, were demolished and removed from the site prior to the excavation commencing.

2 PREPARATION METHODOLOGY FOR THIS ANALYSIS

2.1 INTRODUCTION

The excavation at 42-48 Scotch Street maintained an extensive sampling programme for environmental remains from all phases, as cited in both the Project Design (Giecco 2003) and the English Heritage Guidelines (Jones 2002). This resulted in the recovery of large quantities of botanical remains that were available for assay in the assessment phase (Giecco *et al* 2004). The results obtained from this assessment were then available for further analysis. The aim was to identify tasks related to production, processing, and consumption of crops should they be present (Hastorf & Popper 1988: 121) as well as other relevant botanical material. The archaeobotanical samples recovered from Scotch Street also have the potential to aid the answering of questions relevant to the environment and economy of the site through all its phases, thus increasing the knowledge of the changing relationship between the people-plant interaction both in Carlisle and in relation to other sites (Dockrill & Bond 1998: 22).

This pilot study used both the 'internal' course, examining the botanical remains in connection to their context and position on the site discussed in Chapter 4, and the 'external' course, examining the range of ethnographic evidence available for the periods covered by the study as discussed in Chapter 3, as well as information recovered from other sites. The external evidence formed a part in the discussion of the results, providing information as to the processes leading to the deposition of the botanical remains. By using these two approaches, the pilot study should be able to further determine the strategies required to fill in the blank areas of knowledge for the NWRF, particularly with reference to the Mediaeval Period.

Focusing on the methodological procedures used leading up to and during the study, this section spans several issues. These were tackled as:

- investigation and referral to ethnographic sources
- initial on-site sampling that led to the recovery of the material
- storage of the whole earth and spot samples awaiting treatment
- processing of the samples to allow for analysis
- extraction of organic remains from the processed samples
- material selected for analysis in the study
- sorting and identification of material extracted from the samples

- anthropogenic and taphonomic processes leading to the survival of plant remains
- recording of information analysed from the samples
- analytical methods and interpretations used on the recorded results
- exposition and presentation techniques for the analysis
- post excavation treatment and storage of the material

These separate areas were explored below and were seen as the preparatory stage by which the main analysis of some of the samples initially recovered from the site were used to form this study. This brief methodology outlines the actions taken at each step, from the initial sampling to the post-excavation storage of the material. A discussion about the merits and problems involved with each technique, and an explanation of the reasons behind the employment of each methodology is given.

It is important to choose sampling and analytical methods to complement the research question being assessed in any study, as these will influence the data produced from the results (Hastorf & Popper 1988: 53-54). A detailed sampling strategy was implemented at the beginning of the excavation (Giecco 2003; Giecco *et al* 2004; Greig 1989: 19; Jones 2002; van der Veen & Fieller 1982) to address the research objectives of the site and in accordance with English Heritage Guidelines (Jones 2002). As stated in Chapter 1, Section 1.5, the contexts studied here were from the excavation carried out in 2003 at 42-48 Scotch Street, Carlisle and appear in Giecco *et al* (2004). They were chosen based on their contextual integrity and rich organic content, or their association with significant archaeological features. Only those with determined chronologically tight time bands were used in this study, mainly from the Mediaeval Period.

The chronological evidence relating to the artefacts and features was taken from the assessment report. The preference for other contexts selected for further analysis was based on this as well as the relationship of them to structures, or their close association with those structures as being primary floor surfaces, cess pits or middens. (Giecco *et al* 2004). The methodology involved in the study was complex as it began with the recovery of samples during the excavation from their various contexts. Post-excavation work then continued in the laboratory on return to NPAL (formerly NPHT). This was then followed by the author's own assessment of the matrices through various stages.

North Pennine Archaeology Limited (NPAL formerly North Pennines Heritage Trust, NPHT) were invited by E C Harris to submit a tender for additional archaeological excavation on land at 42-48 Scotch Street, Carlisle following the archaeological evaluation phase of the site. Situated to the rear of the current extant building at 42-48 Scotch Street, in the heart of both the former Roman and Mediaeval Carlisle, the area had seen significant Roman remains discovered in the close vicinity of the development site, including a probable bathhouse and a high status *mansio*.

Following a desk-based study carried out by Lancaster University Archaeology Unit in 2001 (Town 2002), an archaeological brief was prepared by E C Harris, archaeological consultants. This followed the evaluation phase of a test-pitting programme on the development site, when complex archaeological deposits were recorded at a depth of approximately 300mm below the then current ground level. The project brief required an intensive watching brief over the bounded site area be carried out, followed by the total excavation of all archaeological deposits down to a formation level of 19.43m OD.

Removal of modern surfaces across the remainder of the development site revealed extensive cellaring during this watching brief. However, several areas of intact archaeological deposits were observed that required total excavation down to the desired formation levels. At this point, the Project Design was drawn up before further work could commence (Giecco 2003).

Only on-site sampling (Jones 2002) was carried out at 42-48 Scotch Street, as the area of the excavation was limited by the extant boundaries of the site; those linked to it outside this area could not be determined due to modern extant buildings and road systems being present. Previous excavations already discussed may shed some light here though in later discussion. The off site areas that may have been formerly linked with the site, such as woodlands and parklands, could not be detected. All inference to these had been lost, except for tentative references in primary documentary sources. These related to certain owners of properties in Carlisle being landed gentry in the wider realms of Cumberland. These elite would have held sometimes vast estates, probably with areas of both woodland and parkland. This land would have provided useful material and resources for use in their city and estate houses.

The open area excavation of the site revealed the presence of surviving archaeological features and associated deposits. Plant macrofossil assessment was undertaken on matrices recovered from whole earth environmental samples taken during the excavation. The recording of other organic and artefactual material recovered was also carried out. This recording, along with other relevant information revealed during excavation of contexts, hand recovered bone and pottery assemblages aided the interpretation of features and deposits from which the remains were recouped.

The samples discussed or examined during this investigation were assembled during the excavation undertaken in 2003. The archaeological commission took the form of an open area excavation delineated into areas as features became apparent (Barker 1993). Sampling strategies had the objective of assessing and analysing the type of remains for a number of contexts from which samples were retrieved. These strategies followed the guidance of the then North Pennines Heritage Trust (NPHT), now North Pennines Archaeology Limited (NPAL) Method Statement (Giecco 2003). This in turn followed English Heritage guidelines (Jones 2002).

Sampling strategies can be classified as either non-probabilistic or probabilistic. Non-probabilistic sampling is used when the archaeologist is most interested in already visible or suspected sites and does not need to sample elsewhere, used during this excavation as seen on this site, that was defined by the extant boundaries of the property. The presence of archaeological matrices had already been detected during the evaluation phase of the investigation on the site.

2.2 INVESTIGATION AND REFERRAL TO ETHNOGRAPHIC SOURCES

The results of this part of the study were based on both primary documents, most notably maps, but with other primary records used as well. Some of these took the form of the pipe rolls. The pipe rolls contain accounts of the royal income and were written between AD1155 through to the nineteenth century. The earliest surviving public records, they were arranged by county for each financial year. Although problematic, in that they were usually written in Latin, they were an excellent source of information. Other primary sources referred to were copies of the Letters patent, where an instrument issued by a monarch conveys a right or title to a private individual or organisation that includes conveyances of land. Primary sources such as wills and deeds were also examined.

Primary documentary sources pertaining to both the church and various Priory records were also consulted. Some of these were Lanercost Cartulary (Dean and Chapter Library 1287) and various tithe maps. Maps consulted ranged from as early as about 1560, with an anonymous map as a map of the City of Carlisle (Anon *c*1560). Other maps consulted ranged from the eighteenth century until the present time, with some used as reference material in this study.

Many other secondary sources and publications were consulted for the study to determine the state of the site throughout various eras. Some of these were Creighton (1889), Fetherston (1872), Housman (1800), Hutchinson (1794), Lee (1998), McCord & Thompson (1998), Nicolson & Burn (1777), Parson & White (1829), Perriam (1992), Rollinson (1978), Spence (1984), Summerson (1993), Towill (1991) and Wilson (1968). These sources were often collated from earlier primary documents as translations of original texts, including *The Anglo Saxon Chronicle* (Garmonsway 1954).

The reader should note that at the time of collation of material for the well-known *Domesday Book* of AD1086, Carlisle was governed by Scotland and so was not included in this great survey of England (Gosling 1976)! The results of the investigation were presented according to the archive from which they were consulted where applicable. There were several Sites and Monuments Records (SMR) for the study area around the site of the excavation. Listed Buildings may also exist within the study locale, indicative of the architectural and historical importance of the area. A full list of the sites identified by the assessment appears in the Gazetteer in Appendix 6.

2.3 Initial On-Site sampling From the Previous Assessment Phase

Projects at all levels of interpretation, be they at the basic site level, regional or national level of definition, incur the idea of context sampling as a means of analysis, for the end result of the archaeological material recovered from the contextual samples, taken in consultation with the sampling strategy decided before excavation (Orton 2000: 1). As stated in the introduction, bulk samples were chosen based on their contextual integrity and/or rich organic content, or their association with particular archaeological features. The intention being to remove from these archaeological deposits any artefacts, ecofacts or geologically associated material from their source that could provide indicators as to past depositional processes of these features (Orton, 2000: 148).

Bulk or, better termed, whole earth sampling is the removal from a single location of a proximal unit of soil or other similar mass of matter, and usually constitutes larger quantities of material of between 40-60 litres in volume (Lennstrom & Hastorf 1992: 206; Jones 2002; Orton 2000: 155). This method is known as systematic sampling, and relies on the selection of archaeological features or surfaces from which to remove material for further processing. All strata and features were considered over the whole site using this method, it was then possible to reassess strategies as excavation advanced, features were defined and interpreted (Jones 2002: 18-19; Orton 2000: 20).

Sampling strategies can be classified as either non-probabilistic or probabilistic. Non-probabilistic sampling is used when the archaeologist is most interested in already visible or suspected sites and does not need to sample elsewhere to discover them (Orton 2000: 34). This method was utilised on this site, but should be used with caution; its limitations were reviewed further in the discussion section. There was also an element of 'typical' or 'judgemental' sampling (Orton 2000: 21), where material was selected for because it was seen to contain specific objects, or presented types of matrices such as waterlogged material, where rich organic content would be known to be present, thus giving good, productive residue (Orton 2000: 2). The need for sampling is immediately evident; each archaeological context is the equivalent of a specifically occurring event on that site when it was deposited, and potentially contains numerous macro or microscopic ecofacts and/or artefacts within its matrix (Orton 2000: 148).

Samples were processed generally at the same time as the excavation was taking place. This allowed sampling strategies to be refined and modified during the course of the fieldwork. The advice of the archaeological curator for Cumbria was sought at each stage of the work by visiting the site at weekly intervals. Sue Stallibrass, English Heritage North West Regional Science Advisor, was also contacted when significant environmental deposits were detected to give advice and monitor the works.

Initially the Project Design stated that the University of Durham would undertake detailed work on environmental samples and that any environmental evidence found during the work would be sampled according to the North Pennines Heritage Trust standard environmental sampling procedure, in consultation with appropriate specialists at the University of Durham (Giecco 2003). The author however, on becoming a

member of NPAL staff, undertook the remaining work on the samples that had already been removed. These were then processed soon after the excavation was completed (Giecco *et al* 2004). The fieldwork programme was then followed by an assessment of the data, the process to be adopted being set out by English Heritage in *The Management of Archaeological Projects* (English Heritage 1991).

The sampling strategy selected must reflect the aims and objectives to be answered from the Project Design. The initial excavation sought, as stated in 1.2.1, to establish the condition, extent, and depth of the archaeology present on the site and to recover artefactual and ecofactual material as it was detected to be interpreted or used for dating purposes in post-excavation. The academic aims also listed in 1.2.1 then sought to produce complete records of this information and establish the range of eras that were encountered during the excavation. Ultimately it was recommended that the curation of finds, ecofacts and the site archive be vested in Tullie House Museum, Carlisle, where they will be available for future research.

The Project Design (Giecco 2003) stated only that the aims in relation to the environmental material were 'to recover paleoenvironmental material where it survives'. The sampling strategy used was then recorded in retrospect here from the assessment report (Giecco *et al* 2004) and the author's personal account. The English Heritage environmental archaeology guidelines (Jones 2002) were adhered to, unless a modified methodology was required to meet the peculiarities of the site; this first having been agreed by all relevant personnel.

Multiple features and finds were located during the excavation. Samples were recovered from distinct features that included pit fills, deposits, postholes, layers and kilns or hearths. Samples of whole earth were recovered from the site to analyse animal bone, charred waterlogged and mineralised plant remains, organic soil components, environmental indicators (such as snails) and other small finds from securely dated and stratigraphically significant contexts. (Giecco 2003; Giecco *et al* 2004).

The samples recovered may have been of a significant volume (whole earth samples) or smaller quantities (spot samples) depending on the reason for sampling. Whole earth (large volume) and spot (small volume) samples were recovered as laid out in the NPHT

Project Design, all procedures being followed to reduce the risk of contamination from other contexts (Giecco 2003). It is not normally feasible to sample whole contexts for reasons of risk of contamination by and of the surrounding ones, along with time and cost restraints; the archaeobotanist is then always relying on deriving information from initial sub-samples (van der Veen 1984: 193).

From the area excavated a total of 86 samples were removed a selection of which were analysed here and discussed below. Each sample was given a relevant Environmental Sample number thus < > with all the details pertaining to it filled in on a sample index and then on an individual sample sheet. These and the archive were retained at NPAL to be used as part of the analysis of the material. Bone was mainly recovered by hand during the excavation but a quantity of mainly smaller fragments was recovered from the bulk samples. (Giecco *et al* 2004).

Whole earth samples as described below were collected from suitable soil matrices during excavation from features or deposits following English Heritage sampling guidelines (Jones 2002). This was achieved by selecting material as the features and deposits were located during the excavation throughout the stratigraphic build up of the site. The samples were collected from secure contexts to maximise their integrity. Green (1982: 41) suggests that sampling strategies have undergone significant debate in recent years. Stemming from this debate a number of possible criticisms could be voiced against the strategy used during this excavation, and could be seen in the discussion associated with this study in 4.3.

Staff of NPHT (now NPAL) removed the samples as the excavation progressed following NPAL and EH guidelines. Whole earth bulk soil samples, normally of 40 litres, or 100% of excavated material from smaller features, were removed from suitable matrices as required. From these, prior to any processing, approximately 500 ml of each sample was removed for parasite and pollen extraction, should this be required at a later date. In the following evaluation sample numbers appear in brackets thus < >, whilst context numbers appear in brackets thus ( ) for all analysis and discussion in this study. Isolated organic matter as spot samples, were removed separately to limit the damage that may have occurred to them had they been treated as a bulk sample. These included samples of fibres, textiles and wood. There was also an intact pottery vessel removed

whole so that the contents of it could be carefully excavated in the laboratory. This was done in narrow bands or spits that were further processed by the same method as the bulk samples narrated below, but using a smaller scaled apparatus so as not to loose any of the reduced volume of material recovered. (Giecco *et al* 2004).

It is important to take care with regard to the collection and storage of soil samples, to avoid contamination when they are being taken. Obvious artefacts or larger bones were not extracted during sampling as they form part of the 'whole earth' matrix, and provide valuable integral dating and/or typological evidence relating to the context from which they came. All samples were clearly labelled, with the site code CAR-A prefaced by NPHT03, the context number added and encircled, the sample number was put into brackets such as <24>. A waterproof label detailed the same was placed in the container with the sample to reinforce the external labelling. The study could then take into account such factors as species and ecological communities, as well as an interpretation of the contexts or phases from which the samples were removed.

During processing material thought suitable for radiocarbon dating was handled as little as possible and was not washed. Samples of bone, antler, seeds, charcoal, wood, textile and plant remains were considered for radiocarbon dating. Such samples were wrapped in aluminium foil as soon after recovery as possible, then labelled and placed in a box. Radiocarbon dating was not thought necessary, however, as the material recovered from this site, both typology and stratigraphically, was thought sufficiently well defined to date various contexts. An oven or kiln was dated accurately to the late fourteenth-early fifteenth century archaeomagnetically. Wood samples were sent for dendrochronology dating, the results of which appear as Appendix 4. (Giecco *et al* 2004).

Coarse sieving of samples was not used on the site, as this process was thought unnecessary, due to the lack of large spreads of matrices from which organic remains might have been recovered in abundant quantities by coarse sieving. The small 500ml sub-samples that were separated from the whole earth samples will serve the purpose of further invertebrate and parasite analysis by specialists. As no completely waterlogged contexts were recorded as being present on the site, from the context sheets in the archive, it must be assumed that this method of sample recovery was not deemed necessary at the time they were recovered.

The size of the whole earth samples taken was also an important factor in the sampling strategy to ensure that a statistically significant sample population was available for analysis. The samples from Scotch Street had no common volume, personal interpretation by the field worker removing them becoming the main factor of recovery. Hall and Kenward (1990: 295) consider general biological analysis (GBA) samples of 5-10 kg for waterlogged material. Here the volume of samples taken ranged from 10 to 40litres, with spot samples varying in size, depending on the type of material removed. Wood was taken as a whole artefact.

2.4 Storage of the samples awaiting Treatment After Excavation

As the excavation progressed, the whole earth and spot samples recovered were taken to the headquarters of North Pennines Archaeology Limited (formerly NPHT now NPAL) for processing. This occurred almost immediately and therefore samples were not at risk of deterioration by bacterial, fungal or algal growth.

2.5 Post Excavation Treatment to Facilitate Further Sample Analysis

The whole earth samples were processed at NPAL. The spot samples that were removed as specialist material were examined on return to NPAL. The environmental sample sheet completed detailing the sample's composition at the time of excavation was added to as information was revealed. The whole earth samples were passed through a flotation tank, yielding a wide range of ecofacts and small artefacts during the process. Flotation serves to separate the material that remains suspended in water and is caught in the mesh below the overflow, namely the light fraction or flot of mainly organic and charred remains, from the denser material or residue/retent that usually sinks and is retained in a mesh within the tank for further examination. The method relies purely on the variation in density of material recovered to separate it from the soil matrix, allowing for recovery of all fractions of archaeobotanical remains (Pearsall 2000: 19).

For the assessment, the samples were sieved using a 'Siraf' style flotation tank as seen in Figure 15 below. The flot was retained on a 250-300µm sieve, and the residue collected in a 0.5mm mesh as per English Heritage guidelines (Jones 2002; Murphy & Wiltshire 1994: 5). The flots were examined for seeds and other plant macrofossils; bone fragments, including burnt bone and fish bone; textiles; wood, both charred and uncharred; coal; and insect remains. This process used a binocular Leica microscope with down lighting, at up to x50 magnification. Clean residues were examined for

nutshells; fruit stones; bones of all types; pottery sherds; amorphous organics; slag or other metalliferous objects; and scanned with a magnet for magnetic fragments.

Material was then quantified and catalogued to provide specialists with sufficient data to make informed decisions about further analysis. The author then assessed the quality, quantity and further potential of preserved remains recovered from the site. For the present purposes, deposits can be divided into dry and wet contexts. Soil samples were taken from contexts in or associated with features. The material recovered included seeds, insects, parasites, bones, pollen grains, wood and other plant remains. Depending on the dataset of specimens recovered, and their associations, potential for shedding light on questions including diet, health, living conditions, building materials used, and local vegetation cover can be significant (Hubbard & Clapham 1992; Pearsall 2000: 12, 19). Detailed work on soil samples was contracted out to external soil specialists.

It was imperative to ensure samples were air-dried before storage, to prevent mould growth, and that they were packed to avoid abrasion and crushing to avoid damaging the remains (Gale & Cutler 2000: 2). This allowed future assessments to be able to use the material extracted. Recovered remains were examined and assessed at NPAL after drying under laboratory conditions. Spot samples that required removal of associated soil matrices, were processed through a small-scale floatation system in the laboratory, limiting loss of recovery due to the small sample size; assessment then followed. Further discussion only concentrates on the light fraction, as this is the portion assessed in this study with some reference to material recovered as spot samples.

Flotation was the method used here and is often the preferred method of extraction for macroplant remains. Badham & Jones (1985: 24) suggest wet sieving is preferential for smaller samples providing ‘the most comprehensive recovery’ with high time efficiency without compromising the random nature of sampling compared to both wash-over and peroxide flotation. Nevertheless, wet sieving can have a detrimental impact on fragile remains (Badham and Jones 1985: 24). Wagner (1989: 23) mentions that charred material is liable to fragment when it comes into contact with water and due to the abrasive effects of sieving. Obviously, the issue of water contact remains where a flotation method is used. In addition, both chemical and non-chemical forms of flotation

are thought to provide much poorer recovery of mineralised material (Badham & Jones 1985:21) than wet sieving.

A sub-sampling strategy was implemented in relation to the whole earth samples, as analysis of types of macrofossil other than macroplant remains had to be taken into consideration. Between 500mls and 1 litre was removed from each of the initial samples for insect and parasite analysis by specialists. The remainder of the whole earth or bulk samples were selected for processing in order to assess their environmental and artefactual potential. This helped provide further information regarding the depositional processes involved in their formation. The methodology employed required that the whole earth samples be broken down and split into their various different components as light fraction or flot and heavy fraction or residue/retent. The floating material or flot was recovered on a mesh size of 250-300 microns. The retent was held in the floatation tank in a 0.5mm mesh. A schematic drawing of a floatation tank appears below in Figure 15. (See Table 2 below for the context and sample information relating to samples from this study).

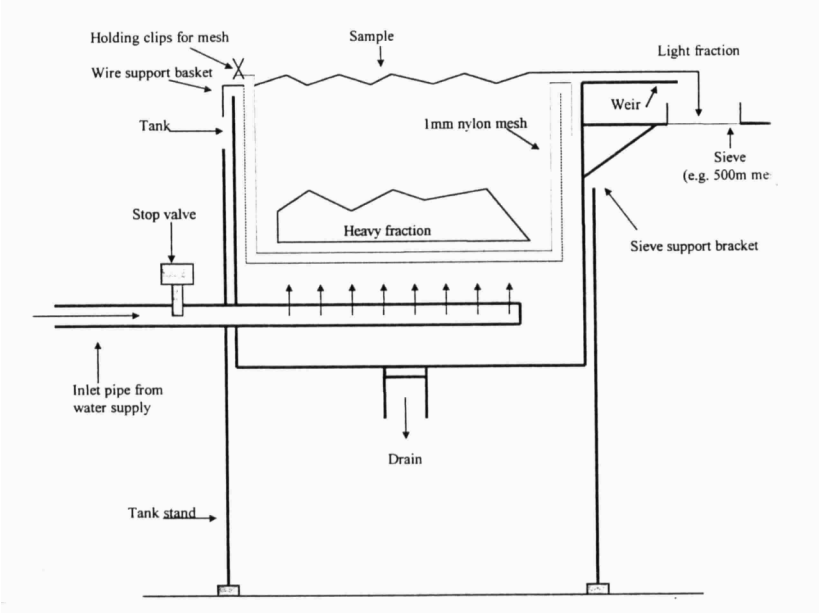


Figure 15: Schematic drawing of 'Siraf' Style Floatation Tank.

2.6 Extraction of Organic Remains from the Processed Samples

Wet-sieving could have utilised sub-sampling techniques before the processing stage began, thus limiting greatly the amount of material that needed to be assessed, as more plant material would be expected to be recovered from waterlogged material. The matrices the author processed did not though exhibit truly waterlogged conditions. A limited number of samples were recorded as being waterlogged but these matrices presented as very moist at the time of processing. Many of them had though been stored in large polythene bags rather than tubs, also suggesting that they were not waterlogged.

The material recovered for use in this study that remained after processing through the flotation tank took two forms. The light floating 'flot' was retained in the 250-300 micron sieve after washing over in the floatation tank. The heavy retent material smaller than the mesh size, was effectively discarded as it was washed through to the bottom of the tank, removed and disposed of as being redundant. The second form, the residue or retent retained in the mesh from each sample was thoroughly dried, described and recorded then scanned using a magnet to recover ferrous fragments. The retent, like the residue from wet sieving, contained larger items of bone, heavy (eg waterlogged or petrified) ecofacts or artefacts as well as stones and gravel. (Giecco *et al* 2004).

Processing of the samples revealed though that some plant remains were possibly recovered in an interim state between waterlogging and moist. Evidence for this was the whole structural remains of certain fragile plant types under the microscope. Mosses and other plant matter recovered could probably, with appropriate reference material, be recorded down to genus level, if not species in some cases. This applies especially with regard to those that may prove to be cesspits - and should possibly have been treated differently during recovery as waterlogged matrices.

The organic remains recovered during the excavation were preserved to varying degrees from very well to very poorly. It is unlikely that the matrices had undergone excessive post deposition disruption or the definition of the features would have been obliterated or at the least heavily truncated. It is more likely that the upper strata and subsequent development of the site had led to the isolation of the features and the organic material within them in a more stable anoxic environment.

The flots were also thoroughly dried slowly and then scanned at x40 magnification for charred and uncharred botanical remains. The flot or floating fraction generally contains organic material such as plant matter (charred and uncharred), fine bones, cloth, leather and insect remains. A rapid scan was done to allow recommendations to be made as to the potential for further study of the material by entomologists or palaeobotanists, with a view to retrieving vital economic information from the samples (Giecco *et al* 2004). Macroplant analysis and identification of remains from the selected samples used in this study was undertaken by comparison with modern reference material held in the Environmental Laboratory at North Pennines Archaeology and at University of Durham Environmental Laboratory. Reference manuals also used were Anderberg (1994), Beijerinck (1947), Berggren (1969 & 1981), Fitter *et al* (1984), Hubbard (1992), Jones *et al* (2004), and Ross-Craig (1956). Plant taxonomic nomenclature follows Stace (1997). This analysis was then used as the basis for this study.

The extraction phase of the processing work was undertaken by the author and therefore methodologically was in part inspired by her previous archaeobotanical assessments (Giecco *et al* 2004; Shaw 2002). Despite the issues associated with the sampling and processing techniques, it could be argued that a continuity of extraction would, as in the case of the sampling strategy, be key to producing an effective comparison between the samples deriving from the excavation and this data. The volume of material floated from samples used in this study produced in some cases a vast quantities to be analysed. A strategy of sub-sampling for speed of assessment then had to be implemented. This was carried out by splitting the sample by weight and extracting the charred, mineralised or other identifiable material only from a relevant portion as follows.

- All samples to be used were first weighed
- Where an amount of more than 100 grammes was present the sample was taken as a whole and placed on a large sheet of paper.
- The sample was then divided as equally as possible down the middle using a ruler, taking care to minimise damage to the plant remains.
- Knowing the initial weight, the sample was then repeatedly divided equally until a suitable volume was reached, putting the surplus aside each time.
- This amount was then weighed.

The initial assessment was then done on only this portion. This was seen to be a manageable amount considering the time available to produce the assessment report.

2.7 MATERIAL SELECTED FOR ANALYSIS IN THE STUDY

From the assessment of 86 of the samples collected during the excavation, 12 were subsequently chosen for full analysis on the grounds that they covered the complete timespan of the Mediaeval Period and also two from the other phases. All of the remaining material from these contexts was therefore processed to the same methodology as for the assessment. Particular attention to plant remains other than seeds were made in this study. An attempt to make cursory identifications of these other types of plant remains was made to further interpret the contexts from which they came.

Material forming part of the archive of organic remains recovered from the site at 42-48 Scotch Street, Carlisle in 2003, the samples chosen for analysis and discussed below were again selected for to form the basis of this study. Other strata recovered served the purpose of control samples, as the pre Roman and Roman period samples examined. The remaining samples were all selected for their periodic phasing to the Mediaeval eras and span the whole gamut of the Middle and Late Mediaeval Periods encountered during the excavation. Sample <47> (474) was also selected as it was found to contain intestinal parasite eggs (Carrott 2004). Accurate dating of Sample <14> (194) by archaeomagnetic methods strengthened the reasons for selection of this matrix.

All relevant samples were removed from the Scotch Street archive and kept in Unit 6, NPAL, for the duration of the study. They were selected for their association with features from the Mediaeval Period and their rich organic content. This will provide, taken in context with the rest of the archive information associated with them, a representation of the activities and uses of the material recovered during the taphonomic processes by which they were laid down. Some of the organic material will not be present though as conditions both during and post excavation would have led to the degradation and elimination of various organic remains. (Wilson 2000: 103).

Preliminary assessment of the contexts from the excavation at Scotch Street followed Toll's (1988: 37-39) two-tier scanning method as the most appropriate to the study. Weed seeds and cereal grains were recorded for further assessment and quantification, also making notes and records of other plant remains recovered.

Samples suitable for further analysis that could answer a particular question relating to the site or feature from which they came were selected. Deemed of greatest importance to interpreting the archaeobotanical assemblage relating to both local environment and economic systems utilised, such as crop growing and import or cultivation of exotics, the study focuses on all elements of the floral aggregate. The samples for further assessment were selected for because of their high concentration of organic remains. Those from pits, possibly middens, containing rich, well preserved organic remains and those bearing high cereal grain proportions were selected for further study and termed the sub-sample below. These consisted of ten samples with two controls.

2.8 Sorting, Identification and Recording of Extracted Material

Of the 12 contexts selected for further study as the sub-sample of the original number of samples removed from the site, as much seed and grain material was removed from each as possible. Recording of the remains was done using two different quantifications. These occurred as a minimum count for charred grain and other rare individuals and an abundance scale for the bulk of the more numerate material. A 'minimum' count was preformed on the charred grain as well as any other unique or very rare material to ensure precise counting with no repetition. The vast majority of the material was quantified using the abundance scale discussed previously and is based on that employed by Hall and Kenward (1990: 297). Recording of material recovered during the initial assessment took the form of a table, the method repeated here in an attempt to incorporate as much of the absolute data as possible for further interpretation.

Weed seeds and cereal grains were identified as near to species level as possible, then quantified; other identifiable plant remains were also recorded. This was achieved by comparison with reference material and manuals. Identification manuals used were Andeberg (1994), Beijerinck (1947), Berggren (1969; 1981), Fitter *et al* (1984), Gale & Cutler (2000), Jones *et al* (2004), Martin and Blarkley (1972), Ross-Craig (1956) and Schoch *et al* (1988). Consultation for general environmental references to habitat and conditions were from Asch and Asch Siddell (1988), Ferguson-Lees and Campbell (1979), Hyde & Wade (1978), and for geographical distribution Holm *et al* (1977). Nomenclature follows Stace (1997). Reference material from the collection of the University of Durham and the author's own material was also consulted.

Each of the assemblages of botanical remains from the various contexts were then stored and labelled in glass phials and returned to their archived locale, together with the remainder of the sample from which they were extracted. Organic material from this study was stored in its entirety as flots and retents at the headquarters of North Pennines Archaeology Limited, Nenthead, Alston, Cumbria. A decision may be made in the future to limit the remains of the retents recovered, as storage of these large volumes is difficult in the long term and the main matrix of these is stone. Such a decision will only be made after re-examination of the material to check for further useable remains. The flots will be kept in suitably dry conditions in the presence of silica gel to reduce moisture content to limit degradation of the material. This will be changed regularly as advised by Jenny Jones, conservator at the University of Durham.

2.9 Archiving of the Material and Contextual Records or Reports

A copy of this study will be kept at North Pennines Archaeology Limited, Penrith and Carlisle Libraries, Kendal and Carlisle Records Offices and University of Durham Library for future reference. Full reporting on this site will also be held at the above locations and additionally with English Heritage. All primary records associated with the site have been checked, ordered and appropriately stored, and stratigraphic matrices have been produced. These are held at North Pennines Archaeology Ltd headquarters at Nenthead, Alston. All information should be made available through NPAL.

Deposition of the archive on completion of the analysis and publication will eventually be with Tullie House Museum, Carlisle. The Publication report of which this study will form a part will be submitted for publication in the Cumberland and Westmorland Antiquarian Journal in two separate sections. The breakdown will separate the Roman and sub-Roman results from the Mediaeval results. The detailed environmental results will be submitted to Environmental Archaeology, the journal of the Association for Environmental Archaeology. The detailed Mediaeval pottery results will be submitted to Mediaeval Ceramics, the journal of the Mediaeval pottery research group. A decision will be made as to where the environmental archive will be kept on completion of all relevant post excavation work. It may be best if it remains at NPAL as it requires specialist treatment during storage and there it can be better monitored.

3 THE SITE THROUGHOUT PERIODS OF HISTORY

3.1 MACRO-SCALE ASSESSMENT: THE HISTORICAL CONTEXT OF CARLISLE

Much past activity has been demonstrated by the excavation and analysis of archaeological sites throughout Carlisle and the surrounding areas. Information recovered from these excavations has added much to our knowledge of historical periods for the area. The pilot study carried out here seeks to further knowledge gleaned from the Mediaeval Period to enhance the lacking information for that era. Information gained from interventions prior to this excavation sometimes purposely sought strata from certain eras, ignoring elements from the Mediaeval Period in an attempt to target the rich deposits from such matrices as the Roman strata exposed. Information below details activity known for the area during the historical periods discussed in the immediate vicinity that may enhance the image of Carlisle at the time of deposition of strata on the site or lead to a better understanding of the growth of the city.

3.1.1 Introduction

There have been a number of archaeological investigations within the area defined as the City of Carlisle Hazard Area (SMR No. 3560) as discussed in more depth in 1.4 above. These include major excavations at The Lanes (Carlisle Archaeological Unit 1979-83), an evaluation at 40-78 Botchergate (Carlisle Archaeology Ltd 1998-99; LUAU May-July 2001) and 53-63 Botchergate (Miller 2002), an assessment of 7-9 Fisher Street (CFA 2002) and a watching brief at Cumbria College of Art and Design (Oxford Archaeology North/ The Archaeological Practice July 2001). Various excavations at Rickergate for the Lanes extension (Carlisle Archaeology Unit 1997, 1998 & 1999) were also done. A Building Recording survey by E C Harris (Jan 2003) and a watching brief/assessment by NPHT (now NPAL) in 2003 prior to the main excavation at the site of 42-48 Scotch Street (Giecco *et al* 2004).

3.1.2 The Prehistoric Period in Brief

Prehistoric Period (up to 43 AD). Little is known about settlement in Carlisle prior to the arrival of the Romans in AD 72-3 although there is extensive evidence for prehistoric activity within and around the city. This was seen in the form of ardmarks, from prehistoric ploughing, at Blackfriars Street (McCarthy 1990: 13-14) and Lowther Streets respectively, to the south and north of the site. Neolithic and Bronze age pottery found at Scotby Road and flints from various areas were also noted. (Giecco *et al* 2004).

There have also been a number of stray finds of Prehistoric significance recovered within the vicinity of Carlisle. These primarily date from the Bronze Age and include spearheads, arrowheads and food vessels. Bronze Age axes were found at Kings Meadow, Stanwix with two Bronze Age cemeteries and cist burials also discovered in the area. It is therefore possible that there will be further finds from the Prehistoric Period in the area of assessment (Gosling 1976: 171). Evidence of Prehistoric agricultural activity in the form of ard marks has also been recorded on Castle Way and Botchergate (Giecco pers com). It has been suggested that the promontory on which Carlisle Castle now stands has been a defended site since the Iron Age and was possibly a pre-Roman dun (Giecco *et al* 2004). Before the Roman Period, the Celtic Brigantes Tribe occupied the region (Towill 1991: 3). Tacitus (Shotter 1989) gives an account of the Roman assault of the region.

3.1.3 The Roman Period in Brief.

The Early Roman Period. In the Roman Period the settlement at Carlisle was known as Luguvalium – the town of Luguvalos. References to Luguvalium can be found in the *Antonine Itinerary* and the *Ravenna Cosmography*, indicating the importance of the town as a centre for communication (Gosling 1976: 171). Roman occupation of Carlisle was first indicated by the presence of a turf and timber fort (Hogg 1964; Towill 1991: 3). This fort, dating to the early seventies AD, was possibly centred on the present Castle Green. Two phases of the fort are known to have existed from excavation. Excavations between Mary and Tait Streets revealed foundations of a small timber building that aligned at 45 degrees to Botchergate. Other stages of Roman activity were found including cremation burials, military ditches, timber buildings and a cobbled road (Giecco 2000). A ditch excavated in Annetwell Street could form the northern boundary of the fort's first phase and predates the later, much richer, Roman town of *Luguvalium*. It was post-dated by another fort across the Eden in the Stanwix area. Evidence of a Roman bridge over the Eden, North of the city exists. (Giecco 2004; Towill 1991).

The Middle Roman Period. During this time the Romans established a fort at the northern end of the present city centre that quickly expanded to become a substantial civilian settlement of over 40 acres. The withdrawal by the Romans from Scotland in about AD80, and the building of Hadrian's Wall from AD122, probably had a substantial impact on the settlement. By about AD200 Carlisle seems to have been granted special status, and continued to flourish, with a large number of houses, shops,

administrative and other public buildings, until the end of the Roman occupation around AD 400. (Ferguson 1893: 365-374).

The Late Roman Period. The Roman roads, which have been located through archaeological investigation in the area, may not form the total extent of the traffic system used as seen by the discovery of the street found at Tullie House, which failed to fit into any Roman grid system yet devised. This suggests the Roman civil town had a different alignment to the earlier fort. Evidence for the existence of a post second century AD ditch may relate to urban defences of the Roman civil town. Uncovering of Roman cemeteries outside the civil town boundaries indicates that Roman Carlisle was similar in size to its Mediaeval counterpart (Ferguson 1893: 365-374).

3.1.4 The Mediaeval Period

The Early Mediaeval Period (approximately 400-1066). Reference to Carlisle in the Anglo Saxon Chronicle that was compiled on the orders of King Alfred the Great in approximately AD890 (Garmonsway 1954: 108) states that '*Carleil or Lugubalia was the same city, which, like others in those parts, was destroyed by the Pagan Danes 200 years before and remained deserted until that time'*. Thus the settlement and growth of the city was complicated by the Norse-Irish colonisation and the resurgence of the British Kingdom of Strathclyde (Rollinson 1978: 37). The early tenth century AD witnessed the River Eamont, 15 miles south of Carlisle towards Penrith, as the southern most border of Strathclyde. Ferguson (1890: 6) also makes comment to an '*ancient British track*' that ran under the west of the castle-hill after entering Cumberland at the south. He further says that by a line represented by Collier Lane and Backhouse Walk, and lanes in Willow Holm it '*sneaks under the west side of the hill on which Carlisle and its castle now stand*'. This track may be from the Early Mediaeval Period.

In the seventh century, Carlisle housed an important monastic community. Bede has described the visit of St. Cuthbert to Carlisle in AD685, where St. Cuthbert walked along the Town Walls and saw a Roman fountain that continued to work two and a half centuries after the end of Roman rule. This was thought to imply that Carlisle was inhabited, and continued to be so, after the formal end of Roman rule. At this time, it is known that Carlisle belonged to the *parochia* of the Northumbrian bishops. The town was important in Cuthbert's influence and defined as an area of 25 kilometres. The town itself was granted to Cuthbert in his consecration as Bishop of Hexham in AD684

(Gosling 1976), after which time, Carlisle is not mentioned in the documentary record again until AD875. During this period, the Vikings were constantly raiding England and it is thought that in the year AD875 a Danish army may have laid waste to the city. As can be attested to by place names, sculpture, graves, and metal work, Scandinavian settlement was dense in the area, although extant evidence is minimal. Here the history of Carlisle becomes unclear and remains so for the next two centuries (Gosling 1976).

The Mediaeval Period (1066-1485). In AD1066 the Norman invasion throughout the rest of England had little effect on the counties of Cumberland and Westmorland. Following the raids from the Scandinavians in the Early Mediaeval Period the area became debateable land, this time haggled and wrangled over by the Scots and English until little remained to be argued over. It is not known what state Carlisle was in prior to the annexation by William Rufus in AD1092 when it reverted to English control (Rollinson 1978) and came under Norman rule (Earle & Plummer 1892). Before this date, Carlisle was considered part of Scotland, and as such does not appear in the *Domesday Book* (Gosling 1976). There may have been little of a settlement, let alone the remnants of the lavish city the Romans had left. The outpost probably only existed on the high ground where the Cathedral and St Cuthbert's Church now stand.

In AD1092 the Normans brought about major change with the building of a new town on the site of the old Roman one (Rollinson 1978). During the reign of David, King of Scotland, in the twelfth and thirteenth centuries, Carlisle prospered. In AD1130 a wall was built to surround the town. It was heightened and the castle strengthened when in AD1135 the actual counties reverted mainly to Scots rule. The castle became an island in the Scottish sea holding out until the counties reverted to English rule again in AD1159. The invasions by the Scots King William the Lion, grandson of David I, in AD1173-74 destroyed much of the area around Carlisle, but the city was not surrendered as the improvements to the castle and town walls by the Scots ironically proved worthy. (Jones 1976; Rollinson 1978).

Further to this, a period of, if not calm, at least an element of stabilising influence, saw a political frame of Marchlands established by using the Norman castles of Brough, Appleby and Brougham, along with other fortifications (Rollinson 1978). During the thirteenth century Carlisle saw an extended period of peace after the Scottish siege of

AD1216, and the city benefited from increased trade with Scotland. The ever-present threat of war continued to have a negative effect on trade in the city though. The raiding Scots abandoned developing suburbs beyond the city walls during times of war, due to either defence strategies or destruction of the suburbs. The then wood-built city of the period suffered from a series of damaging fires and outbreaks of plague. The city survived on localised trade, much of it associated with the agriculture of the area such as wool and leatherworking. There is little evidence of economic support by other methods, although the City's population was retained, and so must have been supported efficiently. (McCord & Thompson 1998: 126-7).

The southern limits to the beginnings of the Mediaeval town are difficult to define, although a deed from about AD1250 suggests that the limits ran from the Grey Friars' (Franciscans) lands to the highway. A possible extension of the limits of the town in that area is alluded to with reference to the carrying of the Friars' conduit through the city walls (Jones 1976: 86-7). From the Norman Invasion of England in AD1066, throughout the Middle Ages to the eighteenth century, settlement in Carlisle was mostly confined to the land within the city walls. There were, however, three suburbs outside of the city gates, with Botchergate being one of these suburbs. It was written in the documentary record that in the twelfth century, a suburb was already developing beyond the Botchard Gate (Botchergate). It is thought that this area had not grown any larger by the thirteenth century. It has been deduced, based on the development of other Mediaeval towns, that the Botchergate suburb most probably took the form of a ribbon development, with buildings both domestic and industrial fronting onto a main road; behind these areas were probably strips of fields (Giecco 2000). In 2000, excavations between Mary Street and Tait Street found no traces of any Mediaeval buildings. However, the presence of pits and a well that dated from the twelfth to the fifteenth centuries were found that attested to the presence of a Mediaeval Period suburb.

It is thought that the absence of survival of Mediaeval remains there is due to building activities carried out in the nineteenth century (Giecco 2000). It is known that the name of Botchergate derives from *Botchardgate*. Botchard was the knight who held the Mediaeval lordship and owned this land. This, combined with the Anglo-Scandinavian word *gate*, meaning road or way, gives us Botchergate. (Parson & White 1829). This then saw the beginnings of a larger footprint to the City of Carlisle.

Towards the end of the fifteenth century the population was growing and the defences were again repaired and strengthened. The founding of Carlisle Cathedral in AD1122, with the incumbent bishopric and associated clergy and friars, also aided the economic strength of the city (McCord & Thompson 1998: 127). A drawn map by Haschenberg from about AD1542 (McCarthy 1990: 13) shows a tower just to the south of the Irish Gate, but limited excavation in 1997 failed to identify any remains of this tower. There is a possibility though that, although it may have been intended, it was never actually built. Both fires and border warfare caused the population of Carlisle during the later Mediaeval Period to decline.

3.1.5 The Post-Mediaeval Period in Brief

Post-Mediaeval (1485-c. 1900). Plague was rife in Carlisle in AD1597. Two thirds of the dwellings were affected. Whole families were obliterated, as well as trades. (Towill 1991: 50). A map in the frontispiece of Towill (1991) of Elizabethan Carlisle shows little in the ways of structures outside the city walls. The ascent of James VI of Scotland to the English throne in 1603 again saw a period of instability in Carlisle, along with the pestilence and demise of both agriculture and the villages. Accounts of St. Cuthbert's Church, begun in AD1603, summarise the state of the city in this period. They say '*Carlisle then fell, from being one of the most important garrison towns in the kingdom, to a mere country town without commerce or manufactures*' (Ferguson 1890: 312). The associated marauders would almost certainly have camped outside the various city gates (Smith 1967: 49). This and the devastation of the city by plague led to the makings of a poor and humble city.

The map of Carlisle from AD1774 in Figure 4 (p7) shows the main city walls with other buildings outside these associated with the various gates to the city. Within the vicinity of the development site is Corporation Mill, the site of a Mediaeval borough corn mill. This mill was in existence in AD1474, when it was leased to other mills that were under control of the Corporation. Maps from 1790 (Towill 1991: 66) and 1815 (Perriam 1992: 185) also show buildings and associated streets in the area with the corporation dam now present. It is thought that this was the 'Wheat Mill' of AD1746 that was marked as a mill in an 1805 map; marked again as corporation Mill on another map of 1821. This mill was demolished in the 1870s to accommodate the extension to Citadel Station.

Due to numerous fires and more border warfare, the population of Carlisle during the later Mediaeval Period had declined. Timber and thatch houses were still common and troubled times continued with the suppression of the Church in about AD1547, as well as government struggles (Towill 1991: 50). The early seventeenth century map by John Speed in Towill (1991: 55) shows habitation now forming outside the city walls only outside the Scotch Gate and no water mills were shown.

Famine occurred in AD1623 but attempts to attract money to the city came to nothing, neither did the founding of a university as other similar cities had done. From Ferguson (1890: 132-3) we see both the church and the cathedral in decline. The succession of Charles I to the throne in AD1625 saw the Scots invading England, the Civil War following shortly after. Continuation of border warfare into the eighteenth century, as well as being occupied by the Scots, the Duke of Cumberland in 1745, and Carlisle's involvement in the Civil Wars, did nothing to improve the population in the post-Mediaeval Period. In 1759 John Crofts described Carlisle as '*a small deserted dirty city; poorly built and poorly inhabited.*' The census of 1801 revealed the population, of the walled town and the suburbs of Carlisle, as only 10,221 (Gosling 1976; Towill 1991).

Modern Settlement. Botchergate appears on maps of Carlisle outside the city walls from the late seventeenth century AD (Towill 1991: 66), where it was shown as a ribbon development with open land behind the front street. On the western side of Botchergate, the open land was divided into small fields defined by a field boundary. By the 1790s, this field boundary had become a passageway between gables known as St. Nicholas Lane, later renamed Collier's Lane (Giecco 2000).

A 1790 map (Towill 1991: 66) shows the city now extending outside all the gates and the area behind the site at Scotch Street as open gardens. The late eighteenth and early nineteenth centuries saw the introduction of the factory system and other industrial technologies that gave rise to a population increase in most urban areas throughout England. The population of Carlisle expanded significantly during this time. In AD1780 it was stated that Botchergate included 95 houses and by AD1796 the number of houses had grown to 172. This was upheld by the engrossing of thousands of acres of wasteland into arable and pastureland throughout the county in that period.

In the nineteenth century much of Botchergate was populated by 'the labouring classes' whose numbers had grown to such an extent that a new church, Christ Church, was built in 1831 (Ferguson 1890). This was the first major increase in the size of the city beyond the Mediaeval city walls to be seen in Carlisle. It suggests an increase in both trade and population, possibly due to the presence of businesses associated with the more stable and affluent city. In the latter half of the nineteenth century the population of the Parish of Christ Church was mostly employed by three cotton mills, a woollen factory, three foundries, or on the railways. Increasing rapid growth of the area led to new roads and back-to-back housing such as those in Tait Street, Union Street, and South Street, laid out and following the boundaries of the former field systems (Towill 1991: 107-15).

The end of the eighteenth century saw the collapse and disrepair of the Mediaeval city walls, with the eighteenth century in general being a period of stagnation for Carlisle. For ease of commerce and traffic, the entrances to the city had to be widened and the walls repaired. The Scotch Gate, north and east walls were removed some time before AD1811, this then allowing the thoroughfares to be widened (Perriam 1992: 196). This again probably indicates increased trade and prosperity to the city. The arrival of the railway brought new possibilities. It could be said that had it not been for the coming of the railway, and the converging at Carlisle of so many associated routes, the city would have amounted to nothing more than a provincial market town (Smith 1967: 52). In addition to new domestic buildings, the subsequent increase in prosperity brought by the railway saw an increase in the number of public buildings within the town and the major redevelopment of Scotch Street. These buildings were the basis of those still present.

3.2 Micro-Scale Study: Ethnographic Evidence of the Mediaeval Period

Past activity, demonstrated by excavation and analysis of archaeological sites throughout Carlisle, has led to the recovery of information regarding most historical periods and has added much to our knowledge of the area. The pilot study carried out here sought to further knowledge appropriate to the Mediaeval Period and enhance the lacking statistics for that era. Information pertaining to the Mediaeval Period was also gained by the study and narration of historical data recovered from documents and texts seen below. This data details activity relating to the area during the Mediaeval Period in the immediate vicinity of the site, and sought to enhance the image of Carlisle at the time of deposition of the strata, whilst leading to a fuller understanding of the growth of the city.

3.2.1 Introduction

There are many existing ethnographic sources relating to the City of Carlisle and its environs. Some chronicle the more mundane day-to-day events that can be an invaluable source of evidence for the state of the city at a particular period in time. Unfortunately, much of this evidence was recorded in Latin and, not being a scholar of the subject, I had to further rely on translations of primary sources when inevitably mistakes occur. The maps seen in Figures 3 to 10 (p6-11) are though another excellent primary source and can be heavily relied on when dealing with the representation of the terrain in and around Carlisle, as the cartographic sources used clearly orchestrate the elements of the periods recorded there. These maps are valid sources of ethnographic information as many of the features recorded remain extant to this day, or have been researched thoroughly by means of archaeological interventions, as discussed in 1.4.

From the late eleventh to the thirteenth centuries expansion of urban settlements took place throughout Britain at varying rates, primarily instigated by the invasion of the Normans in 1066, for the first time seeing the expansion of towns and cities to take in unsettled areas as well as straddling outside the city walls. Some growing townships were planned, whereas others grew from the remains of their former rulers as the Romans or Anglo-Saxons. In Carlisle expansion was linked to the spread of market rights and fairs, as discussed below in information gleaned from the Pipe Rolls, so linking the outer areas by trade routes and increased need for both food and commodities. (Schofield & Vince 2003: 31).

3.2.2 The Pipe Rolls

One of the major primary sources available to any historian is the Pipe Rolls, originally known as the Great Roll of the Exchequer. An annual registration of the income of the Treasury, these lists prove an invaluable source of evidence of the day to day goings on involved with the towns and cities of England, as well as those others ruled by the monarch of the time. Any resource that involved finance regarding the treasury between it and an area ruled by the monarch was recorded in these Pipe Rolls. As such, they are regarded as a valuable record of former monetary dealings with good associated narratives. Usually arranged under county headings, it is a simple process then to obtain facts about local proceedings in Cumberland and Westmorland after translation.

One of the earliest rolls still in existence in relation to Cumberland is from the reign of Henry I in the year 1131-32 (Parker 1905: II). A gap then follows until the reign of Henry II in 1159, from whence there is an almost unbroken sequence for Cumberland, possibly indicating the importance of the county as a source of revenue. Historical evidence of Cumberland and Westmorland is particularly lacking, as there is little record in such tomes as the *Domesday Book* (Gosling 1976) due to most of it being part of Scotland at the time of its writing, and that part surveyed being listed under the jurisdiction of Yorkshire (Parker 1905: III).

From the Pipe Rolls of Cumberland and Westmorland 1222–1260, during the reign of King Henry III (Parker 1905) comes the following information in chronological order. The first year recorded here 1222-1223 (Parker 1905: 1-2) gives details of the fact that the citizens farm the city of Carlisle and so are liable for the payment of their portion of the farm of the County of Cumberland. Other matters of import listed are the raising of rents from a fulling mill and a tanning mill, as well as an assart, meaning the bringing into cultivation of a piece of woodland by clearance of the area. This indicates the need for more food sources at the time. It also mentions rent from the mine (discussed below), as one of the principal sources of revenue. The rent for that year was fixed much lower than at previous periods, possibly indicating a decline in output.

The year AD1223-1224 (Parker 1905: 6) lists work on Carlisle Castle and buildings within the castle being constructed. A bake-house was also built in Penrith, possibly again an indication of increased necessity. The year 1226-27 (Parker 1905: 12) sees the building of a gaol in Carlisle Castle and a payment of rent from the Abbot of Holm Cultram for land, and the proceeds from the new Penrith bake-house. The expenditure for AD1227-28 (Parker 1905: 17) records an outlay for repairing the Castle Keep and the housing within the castle. New listings occurred from the Abbott of Holm Cultram for confirmation of several royal charters relating to the hermitage of St Hilda (Islekirk), the forest of Inglewood (the most extensive in Cumberland) and Holm Cultram itself.

Year 1228-29 (Parker 1905: 23) mentions noutgeld – a crown rent paid in cattle that was the staple agrarian product of the region and from which could possibly be measured the availability of such a resource. The fulling mill was listed under another proprietor here, and profits for land under the jurisdiction of the Castle, as well as

monies for the custody of the Castle and County, were granted to the Bishop. The year 1229-30 (Parker 1905: 28) again sees the repairing of houses in Carlisle Castle and the City Gate.

The next pertinent entries, for the year 1231-32 (Parker 1905: 35), see several plots of land, recently enclosed, now bought. Monies were realised from the sowing of corn in relation to the Forest, therefore implying the making or harvesting of an assart. A payment was made for two acres of oats and a meadow, with the township of Penrith also paying for 104 acres of oats. Common of Mast mentioned, according to Forestry Commission Common Rights, is the right to turn out pigs in the Forest during pannage season. Pannage is an ancient practice to fatten pigs before slaughter and salting for the winter and served another purpose. It was additionally useful in the Forest as the pigs turned out ate green acorns and beech mast that are poisonous to cattle and horses.

Enclosures and encroachments of the forest brought fines in 1232-33 (Parker 1905: 40), as well as 10 acres of woodland that the Abbott of Holme Cultram took under assart and cultivated. While in 1233-34 (Parker 1905: 45) a breach in the Castle Tower, lead roof and repairs of the walls where the Carlisle miners were purported to have dug when Alexander, King of the Scots, had besieged the castle, were listed. Again, in AD1234-35 (Parker 1905: 50) revenue was listed for oats, oatmeal and malt from rents for the manors of Penrith, Langwathby, Salkeld and Scotby. In AD1235-36 the carrying of the King's venison to Nottingham was charged with the rent of the mine at 10 marks. An allowance in AD1236-37 was made to the Grey Friars for church repairs. A turbot salted and sent to London was also offset. Cornage rent or noutgeld was listed in payments in AD1237-38 (Parker 1905: 67).

The year 1238-39 (Parker 1905: 72) saw King Henry III ceding land to the King of Scotland, originally that of the manors of Sowerby, Carlatton, and Upperby. In 1239-40 (Parker 1905: 35), a charge again appears for repairs to houses inside the Castle and other repairs. Rents of the above manors were also brought in. Tallage or land tax was also listed at 50 marks, a mark being about three fifths of a pound. In AD1240-41 (Parker 1905: 82), repairs were done to the bridge over the Castle moat, steps of the great chamber and the larder (an underground brick cavern). The grant of the manor of Maulds Meaburn required the payment for services as a pound of cumin each year.

There is also a debt for pannage listed. In 1241-42 (Parker 1905: 87) the mill was granted to the citizens of Carlisle. An enclosure was made at Racton and several other grants were made, one to the Prior of Carlisle.

The year 1242-43 (Parker 1905: 93) saw the amount of cornage payment reduced. Tallage for this year had Rickergate and the suburb of Carlisle contributing, as well as the three manors listed as being ceded to the King of Scotland in 1238, possibly indicating their return to English rule. In 1243-44 (Parker 1905: 99) there appears listed revenues for the Royal demesnes after the assignment to the King of Scotland. The year 1244-45 (Parker 1905: 106) saw the King's engineer paid for making the King's engines. The houses in the Castle were again repaired and payment was made for salting venison and transporting it south. Reference was also made to the various smallholdings now in existence outside the City, both at Eden Bridge and beyond the gates seen in Figure 3 (p6). Payment was made from Upperby for licence to have a mill; there was also a toll levied on herrings.

In AD1245-46 (Parker 1905: 111) mention was made of wood for the house of the Dominican or Black Friars. A substantial amount was also made for the King's wardrobe, as well as a ton of wine bought. Wine was granted annually to the Sheriff for custody of the Castle starting in the year AD1246 (Parker 1905: 116). In AD1247-48 entries were seen for the adjustments of the last nine years when the King of Scotland had held the lands mentioned above in the year AD1238. The arrears owing were thus forfeited from the Sheriff of Carlisle, and only part of the arrears for the Penrith bake-house are due; as the King of Scotland held it for the rest of the period, the farm of malt, oats and oatmeal was also similarly excused.

Year 1248-49 saw Alexander, King of Scotland, charged for his custody in Northumberland and he died in 1249. The year following, 1249-50 (Parker 1905: 133), again saw tallage listed for Upperby, recorded as ceded to Scotland in 1238, as well as Rickergate and the suburb of Carlisle that were ceded in 1242. Tallage was also listed for Carlisle itself, Stanwix and Ousby. Listed under 1250-51 (Parker 1905: 138) was the death of Alexander the Second of Scotland. The Sheriff of Carlisle was discharged from liability of the lands that had been granted to Alexander, and the Escheators were to ensure they were brought back into rightful ownership.

The year of 1251-52 (Parker 1905: 146) saw the listing of the cost of salting and transporting 200 stags to York and Windsor. Land was also granted to the friars Hospital of St Nicholas for lepers, said to be of Royal foundation as well as the Holy Sepulchre. The unusual appearance of an item here referring to AD1477, during the Reign of Edward IV, says the revenues were given to the Prior of St Mary's, Carlisle, and another under Henry VIII to the Dean and Chapter of Carlisle. In AD1252-53 (Parker 1905: 152), corn was given to the Dominican or Black Friars and a further 200 hinds were salted and sent to York. Numerous fines, especially referring to Forests, seem also to have been listed for this year as well as a tallage levied.

The year AD1253-54 (Parker 1905: 160) lists only the latter half of the year and deals solely with the Bishopric of Carlisle. In AD1254-55 (Parker 1905: 162), a number of grants of assarts and purprestures (wrongful seizing of, or encroachment on, others or common land) were listed, all exempted from fines. The year AD1255-56 (Parker 1905: 172) saw the City of Carlisle fined, an Abbot and Prior each paying for an assize, while the Prior and Convent at Carlisle were charged with rents for new holdings. The year AD1257-58 (Parker 1905: 179) sees a considerable adjustment in the revenue. The 'Profit of the County' to be paid is £100 rather than 100 marks, an increased sum. The purchase and transport of cattle for the King were also listed and money was raised from the chattels (possessions) of refugees and from fines. The year AD1259-60 (Parker 1905: 188) sees thirty stags sent to Westminster and salmon again sent to Chester. Demesnes belonging to the Castle have their proceeds listed.

The portion of the book listing the entries for Westmorland sees only four entries made for the same forty-three year period, occurring in the years AD 1235-36, 1242-43, 1247-48 and 1257-58. The payments recorded for these periods are by private individuals regarding assistance from the law courts or as penalties. Goods of outlaws and fugitives were listed as confiscated, as are the proceeds of fines.

3.2.3 Miners and Money in Cumberland

I would like to acknowledge the importance of Blanchard's works (1996 & 2001) in helping to unravel the economic history of the first half of the Mediaeval Period associated with Carlisle in the following material.

The turbulent reigns of Stephen (AD1135-54) and Matilda (AD1141) wrought great changes on England's northern borders (Blanchard 1996), and David of Scotland in AD1135 supported his niece, the Empress Matilda's claim to the English throne, and invaded the realm. Initially, from AD1136-8, this resulted in the annexation of Cumberland and later Northumberland and Westmoreland, with Durham and Kentdale (Kendal) becoming client states, Scottish influence then stretching deep into Yorkshire. The middle of the twelfth century AD saw David lording over an 'English Empire', as well as his lands in Lothian that he and heir Malcolm IV held until AD1157. These territories were settled with knights brought from the west and south of England, who were moving northward during the closing years of Henry I's reign, to create a new feudal kingdom from a wild, remote wilderness inhabited by people lacking in wealth.

Carlisle was to become one of the regional capitals of King David's extended empire, said to be at this time only a refuge under the protection of the castle built in AD1092 by the Normans (Garmonsway 1954: 227, Rollinson 1978). The City of Carlisle originated from the administration of Henry I in about AD1120, when Ranulf le Meschin, on becoming Earl of Chester, surrendered the Earldom of Carlisle into the Crown's hands (Ferguson 1894: xiii). From Hunter (1833: 142), extracted from Pipe Roll 31 Henry I (year AD1131), the following was learned. The baronies of Gilsland and Liddale protected the passes to Scotland by land, while Burgh protected the seaward side of the Solway Firth (as seen in Figure 1, p4). To the south were the critical holdings of estates such as Scaleby, Etterby, Harraby and Botcherby; these, and the Royal Manors of Scotby and Dalston, encircled Carlisle and were retained by the crown itself, along with the forest of Cumberland to the east.

From this scheme, the township of Carlisle emerged. Important lordships were Etterby along the old Roman Road, northwest of the city to the sea. The land of Botcherby, on the same road to the southeast, reaped the benefits of administering what later became the wards of Rickergate and Botchergate that lay within the walls of the city. Within these wards, still enclosed by a wall in AD1130, these lords retained houses, a secure refuge in times of trouble. So here we glean an insight into the city of Carlisle in the years prior to AD1133, when it was revealed as a part of the military structure devised by Henry I in Cumberland. Carlisle was also though part of the royal demesne under the sheriff's authority; economically limited by its resources it still produced an income.

Ground rents were low, even when added to monies from the royal manors, and generated less than the crown's forestlands. As discussed above, revenue from forest taxes and fines were considerable, the noutgeld or *geldum animalium*, a crown rent paid in cattle, was the staple agrarian product of the region and extremely important.

Between AD1125-28 the animals from which the noutgeld was paid had been utilised to stock the depleted royal manors. The following years between AD1128-1130 saw them sold for large amounts, suggesting that the animals reserved for the noutgeld existed in huge numbers according to the Pipe Roll of AD1130 (Poole 1940: 284-95). As only a part of the resources of the surrounding lands existed mines, the modern workings of which had been excavated since about AD1125, and produced revenue for the township of Carlisle. The crown reaped rewards from the mineral rights and workings of these mines from AD1130. These were the minaria, but at this time were more specifically limited to the rights realised from the silver mine (argentaria) itself. Historically this mine had been rented out, as this proved more lucrative than the crown carrying out the extraction in there own name, as it had historically provided a diminutive return.

The year AD1130 though saw the opening of new veins with expanded production and acutely increased returns. Increased taxes by the crown led to intensification of the process, with greater ore production; in turn leading to the raw product expanding onto the market to be smelted and refined by the burgesses of Carlisle (*burgenses de Caerliolio*) (Hunter 1833). The miners thus became the community (or burgesses) of the city, favoured with the benefits of being both miner and citizen. Carlisle then became the commercial and community base for the miners encompassed in the boundary of the royal forest, and providing a material input to the economy of the royal demesne. Although the combined monetary return from the mine and the agrarian economy was considerable from the royal demesne, the accounts shown in the Pipe Rolls depict a story of hardship and lack of actual currency. Much of the revenue for the year AD1128-29 was spent on the nobles and soldiers retained to protect the city and royal demesnes. This then explains the reason for the almost annual recording of the building of the walls and repairing of the houses within the city, as seen above from the Pipe Roll entries, and why, in AD1130, the walls of the township were still under construction (Hunter 1833: 142). After Henry I's visit to Carlisle in AD1122 the priory of St Mary's was also still under construction after a period of 8 years (Arnold 1885: II 267).

The priory, incepted by Royal Charter, continued to be heavily dependent on royal patronage and bequests. The royal gifts did not constitute physical wealth though, and the building of the priory suffered serious cash flow problems, the offset of such as the £10 cash gift listed in the Pipe Rolls (Hunter 1833: 142), paid to the canons in AD1130 'for the building of their church', made little mark in the financial state of a major construction. The conclusion from the Pipe Rolls and other sources is that the royal demesne produced too little actual profit to support the creation of an infrastructure to a newly emerging city that could burgeon and underpin the advancement of Henry I's military, political and ecclesiastical aspirations.

A 'shire' system of land use existed in Northern England and Scotland at this time, where extensive heath and moorlands annexed to a township or territory, or grazed by the animals of several such townships, provided a critical element in the farming system of the populace of the region. (Barrow 1973: 7-68). The Scottish Crown possessed extensive grazing land and woodland in the form of marginal lands. Abbeys utilised portions of these landed resources in cultivation, but also exploited the capacious rough grazing available to them for livestock. These holdings of small settlements generally incorporated five to ten family units, consisting of meagre arable fields and the annexed moor or heath lands, and were a distinctive feature of the borderlands of the Scottish domain. Livestock was managed in a transhumance arrangement that involved the seasonal migration of animals, and the people who tended them, between lowlands and adjacent mountains or high ground where shielings or rough huts were constructed for shelter. (Barrow 1989: 2).

Taking into consideration the agrarian and forest resources however, the overall impression of both the English and the Scottish realm is one of poverty, as well as local currency shortages when 'coin substitutes' such as noutgeld were used (Fox 1983: 99-100), thus deliveries of extant commodities from producers to consumers were an explicit reaction to existing Trans-European shortages of coin (Blanchard 2001: 528-545). No true comparison though for hard currency of precious metals in a multi-lateral trading network that worked through a trading system and associated burghs. Crucially this affected trade during this period, resulting in small collectives and burghs losing their commercial viability.

In Edinburgh, at the beginning of David I's reign (AD1124-53), like Carlisle across the border, there was a similarly insubstantial settlement, even though it was the cardinal royal centre of the Scottish King's realm. Little of its royal importance could be seen though in the Spartan appearance displayed throughout the municipality. Considering the comprehensive agrestic enterprise operated within King David's realm, from which the extensive excise system emerged, and through which also the royal demesne was characterised, the blanket view the facts above paint for the researcher, of northern Britain as the area south of the Tay in AD1130, is an image of dearth, with a serious deprivation in regard to monetary wealth. (Blanchard 1996).

The First Silver Mining boom occurred about AD1125-58 in the Carlisle Mine. With this, the increased silver production between AD1125-1225 revolutionised the situation, gaining momentum when, in AD1133, breaking news began to circulate that veins of silver had been discovered at Carlisle. Citizens were encouraged by the payment from the miners to the King of a large rent of £500 per annum, assuming then that the vein had a high return (de Torigni 1884-89: IV 123; Haydon 1858-63: III 64). This could be seen as a turning point in England to providing the lacking coinage to boost the economy. The lode struck sustained production nonpareil in then modern Europe and it brought prospectors to the wild High Pennines where three counties meet, to increase production by gouging the land to get at the parent ore (Blanchard 2001: II 583-685). The extent of the operation was then reflected in grants endowed from the legacies of the English and Scots royal houses that had initially incorporated all mining activity on the fells during the years AD1125-54 (Hunter 1833: 142).

A second boom occurred in approximately AD1180-1210. The crown retained the mine holding until AD1154 when King Stephen granted it to the Princely Bishop of Durham in his final reigning year (Raine 1839: Appendix 27 xxxiii-xxxiv). Moving to Stanhope during phase two of mining activity this then became the core of the acute mine working. The ruling Scots or English king retained the workings during the twelfth century except when, between AD1189 and 1193 they were held by the Earldom of Northumberland. So, below the seeming wasteland under Nenthead, lay the mine or 'minery' of Carlisle, still acknowledged as the most productive silver mine of Mediaeval England, even briefly during AD1125-54 unified under the English and Scots crowns; reverting into division after this period. (Blanchard 2001: II 583-685).

At the height of silver production in about AD1136-8, three to four tonnes of silver was extracted a year, an enormous ten fold increase on that produced from the entirety of Europe in any year during the past three-quarters of a millennium. Continuing for just over a decade silver seemed to ooze forth from the mines of Silverbeck and Minerdale in Cumberland, set on the limestone fell lands east of Crossfell escarpment. The ensuing decline resulted in a dissolution of the whole industrial process, movement of the peoples and their skills to nucleations in Northumberland, Durham and Yorkshire, taking production to greater heights after AD1157, but leaving Cumberland depleted of the resultant wealth. (Blanchard 2001: II 583-685).

Under English (AD1133-5 and 1139-41) or Scots (AD1136-8 and AD1142-57) rule, the effect on the local economy of the mining boom was dramatic. Henry I in AD1133-35 saw the crown's share of mine output, totalling £500 a year in AD1133, more than twice the total amount received from the royal demesne in the previous three years. Major building programmes could now be completed in Cumberland due to the influx of cash. These included the completion of the City Walls and the Priory of St Mary's, later to become the Cathedral, and first conceived in AD1122 that could now finally be developed. Henry I in AD1122 saw the dedication of churches and other ecclesiastical duties carried out by the Bishop of Glasgow in Cumberland, but could do little to make his own mark on them (Goodall 1775: 289-90). The priory was completed in AD1133 when Aethelwulf was appointed bishop of the new see simultaneously created. The beginning of the Cathedral also saw the inception of the reign of the Archbishop of York in the county, with that of the Scots Bishop John diminishing. This was the inauguration, combined with the newfound wealth available to them, of the King and his Archbishop; now the true head of the northern see in England, as well as gaining the title of City, Carlisle was no longer under the thrall of the Scots. (Blanchard 1996).

As discussed above, the miners conveyed their silver to Carlisle, becoming the burghers of the newly rich city; the Carlisle mint was then inaugurated by way of the newfound source of precious metal (Blanchard 2001: II 627-39; Brooke 1916: I cciv-ccv). There then followed a stream of merchants arriving to meet the demands of the newly rich citizens, which continued for about twenty-five years during the first mining boom. This saw the metamorphosis of the city's visceral structure (Jones 1976: 77-96). The merchants swelled the population of the township adapting it to become a newly formed

conurbation. The area between the city and the castle outside the walls was where foreign merchants began to reside. New commerce brought by these foreign immigrants, with their different methods of speech and culture, saw the Priory and Church of St Cuthbert with its adjacent housing swamped; the area between the priory and Botchergate became the Flemish quarter, from which the market within the walls could be reached. This road also housed the Gaelic-speaking traders (*vicus hybernicorum*), whose range crossed the western seas, and, in the section below the city wall, the quarter of the Franks (*vicus francorum*). (Blanchard 1996).

It was after AD1157, when Henry II secured several powerful strongholds, that the northern part of modern Cumbria fully became part of the English realm and so secured the Scottish border (Kapelle 1979). English merchants also set up in business, adjusting to the fact that Carlisle was under English rule. The merchants now held the primary role in the new conurbation, while former factions were absorbed into urban life. The merchants and traders evolved as the dominant group about the middle of the twelfth century AD. A natural displacement of the miners was then seen as the mining activity migrated eastward, thus weakening the advantageous locale that Carlisle had logically realised until this time. Henry II confirmed a merchant guild on the English merchants of Carlisle in AD1157-8 (Ferguson 1894), with the superiority that it incurred, involving the acquisition of the silver before it was minted, and holding the rights to trade within the city, as well as directly with the miners that the foreign merchants were then denied. Unfortunately for Carlisle, this resulted in the bulk of the silver being removed for minting by English merchant's to their former domiciliary area. (Blanchard 1996).

The situation did not ease during the period of Scots rule and mine ownership from AD 1136 to 1157. Then, although Carlisle became of major regulatory importance associated with a huge province, the silver appeared in Scots coinage (Thompson 1956), or occurred as the major export into England or overseas, seeing only small amounts used in local circulation. It did however result in the Carlisle merchants no longer holding sway over the major trades, as Scotland and the traders who permeated the system oversaw them. As in the modern day economy, rapid expansion of the mining populace, coupled with inflated costs of basic commodities, led to exploitation by tradesmen and manufacturers at all levels. Increased production at the mines led to a massive growing infrastructure to support the trade and communities that worked the

industrial system and grew to encompass areas south of Cumbria, as well as into Scotland and Northumberland. Cumberland saw traders amassing each year from Scotland and the eastern trade routes with produce to exchange for silver to be minted at home (Blanchard 2001: 629-39). A trade boom ensued that, at its height in about AD1136-38, instigated an enormous repercussion on the local economy.

The cause and effect was simple and the mining boom wrought inflationary effects on the northern economy. It saw foreign traders flowering at the extremities of the silver routes, bringing exotics in all forms as foodstuffs and commodities, in exchange for the silver or coinage produced. Not only did this affect the Scottish and eastern routes, where ships abounded in the harbours about Berwick, Lothian and Tyneside, but at Burgh-by-Sands, at the end of the Roman Road associated with Hadrian's wall, ships of Flemish, Gaelic and Frankish origins were anchored, goods trafficking from there to the foreign settled merchants below the City Walls at Caldew. The English merchants inside the city acquired goods from England, exchanging and bartering their own and foreign wares in the backcountry around the city, thus uplifting the economy of the city itself. (Blanchard 1996).

The years leading up to the late AD1140's saw a decline in silver production, followed by the inevitable end of the veins. Thus, ultimately the wealth that came from it, stretching eventually to the far reaches of the extended trade routes, both north to Scotland as well as east and south to England, diminished and declined. This reversed the economy to that of AD1133-5 but even more devalued, and the mining areas then shifted away from Cumberland (Lancaster 1915: 207), leaving Carlisle with a changed and depleted economy, and lacking provisions from the normal routes. The route of the Tweed and Tyne though still flourished, with the mines of the northeast gaining production, their avaricious ways seeking out the produce of the Upper Eden. Silver production and the associated coinage would never yield the same again (Blanchard 2001: II 637-9), the source of the silver now reaching its inevitable conclusion.

Scotland under King David between AD1133-52 became a force to be reckoned with, as wealthy both in construction and commerce (Pinkerton 1789: 439-56), with his own material wealth increasing so that he could confer grants to attract sympathisers. Material resources of the king were no less transformed. As the mining 'bonanza' ran its

course, he was able, on occasion, to make direct grants from mine revenues to would-be followers. Land associated also increased in value, and was donated to church and potential followers, increasing the power and wealth of Scotland (Barrow 1985: 154).

The economy of Scotia, Lothian, Cumbria and Northumbria, continued to benefit from the mining, albeit via a different route, King David seeking to protect this infrastructure and ultimately his newly rich realm (Barrow 1984). Recovery of silver slowed and inflationary coercion swelled earnings, but the king guaranteed price comparisons between foreign and domestic wares and directed trade through the burgh markets to validate them and eliminate the element of free trade that swayed the markets so much. David also created the land baronies of the new feudal order. With that, plus the commercial network and infrastructure of powerful merchants and churchmen, David was a formidable neighbour to the north of England, particularly Cumberland, analogous, according to Ailred of Rievaulx (Pinkerton 1789: 439-56) to a 'golden age' in the arduous times ensuing.

3.2.4 Topography and Population Changes in and Around Carlisle

The position of Carlisle as a settlement has, from its inception, had the scarp slope above the River Caldew as its focus, similar to the cities of Durham and Lincoln (Schofield & Vince 2003: 34). Easy to defend and away from the floodwaters of the Eden, this was a major natural feature affecting the foundation and growth of the subsequent settlement. Jones (1976) discusses the changes of Carlisle's settlement and street pattern covering three hundred years from the coming of the Normans in AD1092 (Earle & Plummer 1892; Rollinson 1978) to the end of the fourteenth century.

The Middle Ages in the area, following the disintegration of the western region of Roman control, saw no one owner of property as dominant. From the Mediaeval Period the king was the ground landlord but no lists of *hus gabulum* or house gavel rents have become known. A few rents are known from references in personal deeds held in places such as the Records Offices (Kendal and Carlisle County Archives) and the Pipe Rolls of the Exchequer as discussed above. They provide information about the general pattern of the settlement, particularly for the twelfth century AD.

Written post mortem inquisitions also provide information from tenants in chief of the crown, cartularies and deeds. In connection with the allocation of land within the city to baronies and lords of manors in Cumberland as a whole, many of them, discussed above, maintained at least one town house as a chief or principal burgage, and also developed plots for further building within the city. It is possible to then trace the history of some of these principal houses through to the sixteenth century due to the probate inventories. The design and layout then becomes clearer and shows how the structures were arranged on the burgage plot. (Jones 1976). Evidence of this can then be gained from archaeological intervention (Murphy 1991). As stated above the reference material from the old maps is an invaluable source through which to see the growth and development of the city, both in and just outside the Mediaeval gates.

A settlement of some importance in the Roman Period (Handford 1970), and possibly the Anglo-Saxon times, Carlisle, as well as the rest of the country, saw changes when the Normans invaded in AD1066. Taking a while to diffuse through the country to the northern limits, the changes saw AD1092 as the start of the modern Norman town of Carlisle (Earle & Plummer 1892; Rollinson 1978) with the building of the castle, becoming a city in the later Mediaeval Period when the populace had increased, the charter granted and the cathedral founded in AD1122. The new town was built over the old settlement as far as we know, the castle was built and people were brought in to protect and maintain it. (Jones 1976). From the Anglo-Saxon Chronicle (Garmonsway 1954: 227) we hear that the King, William the Conqueror, went to Carlisle with money from taxes and both restored the town and built the castle. Further mention of a man called Dolphin, who it was said had his men based at the castle, was made, whereby he was driven out as the then ruler of the area. Subsequently, on the return of William to the south, he sent ‘many peasants thither with their wives and livestock to settle there and till the soil’, becoming the new settlers of the township (Garmonsway 1954: 227).

The burgage plot (Dartmoor National Park Authority; Grenville 1997; Higham 1992; Schofield & Vince 2003: 46) was defined by Grenville (1997: 198) as a long narrow plot of land running at right angles from the street frontage in a town and was important in Mediaeval England. This system predated the Norman Conquest when they occurred as plough land strips of the original agrarian settlements, subsequently with dwellings and sometimes workshops extant on them.

Beginning as inclosed fields (that is an area fenced or enclosed and that had deed or title to one or more owners) that extended within the confines of the Mediaeval town, burgages were established by the lord of the manor as plots or divisions of the open field system. The burghers or burgesses, as discussed above, were allotted these plots as tenants, paying a cash rent rather than part of the former system of feudal service. The burghers must be free men and as such be entitled to practice a trade within the town, and so were involved in electing the ruling council of the town. The frontage of the burgage plots often had a building erected on it as a combination of habitation and trading booth, the front of which could be opened up to display the wares on sale. Burgage plots can still be detected in many of our towns and cities as they grew from the road front properties, the plots still seen extending behind as a long garden plot behind the dwelling, as seen in the maps of Figures 1 to 5, sometimes more than one combining to form a larger more modern property.

Within the city walls, the area along the English and Scotch Street axis grew in the twelfth and early thirteenth century. Here a distinctive lane pattern on the east side of the line formed by the two streets is compelling in the suggestion that it was originally taken in from a field, the wall of which ran through as a man-made delineation. At the southern end, to the east side of English street, there was a plot large enough to house the Fransiscan or Grey Friars on the inception of the monastery as late as AD1233 (Doubleday 1901: ii, 194). This suggests there was ample available space, until they moved the monastery to the west side of Blackfriars Street in AD1237 after comments were made that it was in the way of commerce!

The earliest written reference to a house and its whereabouts in Carlisle occurs as one gifted to the Priory (assumedly of St Mary's) before AD1130, and said to be next to St. Cuthbert's Church, thus proving the existence of the Church at this time and also the presence of urban occupation if the twelfth century in this area of Carlisle (Edward III 1332). The siting of the church is at odds with the development of both Scotch Street and English Street, but the definition of the two streets was probably due to the alignment of them with the building of the Norman bridge over the River Eden (Jones 1976: 90). The siting of the church may have originally been linked with the former Roman settlement pattern or a later Anglo-Saxon phase as, in antiquity, St Cuthbert's Church probably originally linked with Blackfriars Street.

This area though would loose significance as both English and Scotch Street developed as the major thoroughfares. Before the development of the northern end of Castle Street in the thirteenth century, the ancient and as yet undiscovered Church of St Alban's stood at the head of Fisher Street. Reference was made to the church in the Pipe Roll for AD1201 (Exchequer 1847) describing land possibly sited in the dogleg of Rosemary Lane, the north to south portion of which appears to lie along the boundaries between properties on Scotch Street and Fisher Street (Jones 1976: 95).

The twelfth and early thirteenth centuries saw Carlisle growing undisturbed by King Stephen's bid for supremacy over Empress Maud, or the persistent threat of invasion from Scotland, probably due to the erection of a wall by the year AD1130, thus providing defence for the city. As discussed above, David, King of Scotland, ruled in Carlisle and Cumberland when King Stephen ruled the rest of England. David strove to develop the city as a kind of southern capital to his extensive kingdom, probably to protect the wealth from the mines. Further improvements were seen in Carlisle in the late twelfth century to the city walls and castle with the gates upgraded in AD1165. The invasion by the Scots William the Lion in AD1173 and 1174 caused devastation in the area around Carlisle but the city itself was not surrendered. Then, in the year AD1216, the town was delivered to Alexander II of Scotland without opposition (Bain 1881). The town then was defined as growing rapidly in the twelfth and thirteenth centuries, owing little to the earlier Roman Period layout that had been extant at least to some degree until the appearance of the Normans (Jones 1976: 96).

From the Pipe Rolls (Parker 1905) mention is made of the construction of a ditch in AD1173 alongside the castle that was possibly in reaction to the tried invasion of William the Lion mentioned above. A bridge between the castle and the town in AD1197, also recorded in the Pipe Rolls (Parker 1905), indicates a certain amount of stability, as access to and from the castle would have been easier. At this time, the main gate may have been removed from the inner ward to the present modern day position as over the ditch, thus detracting from Fisher Street as the main access from the town to the castle (Jones 1976: 94). From the Liberate Rolls, 29 Edward I (Wedgewood 1200-1327), it states 'in which year also the same authority shews that John de Halton, Bishop of Carlisle, Farmer of the castle and Lordship of Carlisle, was allowed £5 5s for timber to make new stockades round the castle'.

At Irish Gate, new modern barracks with excavations for cellarage were made into a ditch and the vallum of the castle was cut into (Ferguson 1878). Two skeletons were then recovered with an east-west alignment, suggesting Christian burials; Mediaeval pottery was also recovered in the vallum at the time in a similar context. With that and the pottery, it was assumed the context was Mediaeval. There was also a stockade to the south side of the ditch, where twelve feet down three or four stone balls were found, probably from the Siege of Carlisle by Robert the Bruce in AD1315. The Lanercost Chronicle (Maxwell 1913) tells that during this siege the Scots had erected an engine for casting great stones and continually threw them at Irish Gate. These stones may then have gone over the wall into the ditch that had subsequently silted up. Other Mediaeval finds were recovered and also part of a red deer skull indicating that this ditch was the one constructed in AD1173 mentioned above (Ferguson 1878).

The year AD1190 saw specific mention of the three gates as English, Irish and Scotch Gate, more than likely being designed and built due to the trafficking in and out of the city. This was caused by the rapid trade growth linked both with the silver mine, and the development of Carlisle by King David of Scotland to provide a secure southern outpost to his vast kingdom. This information, from the Pipe Rolls of AD1244-45 (Parker 1905: 109), specifically mentions the three gates of the city in Latin as Boschardi, Caldewe and Ric(ardi), now better known as English, Irish and Scotch Gates respectively.

The Musgrave Deeds (date unknown) describe property on both sides of Scotch Street near the Rickergate at that time. From these deeds there is an impression of a gradual development and building up of this area of Carlisle, akin to the south end of English Street, as in AD1281 a clerk was given land lying between that belonging to two others next to the town wall that measured 72 feet (Jones 1976). Land owned at well established dates in the thirteenth century had, from the Lanercost Cartulary (Todd 1997), a house on it from which rent was charged that was paid to the priory. This held a description of the land as ‘via francorum’, but it is unknown where that might be, as nothing with that name now survives. It may indicate though an area where the Frankish merchants plied their wares on the outskirts of the city that belonged to the priory. Holm Cultram Abbey also held land there. A fire in AD1292 destroyed a large part of the town (Maxwell 1913: 87-9) and so enabled alterations in the town plan to take place after that period, although it is not known what area the fire covered.

Some lords had many plots in the city and derived rent from them. The de Tilliols of Scaleby owned a 'baronia' in Scotch Street (Grainger & Collingwood 1929: 12). Therefore, various types of ownership relating to people existed, such as burgage plots, manors and baronia. A manor or principal house on the east side of English Street was described in the Carlisle City Deeds in AD1503 (Carlisle City Deeds and Leases 1503).

These properties within the city walls, provided refuge for the Lords of Cumberland when county or city came under attack from the Scots. Such an incident in the Lonsdale Deeds (D/ Lons/ L. C. 20.) of the year AD1311, recalls that a burgage on the east side of English Street owned by the de Boyvilles, offered shelter to the owner when the Scots terrorised the city walls and their holdings at Thursby (Lonsdale Deeds date unknown).

Further grants, some relating to property in Carlisle, (Church of England Diocese of Carlisle 1964?) from AD1332 are from Letters Patent of Edward III and give the text of a Charter of Henry II listing a few that are for property in Carlisle. The granting of a charter in AD1316 to the Mayor and citizens led to them being able to acquire property, so enabling them to build on and improve waste places in the city; the defences of the city walls and gates remained the responsibility of Royalty but the city ditches were let. The town leases for the gates and towers were not found, the only leases surviving are from the crown or the crown officials (Lonsdale Deeds D/ Lons/ L. D. 72-3).

In later periods, about AD1400, improvements made by the town were held by a customary tenure called cullery (Nanson 1882: 305-8). In addition, a house belonging to the Earl of Northumberland, at the present site of Marks and Spencers, had a central gateway in AD1405 referred to as 'La Lucy Inne' and later in the fifteenth century as Earl's Inn (Cockermouth Castle Records 1405-8; Calendar of the Patent Rolls 1903-9) when it was used as lodgings for the lords and ladies. A grant of AD1418 saw the mayor and citizens of Carlisle describing Annetwell Street as leading from Caldewgate to Castlebrig – presumably the castle bridge (Carlisle City Deeds and Leases 1418). Reference was made in the Lonsdale (D/ Lons/ L. D. 72-3) and Musgrave (D/ Mus) Deeds that on the 16th August AD1491, Henry Wyott, King's Commissioner, delivered the custody of the walls and ditches of the city to Henry Denton, Mayor of Carlisle, and also the care and maintenance of the gate called 'Bochargate' (formerly the gate of Botchard – the nobleman after whom it was named, as discussed in 3.2).

Few accounts in the Public Records in London for repair of the town walls have survived and when the walls served as a boundary to a property the deeds show them as 'murum domini Regis' (Lonsdale Deeds D/ Lons/ L. D. 72-3), still under the jurisdiction of the crown. A burgage let to the Liddells held the clause that should the Abbot of Jedburgh visit Carlisle he would be able to reside there and stable his horses (Calendar of Inquisitions Miscellaneous (Chancery) 1916).

Other various monastic houses reserved safe accommodation when travelling and this trend of a principal house or simple burgage may have spawned the origins of future lane or court development, particularly in English and Scotch Streets (Grainger & Collingwood 1929: 13). No records survive for these properties, however tenuous links were extracted from a deed or single rental or survey in other documents. Even the Carlisle Cartulary for the priory does not survive and there are few other Mediaeval Period deeds. They may have been taken by the Scots or hidden for safekeeping but still remain uncovered.

Maps become a good resource in the later Mediaeval Period and beyond. From the sixteenth century, Carlisle within the walls is well mapped as seen in Figures 3 (p6). This map from the sixteenth century shows boundaries between plots and individual buildings, as does the map of Hodgkinson & Donald in Figure 4 (p7). It also shows Scotch Street as linked to the Scotch Gate.

Mainly though, from the Mediaeval Period of Carlisle right up until the nineteenth century, delineations for boundaries of buildings that mirror the patterns of strip fields or burgage plots were shown (Jones 1976: 96). This was strongly defined on the east sides of English and Scotch Streets up until the demolition of the lanes, as many of these buildings had been extant since the Mediaeval Period and so the footprint of the burgage plots, although developed on and around since the Mediaeval Period, was still visible (McCarthy 2000). It is evident from these archaeological investigations that the Normans built on former cultivated arable land. This may have been in response to an increased need for secure housing within the city walls or a reflection of the need for the rich and influential of the new regime to display their wealth in property ownership.

3.2.5 Discussion of the Ethnohistorical Data

David of Scotland invaded Cumberland in AD1135, he and heir Malcolm IV holding it until AD1157. Carlisle was to become David's regional capital at a time when it was only a refuge, not a true town. (Blanchard 1996). Ground rents were then low, even added to monies from the royal manors, and generated less than the crown's forestlands. As discussed above revenue from forest taxes and fines were considerable, the noutgeld was the main product and extremely important. The years between AD1128-30 saw the animals sold for large amounts, suggested their huge numbers (Poole 1940: 284-95).

In the high Pennines existed mines primarily of lead ore that produced silver. Excavated since about AD1125, they produced the revenue for the township of Carlisle, but only in minimal amounts, the crown receiving nominal rents from them (Blanchard 1996). In AD1130 new veins and greater production of silver saw increased returns. Even so though, the combined increased monetary return from mining, plus the agrarian economy, sees the accounts still indicating hardship and a lack of hard cash available for the city. Available revenue was ploughed into paying for protection of the city and county, a sound reason for the annual attempts at wall building and house repairs repeatedly seen listed within the city. It also explains why, in AD1130, the walls of the township and the priory were still under construction (Hunter 1833: 142), there never having been enough revenue to complete the work at that time. The overall impression of both the English and Scottish realms is one of poverty and money shortages with 'coin substitutes' of noutgeld used (Fox 1983: 99-100); this problem also stretched to Europe, where coin was also in short supply (Blanchard 2001: 528-545), crucially affecting trade when small commercial concerns became unviable.

The silver boom in AD1125-58 in the Carlisle Mine heightened production between AD1125-1225, increasing the amount of silver both for use in trade and convertion into currency as high returns were reached (de Torigni 1884-89: IV 123, Haydon 1858-63: III 64), defining a turning point in England to boost the economy, along with a second boom in AD1150-1180 and 1180-1210. Loss of this important revenue came though when it was ceded to Durham (Raine 1839: Appendix 27, xxxiii-xxxiv). Silver production continued for just over a decade, but the inevitable decline resulted in dissolution of the industry and migration of the workers, leaving Cumberland again with depleted wealth. (Blanchard 2001: II 583-685).

The effect on the local economy of the silver had been dramatic enabling the conclusion of many building projects. The city became like any other (Jones 1976: 77-96), merchants swelled the population and adapted it to become a commercial centre, taking over from the miners as dominant, the mining faction eventually moving east with the work pattern and so leaving Carlisle in a weakened location.

Henry II confirmed a merchant guild on the English merchants in AD1157-8 (Ferguson 1894), assuring the acquisition of the silver before it was minted and holding the rights to trade within the city, as well as directly with the miners, something the foreign merchants were denied; Carlisle lost the hold over the silver ultimately though, as the English merchants removed it to their home towns, away from the local economy (Blanchard 1996).

Scots rule and mine ownership from AD1136 to 1157 resulted in the silver either appearing in Scots coinage (Thompson 1956), exported into England or overseas, resulting in only small amounts remaining in local circulation. Carlisle merchants no longer held sway over Scottish trades, with exploitation by tradesmen and manufacturers at all levels. A growing infrastructure to support the mining and other communities that worked the system grew to encompass areas south of Cumberland, into Scotland and Northumberland, traders amassing to buy produce in exchange for silver to then be minted at home (Blanchard 2001: 629-39).

The trade boom that ensued in about AD1136-38 instigated an enormous repercussion on the local economy. It saw foreign traders at the terminals of the silver routes who sold foreign foodstuffs and commodities in exchange for the silver or coinage produced. This positively affected the Scottish and eastern trade routes, as well as Burgh-by-Sands, where ships of Flemish, Gaelic and Frankish origins anchored in the ports, and goods seen trafficking into Carlisle were exchanged for goods acquired from England with the English merchants in the city itself. (Blanchard 1996).

The late AD1140s saw a decline in silver production followed by the extinction of the silver from the veins, reversing the economy to that of AD1133-5 but even more devalued (Lancaster 1915: 207), leaving Carlisle with a changed and depleted economy also lacking in provisions from the normal routes.

King David between AD1133-52 became a force to be reckoned with in construction and commerce (Pinkerton 1789: 439-56), increasing the power and wealth of Scotland (Barrow 1985: 154). That, along with the commercial network and infrastructure of powerful merchants and churchmen, saw David as a formidable neighbour to the north of England, particularly Cumberland, in the arduous times ensuing.

Monastic houses and individuals reserved safe accommodation in Carlisle; principal houses or simple burgages being retained, possibly the origins of much of the street plan of Carlisle (Grainger & Collingwood 1929: 13), but no records survive for these properties, except for tenuous links from deeds, rentals or survey in other documents. The existence of the Carlisle Cartulary for the priory would have proved invaluable in this study, as other Mediaeval Period documents are scarce. The three gates mentioned in AD1190 (Parker 1905: 109), as English, Irish and Scotch Gate, were probably built for added security in response to trafficking in and out of the city by the merchants and traders.

The Pipe Rolls of the Exchequer provide further information about the general pattern of the settlement in relation to Carlisle, particularly for the twelfth century. Reference made about the ancient Church of St Alban's in the Pipe Roll for AD1201 (Exchequer 1847,) describes the boundaries between properties on Scotch Street and Fisher Street (Jones 1976: 95). Evidence of this church has never been found, but, as it was built in antiquity, it may have been constructed of wood, and difficult to locate.

There is no indication sometimes in the Pipe Rolls whether a paragraph relates to the previous one discussed. This is particularly important in relation to forests as the making of an assart was levied, as was the growing of crops from it in the initial stages. This has a bearing on how many areas were being taken into cultivation as a source of increased production of foodstuffs. The implication then is that assarts were only taken into cultivation in response to the need for increased supply. As well as this, a sizeable crop of oats were grown in AD1231-2, possibly indicating the need for a crop that would give a good return irrespective of the soil conditions, as oats can be grown on poorer soils, and could easily form the basis of the food economy in times of shortage or used for animal feed (Bond *et al* 2000; Shaw 2002).

Several incidences can also be seen in the literature where rents were raised and woodlands were turned to cultivation as in the year AD1222-3, but also a tanning and a fulling mill were mentioned, indicating increased production needs (Parker 1905: 1-2). This may be in response to the killing of cattle or sheep held for noutgeld. A bake-house built in Penrith mentioned in AD1223-4 (Parker 1905: 6), may indicate the increased demand for bread.

The year AD1231-32 (Parker 1905: 35) mentions the sowing of corn, and 104 acres of oats. In addition, the forest brought in fines in AD1232-33 (Parker 1905: 40), as well as 10 acres of woodland taken under assart and cultivated. Again, in AD1234-35 (Parker 1905: 50), revenue was listed for oats, oatmeal and malt from rents. In the year AD1242-43 (Parker 1905: 93) the amount of cornage payment was reduced, probably as there was less of a crop. In AD1244-45 (Parker 1905: 106) the toll levied on herrings may indicate large catches. Numerous fines referring to Forests were listed for AD1252-53 (Parker 1905: 152). Increased production was probably in response to the population growth as a result of the mining and commercial activity in and around Carlisle.

Work on Carlisle Castle was recorded numerous times, as in AD1223-4 (Parker 1905: 6); buildings within the castle were also repeatedly repaired. In AD1239-40 (Parker 1905: 35), a charge again appears for repairs to houses inside the Castle. In AD1240-41 (Parker 1905: 82) repairs were done to the bridge over the Castle moat, as well as the Great Chamber and the larder. The completion of much of the building works was achieved though in the thirteenth century when it was finally brought up to standard. The three gates of the city were also then in use. This work may have been the result of the Scots coinage though as Alexander II had held the town since AD1216, continuing in occupation until his death in AD1249.

In AD1240-41 (Parker 1905: 82), a pound of cumin was paid for services from the manor of Maulds Meaburn to Carlisle, granted in that year. The plant now occurs as a very rare casual in the British Isles, mainly in Southern England, so it was an exotic in the Mediaeval Period, thought to have lost its popularity in the Middle Ages. An unusual choice for a payment, and possibly a quirk of a Royal cook it is also an indication of the breadth of knowledge of exotic herbs and spices.

The year AD1242-43 (Parker 1905: 93) saw the amount of cornage payment reduced, possibly from a lack of return from the three manors ceded to the King of Scotland in AD1238, especially as they appear listed as paying tallage for this year. In AD1244-45 (Parker 1905: 106), licence for a mill was given to Upperby. In AD1247-48 entries made for adjustments during the previous nine years, when the King of Scotland held certain lands mentioned above from the year AD1238, excused certain arrears owing. This may have been the time when the lands reverted to English rule, as the following year Alexander of Scotland was charged for his custody in Northumberland.

Tallage was listed in AD1249-50 (Parker 1905: 133) for Rickergate and the suburb of Carlisle, formerly ceded in AD1242. Tallage was also listed for Carlisle, Stanwix and Ousby. Mentioned above in the year AD1251-52, these entries would not have occurred in the Pipe Rolls discussed here, and it is a mystery as to why they were inserted in the translated part, other than to say that revenues were donated to the Churches, Priories or Abbeys of Carlisle. In years AD1251-52 and AD1252-53 reference was made to 200 stags or hinds being salted and taken to York when the English King ruled. The many fines listed may be a result of land brought back into English rule, lapsed rules and forestry laws again being levied and also an indicator of lean times when revenue needed enhancing. The year AD1257-58 (Parker 1905: 179) sees the 'Profit of the County' paid as £100 rather than 100 marks, an increased sum. The purchase and transport of cattle were listed and money was raised from the chattels (possessions) of refugees and from fines. This possibly also indicated a poor year.

The fire of AD1292 destroyed much of the city (Maxwell 1913: 87-9), so enabling alterations in the town plan to take place after that period, although it is not known what area the fire covered. Valuable information may have been lost during this phase, both in terms of archaeology and loss of written records pertaining to both the old and the new phases. The portion of the book listing the entries for Westmorland sees only four entries made for the same forty-three year period, occurring in the years AD 1235-36, 1242-43, 1247-48 and 1257-58. The payments recorded for these periods are by private individuals regarding assistance from the law courts or as penalties. Goods of outlaws and fugitives were listed as confiscated, as were the proceeds of fines. It is assumed that the English King was still ruler of Westmorland and therefore due the fines and monies raised from the county.

Little evidence is seen for the existence of the town of Carlisle before AD1092 when the Normans arrived (Earle & Plummer 1892; Rollinson 1978), any clues remaining probably exist under the cathedral, St Cuthbert's Church and south from there, then following Blackfriars Street (Jones 1976:96). As well as churches being well known for the reuse of former settlement or sacred sites on which to stage the base of their new power, this position of the city was by far the easiest to defend in any period, as it was situated on a bluff. To the present day, not many artefacts or contexts have been recovered dating from between the Roman and the Middle Mediaeval Periods, although other evidence exists indicating there was activity during this period within and around the city. During that interim period though, any buildings would probably have been of timber construction, and so very ephemeral in the archaeological record, especially after the redevelopment of the town in various later phases.

It is difficult to unravel the definite areas of lands described in many of the old documents, not only for reasons of translation. More often, they were only referred to by way of those other lands to which they abutted or adjoined. There are many references that could have been listed here but they describe only the personnel involved in the claims, not the actual position of these tracts of land within the city, and so it was not possible to link them to the precise area of the study. Therefore, it is difficult to assess the use of the piece of land excavated in the study. Mainly reference to it comes from conjecture, or tenuous mention in passing, relating to the person or persons who owned the land, or brief mention of an adjoining or closely placed building or church, and that only if it is of importance. The main body of this text though serves to document the growth and change of the city of Carlisle in response to the changes taking place in and around it, sometimes greatly affected, both positively and negatively, by the realm of Scotland and the trade from such as the mines.

3.3 PLACE NAME EVIDENCE

The history of Carlisle stretches back to the pre-Roman times, as does its name, adjusting or metamorphosing over the millennia with changes of government and leadership (Armstrong *et al* 1950; Cameron 1963; Lee 1998; McCarthy 2003). The Romans came to Carlisle in about AD80, led by Agricola, and began the recorded history of Carlisle as a fortified town with the establishment of the first fort (Jones & Mattingly 2002; McCarthy 1993). Hadrian's Wall was then built between AD122-30 (Embleton & Graham 1984: 311-6).

Carlisle in the Roman Period had two principal names associated with it. In the latter half of the second century it appears twice in the Antonine Itinerary (Isaac 2002), recorded there as both *Luguvallo* and *Luguvalium* (Rivet & Smith 1979: 301, 402). Around this time, *Luguvalium* seems to have been granted special status. The area flourished having a large number of houses, shops, administrative and other public buildings until the end of Roman occupation around AD400 (Giecco *et al* 2004). In the Ravenna Cosmography from the seventh century AD (Richmond & Crawford 1949: 129) it was referred to as *Lagubalumi*, slightly differing by various transcriptions and translations, as well as the copying of the name into different texts over the millennia. Both these entries indicate the importance of the town during this period as an administrative centre (Gosling 1976). The Roman name for Carlisle though is generally taken as *Luguvalio*. *Luguvalio* is not of Latin origin although the Romans called the city by this name; it is more likely to be of Celtic origin, from the name *Luguvalos*.

Known also as the 'civitas Carvetiorum' or town of the Carvetii, one of the Brigantes Tribes (Edwards 2006: 221-6), Carlisle was then an independent administrative centre. Civitas were towns that loosely followed administrative areas of the pre-existing Celtic tribal territories governed independently by the Celts. Becoming Romanised gradually, the town carrying a Celtic as well as a Roman name. The Roman name *Luguvalio* had been changed greatly by AD1106 to *Carleol*, the modern name Carlisle being a derivative, later Normanised by addition of the s (Armstrong *et al* 1950; Cameron 1963; Lee 1998; McCarthy 2003). The word *Caer*, is from the Welsh for castle or fortress of. The names *Carleol* or *Carlisle* mean 'the fortress of Luguvalos'. Little is known of Luguvalos except that he was a Celtic noble, possibly of the *Carvetti* tribe (Higham & Jones 1985). After the Romans left, the town, fort and Hadrian's Wall fell into ruin when Cumbria became part of the Celtic Kingdom of Strathclyde, consequently separating into the smaller Celtic Kingdom of Rheged (Smith 1967), and possibly after an inheritance from father to son by the King of Strathclyde. This was the time when the name Luguvalium became Leul and the prefix of Caer was added, maybe an indication that Rheged had a Welsh link. From the chronicle of Florence of Worcester in about AD1118, Symeon of Durham relates that 'Lugubalia' or 'Carleil' was the same city that had been destroyed by the pagan Danes 200 years before and hence remained deserted, presumably until William the Conqueror rebuilt it (Arnold 1885: II 220). This was seen as evidence that the two names relate to the same town.

4 RESULTS AND DISCUSSION

Evidence of the Early Mediaeval Period from the excavation was limited. A dark earth, context 371, overlay a building of Roman date in Phase 6a (p31). A series of post pads and pits were seen in Phase 6b (p32) where the footprint of a structure measured 14 by 10 metres. Patches of clay, possibly associated with the floor of the structure overlay context 371 discussed above. Other contexts from the Early Mediaeval Period may have been present but not recognised as such. The Early Mediaeval Period showed activity in this area but was very elusive. No samples were recovered from those contexts during excavation signifying a loss of information concerning their deposition.

Phasing of the excavation determines the Middle Mediaeval as between the twelfth and fourteenth centuries and the Late Mediaeval as the fourteenth to fifteenth centuries. The end of the Mediaeval Period is taken as AD1485. The Middle Mediaeval sequence from the excavation, broadly defined by the re-appearance of pottery, began in the early twelfth century seeing the cutting of numerous rubbish pits throughout the site. The most significant Mediaeval activity was defined by a series of fourteenth century pottery kilns. These heavily truncated kilns represent the only example of Mediaeval pottery kilns discovered within Carlisle and they had gone out of use by the late fourteenth century when numerous rubbish pits were dug across the site associated with Mediaeval Period buildings that fronted Scotch Street. No remains survive of these buildings as the Mediaeval frontage area was cellared in the Victorian Period. (Giecco *et al* 2004).

The most significant feature excavated was a probable pottery kiln, context 305, part of which can be seen in section in Figure 16 (p104). The earliest deposit within this feature was a silty clay, context 309, that appears to be the initial levelling deposit of the site. One stone of a flagged floor base remained in situ and may have formed part of a splayed opening of the flue and stoke hole, although this part of the kiln had been destroyed by later pitting. The kiln walls were of clay construction, context 306, that showed signs of intense heating and at least one episode of relining. The final period of intense heating associated with this deposit of baked clay was dated absolutely to AD1370-1400. This layer was then covered by a thin band of charcoal, context 307, that obviously related to the final use of the feature. The area of the hearth/kiln was then in-filled with a dark brown sandy loam, context 194, which concluded this period of intense activity in Area 2. (Giecco *et al* 2004).

If this was a small pottery production site as suggested by the presence of pottery wasters in the adjacent areas, at least some portions surrounding this area must have been under cover to keep the elements from the clay preparation and potting area. No obvious structural remains of any substantial buildings survived, with the only evidence of any form of shelter coming from an arc of five stake holes, contexts 701 to 705, cutting into context 191. These may represent all that remains of a wattle wall that could have been part of a temporary structure associated with the kiln. The build up of a dark brown garden soil extending over Areas 1, 2 and 4, ended this period of intense industrial activity. This layer appeared to represent a gradual soil build up. Although heavily truncated the boundary appeared to turn eastwards on the line of Rosemary Lane and could mark the delineation of the property boundary. (Giecco *et al* 2004).

A small pit, cut number 156, in Area 3 contained two fills. Sample <1> was recovered from the primary fill context 157. The upper fill context 117 contained pottery dated to the late fourteenth to early fifteenth century. Later Mediaeval Period deposits here were truncated by nineteenth century construction levels. In the Late Mediaeval and Early Modern Period the area witnessed very little activity and appears to have been set-aside as gardens, possibly visible in Figures 3 and 4 in Section 1. There was a possible property boundary, perhaps the precursor to Tower Lane, along with two wells excavated in the area. The next major phase of activity related to the late eighteenth /early nineteenth century redevelopment of Scotch Street. (Giecco *et al* 2004).

The damp conditions at the bottom of the strata from the site served to preserve the recovered assemblages well on the whole. Even those higher up in the sequence were quite well preserved, although much material may have been degraded since deposition of the contexts, and quantity is very difficult to assess. Contexts for further analysis , selected from the assessment phase, were selected using two criteria. These were those that contained many plant remains, particularly charred material and additionally two controls, one from the Roman Period Sample <76> context 679 and one from the Pre-Roman Period Sample <77> context 683. No areas or features were pre-selected for in this study, but the assessment phase was examined for samples that had yielded particularly good data, except in the cases of the two control samples. To determine the nature and range of species present the environmental samples selected for this study were critically recorded to maximise the information recovered.

Contextual information appears in Table 2 below. Context and artefact information from the assessment stage was used to determine the phase of the excavation from which each matrix was removed. In most cases, this was definable from the pottery recovered within the matrix or that had been hand recovered at the time of the excavation. Dating of some of the contexts though was more indeterminate and had to be extrapolated from those matrices that occurred above and below those used in the study.

Most tightly dated was Sample <14>, context 194, by the absolute dating technique of archaeomagnetic methods. This gave a date within the range of AD1370-1400, the late fourteenth century. By means of typology as well as artefact and other associated contextual information recovered samples <8>, <10>, <14>, <29>, <47>, <70> and <71> were all classified as being from between the twelfth and fourteenth centuries and so fell into Phase 7 of the site that encompasses the Middle Mediaeval Period.

Sample <1>, context 157, was determined from the contextual information as being from the fourteenth to fifteenth centuries. Samples <6>, context 204, and <7>, context 205, were the most difficult to date. No pottery evidence was recovered from context 205. This layer though was above context 114 from which pottery with a fifteenth century date was recovered. This then, by association, gives a date of the same as or later than context 114, that is then equivalent to, or later than, the fifteenth century date that was assigned to context 114. As context 204 lay above context 205 this layer can also be loosely dated to the same period, especially as context 204 is below context 116. Pottery from context 116 ranged in date from the eighteenth century to the Late Mediaeval Period recovered from the matrix. Samples <1>, <6> and <7> were then defined from the site phasing as being from the Late Mediaeval Period.

The context data is summarised in Table 2 below. Table 2 displays contextual and dating evidence for the contexts from which the samples came and was followed by discussion on each separate sample in Section 4.1. These results were summarily demonstrated in Tables 3, 4 and 5 below in Section 4.2. Discussion of the plant material and other indicators affiliated to samples then took place. This was related to Charts 1, 2 and 3 below, further discussion of which occurs in Sections 4.2.1-4.

Context Data for Samples from the Site of 42-48 Scotch Street, Carlisle, Site reference NPHT03 (North Pennines Heritage Trust 2003), Site Code CAR-A

Sample number	Context number	Site phase	Site area (Figure 8)	Context Type	Context Above	Context Below	Context is Fill of	Date of Pottery
1	157	M	A3	Fill	156	100	156	
6	204	M	A2	Layer	205	116	252	
7	205	M	A2	Layer	114	204	252	
14	194	M	A1	Layer	192 320	307	305	12th/ early 13th C
DATING BY ARCHAEOMAGNETIC METHOD OF AD1370-1400 RECOVERED								
8	216	M	A2	Layer	291 217 276	114	252	
10	181	M	A3	Fill	182	180	145	
47	474	M	A2	Fill	677	445	473	13th C
70	661	M	A2	Fill	662	363	350	
71	662	M	A2	Fill	350	661	350	13th C
29	304	M	A3	Fill	264	303	264	
76	679	R	A9	Fill	644		644	2nd C
77	683	SR	A9	Layer	Level of Excavation	134		

Key: Colours as for Tables 3 & 4 below C = century	LATE MEDIAEVAL
	MEDIAEVAL
	ROMAN
	PRE ROMAN

Table 2: Context Data from the Assessment Report (Giecco *et al* 2004)

4.1 How the Results Were Obtained and Recorded

To determine the nature and range of species present the environmental remains selected for the study were intensively recorded to maximise the information analysed from them and appear in Tables 3, 4 and 5 below. This information was then used to determine the type of environment present at the time of deposition of the material. The plants of economic importance were analysed to determine their origins and subsequent role on the site, thus leading to an understanding of specific uses for deposits, buildings and phases of occupation. Other species were analysed with a view to informing on the habitat and diversity of the environment and to assess whether material had been brought into the site from other areas. It may be possible through the study to trace exotic species of plant as introduced by the Romans or traded from other areas of the country or even greater distances.

Additional advice on economy, ecology, environment and preservation from Jacqui Huntley, English Heritage North East Regional Science Adviser and Charlotte O'Brien of Archaeological Services University of Durham were of invaluable encouragement and help. Other resources used in this area were Allaby (1994), Andeberg (1994), Badham & Jones (1985), Beijerinck (1947), Berggren (1969; 1981), Cochran (1963), Cronyn (2001), Dennell (1976), Green (1982), Greig (1989), Grieve (1977), Hall & Kenward (1990), Hastorf & Popper (1988), Hillman (1981), Holm *et al* (1981), Hubbard (1975), Hubbard & Clapham (1992), Huntley (1995), Hyde & Wade (1978), Ilic (1987), Jones (2002), Jones (1991), Jones *et al* (2004), Kenward & Carrott (2006), Kenward & Hall (1995), Letts (1999), Martin & Blarkley (1972), Micsicek (1987), Orton (2000), Pearsall (2000), Popper (1988), Reynolds (1981), Ross-Craig (1956), Schoch *et al* (1988), Smart (1988), Stace (1997), van der Veen (1984; 1985), and van der Veen & Fieller (1982).

Of all the preparation methods in bringing a crop to the point where it can be used for consumption, few lead to the deposition and ultimate survival within the fossil record. What then is the purpose of quantification? It provides an accurate account by which comparisons can be made. (Hubbard & Clapham 1992). It is therefore paramount to select the correct method of quantification for comparisons to be made with parallel studies running concurrently or as part of future research (Popper 1988: 53-54). A count of absolute numbers of each taxon present in samples is rudimentary but easily reproducible and can provide explanations for its presence and economic importance (Dennell 1976). It is though time consuming and labour intensive when time and budget are constrained, also assuming that the remains reproduce processes leading to their deposition or economic origins (Dennell 1976). If account was taken of the biases introduced quantification could be used with other analytical techniques to successfully interpret botanical remains. It is important that data be standardised for comparison otherwise trends may not be apparent due to differentials in groupings (Pearsall 2000: 12). Quantification of some botanical remains can occur with the little, more, many approach, analysed by weight or volume, rather than as individual units as it is not always necessary to quantify them as numbers (Pearsall 2000: 12), merely a representation of the whole from which they came. Difficulty with these methods occurs though with the small, light, fragile quantities of plant material requiring refined, delicate methods of assay for accurate measurement (Hubbard & Clapham 1992).

The method used here was that of the richness scale discussed above for plant macrofossils and other constituents recovered from samples and demonstrates proportional representation of constituents as part of the whole. In the text relating to each sample, minimum counts were stated for charred material with an abundance scale for uncharred or more numerate material. A 'minimum count' was done on charred grain and other rare material to ensure precise counting with no repetition or false representation. The majority of material was quantified using an abundance scale (3= Abundant, 2= Frequent, 1= Present, 0= Absent), a four point scale based on that employed by Hall and Kenward (1990: 297), used with repeatable integrity for material examined by Hall and Kenward in sites excavated at York (Kenward & Hall 1995).

The initial recording of material recovered during the study took the form of a table. The written information was then transposed to excel data Tables 3, 4 and 5 seen below. Results were then discussed by sample and context number individually. Results were further summarised in Section 4.2 below as Charts 1, 2 and 3, where the occurrence of plant macrofossils in differing ecological niches is demonstrated to determine whether there was any differential between periods encountered during the excavation.

4.1.1 Introduction

From the environmental assessment phase, it was noted that several contexts contained relatively low diversities of seed species. Generally, contexts containing the highest diversity of seeds also had the greatest variety of material in the retent contents. This may suggest that these contexts were associated with areas of refuse deposits or cesspits where domestic rubbish and food were deposited. Areas with least variety may be indicators of internal or well-trodden surfaces where, following deposition of material, wear and tear of these areas lead to low recovery of plant matter post-depositionally. The diversity of plant species associated with the samples then fell into two main categories. The first was of charred grains related to weed seeds of arable land, and usually associated with a quantity of charcoal. The second category was that of weed seeds, sometimes in association with fruit pips and stones. These were also recovered from pits, most probably of cess, as there was very little charcoal associated with them and intestinal parasites were present in some. Flax seeds were found in several of these contexts, also possible indicators of cess as they were used medicinally for stomach upsets. (Giecco *et al* 2004).

Discussion in this section will follow the format of the abundance counts as in the tables; where a seed is 'present' in the flot it is listed as an abundance of 1 in the following tables. 'Frequent' here would rate 2 in the table and 'abundant' would rate 3. Seeds not recorded are not present and therefore have a value of zero or – in the table.

4.1.2 Results and discussion for Sample <1> Context (157)

Sample <1> Context (157) was recovered from Area 3. A small pit had been cut into context (142) as cut (156); it contained two fills as (157) and (117) that produced material dateable to the late fourteenth/ early fifteenth centuries. Had there been any later Mediaeval deposits these would have been truncated by the nineteenth century construction levels and cellaring that occurred in some areas of the site. From the assessment phase, it was noted that this sample contained charred grain and weed seeds of arable land with an abundance of charcoal. Small mammal bones were also recovered, and a few bones from bird skeletons. Burnt bone also occurred frequently and the main matrix of the residue was stones and gravel. (Giecco *et al* 2004).

Discussion. Charred 'blown' grain was recovered from the sample that was in a very poor state and as such could not be properly quantified. Some charred wood fragments were also present that it would be possible to identify and charcoal was abundant in the flot. Charred grain was present as *Hordeum* L., barley species, as a hulled and a naked grain. Two charred oats in an ash matrix recovered were small with four larger ones also present. Charred grain of indeterminate genus was also present. There was no charred chaff present, but two pods of the arable weed seed of wild radish (*Raphanus raphanistrum* L.), still linked together, were recovered. Other charred weed seeds of wide niches present were good-King-Henry (*Chenopodium bonus-henricus* L.) and docks (*Rumex* L. sp.) A fragment of charred moss was also recovered.

Uncharred material present were fibres or moss matting with a few small vertebral fish bone fragments and some worn small mammal bone. Mineralised material present as uncharred moss leaves, seeds of elder (*Sambucus nigra* L.), the ruderal pale persicaria (*Persicaria lapathifolia* L.), and *Rubus* L. sp., a wide niche weed of such species as blackberry and raspberry. Wild Mignonette (*Reseda lutea* L.) that can inhabit arable or ruderal places was present, as was chamomile (*Chamaemelum nobile* L.) that may grow as an arable weed seed or in wider niches.

Interpretation. This sample was recovered from a matrix of the Late Mediaeval Period, pottery recovered from associated contexts being dated to the late fourteenth or early fifteenth century. The charred grain recovered from this sample had probably been exposed to very high temperatures with an amount of oxygen present as it had a 'blown' appearance, somewhat like popcorn except that it was charred. The oats did not display this feature but that may be because the grains are narrower and as such were less affected by heat differentials as they heat through more evenly. The ash matrix from which the oats were recovered could indicate that the grain had dropped through the fire, possibly when being dried or cooked, thus positioning them in an area of the fire that may have had less oxygen present and so less intense heat by which to distort them.

The lack of any charred chaff may also be an indicator of high temperatures burning the small fragments off or it may have been that the grain was 'clean' and so did not contain any chaff fragments, a distinct possibility as there was only the arable weed seed of wild radish present. The charred good-King-Henry and docks (*Rumex* sp.) were weed seeds of wide niches and could have come from the domestic area. Some charred wood fragments were also present that could be identified given the opportunity.

The presence of charred chamomile (*Chamaemelum nobile* L.) is interesting in that it is an old herb, well known to herbalists. It grows wild and has medicinal properties as an aromatic plant used as a stewing herb in the Middle Ages and purposely planted to be walked on, the smell then being released as beneficial to the inhaler. Supposedly it gives health to gardens if planted, is used as a general tonic and stomachic by inciting gastric digestion, a pain reliever and anti spasmodic. It is well known now and possibly also in the Mediaeval Period, as a calming infusion. (Grieve 1977). It is possible then that, as the seed was charred, it is indicative of the plant being used for cooking or as an infusion.

The presence of the small mammal bone indicates scavenging or nesting of these animals, although species was not stated in the assessment report. It is an indicator of enough waste food present for them to survive. The presence of the fish bone indicates their use as a food source. The fish remains, along with the charred grains indicates the pit was mainly a rubbish pit. Remains of both fires and domestic refuse being put into it seen from the recovery of the uncharred material and the burnt bone.

No large mammal bone was recorded in the assessment report as being recovered from this context. The small mammal bones that occurred may indicate that those animals were associated with the area where the birds were reared or kept, as bird bones were also recovered. This may indicate the presence of refuse or discarded food matter used as bird food. Either would attract small mammals as scavengers.

4.1.3 Results and discussion for Sample <6> Context (204)

Sample <6> context (204) was recovered from Area 2. This sample comes from a complex series of events, determined from the assessment report to be of Late to Middle Mediaeval date. Samples <7> and <8> discussed below were also in this series. A square pit, interpreted as related to an early kiln feature, was filled by a series of charcoal rich deposits. These deposits were then cut by a large pit, context (221), that was filled by a series of dark grey silty clay deposits that contained large quantities of burnt sandstone and significant amounts of charcoal. Sample <6>, context (204) was the uppermost fill of feature (221) and one of the contexts that sealed a wooden trough that could be associated with the final phase of the oven/kiln sequence of context (194), seen below as Sample <14>, possibly a clay working water trough. From the assessment phase, the plant material from this matrix fell into the category of charred grain and charred ruderal weed seeds with a lot of associated charcoal. If this series of oven/kilns was for the small-scale manufacture of pottery it is likely there would have been a series of small structures around the kiln to cover the clay processing areas for the pottery and shelter it from the weather. (Giecco *et al* 2004).

Discussion. All material recovered from this sample was charred and mainly charcoal, the largest fragments being 2x2x2cm. The charred material consisted of wood fragments, charcoal with a few fragments of coal, a piece of straw and a culm node. Cereal grains were present but some were too distorted to identify them to genus. Some were also very worn and had lost their outer coating. Actual counts of those identified were barley (*Hordeum* L. sp.) 16, oats (*Avena* L. sp.) 2, indeterminate 17. Some wheat (*Triticum* L. sp.) were probably present as chaff occurred as a wheat rachis, and a bread wheat (*Triticum aestivum* L.) node. Other charred material were fragments of round wood, heather, monocot root bases. Ruderal seeds of ribwort plantain (*Plantago lanceolata*) and arable weed seeds of fat-hen (*Chenopodium album* L.) were also frequent with other unidentifiable charred species present. Seeds of wide niches were present as knotgrass (*Polygonum* L.) species.

Interpretation. As stated above this context forms part of a complex area of various kilns or ovens associated with the manufacture of pottery, as do Samples <7> and <8> discussed below. It was often the case, particularly in the Mediaeval Period, that such features had secondary uses. This context appears to have formed from one of the draw outs from the oven/kiln structure when the spent fuel was raked or drawn out and was then often left in situ as a deposit around the structure. These contexts may have been periodically removed, not only to make room for more but also to provide surface material or even to improve fields or garden plots in the area.

For the firing of pottery, such a structure would need to reach fairly intense temperatures. As a secondary use for either cooking or grain drying, the temperature would have to be considerably lower for approach to the fire to be gained. This could then only occur before the firing started or on nearing its completion when the pots were cooling. Large structures for the manufacture of pottery, such as those built to the same pattern as the Mediaeval Period and still used today in Morocco for instance, are generally sealed after a period. This both stops the fire by starving it of oxygen whilst allowing a steady drop in temperature that prevents the pottery from cracking by heat stress. Such kilns, when they reached temperature, were sealed after a period of time. The use of small pottery kilns often resulted in them being broken open to extract the pots. The structure was actually built over the fire and the pottery to be fired in it, after which the hearth could be used to dry grain or cook. (Musty 1974).

The charcoal recovered was obviously that removed from the kiln/oven process and would benefit from identification to aid the wider evaluation of the surrounding environs in determining woodland management practices. All the plant matter recovered from the sample was charred. The charred cereal grains had been exposed to high temperatures that had 'blown' and distorted them.

The presence of the charred ruderal weed seeds and those of wider niches could be a result of the material, be it the wood for the fire or the grain to be cooked or dried, being kept in the interim period before entering the kiln or oven; these local weeds would then become contaminants of the material. They are probably then local contaminants from the immediate environment. The ruderal and other seeds may also indicate the area was, apart from the associated features, fairly derelict or littered with waste material.

4.1.4 Results and discussion for Sample <7> Context (205)

Sample <7> context (205) was recovered from Area 2. Again this sample comes from the same complex series of events, determined from the assessment report to be of Late Mediaeval date and was below Sample <6> context (204). It was an area of compacted burnt clay that lay above (114), one of the contexts that sealed the wooden trough, and the possible clay lining of another hearth or oven feature. This occurred sequentially above other distinct analogous features resulting in a succession of hearths or ovens. An amount of charred grain was associated with this context as well as weed seeds of arable land that was also seen in other contexts associated with these features as (216) and (277). Small charred wood was present as well as some burnt bone. (Giecco *et al* 2004).

Discussion. The charred material was given total counts in the discussion. As cultivars a grain of indeterminate wheat species was present. There was also chaff from 2 charred culm nodes of bits of straw. Bits of bread wheat chaff were present as 2 nodes with a fragment of rachis internode. The arable weeds as 2 seeds of fat-hen (*Chenopodium album* L.) were present. A charred ruderal occurred as a seed of nipplewort (*Lapsana communis* L.). Other charred seeds, all examples of wide niche plants occurred as 1 cinquefoil (*Potentilla* L. sp.), 1 of a buttercup species (*Ranunculus* sp. L.) and 1 of common chickweed (*Stellaria media* L.) with 2 of knotgrass (*Polygonum* L. sp.). Present as uncharred seeds were fat-hen (*Chenopodium album* L.) and seeds of the Rosaceae or rose family.

Interpretation. No large mammal bone was recovered from this context. Air fall spatter was present though, suggesting some kind of metal working process on or around this area as it forms globules in the air during metal working processes. Young leaves of the plant nipplewort are edible and can be used as salad or cooked (Plants for a Future database electronic resource). Again indications were that the weed seeds, particularly the ruderals, were introduced to the matrix as it was being stored or awaiting processing before the assemblage entered the hearth or kiln when charring occurred.

4.1.5 Results and discussion for Sample <8> Context (216)

Sample <8> context (216) was recovered from Area 2. This context was above the in situ trough discussed in Sample <6> context (204) and so part of the same complex of features and contexts associated with them, dated to the Middle Mediaeval Period. Context (216) was the layer directly above the trough and formed the bottom of a series

of three successive dumps of charcoal. Over this lay context (205) from which Sample <7> was taken, a compacted burnt clay. Charcoal predominated in Sample <8> with charred grain and charred weed seeds of arable land present. Unusually though there were several other charred weed seeds also present.

Discussion. Sample <8> context (216) consisted mainly of large fragments of oak charcoal that was assigned an abundant score in the interpretation. All the seeds were charred, some occurred as fragments associated with cereals, as well as seeds of species that occupy wide niches, with arable and ruderal species present. The cereal components were an indeterminate grain that was very badly blown as well as a nicely preserved one of barley (*Hordeum* L. sp.). Two basal rachis nodes of barley were also present. Charred seed of cornflower (*Chrysanthemum segetum* L.), a weed of arable land, was present as was fat-hen (*Chenopodium album* L.). Seeds of the charred ruderal knotgrass (*Polygonum aviculare* L) were also present.

There were many charred weed seed species of plants that inhabit a wide range of niches. The following were present in the sample with a presence-absence value of 1 as they appeared too frequently in the 500mls of flot recovered to be counted. These occurred as the cabbage family (*Brassica* sp L.), meadow grasses (*Poa* L. sp.), knotgrasses (*Polygonum* L. sp.) that had lost their outer coats and so could not be identified further, cinquefoils (*Potentilla* sp. L.), buttercups (*Ranunculus* L. sp.), and Rosaceaeous achenes as Potentilla like seeds that have lost their outer coating, and sheep's sorrel (*Rumex acetosella* L.). Other dock species (*Rumex* L. sp.) were frequent in the sample, but there were no outer seed heads of perianths as seen in other samples, possibly due to the charring. Sedges (Cyperaceae) from wet habitats were also frequent as both trigonus and lenticular species.

Interpretation. Although crop seeds as charred grain numbers and the arable weed seed cornflower were low in this sample they still occur, indicating their presence in relation again to the features of oven/kiln structures as a secondary use. The fact that they both occur charred also indicates that the crop had not been cleaned properly before entering the environment from which it was recovered. This may indicate small-scale crop production locally, especially as ruderal seeds were also introduced to the assemblage and before charring, probably from the immediate environment.

What is interesting in this sample is the occurrence of many weed seeds of wide habitats with the frequent occurrence of wetland sedges as well as docks, all associated with an abundance of charcoal. All the material recovered was charred. This may reflect the use of peat as a fuel source from the seeds and other plant remains recovered in this sample. This charred assemblage indicates peat debris with the presence of monocotyledon root debris, and the frequent occurrence of sedge nutlets. Given the high number of sedge nutlets that occurred this charred material probably originated from sedge peat.

4.1.6 Results and discussion for Sample <10> Context (181)

Sample <10> context (181) was recovered from Area 3. A large pit in the centre of Area 3, cut (145), truncated three earlier pits. Pit (145) had a diameter of 3m and measured over 1m in depth and contained 12 organic rich fills of which context (181), Sample <10>, was one in a sequence. The context information indicated it dated from the late thirteenth to early fourteenth centuries. The diversity of seeds in Sample <10> context (181) was that of charred grain and weed seeds of arable land, associated with a quantity of charcoal.

Discussion. Lumps of wood were frequent in this sample and magnetic residue as fragments of hammerscale was also frequent. A 30ml glass vial was filled with charred bread wheat (*Triticum aestivum* L.). The exact quantity was unknown but was more than a hundred. Of these, a proportion were the subspecies (ssp.) *compactum*. Other charred material occurred as 2 charred rye grains (*Secale cereale* L. sp.), a very nice charred round split legume, possibly garden pea (*Pisum sativum* L.) and 3 charred common vetch (*Vicia sativa* L. ssp. *segetalis*). Charcoal and burnt bone were also frequent in the residue.

Uncharred arable weed seeds were present as the outer coating of Corncockle (*Agrostemma githago* L.), Corn Marigold (*Chrysanthemum segetum* L.), Corn Spurrey (*Spergula arvensis* L.) and fat-hen (*Chenopodium album* L.). While uncharred seed species from wide niches were present as good-King-Henry (*Chenopodium bonus-henricus* L.), *Rubus* L. sp., common or stinging nettle (*Urtica urens* L.), and a few other unidentifiable seeds. The ruderal pale persicaria (*Persicaria lapathifolia* L.) was also present. The cases of insect larvae were frequent in the sample.

***Interpretation*.** The main background component of this sample is cess with small fragments of charcoal frequent. The charred bread wheat is interesting as it is very well preserved but is mainly the compact variety, about 4mm long and 3mm wide, very short and squat. Some of the grains could be misinterpreted as barley but they were in fact all wheat (J. Huntley pers. comm.). The grain may comprise 2 subspecies. Assessment would require about 100 grains be measured and a length/breadth ratio done to determine whether two varieties are present. The assemblage would benefit from being thus analysed so that more accurate identification and quantification would be possible.

The assemblage could suggest a maslin crop, that is a crop of mixed wheat and rye, but presence of rye occurs as only 2 rye grains in an abundance of wheat. It is therefore not possible to interpret it as a maslin crop as this was not the primary deposition context; the matrix was moved from the primary location and deposited in this feature.

The presence of the charred vetch is also of interest. Zohary & Hopf (2000: 119) speak of it as a crop in the Roman Period. It can also be grown as a green manure; green plant matter that is spread on fields after uprooting, the benefit being that, as a legume, the nitrogenous plant matter is ploughed into the soil and is effective in maintaining the health of the soil over winter and into the new growing season (Woodward & Burge 1982). Seen as an integral part of the agricultural system in Mediterranean regions legumes, particularly vetch, are used as both fodder and green manure to enrich both livestock and crops with nitrogenous matter (Lloveras *et al* electronic resource).

4.1.7 Results and discussion for Sample <14> Context (194)

***Sample <14> context (194) was recovered from Area 2*.** Another series of features, this context was thought to be associated with a kiln, probably for pottery, and can partly be seen in section in Figure 16 below. This feature (305) consists of a large halo of red material, context (194), a compact heat affected layer of baked clay that surrounded a black carbon-rich deposit. The trough discussed in Samples <7> and <8>, as contexts (205) and (216) is thought to be related to this feature.

The matrix of context (194) exhibited fragments of clay from the superstructure of a kiln (Giecco *et al* 2004: 42, 73). The feature was very fragmentary and this context was dated by archaeomagnetic methods to AD1370-1400 for the final firing, a period of intense heating associated with this deposit of baked clay. There were several pottery

wasters recovered from the close proximity that were of a highly decorated ware, usually dated to the later thirteenth or early fourteenth centuries. This is consistent for the succession of the pottery kiln (305) by the later one (194) in the latter half of the fourteenth century. Sample <14> context (194) exhibited the effects of intense heating.

The feature had a flagged base that was sealed beneath another charcoal rich clay silt. This was context (308) that may be associated with the final firing. No in situ evidence existed of the roof of the kiln, it having probably collapsed, possibly forming the layer context (193) that, as would be expected, had not been exposed to the same high temperatures as other contexts (191) and (196) associated with the feature. The interpretation is that context (194), a compact heat affected layer of baked clay, could relate to a later kiln/oven feature that had been heavily truncated and had been constructed on the site of an earlier kiln. (Giecco *et al* 2004).

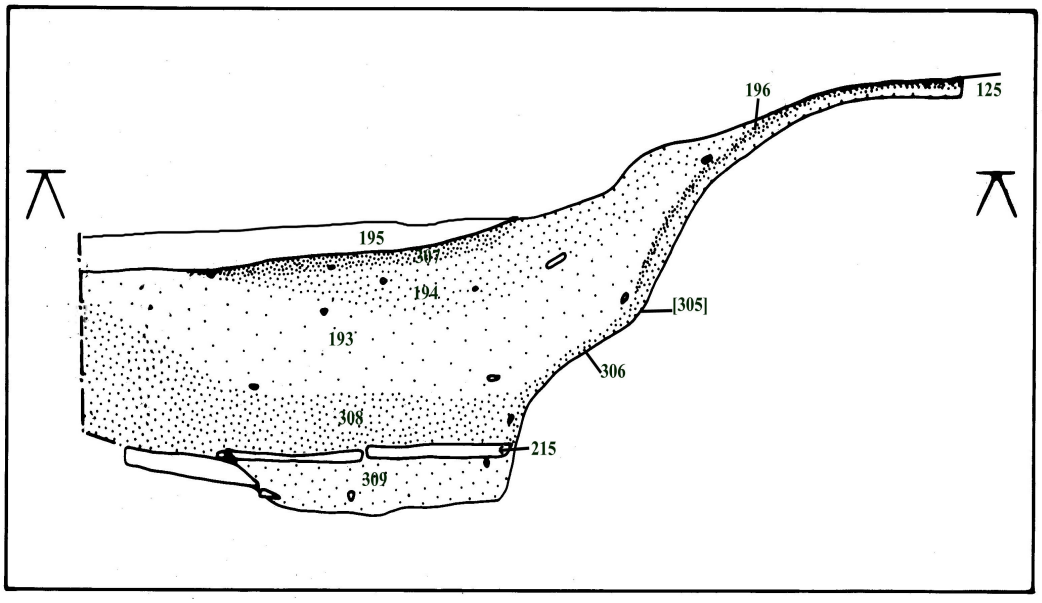


Figure 16: Section drawing showing context (194) (Giecco *et al* 2004)

Discussion. There were no uncharred plant remains recovered from this sample. The matrix of the flot was mainly charred wood as small fragments, the largest being about 1x1cm. The other fragments were much smaller with very few not charred. Metal plates of hammerscale and spheres or globules from airfall spatter with other magnetic material were frequent. Charred grain occurred as a bread wheat (*Triticum aestivum* L. sp.), a fragment of barley (*Hordeum* L. sp.) that may be hulled or naked and cannot be identified to species, and 2 charred oats (*Avena* L. sp.). There were also 2 charred grains of an indeterminate genus but no chaff was recovered to aid identification. Other charred material exhibited as the pointed tips of flax seeds (*Linum usitatissimum* L.) of which there were three, as well as one seed that was almost complete but very blown. Other charred seeds occurred as 2 of the knotgrass species (*Polygonum* L. sp.) and 1 of pale persicaria (*Persicaria lapathifolia* L.).

Interpretation. Flax was often grown as a crop in the Mediaeval Period, for both linen and the medicinal properties it has to relieve stomach problems (Potterton 1983: 77). Flax seeds ripen August to September. Flax contains between 30 and 40 % oil (Grieve 1977: 319) so when flax is charred, the high oil content makes the seeds explode and fragment or swell up and look bulbous. It appears that the seeds have fragmented in this case from the tips recovered, except for the almost complete blown example.

The charred remains of grain, flax and weed seeds again indicate the double use of the kiln/hearth feature. There also occur as frequent in this sample, metal plates of hammerscale and spheres or globules from air fall spatter with other magnetic material. This may be an indicator that metal processing was being carried out in or near the hearth or oven, either as part of the same series of events or close enough to it to register in the matrices. Magnetic spheres also occur in Sample <10> context (181) discussed above and Sample <71> (662) discussed below. For such a small flot of 5mls this was a very rich sample in terms of charred remains.

4.1.8 Results and discussion for Sample <29> Context (304)

Sample <29> context (304) was recovered from Area 3. A localised spread of silty clay was cut by a pit (264) that had been heavily truncated and contained the organic rich fills contexts (304) and (303), that had inclusions of twelfth to early thirteenth century pottery. (Giecco *et al* 2004).

Discussion. Animal hairs were present in small quantities in this sample, possibly from pigs. Insect larval cases were abundant and very well preserved. Epidermis or bran fragments, frequent as background noise to the sample, indicated cess having passed unaltered through the gut. No seeds were charred. Arable weed seed wild radish (*Raphanus raphanistrum* L.) and Corn Spurrey (*Spergula arvensis* L.) were present; seeds of fat-hen (*Chenopodium album* L.) were frequent. Other seeds were wide niche species present as good-King-Henry (*Chenopodium bonus-henrichus* L.), cabbage family (*Brassica* L. sp.), pale persicaria (*Persicaria lapathifolia* L.) and docks (*Rumex* L. sp.). Large fragments of waterlogged wood, the largest being 3x4x1cm were present

Interpretation. The huge number of larvae that would have been present in this matrix at deposition suggests a seething, festering, pile of something that eats anything and everything. The consumed matter would then emerge from the other end of the larvae as almost dust. The remains in the pit must have been soft organic debris such as faeces, either human or animal or possibly both. The numerous fragments of waterlogged wood suggest the pit had been wood lined. The wide variety of weed seed species present in the absence of charred material, particularly grain, indicates domestic waste and cess with the associated plant types from the environs of such a deposit.

4.1.9 Results and discussion for Sample <47> Context (474)

Sample <47> context (474) were recovered from Area 2. Two samples were removed from Context (474) as <47> and <48>. Context (474) was the fill of a late Mediaeval cesspit with a matrix of wet, silty clay with organic inclusions. Several finds were associated with this context. Two small pieces of shoe leather were recovered from it, with traces of stitching on one side that probably formed part of the shoe upper, the design of which dates to the thirteenth or fourteenth century. A length of leather thong and two coins were recovered. From the environmental assessment, the plant material recovered fell into the category of weed seeds, some in association with fruit species. Small mammal bones were also recovered from this sample. (Giecco *et al* 2004).

Various contexts were sent for assessment of parasite content to Palaeoecology Research Services. Pollen grains and/or spores were present in the deposits and the parasite remains from context (474) were well preserved. Context (474) contained significant numbers of eggs of intestinal parasitic worms. This indicates a significant faecal component to the context matrix. (Carrott 2004).

Discussion. From the parasite assessment of this context well preserved *Trichuris* sp. and *Ascaris* sp. eggs were recovered. Fish bone fragments, small mammal bones, claw of vertebrate mammal, feather and a small amount of bran were recovered from the flot. This context was probably waterlogged or at least very moist and smells like cess. The bone appears mineralised as well, possibly a result of the faecal and/or urine content. Other materials present were woody fragments, roots, organic debris and wood.

Charred cereal grains recovered from the sample as actual counts were 1 oat (*Avena* L. sp.), 1 barley (*Hordeum* L. sp.) and 1 rye (*Secale cereale* L.) that displayed as very mucky and silty indicating it was from a ditch deposit. Uncharred seeds occurred as follows. Arable weeds were present as the outer coating of corn cockle (*Agrostemma githago* L.), seeds of corn marigold (*Chrysanthemum segetum* L.), wild radish (*Raphanus raphanistrum* L.) with some pod fragments and corn spurrey (*Spergula arvensis* L.) and frequent as fat-hen (*Chenopodium album* L.).

Weed seeds of wide niches present were good-King-Henry (*Chenopodium bonus-henricus* L.), nipplewort (*Lapsana communis* L.), parsnip (*Pastinaca sativa* L.), cinquefoils (*Potentilla* L. sp), buttercups (*Ranunculus* L. sp.) as *repens* type, *Rumex* L. sp. as well as *Rumex* L. in perianths, probably *longifolius* DC or northern dock, brambles (*Rubus* sp.), sow-thistles (*Sonchus* L. sp.), common nettle (*Urtica dioica* L.) and small nettle (*Urtica urens* L.) and hogweed (*Heracleum sphondylium* L.) and an actual count of 3 straw culm nodes. A few unidentifiable seeds and a small amount of moss were also present.

The ruderal seeds exhibited as pale persicaria (*Persicaria lapathifolia* L.), frequent in the flot. Hemp-nettles (*Galeopsis* sp.) and chickweed (*Stellaria media* L.) were present. The wetland species of both trigonus and lenticular sedges were present. Both elder (*Sambucus nigra* L.) and ground elder (*Sambucus racemosa* L.) were present as well as the heathland species of dock sheep's sorrel (*Rumex acetosella* L.). Small twigs were also present, as was charcoal, being low in recovery with a general woody background matrix. Moss fragments as well as leaves and stems were present and a fine translucent leaved delicate moss, with a Polytrichum species such as hair moss. Both vegetation and leaf as dermis and plant tissue were present.

Various nutshells as well as fruit pips and stones occurred and are listed here as actual counts. Hazel nut (*Corylus avellana* L.) shell totalled 19 fragments as 4 complete halves with the remainder having between an eighth to a third of the shell present. Cherry stones recovered numbered 10 but could not be identified to more than genus level as *Prunus* L. as they were so varied. The number of sloe (*Prunus spinosa* L.) stones recovered was 3. The most unusual and exotic seed recovered from the site were a few fig pips (*Ficus carica* L.) and as they occurred in two different contexts (see <71> (662) below) from two different features it is unlikely that they are contaminants.

***Interpretation*.** There was no substantial amount of bran in the remains to suggest this was human faeces. The bran may have been sieved out of any flour consumed though and therefore not present at the depositional stage. The matrix could also be faeces from pigs; there would then be no bran present initially to be recovered, as digestion would have destroyed it. Measurement of the parasite eggs and analysing them statistically could determine faecal type. Moss fragments, leaves and stems were also present. These were types that grow on ditch edges. A fine, translucent leaved and a delicate hair moss of Polytrichum species was present. Moss was often used to wipe after defecating. From the seed types and general background matrix of the sample, as well as the small mammal bone recovered, this matrix seems to be more typical of a ditch deposit except for the large number of fruit stones and pips. The *Rubus* species look like blackberry and raspberry seeds that had been passed through the gut, as they were worn, but these could still originate from pigs. It is though a large pit with a leather shoe upper dating to the thirteenth or fourteenth century. There is no bran from cess but as discussed above the faeces may have been from pigs or the larvae may have consumed it.

It is also possible however that the pit had other fills as well as cess, or that the pit was cleaned out regularly and other matter brought in to add to it. This could be an indicator of an area where cess was not usually deposited, possibly because of the other processes that were carried out during the period in that area. The uncharred arable weed seeds for instance could be an indicator of a localised area for cleaning crops, the residue of which was then placed in the pit as rubbish. There also seems to be an indication of other domestic waste. Three types of sedges were present; if these could have been further identified the habitat from which they came could have been better determined, giving an insight into the local environs at the time of deposition.

The fig (*Ficus carica* L.) pips recovered from this sample can be classed as an exotic; it is unlikely to be a contaminant as this was a late Mediaeval Period cesspit (Potterton 1983: 75). Fig pips were also recovered from Sample <71> context (662) discussed below. Figs were a common foodstuff in the Roman Period, as they were imported via the trade routes used at that time. Their presence in the region is thought to have declined though when the Romans left Britain as these Roman trade routes stopped operating in the north of England, links only continuing in the south (Huntley 1997).

We know from the discussion in 3.2 above though that foreign merchants abounded in Carlisle. This was a result of the silver mining in the east of Cumberland, and the minting of the silver that occurred locally in Carlisle, so bringing currency into the area. Payment as a pound of cumin was also levied as discussed in 3.2.2 (p66) and 3.2.5 (p83) above, another exotic, reinforcing the existence of exotic trade links in the Mediaeval Period that would have stretched from the continent or possibly beyond to the City of Carlisle.

4.1.10 Results and discussion for Sample <70> Context (661)

Sample <70> context (661) was recovered from Area 2. A large rubbish or cesspit, context (445), was cut in the centre of Area 2 and a sequence of 9 fills added to it over a period. These matrices produced a thirteenth century pottery sequence. Another large pit was cut to the south of (445) as cut (485), filled by context (486). Pit (485) was then re-cut as (350) and four distinct layers of cess or rubbish were added as the fills, contexts (662) Sample <71>, (661) Sample <70>, (363) and (352). (Giecco *et al* 2004).

This large pit is likely to be associated with a kiln feature, context (305), and sequentially context (194), discussed above under Sample <14>. Pit (350), that contained the remains of a large hearth and more pottery wasters, was then re-cut. From the environmental assessment phase, Sample <70> (661) contained charred grain and weed seeds of arable land with an amount of charcoal present. (Giecco *et al* 2004).

Discussion. No charred remains were recovered from this sample. The main background to this matrix occurred as moss, wood fragments, a number of small mammal bones and a large mammal toe or hand bone. Pips and stones of various fruits were numerous in the sample. An almost complete hazelnut shell (*Corylus avellana* L.) with the inner seed and 4 other fragments of about a quarter each were also recovered.

Pear (*Pyrus* L. sp.) pips were present as a total of 4, as well as various *Prunus* species. These stones occurred as a large stone of the modern plum size, 2 damson (*Prunus domestica* L. ssp. *institita* L.), 7 bullace (*Prunus domestica* L. ssp. *institita* L.), that varied in size, and 21 sloes or blackthorn (*Prunus spinosa* L.). A total of 60 cherries were present but their species could not be determined. Seeds of a *Rubus* species that may be blackberries were also present.

No cereal grains were present but the arable weed seeds as the outer coating of corn cockle (*Agrostemma githago* L.) were present, as were seeds of wild radish (*Raphanus raphanistrum* L.) and corn marigold (*Chrysanthemum segetum* L.), while fat-hen (*Chenopodium album* L.) seeds were frequent. The ruderal seed hemp-nettle (*Galeopsis* L. sp.) was present as were the seeds of wide niches nipplewort (*Lapsana communis* L.), chickweed (*Stellaria media* L.), good-King-Henry (*Chenopodium bonus-henricus* L.) and *Rumex* L. species. Knotgrass seeds (*Polygonum* L. sp.) occurred as frequent.

***Interpretation*.** This pit fill produced a suite of seeds and fruit pips that are typical of cesspits. These, and the presence of small mammal bone, an indicator of scavenging, suggest the material originated from cess, domestic rubbish or a combination of both. This sample was the secondary fill of pit (350) that contained the remains of a large hearth as well as pottery wasters, indicating an industrial area. There seems to be a dual role to the pit then as both a domestic and an industrial dump. The arable weed seeds may again indicate a crop processing area in close proximity.

4.1.11 Results and discussion for Sample <71> Context (662)

***Sample <71> context (662) was recovered from Area 2*.** Context (662) was above context (661) in the sequence of pit fills discussed above for Sample <70>. The main narrative for the contexts is then the same. Sample <71>, context (662), was one of the fills of a Mediaeval cesspit, with a matrix of black silty soil rich in organic material. From the environmental assessment phase the sample contained weed seeds with an association of fruit species. The complete sole with two associated pieces of leather thong from a shoe were also recovered from this matrix, although the leather was heavily mineralised and generally in poor condition. (Giecco *et al* 2004).

One of the samples sent for parasitological assessment (see Appendix 5), pollen grains and spores were also present on examination. The remains of pollen and spores recovered were well preserved; plant tissue and phytoliths with a few diatoms were also seen. The sample contained a number of eggs of the intestinal parasitic worm *Trichuris* L. sp., although it is unknown whether these were of human or pig origin. Both species may have been present in the context but the ratio of the parasite species *Ascaris* L. to that of *Trichuris* L. could suggest the faecal material is human in origin. (Carrott 2004).

Of further interest and import from this context are three separate timbers that analysed by dendrochronology (See Appendix 3). All three samples, identified as oak (*Quercus* L. sp.) were dated by this method. All recovered from the same pit and from context (662), the origin of Sample <71>, the dates were relatively tightly clustered. They were interpreted, after being compared with contemporaneous reference material from the north of England, as being from the middle to the second half of the twelfth century, and probably grown in or near to Carlisle after comparison with suitable reference material. (Tyers 2003).

Discussion. No charred remains other than a small amount of charcoal was recovered from this sample. Again though fruit stones and pips were abundant, as were wood fragments. These occurred as 4 very large stones of damson (*Prunus domestica* L. ssp. *instititia* L.), and a bullace (*Prunus domestica* L. ssp. *instititia* L.) that was smaller than the modern Welsh reference sample, but the same size as the author's reference material from the Eden Valley. A total of 15 cherry pips (*Prunus* L. sp.) were recovered but, as the stones were all so similar, species cannot be determined. Blackthorn or sloe (*Prunus spinosa* L.) totalled 14 very varied stones in both size and shape, some being more ovoid, while others had pointed ends, possibly indicating origins from different areas or habitats. Hazel nut fragments were present, one greater than half and 3 less than.

Other uncharred material was as follows. The outer coating of the arable weed seed corn cockle (*Agrostemma githago* L.), seeds of corn marigold (*Chrysanthemum segetum* L.) and fat-hen (*Chenopodium album* L.), were present. Weed seeds of wide niches were present as good-King-Henry (*Chenopodium bonus-henricus* L.), other *Chenopodium* species, bladder Campion (*Silene vulgaris* Garcke), nipplewort (*Lapsana communis* L.), redshank (*Persicaria maculosa* Gray), wild mignonette (*Reseda lutea* L.), *Ranunculus*

L. sp. *repens* type, as well as blackberry and raspberry (*Rubus* L. sp.) and a few unidentified species. Docks (*Rumex* L. sp.) and some still in perianths, probably *longifolius* DC were frequent.

The ruderal seeds pale persicaria (*Persicaria lapathifolia* L.) and hemp-nettle (*Galeopsis* L. sp.) were frequent. Ruderals present were redshank (*Persicaria maculosa* Gray), knotgrass (*Polygonum aviculare* L.), chickweed (*Stellaria media* L.), hemlock (*Conium maculatum* L.) and dead-nettle (*Lamium* L. sp.). Wetland species as small water-pepper (*Persicaria minor* Hudson), bog bean (*Menyanthes trifoliata* L.) and a trigonus sedge nutlet were present as well as the small tree elder (*Sambucus nigra* L.) and the heathland dock sheep's sorrel (*Rumex acetosella* L.). Again, as in Sample <47> context (474), fig seeds (*Ficus carica* L.) were present, example of an exotic.

The matrix had an odour of cess and fragments of wood, some 3x2cm but only 4mm thick, were well preserved. There was an abundance of small wood fragments suggesting the pit may have been wood lined or that wood was discarded there. Small wood (that of small branches or twigs) was present as were moss fragments and moss leaves and a small feather 2cm long was recovered as well as magnetic spheres.

***Interpretation*.** Seed species proliferated in this sample. Arable, wet ground species as well as ruderals were recovered, with some food plants. Both Sample <47> (474) and <71> contain plants of varied habitats, so they are either ditches with other material as well as cess, or cess pits that were periodically cleaned out and other matter brought in. They were definitely, from the excavation evidence, not ditches, but occurred as fills of pits, and as such, they must both be interpreted as cesspits that were periodically cleaned out.

The possible crop processing waste again may have been introduced with other domestic rubbish. This was possibly due to them having secondary uses as pottery waste dumps, with indicators of other close industrial processes occurring from the metal working debris recovered. Being in close association with these deposits, people may have cleaned the pits regularly, and added dry matrices and other waste to them to limit pest infestations and the constant fetid odours that would have exuded from them. The area may not have been in constant use but one only used sporadically as required.

Again, fig seeds were recovered from this sample, and, as discussed in Sample <47> they were exotics of the era and therefore must be imports. Hemlock (*Conium maculatum* L.) was also present. As a poison drug, it grows readily on waste ground so its occurrence is probably from that source (Grieve 1977: 391). The outer shell, often all that is found, looks like soft toffee coloured scales and can sometimes have seed in it.

The damson stones (*Prunus domestica* L. ssp. *institita* L.) recovered were very large and may indicate they were cultivars in a town environment. Possibly being grown in a garden, and so being cultivated and nurtured, they evolved over time towards plums. The bullace stone was noted as smaller than the modern Welsh reference sample but approximately the same size as the one recovered from the Eden Valley, possibly indicating a regional difference.

Fragments of the outer coating of corn cockle could be present as they can preserve well in waterlogged samples. The fragments can occur as a result of the seeds being a contaminant in grain when the grain and seeds were crushed together during processing of the grain to flour. The outer coating of the seed would survive while the inner seed matrix would be ground in the flour, the membrane then preserving well in waterlogged or damp conditions such as were seen in this matrix.

A number of plant remains that are strong indicators of the presence of nearby grassland and waste ground occurred. These included an abundance of nettles with lesser amounts of nipplewort, knotweed, chickweed and redshank. The occurrence of hemlock may indicate the presence of damp ground, however this taxon also has strong associations with cultivated and disturbed ground habitats (Godwin 1975). Docks, nettles, thistles and woundwort would also have grown in these waste areas.

4.1.12 Results and discussion for Sample <76> Context (679)

Sample <76> context (679) was recovered from Area 9. Context (679) was one of the fills of pit (644) in Area 9 that was interpreted as from the Roman Period, the small amount of pottery recovered dating to the second century AD. Little more was said of it in the report or can be gleaned from the context information to hand at the time. This sample from the assessment phase write up revealed a suite of seeds that fell into the category of weed seeds having some association with fruit species. (Giecco *et al* 2004).

Discussion. No charred remains were recovered except for charcoal. Small mammal bone and hair were recovered in the retent. This flot was very small at 4mls, with charcoal and waterlogged wood frequent. Small mammal bone and animal hairs were present but species were not identified. Stable flies were present, as well as woody plant parts and moss fragments. Weed seeds of wide niches were present as *Ranunculus* L. sp. (*repens* type), *Rumex* sp., probably as *longifolius* but these were damaged, knotgrasses (*Polygonum* L. sp.) and the inner of a Primulaceae seed variety, the common or stinging nettle (*Urtica dioica* L.), wild mignonette (*Reseda lutea* L.) and small nettle (*Urtica urens* L.). Three different species of wetland sedges as *Carex* were present.

The uncharred cultivars occurred as a piece of barley with the glumes attached. Barley and oats were frequent as cereal bran with fragments of cabbage species (*Brassica* L.) present. The arable weed seeds of cornflower (*Chrysanthemum segetum* L.) were present and corn spurrey (*Spergula arvensis* L.). Wetland species present were the common spike rush (*Eleocharis palustris* L.) and seed of the heathland species *Vaccinium*, possibly bilberry. Four different species of wetland sedges as *Carex* were frequent and a few other unidentified seeds.

Interpretation. The presence in the flot of seeds from rushes, sedges and bilberry species may indicate their use as flooring material. There was a high presence of cereal bran in this sample, probably oats and barley. These, as well as the stable flies, woody plant parts and charcoal, are positive indicators of a cesspit that may have been mainly material from stable waste, but could also be from a domestic source or both. The common or stinging nettle (*Urtica dioica* L.) occurs in woodland, fen, cultivated ground and where animals defecate, and is abundant throughout British Isles (Stace 1997: 144). The small nettle (*Urtica urens* L.) is a plant of cultivated and waste ground.

4.1.13 Results and discussion for Sample <77> Context (683)

Sample <77> context (683) was recovered from Area 9. This sample was from the level above which the excavation ended and as such was the earliest recorded deposit of a clean grey sandy silt. It is likely to represent the pre-Roman original ground surface (OGS) that sealed the natural boulder clay (700). This was one of the few areas where the natural subsoil was observed. It produced only weed seeds with inclusions of stone and wood. Heather was also present as well as weed species of arable land and waste places with an amount of fibrous plant matter. (Giecco *et al* 2004).

Discussion. Waterlogged or moist in origin no wood fragments of wood were big enough to identify from this sample. The matrix, mainly wood fragments saw small wood fragments, charcoal, and insects present. Seeds recovered were uncharred, but mineralised to some degree. Seeds of wide niche species were frequent as knotgrasses (*Polygonum* L. sp.) and buttercups (*Ranunculus* L. sp.). Those present occurred as fat-hen (*Chenopodium album* L.), cinquefoils (*Potentilla erecta* L. type), Mignonettes (*Reseda* L. sp.) or other small achene but quite worn, docks (*Rumex* L.), and stinging or common nettle (*Urtica dioica* L.). The grassland species lesser stitchwort (*Stellaria graminea* L.) was present. Species of wetland habitats present were lesser spearwort (*Ranunculus flammula* L.) and various sedges (*Carex* L. sp.) as three different species, both lenticular and trigonus. Small twigs were also present in the background matrix.

Interpretation. This sample yielded a very small flot of only 5mls. None of the seeds was charred and seeds recovered were from a wide range of habitats but of small quantities. The sample mainly presented as wood fragments that had possibly been waterlogged or at least moist in origin. None of the wood was big enough to identify, so interpretation of this context is very difficult, except to state that very little was occurring at the time of deposition as no features were detected at this level.

4.1.14 Tables 3, 4 and 5 Summarising the Results

Tables 3, 4 and 5 below summarise the results analysed from the samples and are colour coded to display the period the context stratigraphically came from. In Table 3 below, material recovered from the residues and the flots were recorded to give the general background matrix of the sample and only includes those plant macrofossils recovered from the residue of a sample. Various ecofacts were recovered from some samples in the flots and residues as bone of fish, small mammal and teeth of large mammal. Burnt bone was also recovered in some cases. Sometimes fibres and wood fragments were recovered as well as charcoal and some plant remains.

In Table 4 the charred flot macro remains were displayed and Table 5 displays uncharred material. Both follow the same key and habitat listings. Seeds and plant parts were listed denoting their habitat first in brackets where (a) = arable, (c) = cultivar, (g) = grassland, (h) = heathland, (r) = ruderal, (w) = wetland and (x) = wide niche species.

Table 3 appears immediately below and displays other ecofacts recovered from the samples.

Sample number	1	6	7	8	14	10	47	70	71	29	76	77
Context number	157	204	205	216	194	181	474	661	662	304	679	683
Site area sample was recovered from	A3	A2	A2	A2	A1	A3	A2	A2	A2	A3	A3	A3
Context type	Pit Fill	O/ K layer	O/ K layer	O/ K layer	Heated layer	Pit fill	Pit fill	Pit fill	Pit fill	Pit fill	Pit fill	Layer
Soil condition	Moist	Dry	Dry	Dry	Moist	Moist	Water logged	Water logged	Water logged	Moist	Moist	Moist
Context relations	Above 156 Below 100	Above 205 Below 116	Above 114 Below 204	Above 291 Below 114	Above 192 Below 307	Above 182 Below 180	Above 677 Below 445	Above 662 Below 363	Above 350 Below 661	Above 264 Below 303	Above 644 Below 645	Above LOE Below 134
Assessed Period	14/15th century	14/15th century	14/15th century	13/14th century	1370- 1400 14th century	13/14th century	13th century	13th century	13th century	12/13th century	Roman	Pre Roman
Volume initially processed (litres)	4	2	4	5	5	10	10	20	20	4	10	5
Volume of retent (mls)	10	100	100	100	700	100	500	800	600	100	200	350
Volume of flot (mls)	100	70	20	500	5	450	230	800	200	500	4	5
Residue contents (relative abundance)												
Animal or plant fibres	-	-	-	-	-	1	1	-	-	-	-	-
Bones: Fish	-	-	-	-	-	1	1	1	-	-	-	-
Bone and teeth: Large mammal	-	-	-	-	1	-	1	1	1	1	-	-
Bone: Small mammal	1	-	-	-	-	1	1	1	1	-	1	-
Burnt bone	2	1	1	2	-	2	1	-	-	2	-	-
Charcoal	-	2	1	2	1	2	-	-	-	-	1	-
Insect larvae/pupae	-	-	-	-	-	1	-	-	-	2	-	-
Nutshell	-	-	-	-	-	-	2	-	2	-	-	-
Plant material, charred	-	-	2	-	-	-	-	-	-	-	-	-
Seeds and fruit pips	-	-	-	-	-	2	2	2	2	-	-	-
Shell sea	-	-	-	-	-	-	1	-	-	-	-	-
Stones/gravel	2	3	2	-	3	2	-	1	-	1	3	2
Textile	-	-	-	-	-	1	-	-	-	-	-	-
Wood, waterlogged	-	-	-	-	-	2	-	2	2	2	3	2
Flot matrix (relative abundance of non macro plant remains)												
Bone - fish	1	-	-	-	-	-	1	-	-	-	-	-
Bone - mammal	-	-	-	-	-	-	1	-	-	-	-	-
Bone - small mammal	1	-	-	-	-	-	1	1	-	-	-	-
Feather	-	-	-	-	-	-	-	-	1	-	-	-
Fibres	1	-	-	-	-	-	-	-	-	-	-	-
Hairs	-	-	-	-	-	-	-	-	-	1	1	-
Larva/pupa cases	-	-	-	-	-	2	-	-	-	3	-	-
Metal working airfall spatter	-	-	1	-	2	2	-	-	-	-	-	-

Key for Table 3 above, 4 and 5 below:

C = century; LOE=level of excavation; O/ K=oven/ kiln

Coloured cells denote the period the contexts were dated to (see adjacent key)

In brackets (a)=arable, (c)=cultivar, (g)=grassland, (r)=ruderal, (w)=wetland, (x)=wide niche,

States Information relating to table
14/15th century
1370- 1400 14th century
Roman
Pre Roman

Table 3: Full context and sample information with residue and flot contents not relating to plant macro remains

Table 4 appears below and displays the analysis of the charred plant remains.

Sample number	1	6	7	8	14	10	47	70	71	29	76	77
Context number	157	204	205	216	194	181	474	661	662	304	679	683
Charred plant remains from flots (relative abundance)												
(a) *Chenopodium album* L. (fat-hen)	-	2	1	1	-	-	-	-	-	-	-	-
(a) *Chrysanthemum segetum* L. (cornflower)	-	-	-	1	-	-	-	-	-	-	-	-
(a) *Raphanus raphanistrum* L. (Wild radish)	1	-	-	-	-	-	-	-	-	-	-	-
(a) *Spergula arvensis* L. (corn spurrey)	1	-	-	-	-	-	-	-	-	-	-	-
(c) *Avena* sp. L. (indet. oats)	1	1	-	-	2	-	1	-	-	-	-	-
(c) *Hordeum* sp. L. (indet. Barley)	1	2	-	1	1	-	1	-	-	-	-	-
(c) Legume indet.	-	-	-	-	-	1	-	-	-	-	-	-
(c) *Linum usitatissimum* L. (flax)	-	-	-	-	2	-	-	-	-	-	-	-
(c) *Secale cereale* L. (rye)	-	-	-	-	-	1	1	-	-	-	-	-
(c) *Triticum aestivum* L. (bread wheat)	-	-	1	-	1	A	-	-	-	-	-	-
(c) *Triticum* sp. L. (indet. wheat)	-	1	1	-	-	-	-	-	-	-	-	-
(c) Cerealia indeterminate grain	1	2	-	1	2	-	-	-	-	-	-	-
(c) Chaff	-	1	1	1	-	-	-	-	-	-	-	-
(r) *Lapsana communis* L. (nipplewort)	-	-	1	-	-	-	-	-	-	-	-	-
(r) *Plantago lanceolata* L. (ribwort plantain)	-	1	-	-	-	-	-	-	-	-	-	-
(r) *Polygonum aviculare* L. (knotgrass)	-	-	-	1	-	-	-	-	-	-	-	-
(r) *Stellaria media* L. (chickweed)	-	-	1	-	-	-	-	-	-	-	-	-
(w) Cyperaceae L. nutlets (sedges)	-	-	-	A	-	-	-	-	-	-	-	-
(x) *Brassica* sp. L. (cabbages)	-	-	-	1	-	-	-	-	-	-	-	-
(x) *C. bonus-henricus* L. (good-King-Henry)	1	-	-	-	-	-	-	-	-	-	-	-
(x) *Persicaria lapathifolia* L. (pale persicaria)	-	-	-	-	1	-	-	-	-	-	-	-
(x) *Poa* L. sp. (meadow-grasses)	-	-	-	1	-	-	-	-	-	-	-	-
(x) *Polygonum* sp. L. (knotgrasses)	-	1	1	1	1	-	-	-	-	-	-	-
(x) *Potentilla* sp. L. (cinquefoils)	-	-	1	1	-	-	-	-	-	-	-	-
(x) *Ranunculus* sp. L. (buttercups)	-	-	1	1	-	-	-	-	-	-	-	-
(x) *Rumex* sp. L. (Docks)	1	-	-	1	-	-	-	-	-	-	-	-
(x) *Vicia sativa* ssp. *segetalis* L. (vetch)	-	-	-	-	-	1	-	-	-	-	-	-
Unidentified seeds and moss	1	**I**	-	-	-	-	-	-	-	-	-	-
Charcoal	3	3	-	3	3	2	1	-	1	-	3	1
Culm nodes of straw	-	1	1	-	-	-	-	-	-	-	-	-

KEY: Abundance score for Table 4 - =ABSENT, 1=PRESENT, 2=FREQUENT, 3=ABUNDANT; Charred count A=Abundant (more than 100); I = Indeterminate number due to poor physical condition; indet = indeterminate; C. = Chenopodium

Table 4: Analysis of charred plant macro remains

Table 5 appears below and displays the analysis of the uncharred plant remains.

Sample number	1	6	7	8	14	10	47	70	71	29	76	77
Context number	157	204	205	216	194	181	474	661	662	304	679	683
Other plant remains from flots (relative abundance)												
(a) *Agrostemma githago* L. (corncockle)	-	-	-	-	-	1	1	1	1	-	-	-
(a) *Chamaemelum nobile* L. (chamomile)	1	-	-	-	-	-	-	-	-	-	-	-
(a) *Chenopodium album* L. (fat-hen)	-	-	1	-	-	1	2	2	1	2	-	1
(a) *Chrysanthemum segetum* L.	-	-	-	-	-	1	1	1	1	-	1	-
(a) *Raphanus raphanistrum* L. (Wild radish)	-	-	-	-	-	-	1	1	-	1	-	-
(a) *Spergula arvensis* L. (Corn spurrey)	-	-	-	-	-	1	1	-	-	1	1	-
(c) *Hordeum* sp. L. (indet. barley)	-	-	-	-	-	-	-	-	-	-	1	-
(c) Cereal bran	-	-	-	-	-	-	-	-	-	2	2	-
(g) *Stellaria graminea* L.	-	-	-	-	-	-	-	-	-	-	-	1
(h) *Rumex acetosella* (sheep's sorrel)	-	-	-	-	-	-	1	-	1	-	-	-
(h) *Vaccinium* sp. L. (bilberries)	-	-	-	-	-	-	-	-	-	-	1	-
(r) *Conium maculatum* L. (hemlock)	-	-	-	-	-	-	-	-	1	-	-	-
(r) *Galeopsis* sp. L. (hemp-nettles)	-	-	-	-	-	-	1	1	2	-	-	-
(r) *Lamium* sp (Dead nettle)	-	-	-	-	-	-	-	-	1	-	-	-
(r) *Persicaria lapathifolia* L. (pale persicaria)	1	-	-	-	-	1	2	-	2	1	-	1
(r) *Persicaria maculosa* Gray (redshank)	-	-	-	-	-	-	-	-	1	-	-	-
(r) *Polygonum aviculare* L. (knotgrass)	-	-	-	-	-	-	-	1	1	-	1	-
(r) *Stellaria media* L. (chickweed)	-	-	-	-	-	-	1	1	1	-	-	-
(t) *Corylus avellana* L. (hazel nuts)	-	-	-	-	-	-	3	1	1	-	-	-
(t) *Ficus carica* L. (fig)	-	-	-	-	-	-	1	-	1	-	-	-
(t) *Prunus* sp. L. (cherries)	-	-	-	-	-	-	2	3	3	-	-	-
(t) *Pyrus* sp. L. (pears)	-	-	-	-	-	-	-	1	-	-	-	-
(t) *Sambucus* sp. L. (elder)	1	-	-	-	-	-	1	-	1	-	-	-
(w) Cyperaceae (sedge family)	-	-	-	-	-	-	1	-	1	-	2	1
(w) *Eleocharis palustris* L. (common spike-rush)	-	-	-	-	-	-	-	-	-	-	1	-
(w) *Menyanthes trifoliata* L. (bog bean)	-	-	-	-	-	-	-	-	1	-	-	-
(w) *Persicaria minor* Hudson (sm water-pepper)	-	-	-	-	-	-	-	-	1	-	-	-
(w) *Ranunculus flammula* L. (lesser spearwort)	-	-	-	-	-	-	-	-	-	-	-	1
(x) *Brassica* sp. L. (cabbages)	-	-	-	-	-	-	-	-	-	1	1	-
(x) *C. bonus-henricus* L. (good-King-Henry)	-	-	-	-	-	1	1	1	1	1	-	-
(x) *Heracleum sphondylium* L. (hogweed)	-	-	-	-	-	-	1	-	-	-	-	-
(x) *Lapsana communis* L. (nipplewort)	-	-	-	-	-	-	1	1	1	-	-	-
(x) *Pastinaca sativa* L. (parsnip)	-	-	-	-	-	-	1	-	-	-	-	-
(x) *Polygonum* sp. L. (Knotgrass)	-	-	-	-	-	-	-	2	-	-	-	2
(x) *Potentilla* sp. L. (cinquefoils)	-	-	-	-	-	-	1	-	-	-	-	1
(x) *Ranunculus* sp. L. (buttercups)	-	-	-	-	-	-	1	-	1	-	1	2
(x) *Reseda lutea* L. (wild Mignonette)	1	-	-	-	-	-	-	-	1	-	1	1
(x) Rosaceae (rose family)	-	-	1	-	-	-	-	-	-	-	-	-
(x) *Rubus* sp. L. (brambles)	1	-	-	-	-	1	1	1	1	-	-	-
(x) *Rumex* sp. L. (Docks)	-	-	-	-	-	-	1	1	2	1	1	1
(x) *Silene vulgaris* Garcke (bladder Campion)	-	-	-	-	-	-	-	-	1	-	-	-
(x) *Sonchus* sp. L.	-	-	-	-	-	-	1	-	-	-	-	-
(x) *Urtica* sp. L. (nettles)	-	-	-	-	-	1	1	-	-	-	1	1
Unidentified seeds and moss	2	-	-	-	-	1	1	1	1	-	2	1
Culm nodes of straw	-	-	-	-	-	-	1	-	-	-	-	-
Wood fragments	-	-	-	-	1	2	1	1	3	1	-	2
Woody plant parts	-	-	-	-	-	-	1	-	-	-	2	-

KEY: Abundance score for Table 5 - =ABSENT, 1=PRESENT, 2=FREQUENT, 3=ABUNDANT; indet = indeterminate; C. = Chenopodium; sm=small

Table 5: Analysis of uncharred and fossilised plant macro remains

4.2 DISCUSSION OF MACROPLANT REMAINS ENCOUNTERED

Various genera and species were encountered in the study and were discussed specifically by sample number above in Section 4.1. Some individual plant types or groups warrant further discussion though and appear below. Initially Charts 1, 2 and 3 seen below were used to discuss trends and patterns in the results. Further discussion addresses other inclusions in the samples or specific types of plant matter encountered in the analysis concluding with the results methodology. Plant species or genera identified from samples were given a count of 1 for the type of niche in which they occurred. These were presented in bar charts as Charts 1, 2 and 3 below. Chart 1 lists both charred and uncharred plant types recovered. Chart 2 displays charred plant types recovered and Chart 3 presents uncharred plant types recovered.

4.2.1 Chart 1: Plant Macrofossil Types Encountered

Various genera and species of plant remains that inhabited different niches were recovered, both charred and uncharred, from the samples analysed in the study. These were displayed together in Chart 1 below where context numbers for charred and uncharred remains appear as separate bars. These were nominated a count of 1 where a type of plant that occupies a certain niche was present, determined from seeds or plant material recovered from a sample. Chart 1 displays information for both charred and uncharred plant macrofossils. From the x axis, bars upwards denote niche types of macrofossils as charred first followed by uncharred for each context analysed in the study. The results were discussed below.

CHART 1: PLANT MACROFOSSILS COMBINED

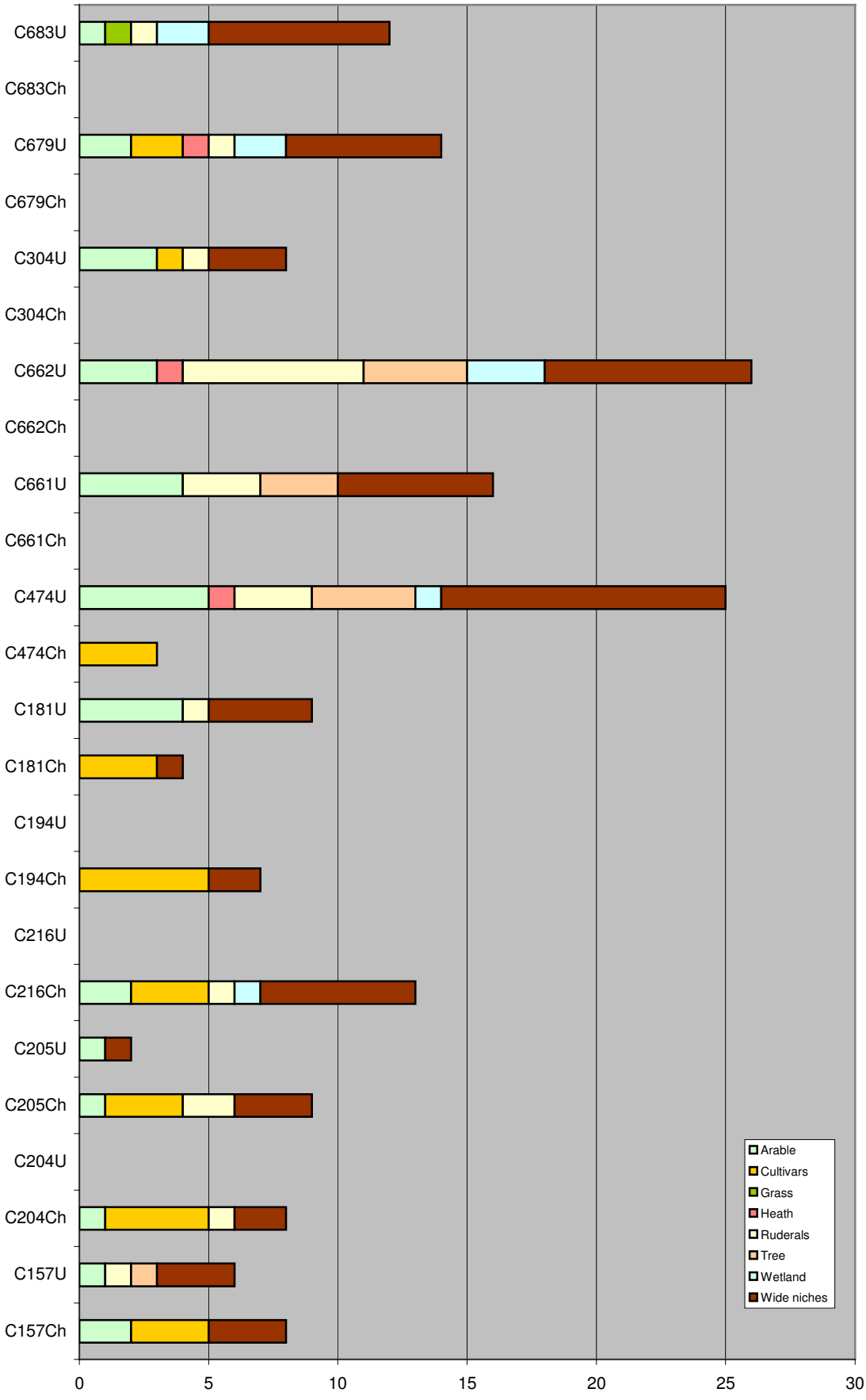


Chart 1 above exhibits that no charred plant macrofossils were recovered from Contexts (661), (662), (304), (679) and (683), Samples <70>, <71>, <29>, <76> and <77> respectively. These samples were recovered from pits, except for Sample <77>, removed from the layer above that which the excavation reached, and so was the earliest deposit encountered during the excavation. The contexts were all dated to the period of the Middle Mediaeval, except for the controls as (679) and (683) that were categorised as from the Roman and Pre-Roman Periods respectively.

The above contexts exhibited similar results throughout. Not only was there a lack of charred remains, but also species of wide niches occurred most frequently in the results for all the contexts. Ruderals were present to some degree in all the samples but occurred much less frequently in Contexts (304), (679), and (683). The latter two represent the controls and as such showed a greater range of wide niche species. Cultivars were also present in contexts (304) and (679).

The earliest deposit observed during the excavation, Context (683) appears to be somewhat differently represented in species present, but had a very small flot of only 5mls. This context presented plant material of grasslands. No cultivars were present but wetland species also occurred. This context was described as the pre-Roman original ground surface (OGS) that sealed the natural boulder clay. It seems unlikely that the arable seeds encountered were there due to cultivation as there was little evidence from this context of anthropogenic activity. The seed fat-hen can occur in waste places as well as arable, but the presence of the wetland species is interesting in that there were three different species of Cyperaceae (sedges and rushes) present, both lenticular and trigonus. The wetland species lesser spearwort (*Ranunculus flammula* L.) was also present indicating a wetland habitat if not in the immediate environs then somewhere relatively close.

Contexts (304) and (679) were similar in species types encountered but very different in amounts of flot recovered, being 500mls and 5mls respectively. The residue amounts were 100mls from 4 litres of sample and 200mls from 10 litres of sample respectively, indicating there was much more material recovered from the flot and the residue for context (304). The recovery of 500mls of flot from sample (304) obviously leads to a better understanding of the matrix from which it came.

Both deposition and post-depositional conditions probably varied with these samples leading to variation in recovery of the material. Context (679) shows evidence of waterlogged wood and wetland sedges. These, in association with the bilberry species may indicate their use as flooring. Post depositionally then this material would have been broken up as a surface material, larger pieces of the matter being periodically removed and replaced, an indication of the origins of this matrix and the plant macrofossils within it.

Context (304) with the much larger flot was described as an organic rich pit fill. With inclusions of Middle Mediaeval Period pottery and animal hairs, there was also an abundance of larval cases from insects with bran fragments also frequent. These remains indicate a soft organic debris of cess, possibly with a large element of animal waste concluded from the fragmented and indeterminate cereal bran that occurred. The absence of charred material indicates domestic waste, possibly with a small element of crop processing waste determined from the weed seeds of arable land recovered.

Contexts (661) and (662) again presented no charred remains. Both were from the same pit dated as thirteenth century. Context (662), positioned below context (661), presented with the greatest range of species. Eight species of wide niches were present and seven ruderals. Eggs of the intestinal worms *Trichuris* L. sp. and *Ascaris* sp. were recovered from this sample. Three timbers dated by dendrochronology also gave a tightly dated chronology for the wood as being from the middle to the second half of the twelfth century. The pottery from the context was dated to the thirteenth century by typological methods.

Numerous fruit stones and pips were recovered as well as seeds of brambles. There were also arable and wetland species. The flot recovered was only 10% of the volume of the original sample but it was very rich in uncharred remains; seeds, nuts and fruit stones as well as bone and waterlogged wood were recovered from the residue. Some plants as well as the moss recovered indicated a ditch fill but this sample was definitely recovered from a pit (Giecco *et al* 2004) that was possibly lined with wood. The indication then is that it was periodically dug out and the matrix within it removed to another locale.

Cultivars are indicated in other samples of similar date on the site and arable weeds are present here. The matrix may have been removed to enhance soil for crop production, as manuring of various types was a well-used practice in the Mediaeval Period and other eras. There are also indicators in the arable weeds that crop-processing waste was disposed of here, as well as pottery wasters and metal working debris. Pottery has also been used historically to aid soil break up to ease the growth of crops.

Context (661), above context (662), was by association dated to the Middle Mediaeval. Not as varied in niche types, numerous species were present with a similar background matrix to (662). There was a more even distribution of niche types with no wetland or heathland species recovered, a possible indicator to the lack of flooring material deposited here. Other remains from (661) were similar to (662) and as such, interpretation was the same; the two matrices formed from the remains of a complex system of agriculture, industry and domestic waste materials purposely deposited together to be reused in another context as a free commodity.

Uncharred macrofossils were absent in Contexts (216), (194) and (204), Samples <8>, <14> and <6> respectively. Context (194) presented mainly cultivars with a few wide niche species and was from a series of kilns. An absolute date of AD1370-1400 was determined and fragments of the kiln superstructure were present in the sample. Charcoal was abundant in the sample with metalworking debris again present. Charred grain and charred flax were recovered and a few species of charred wide niche species. This sample is an indicator of the use of the hearth or kiln for a secondary purpose of either cooking or drying. Flax, due to its high oil content, is known to distort badly on heating and so the context was most likely from domestic cooking as well as pottery firing. It is not unusual then that the plant assemblage presented no uncharred material.

Context (216) contained a variety of niche species but was mainly wide niche species with burnt bone and large fragments of charcoal recovered from the residue. The species encountered though were all charred and indicated that the source of fuel used in the kiln or hearth was sedge peat. There was again evidence of the secondary use of the hearth or kiln for grain drying in this instance, as arable weed seeds were also present, an indicator that the grain was not clean when it entered the deposition context. It is not abnormal then that the plant assemblage recovered from this context was charred.

Context (204) was stratigraphically related to Contexts (216) discussed above and (205) discussed below. The residue of Context (204) presented burnt bone and charcoal and all the material from the flot was charred. This context was one from the complex area of kilns or ovens and seems to have been recovered from the area for the draw out of one of the ovens or kilns. Again, it appears to have had a secondary use of grain drying or cooking. As several types of grain were present including some chaff and an arable, this sample may display grain drying. The few ruderals and wide niche species present were probably from the adjacent area or place of storage of the grain.

The remainder of the contexts as (474), (181), (205) and (157) presented both charred and uncharred plant remains. In context (474) a complete range of uncharred niche species were present, except for grassland species. Charred grain of oats, barley and rye were present in the sample. The eggs of the parasitic worms of *Trichuris* L. sp. and *Ascaris* L. sp. were present, indicating a faecal component as well as domestic waste deposited from other remains recovered, the lack of bran fragments indicating the faeces was of animal origin. Again more indicative of a ditch deposit this context was though unquestionably from a pit (Giecco *et al* 2004). The interpretation is again of a pit that was regularly cleaned out and the matrix removed to another location.

Context (181) contained charred cultivars and vetch; charcoal and burnt bone were frequent in the residue. This sample contained the highest number of charred grain as bread wheat and a charred legume. There was a marked difference in the deposition material recovered from this pit to others discussed above although the background matrix was again one of cess. Seeds of arable niche weeds were a main component of the uncharred material; ruderals were limited and there were a few wide niche species.

The combination of the high quantity of charred grain and the uncharred arable species strongly indicates the nearby presence of a crop processing area where the arable weed seeds were separated from the grain. The arable weed seeds were then deposited in the pit as rubbish. This quantity of charred grain indicates that it was formed whilst the crop was being dried, probably in a feature where the legume and possibly other crops were being processed in the same manner. The resultant charred material was not fit for use in flour making or cooking and as such was discarded. From the plant assemblage recovered here it was likely to have been in the same context that the arable weed seeds

were deposited, the inference being that crop processing and grain drying occurred in close proximity during this period of activity on the site.

Context (205) was stratigraphically linked to (204) as below it. Context (216) discussed above was also part of this sequence. The uncharred remains presented as an arable and a wide niche species, differing niche species represented more in the uncharred material. There may have again been a dual role to the kiln or oven feature at the time of deposition, the ruderals and wide niche species being introduced when the grain was awaiting processing. A charred arable occurred indicating the crop was quite clean before charring occurred.

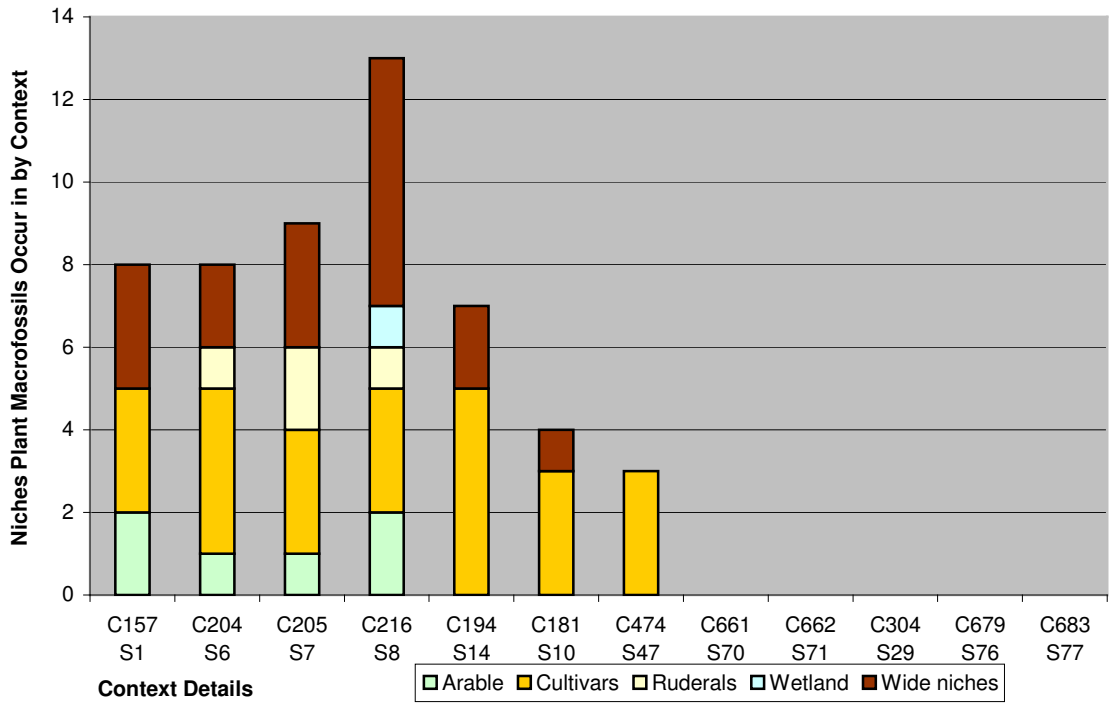
Context (157) from Area 3 was from a small pit, and the sample of most recent date discussed here. Small mammal and burnt bone were recovered from the residue with fish and small mammal bone as well as fibres in the flot. The charred plant matter was varied with the grain badly distorted and two ruderal species with wide niche species present. The uncharred seeds were varied and included the small tree elder and wide niche species. Uncharred material seemed to be of low levels, possibly indicating a cleaner surface area of primary deposition.

The remains in this case indicate charred material that was probably disposed of in this pit but that came from a domestic source, particularly in relation to the burnt bone and fish bone recovered. That, along with the occurrence of badly blown grain and arable weed species, indicates deposition material more from a domestic hearth rather than a kiln or large oven feature. It is unfortunate that this area had been heavily truncated, as there may initially have been important structural information present.

4.2.2 Chart 2: Charred Plant Macrofossils of Differing Ecological Niches

The species of plants that inhabited different niches and were recovered as charred material were displayed separately in Chart 2 below. Context numbers for charred remains appear as bars. These were nominated a count of 1 where a type of plant that occupies a certain niche was present, determined from seeds or plant material recovered from a sample. Chart 2 displays information for charred plant macrofossils. From the y axis bars moving to the right denote niche types of plant remains as charred for all contexts analysed in the study. These results were further discussed below.

CHART 2: CHARRED PLANT MACRO FOSSIL OCCURRENCES IN DIFFERING ECOLOGICAL NICHES

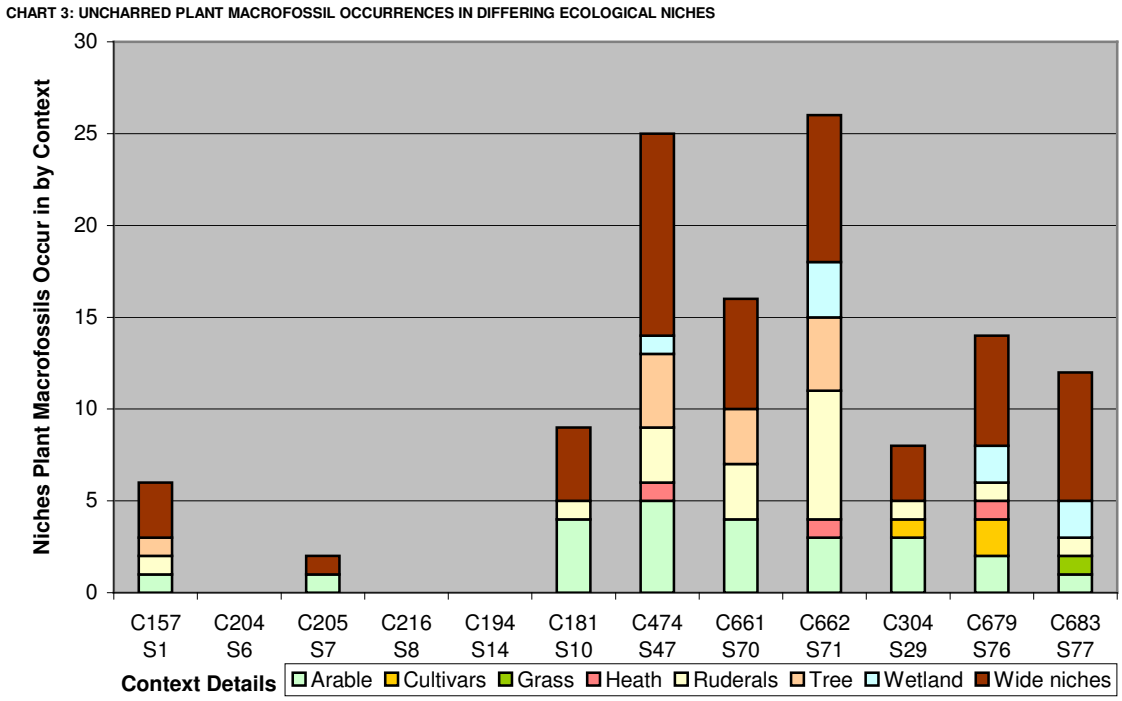


Chronologically the chart displays information as the most recent deposits to the left graded to the oldest deposits to the right. The most interesting observation from Chart 2 is the lack of charred material recovered from the contexts towards the right of the x-axis, that is the oldest deposits. Those from the centre area seem to present mainly cultivars with some plants from wide niches. The kiln or hearth context (194) indicates, by the recovery of several species of charred cultivars, a domestic cooking area. Contexts (181) and (474) were pit fills that contained a few charred cultivar species.

Context (216) displays charred material of wetland species that, as discussed above, was determined as being recovered from sedge peat. Charred ruderals were also seen in contexts (204), (205) and (216), these three contexts were all from the same series of kilns or ovens. The pit fill context (157) presented similar remains as those discussed here and could indicate that the remains were deposited from a feature of a kiln or an oven. The four contexts discussed here may demonstrate that this was an area of small-scale industry with occurrences of waste areas between the industrial features from whence the ruderal seeds became part of the assemblages.

4.2.3 Chart 3: Uncharred Plant Macrofossil of Differing Ecological Niches

The species of plants that inhabited different niches and were recovered as uncharred material were displayed in Chart 3 below. Context numbers for uncharred remains appear as bars. These were nominated a count of 1 where a type of plant that occupies a certain niche was present, determined from seeds or plant material recovered from a sample. Chart 3 displays information for uncharred plant macrofossils. From the y axis bars moving to the right denote niche types of plant remains as uncharred for each context analysed in the study. These results were further discussed below where the chronology of the contexts observes the same pattern as that in Chart 2.



Chronologically Chart 3 displays information as the most recent deposits to the left graded to the oldest deposits to the right. The most interesting observation from Chart 3 is the lack of uncharred material recovered from some of the contexts towards the left of the x-axis, that is, the more recent deposits. Those from the centre area towards the right side seem to present plants from wide niches. There are some indicators of uncharred cultivars though in contexts (304) and (679).

Wetland species also occur in several of the contexts as (474), (662), (679) and (683), possibly indicators of a different type of local background habitat from which these pit fills initially came, especially as heathland species occurred in the contexts except (683). Cultivar evidence occurred less towards the right of the chart with grassland species in the layer (683), the oldest deposit encountered during the excavation.

4.2.4 Discussion and further interpretation

For a number of plant remains it was only possible to identify them to genus level. This was sometimes due to their preservation condition as fragmentary or having a 'blown' appearance, especially in the charred material. Other remains recovered were not seeds but plant parts that may have been from different species of a genus, and as such could not be identified further. Greater knowledge of the immediate environment from which the contexts analysed were developed could have been achieved had identification of some of the plants beyond the genus level occurred. This would also have occurred in some of the grain types recovered, where more formal identification to species level would enable a better understanding of crops grown and the agricultural systems used.

Context (157) presented similar types of plant remains in both the charred and uncharred remains. Contexts (205), (204) and (216) were all from the same series of kilns or ovens, where the first context had few uncharred remains and the latter two presented none. Contexts (181) and (474) were pit fills.

Rather than the discrimination in charred and uncharred material being from the differential in the period from which the contexts were initially deposited, it is possible that this occurred more due to the type of feature from which the samples were removed. This does though infer the changing types of features across the site throughout different eras. The later period seemed to have a more industrial series of events of kilns or ovens alongside metalworking debris, although they appeared to be quite small-scale. The earlier period samples were all from pits, apart from the layer context (683) and were moist or waterlogged in nature. There is then evidence that the local area was of damper, sometimes wet ground in the period from which the controls came and in that of the Middle Mediaeval Period.

4.2.5 Discussion of Carbonised Material

Sample <1> (157) is from the Late Mediaeval Period. A variety of cereals were used throughout the Mediaeval Period though bread wheat and oats were dominant (Huntley 1995: 75) but from the sample several barley grains (count of 16) were recovered, with a good amount (count of 17) of indeterminate grain as well, some at least of which was barley. This sample may then display the shift in crop use from the Middle Mediaeval Period to the Late / Post-Mediaeval Period in this region.

As part of an oven or hearth feature Sample <14> context (194) was predominately charcoal. It also contained an amount of charred grain, but the grain was clean with no weed seeds associated with it. This may possibly have been an effect of the high temperatures burning off the smaller weed seeds. This may explain the limited amount of grain recovered from it. A small amount of bone was also removed from this context. The sequence of contexts associated with the hearth/oven features from which Sample <6> context (204) and Sample <7> context (205) came as (204), (205), (216) and (277) all had an amount of charred grain associated with them, as well as weed seeds of arable land. This suggests that they were probably associated with the drying of grain at some stage. The grain appears though not to have been cleaned properly of the weed seeds associated with it, although the amounts of chaff present were usually quite low, these possibly burned off during the drying process due to their small size and fragile nature.

4.2.6 Discussion of Waterlogged Material

Truly waterlogged material, if it was initially present, was not recovered as such and so was discussed in general in the text of the samples as whole earth sample material.

4.2.7 Discussion of Ecologically Related Taxa

Oats and bread wheat were the dominant cereals used in northern England during the Mediaeval Period (Huntley 1995: 75). The presence of seeds and fruit stones of edible plants including sloe, elder and hazelnut are typical for cesspit deposits. The occurrence of arable weed seeds such as fat-hen, corn marigold and wild radish may indicate that the pits were used for the disposal of crop-processing waste. Alternatively, these weeds could have been growing on areas of disturbed ground near the pits.

4.2.8 Discussion of Seed Types Encountered

Peat as a fuel. From Sample <8> context (216) a large number of sedge nutlets were recovered. Given the number of sedge nutlets that occur in the sample this material is probably from sedge peat that was used as a fuel source in the oven or kiln from which it came. None of the other associated contexts contained any peat like remains. It may be that the peat was only used as an occasional source of fuel when it was available, as it would have had to come from a peat bearing area, such as one of the peat mosses near the west coast, or from the North Pennines. It may be possible to define the type of peat as being from one of these areas, and if it were from the North Pennines it could be more evidence of trafficking and trade linked to the silver mining.

Fruits and Nuts. Samples <47> context (474), <70> context (661) and <71> (662) produced fruit stones or pips and hazel nutshells. A tree of woods and hedgerows hazel is often grown for coppicing, a method of harvesting wood without damaging the tree, particularly for the manufacture of charcoal. The *Prunus* species recovered would also grow in or around woodland habitats. These are both probable indicators of woodland management in the vicinity and worthy of further investigation, both in terms of the charcoal recovered as well as linking this to the edible fruits and seeds found in some of the samples. It would be of great benefit to assess the parasite remains from samples <47 and <71> to further interpret the origins of the intestinal parasites as human or pig species, especially as sample <47> comes from a place where cess was not usually deposited. This would lead to a clearer indication of the practices carried out in those areas in the era from which the samples came.

Linum usitatissimum (flax). Flax (*Linum usitatissimum*) as charred material was recovered from Sample <14> context (194) and is the plant from which linen is extracted. In the Mediaeval Period, flax was not grown commercially in England for the manufacture of linen, but seeds were widely used for the control of diarrhoaea and other stomach upsets. Seed was mainly imported via links with Scandinavian countries, probably via Scotland. Flax was thought to have been raised as a small-scale crop in relation to burgage plots associated with many city housing patterns, and may explain their presence in this sample as the seeds were charred, a result of drying or cooking. Flax is, although making somewhat of a comeback in relation to the production of linen, not now considered a major crop. It is listed in Stace (1997: 550) as of cultivated origins, formerly grown for linen or oil, although these origins are obscure. Grieve (1977: 317) also commends the properties of flax and states that as it has been grown in most temperate and tropical zones of the world its origins cannot be determined.

Well known in the Scandinavian countries, it prefers a cool moist climate during the growing season as it keeps the fibres supple. From Culpepper's Herbal of 1649 (Potterton 1983: 77) it is said to be a cultivated herb, its uses going back to at least Ancient Egyptian times, it is also well known for its medicinal properties (Grieve 1977: 317). It is known to have been a crop in the Mediaeval Period, and grown for both linen and medicinal purposes (Grieve 1977: 317). It grows well though only on ground of good moist loam, where nutrients are retained that feed the growing plant, and it ravages the soil of these, leaving it poor afterwards (Grieve 1977: 317).

***Ficus carica* L. *(figs)*.** The most unusual and exotic seeds recovered from the site were a few fig pips (*Ficus carica* L.) and as they occurred in two different contexts as <47> (474) and <71> (662) from two different features it is unlikely that they are contaminants and so must be interpreted as exotic imports. From the work done by Huntley (Hadrian's Wall Research Framework in progress) the evidence from plant remains, shows that exotic species recovered, that are not native to Britain, must be present as a result of foreign trade. In the Roman Period, figs were assumed to have been brought in as dried fruit but there is still a restricted knowledge of food imports (Huntley 1997:141-144), particularly in the Mediaeval Period.

Cumin and figs (Hammond 2005: 11-12), foreign imports to Britain in the Mediaeval Period, were listed as spices (Hammond 2005: 65). Various monastic orders were said to have eaten figs 'to soften the rigours of their diet' (Hammond 2005: 68). Usually luxuries of wealthy households, dried figs were imported from the Mediterranean by ship (Dyer 2006: 34). The occurrence of fig seeds in the archaeological record (Moffett 2006: 46) is recorded across the country, including Scotland, and is stated as common as they preserve well in the anoxic conditions of cesspits (Moffett 2006: 54).

In the later Middle Ages as preserved fruits, figs were imported for the Christmas season, as well as preceding Lent to relieve the boredom of fish dishes (Dyer 2006a: 208) and could only be obtained via import trade routes from the Mediterranean or further afield (Woolgar *et al* 2006: 276). Thus, figs may not be the 'exotic' we envision during this period, but their consumption was possibly restricted from the masses by the cost of importation (Dyer 2006: 36), another element of the study worth further investigation. Was there an exchange of goods manufactured at Scotch Street for exotic foodstuffs?

***Cuminum cyninum* L. (cumin).** Although not recovered from the samples Cumin, as a spice (Hammond 2005: 65) was another exotic import. Many of the imported spices were only available to the people of high status as they were goods of high value (Woolgar *et al* 2006: 275). The payment in a pound weight of cumin stated in 3.2.2 (p64) then would probably equate to a considerable sum of money. It appears in Culpepper's Herbal of 1649 (Potterton 1983: 24) in relation to medicine.

Green Manure. Sample <10> context (181) had seeds of common vetch, a hardy plant that can be grown as green manure as it is a legume, or possibly feed for livestock as it is known to have been grown as a crop in the twelfth and thirteenth century.

Other remains. Good-King-Henry (*Chenopodium bonus-henricus* L.) is larger and shinier than fat-hen (*Chenopodium album* L.). As well as being at times an amazing crop weed it was used in the Mediaeval Period as a salad plant. Care must be taken when interpreting plant remains, as in other eras or regions of the world, differeing plant uses did and still do occur.

4.2.9 Discussion of Pollen and Spores Encountered

The contexts examined for intestinal parasites were (474), (662), (672) and (678). All of the samples were from pit fills. Context (672) was from a pit of Roman date, while the others were from the Mediaeval Period. No pollen grains or spores were present in (672). Of the other three samples, (474) and (662) produced well-preserved remains, those from sample (678) were fewer in numbers and often fragmented and crumpled.

From the intestinal parasite assessment of contexts (474) and (662), the remains of quite well preserved pollen and spores were encountered that warrant further analysis to give an indication of the general vegetative landscape of the area. Narrow interval column sampling would have been required though to explore evidence of changes through time. This is an omission on the part of the initial study and as such, this information has been lost, as the area has now been built on. The results of the parasite analysis are also incomplete, as it is not known whether they are from human or pig faeces. Further study could be carried out on these to measure them and statistically plot them to determine their origins to give a further insight into the activities on this area of the site.

4.2.10 Discussion of Vermin and Parasites Encountered

Various species occur alongside man in what he sees as his environment. Some of them aid the decontamination of areas by eating discarded foodstuffs that are sometimes decaying. The fact that many of these species, such as insects and parasites, can occur as one or more of several development stages, can allow insights into the formation of certain archaeological features, using the recovered remains of these organisms as indicators. These can inform, from their development stage, what type of matrix was initially deposited in the feature.

Many organic remains recovered from archaeological features give good indicators as to what went on at a particular site. An organic signature of particular interest and importance is that of coprolites or cess. These faecal remains can indicate the health and cleanliness of previous histories associated with features, or events that occurred on and around the site in question. (Reinhard & Bryant 1992).

They can contain large interrelated datasets associated with the diet of the people or animals that added their excrement to the context, from which the environmental samples were removed at the much later time of the archaeological intervention. Although coprolites are much more specific to species and are 'individual' in their origins, material recovered from cess pits can be equally valuable, even though individual faecal sources are not identifiable in the soil matrix. Both coprolites and matrices recovered from cess type environments have the potential for recovery of well-preserved dietary remains as macroscopic or microscopic material, intestinal parasites and pathogens that affected the health of the individuals from which the matrices came. (Reinhard & Bryant 1992).

It is possible to recover and analyse several types of dietary remains from coprolites and material that has origins from cess. The information recovered from these matrices form discrete data sets that, once analysed, can be integrated into the study of a site to give a holistic reconstruction of diet and disease. This can take the form of bacterial, viral, fungal, pollen, insect, phytolithic, parasitic, plant micro and macroscopic remains, vertebrate and invertebrate remains as well as mineral and chemical components. Much of this information would require costly and in depth analysis, but that from plant, bone and parasite remains can be quite easily recovered and analysed. The plant material is discussed above. (Reinhard & Bryant 1992).

What kind of parasites can be recovered? Remains from intestinal parasites are mainly eggs and larvae of helminths (Dainton 1992: 58). These provide important dietary and disease information. Parasite eggs survive well in the post depositional environment. Some parasites are health threats whereas others proliferate in unsanitary conditions. Several contexts were encountered on the site from potential cesspits. Some were tested at a preliminary stage to identify the presence of the human and pig parasite *Trichuris trichura* (whipworm). Results of these are presented as Appendix 5.

Indicators from the material analysed. The insect and parasitological analysis from these samples was very limited. From the insect and parasitological evidence an interpretation of the health and welfare of the population is sometimes possible, and evidence as to whether human or animal faecal material is present, indicating area use patterns as being of human occupation or housing of animals. Insects are very specific in their habitat, thus particular species of insect and their stage of development could positively determine the type of environment from which they were retrieved.

Two samples, contexts (474) and (662), contained amounts of intestinal parasitic worms that, by their quantity, indicated a significant faecal component within these matrices. Most of the eggs were those of *Trichuris*, and for the most were well preserved, often with both polar plugs still in place. Size of the eggs indicated they were almost certainly of the whipworms of either humans or pigs, or possibly both. The low ratio of *Ascaris* to *Trichuris* eggs recovered may suggest the faecal content to be primarily of human origin. To further analyse the source as pig or human the eggs would need to be measured and statistically assessed to determine their origins.

From initial analysis of two of the samples, contexts (474) and (662), sufficient well-preserved *Trichuris* eggs to warrant attention as part of a further study were recovered. Measurements of those eggs retaining both polar plugs would allow a determination of the likely source (or sources) of the faecal content of these deposits to be attempted via statistical means to either human or animal in origin. (Carrott 2004).

The Insect Remains. Analysis of the insect remains would also add valuable information to the study as to the material present when the stages of various insects were deposited in the archaeological record (Kenward & Carrott 2006), but these do not form a part of this study, as the author is not qualified to carry out such an assessment. The large numbers of insect remains in some of the contexts could have been identified to determine the organic source from which they were feeding. Various stages of insect development were present, and interpretation, as well as incorporation of the bone analysis, along with identification of the animal hairs and feathers recovered, would have added to the information about various features on the site and the presence of any livestock on it at the time the matrices were deposited.

***Small Mammals*.** Small mammal bones that occurred in some samples came from animals that were of no commercial value to man, and in fact have a negative social value. It must be assumed then that they occurred commensally to man. Rats and mice would be attracted to grain as well as to other rotting or discarded foodstuffs, or the warmth and protection offered by close association to human habitations with the many nooks and crannies they afforded in which to hide or nest.

4.2.11 Discussion of the Archaeomagnetic Dating

By archaeomagnetic methods (Outram 2003) dates with age ranges of AD1370-1400 or 255-245BC were analysed. A very small age range is apt for the feature by default, as the only date range, assessed with the other data from the excavation, is the late 14th-early 15th century AD date. Although dates associated with Samples <8>, <10>, <47>, <70>, <71> and <29> were determined as Late Mediaeval, Sample <14> was archaeomagnetically dated to the late fourteenth-early fifteenth century, so by association contexts linked with it are likely to be of or around those dates.

4.2.12 Discussion of the Results Methodology

As is clear from this description and discussion of the methodology used during this investigation, it is possible to level criticisms at all aspects of the results, from sample collection to data recording. As has been briefly stated throughout the previous sections, these criticisms should be placed in the context of the operational considerations, research priorities and concessions to time and expense, which all affect the techniques available. Any study can still be valued a success despite problems if it fulfils its core aims. In the case of Scotch Street, these were to locate in situ archaeological deposits on the site and to gain some insight into how they were formed (Giecco *et al* 2004).

The aim was not to provide a comprehensive and overly representative archeobotanical study, but to provide sufficient data to augment the standard archaeological observations and archive to reach this aim (Kenward & Hall 1995). Techniques used should be ones that maximise the pursuit of the primary research aims. This rationalisation enables tailoring of the 'best' or the most precise practices that are in synergy with the aims and constraints of the study that has been achieved during the methodology for this study. (Orton 2000: 65).

Statistical methods and multivariate analysis can be of use within archaeobotanical data but their applications are still limited (Jones 1991; Reynolds 1981: 24). A useful technique used alongside that of absolute counts and volume or weight of taxa are presence-analysis or ubiquity data (Hubbard 1975: 197-198; Popper 1988: 60). This method scores taxa as present or absent, counting their frequency score as the percentage of samples the taxon appears in, thus describing the relative importance of that taxon (Popper 1988: 61), disregarding the absolute count as too influenced by the degree of preservation to be significant (Popper 1988: 60). Taxa are weighted equally regardless of their absolute count; their presence is the salient point (Popper 1988: 61).

This method though has the ability to exaggerate minor components of the assemblage if they present in the bulk of samples (Hubbard 1975), but it considers the importance of the number of samples a taxon occurs in rather than the number of seeds of that taxon present in each sample (Dennell 1976; Popper 1988: 61). The study examines contexts from which more than one sample has been recovered. The ubiquity method assumes that all samples are independent; it is a useful method in exhibiting trends within the selected contexts (Popper 1988: 61-63).

Analysis was then carried out for this study on the multi-sampled contexts as an average count for all samples taken from the same context. As consideration of actual counts is not used, the method presents problems in demonstrating patterning within the group of increased counts of certain taxa due to cultural or economic revision of methods. It is further limited by its dependence on groups and numbers of samples and cannot be used exclusive of other methods. Here multiple samples extracted from a single context were averaged to limit skewing of the results.

Another useful method employed is the Index of Heterogeneity to assess the richness of the study group in relation to indications for arable methods or economic activities. Some archaeobotanical samples display more heterogeneity than others, reflecting not only the mixing of the original material, but also the balance of other sources of plant material against those composed of weeds and inedible portions of crop plants. The method takes the whole study group and represents the taxa occurring in it as the percentage of plant species a specific sample contains. The Index of Heterogeneity is measured as the percentage taxa considered edible.

The Rubbish Index is measured as percentage taxa considered inedible or residue from crop processing divided by the total number of taxa represented in the sample; a study group displaying for example forty taxa present with a specific sample within that group having only ten species, the Index of Heterogeneity will be (10/40x100=25%) and the Rubbish Index can be displayed as a count of inedible species as (4/40x100=1). Indices plotted against each other exhibits a graph displaying a comprehensive identity of the selected samples showing their differing characteristics. (Hubbard & Clapham 1992).

It was also necessary to examine the proportions of grain recovered and analyse the weed assemblages to determine environmental changes. It would be an impossible task to cover all aspects of analysis for this study, nor would some methods be relevant to it (Popper 1988: 60). The above research however led to the determination of methods to be used in extracting and interpreting the data. Time available for research proved a salient factor in the choice but, more importantly, maximising the data obtained from the study was pertinent (Popper 1988: 60). Overall, this section usefully highlights some issues of bias within the methodology that will be accounted for in the analysis as far as is possible. It also suggests some areas that could be improved upon and directs a path towards potential alternatives for future workers on such sites.

4.3 CRITICAL DISCUSSION OF THE AIMS AND METHODOLOGIES

This study is part of the results of the total excavation of 48-52 Scotch Street. Some of the additional information was also considered here. Much of the data analysis referring to the artefactual evidence though must be ignored, as time constraints proved a serious problem here. The total of the information recovered from the site though will be archived for future use. A record of the complete deposition, as discussed below, of all the types of archive will be held at NPAL.

4.3.1 The Site as a Source of Sampling Material

Non-probabilistic sampling is used when the archaeologist is most interested in already visible or suspected sites, and does not need to sample elsewhere, as with this site, but should be used with caution. These types of sampling techniques cannot be used to infer from the sample to the general population, as any generalizations obtained from a non-probability sample must be used alongside the background knowledge of the study. Performing non-probability sampling is considerably less expensive than carrying out probability sampling, but the results are of limited value.

Judgmental site sampling has the highest degree of bias. Using the judgmental sampling method, the location of excavation units is often directed towards maximizing the recovery of artefacts at a known site. Excavation units are clustered around surface finds in the hope that these artefacts represent buried artefact concentrations.

In 1.5 (p24), the limitations of the site were covered. Strategically the assessment phase of the excavation was restricted by the formal boundaries of the site and therefore the sampling methodology was limited by this, the area of Victorian cellaring having to be 'defined out' of the sampling population as Orton (2000: 142) says. This then required no defining of the 'non-site' area (Orton 2000: 128-9), as the sampling strategy was already formally bounded by these strictures (Orton 2000: 142) and so a restricted population from which samples may be drawn already existed (Orton 2000: 128). This does not mean however that the limited fragment of land sampled cannot form a useful insight into what went on in and around that area in the past, or that the information cannot be used to shed light on further adjacent or closely situated interventions and Desk Based Assessments in the future. To take this view would limit the usefulness of the information gleaned from such work of interventions and Desk Based Assessments.

The site was divided into areas to delineate statistical strata. This, says Orton (2000: 142), is more useful statistically and more practicable than in other circumstances. The purpose of this type of demarcation is so that strata can be sampled from at different rates, as there may be a different physical build up of matrices. This is not always necessary as frequently with this site, the demarcation of areas is the presence of more modern features such as concrete plinths or drainage systems, the strata that occurred in these variously labelled areas surrounding such modern features being stratigraphically similar, if not the same. The delineation of areas on this site occurred mainly as a result of the more modern introduction of walls/paths as seen in pink in Figure 8 (p11).

Features of walls and buildings became evident as stratigraphy was excavated but the sampling frame was kept intact within areas already defined; the structures were given other identifications as 'natural' sampling units with appropriate sampling techniques as required (Orton 2000: 142). Accuracy of the definition and removal of samples from the site must be an archaeological distinction, as results from the matrices will be utilised to compare and contrast data, rather than prove statistically viable (Orton 2000: 128).

4.3.2 The Sampling Strategy and Techniques

As stated in 2.3 (p43) the need for sampling is immediately evident, as each sample potentially holds the answers to some of the aims of the excavation, be it on a micro or macroscopic level. It is impossible though to retrieve all the material from which information can be extracted due to limitations of time, funding, specialist availability and many other such practical limitations, not least the requirement of the immediate publication of the results. (Orton 2000: 148, 159).

What we are specifically seeking through sampling is using a contextual portion of the site and investigating that defined area as a 'space' within the strata as a sampled population (Orton 2000:148, 160). Ultimately, that space potentially relates to an activity, or series of activities, that leave sufficient remains as signatures in the archaeological matrix from which the sample is removed, to interpret what went on there at a particular point in time, related to that site.

It may not be possible to define that time zone more definitely than Roman or Mediaeval, but this may be sufficient, by comparison of the information recovered in each phase, to identify trends and changes of activities or constituents used over the same area, but at a stratigraphically different spatial phase. Selection of samples in this study was also led by judgementally selecting those features that indicated rich remains and so cluster sampling was used to some degree (Orton 2000: 166).

This practice in effect skews the results as several similar samples were recovered from one area or feature, other matrices being ignored as seemingly lacking in suitable material for analysis. If all these samples were investigated, complex types of analysis would need to be used (Orton 2000: 68). The sub-sampling of these matrices though can seek to partially ratify this problem as seen occurring in this study. A single sample though can only be classed as a sample size of one, regardless of size and content (Orton 2000: 166). This negates the need for the use of standard deviation and confidence interval calculations though, as, from a statistical view point, these calculations would be futile, as they are based on the hypothesis that a random sample of all the components of a particular feature are present (Orton 2000: 167), when in reality this is not the case, particularly in this limited study.

Bias is introduced at all stages of sampling. Initially we may sample all archaeological contexts, but become more selective as time passes and completion of the excavation becomes more urgent; sampling then only those contexts 'rich' in organic remains, thus introducing bias. Written evidence may also be missed in the Desk Based Assessment and associated literature in relation to analysis of remains recovered from other sites, again biasing the results. Variation in sample size often bears no resemblance to the total quantity of material in a context, again introducing serious bias of recovery, as often it is not the same percentage of matrix that was removed as a sample per context. There is little uniformity in sample size in relation to context size throughout archaeology, sample size often being left more to the judgement of the field worker.

Small caches of important or localised deposits as spot samples were taken to isolate them 'separate events' in the archaeological record, possibly of small scale dumping or processing. These were removed to give them an increased level of analysis from a small area of recovery, a small occurrence in the midst of a larger scale operation on the whole site, the validity of which may be missed if seen as part of the whole. Recording of this type of spot sample and especially why it was removed as such, are significant in the record. Without this, analysis of such remains is lost within the bigger picture.

Samples can also be considered either too small (a common occurrence) or too large (not as common but still problematic), from which to infer a statistically significant population. Specifically we are seeking from samples such material as artefacts, bones (whether human or more commonly animal) or plant remains by which we can form an educated assessment of various processes that were carried out on this site at the time defined by the phasing; and whether these processes varied over the phases related to the site. The recovery of bone by hand though, also introduces bias, as contextual phasing may not be adhered to relative to sampling phasing, and material has been removed from what should be the intact WHOLE EARTH sample.

Macro plant remains are also in themselves biased, as some plants bear few seeds per individual, whereas others may bear vast numbers in one head. This bias occurs at the analysis stage of sampling, and can lead to overstated levels of statistical significance that need to be taken account of (Orton 2000: 149), as minimum numbers of individuals (MNI) are difficult to interpret (Orton 2000: 161).

Here, as in Samples <47> and <71> where fig seeds were recovered, the diversity of rarities or exotics may not be represented correctly. There are thousands of seeds in a single fig, yet only a few were recovered from each of these samples, but we still know they came from a fig, or figs. The samples from which these fig seeds came are then the population to which the statistical analyses are applied, not the complete contextual assemblage of artefacts and other ecofacts (Orton 2000: 161), and must be viewed as a type of cluster sample of various elements (Orton 2000: 30).

The 'diversity' of a sample can be judged, says Orton (2000: 172), in terms of *richness* and *evenness*, with the added view of *heterogeneity*. *Richness* of a sample describes the number of classes of objects present in it, and indicates that the more classes present in the sample, the more diverse the sample is. *Evenness* within a sample exhibits the perception where an assemblage showing all classes of object is more diverse than one in which some objects are more rare than others. Many types of indices have been used to measure the diversity of samples (Orton 2000: 172), but they have been heavily criticised as depending on the most abundant species. The addition of the interpretation of heterogeneity of a sample would serve to reduce the limitations of the most abundant species. All of these indices though depend greatly on sample size as it has been proved that more species are identified the larger the sample size (Orton 2000: 173).

This study also sees samples ranging from vastly different types of features as well as areas. The use of statistical analysis then is impractical as the variation between the matrices is too great. Should a range of samples clustered from the same feature or unit have been analysed in this study, the standard deviations could have been estimated the proportions of each compared. Thus, the samples were discussed and evaluated individually as the use of statistical techniques were not appropriate. As stated the complete excavation analysis should involve all contextual information; macrobotanical material should not be viewed in isolation, seen as a serious problem in this study.

Sampling at the microscopic level occurs in two phases (Orton 2000: 177), firstly the selection of the unit to be sampled, be it an artefact or an ecofact, and secondly the segregation of the specimens within the type of the objects selected to be analysed further. Context (181), bearing a good number of well preserved charred wheat grains, could possibly have benefited from the measurement, recording and further analysis of

the individual grains, to determine by comparison with other sites, any trends or peculiarities of the assemblage. As a lone isolated sample type of this era and area of the site, it would do little to add to the analysis of the site as a whole. It would be better to remain as an individually interpreted feature within this area.

Few sites are ever really allowed to exhibit the full potential of the samples, particularly the environmental material, that come from them. As Orton (2000: 1) states samples can be hoarded for years before eventually being discarded unexamined. Many types of sampling occur during excavation. They include all forms of material, and are not just those taken as environmental samples, those that were washed, dried and sorted for their seeds and macro plant remains. Pottery and bone hand recovered are also types of samples, adding to the type of anthropogenic activity that can be detected as having occurred on the site by either manufacture or import.

It is important to try to recover, discuss and analyse the whole suite of material from a particular site. Even though here I am discussing only the macro plant remains, elsewhere can be found the details of finds and bone hand recovered from the site during excavation (Carrott 2004; Cussans 2004; Giecco 2004). All the information must be taken together to provide as full and clear a representation of what occurred on and around the area at the time of deposition. It must be remembered, however, at all levels of analysis, that the recovered remains represent only a sample of those that entered the archaeological record, and as such can only denote portions of the whole assemblage that made up that of the initial anthropogenic interaction with the environment that caused the remains to occur (Hillman 1981: 123; Orton 2000: 2).

Deliberate selection of material for sampling by the archaeologist can be based on several limitations, points out Orton (2000: 2). He continues that the basis for sampling may be due to the archaeological significance, or more simply the expense or suitability of material during recovery. ‘Typical sampling’, as discussed in 2.3 (p43), where material was selectively sampled due to content, would give good results, but without the capacity to provide a truly general view of the site, as a skewed strategy had been introduced that led to the true distribution of the population being unable to be determined accurately from the results. This can only be achieved by using a formal sampling strategy using strict statistical sampling procedures (Orton 2000: 2).

It is not always possible to steer away from the biased approach of a typical sample, but as Redman *et al* (1979) state, it is probable that the more we know about a situation, the more we can interpret the best way to tackle it, as formal methods of sampling are a reaction to ignorance of the situation. These types of sampling strategies are often also selected and incorporated in the Project Design by personnel not directly involved in the excavation. These may Consultants who, through lack of knowledge of the area or case in question, take the formal, sometimes seen as the more 'correct' approach, without the knowledge of an area or site type, that a judgemental or typical regime can incorporate. The latter approach is often more suited to the site developer, who can see time and money for the project put to good use. Both techniques, as documentary investigation and evaluation phase, should lead to the determination of a suitable sampling strategy.

It is understood that as an archaeological intervention progresses, much is learned about the site and, as Redman (1987: Figure 5, p8) says, the selection by probability sampling is often overridden by the informed judgemental sampling, as the site becomes known to the manager of the excavation. One must always be careful though in such situations as, when site supervisors ask me if there is any potential in the sample of soil they have just removed, I tell them the evidence will become apparent after processing and, just because they cannot 'see' anything in the said sample of soil removed, it does not mean that there is nothing there! Control type samples should then be removed from areas that seem barren to test the theory and make sure that nothing is being missed.

A mixture of the statistical term of 'prior knowledge' and that of statistical stringency must then be used (Orton 2000: 3, 141) to glean as complete an interpretation as possible of the site within the constraining limitations of the job, such as time and funding (Orton 2000: 6). Should we be in the favoured position of sufficient funding without time limitations the sampling strategy would be rigidly structured and systematic to cover all areas. This would however produce vast quantities of data and would immediately produce other problems. These, in terms of both coordination and amount of resources needed to manage large amounts of processing and information recovered from the samples, would seriously increase the load on limiting factors. Data and interpretation are required by external sources to fulfil project design requirements; specialists are also in short supply to interpret information (Orton 2000: 6).

With the implementation of Planning Policy Guidance Note 16: Archaeology and Planning (known as PPG 16, Department of the Environment 1990b) it is a requirement that sampling be carried out efficiently and responsibly (Orton 2000: 74, 115). This document stipulates that the sample should represent or reproduce the total (Orton 2000: 20). Ultimately, it is crucial to elucidate the methodology employed at each juncture and the considerations behind each decision, as all methods introduce bias, which must be accounted for when analysing the results and using the data obtained to draw conclusions and comparisons with other sites during this archaeobotanical investigation of the site at Scotch Street, Carlisle.

It is evident that a detailed, satisfactory sampling strategy was not implemented at the beginning of the excavation, as the methodology for this was not fully stated in the Project Design (Giecco 2003). Additionally, some samples were removed inaccurately. Certain types of samples taken should probably have been removed as specialist samples as waterlogged or anoxic deposits, specifically for the recovery of invertebrate and well-preserved plant macrofossils, to fully address the research objectives of the site (Giecco *et al* 2004; Greig 1989: 19; Jones 2002; van der Veen & Fieller 1982).

Environmental archaeology seeks to reconstruct past environments, habitats and the socio-economic infrastructure from the material remains recovered of the society from which the archaeological site strata were formed. Judgemental sampling, seen in the strategy employed on this site, has the benefit of being cost-effective. The contexts sampled are then mainly those that could be seen to be rich in organic material. This method is very limiting, however, as organics are not always obvious to the excavator, and other areas from which minimal remains are recovered can identify specific methodologies used in the immediate area. (Jones 2002).

Material recovered during flotation is only usually apparent under the scrutiny of a microscope, and can include industrial residues of hammer scale and flint flakes, both indicators of industry. These may be missed then if sampling does not seek to recover samples from all archaeological contexts. (Jones 2002). Gathering of all information linked to the site and surrounding area should be seen as a means of formulating tighter research questions and of these being suitably answered (Orton 2000: 141).

The sampling strategy employed during this excavation was chiefly based upon the wishes and discretion of the excavator following findings in the evaluation phase of the site, and not the true systematic strategy that should have been employed. Partially translated this means that judgement samples were taken from many of the contexts that were of interest or under investigation by the excavator, not from every secure context or feature existing on the site, as should have occurred.

Green (1982:41) is directly critical of this behaviour stating that: "Methods of sampling have been imposed by many excavators in a haphazard way, often in the hope that such samples might give more information on contexts that were particularly difficult to interpret." Some samples may also have been removed to provide dating information or because they were blatantly rich in organics. The aim of the sampling strategy should have been the production of a scheme of sampling that would identify critical archaeological signatures if they were present on the site (Orton 2000: 119).

Systematic sampling is a good method of sampling, although it too can have limitations. Even though sampling by this method can occur in say 1 in 8 squares of a grid, adversity may direct the sampling interval to be such that whole swathes of material are discounted, as they do not fall into the sampled zone (Orton 2000: 22). Only heavy sampling in a tightly spaced grid would detect most, but still not probably all, suitable contexts that needed further analysis for biological or other content.

Green (1982) continues on to say that it is difficult to derive from such haphazard strategies how typical or atypical a sample is of the rest of the context or similar deposits on the site. Jones (1991:55) echoes this criticism suggesting that judgement sampling is "extremely problematic" in that it tends to reinforce the assumptions the excavator enters as a natural bias, and is bound to affect their decision-making.

These are known difficulties in judgement sampling, suggesting that systematic methods would eliminate this subconscious bias. Jones (1991:55) relates a preferable method of 'probabilistic sampling', with the use of random samples which enable a statistical assessment of the probability of the samples reflecting the population. Either the method described above or a total selection strategy, also discussed above, should have been practised, had time and funding not been an issue.

Sampling during excavation should depend largely on the objectives of that excavation and the questions it is seeking to answer. This may vary though, as the excavation progresses and unanticipated sets of conditions occur, requiring that the initial objectives be revised and varied. Cochran (1963: 5-8), with additions from Orton (2000: 27-39), sets out a series of parameters to aid the selection of sampling strategies; these take into account details such as existing knowledge and the objectives of the study, seeking to show that many issues other than the actual selection of the sample affect the end result that are equally important to gain a full understanding of the information recovered from them.

There is potential for a gap in the deposits' isolation during archaeological periods where there is speculation that terrestrial deposition of different phases of the site is sometimes seen to truncate underlying features or layers (Asch & Asch Sidell 1988: 87; Barker 1993: 72). This may then lead to abutting contexts being phased together as artefactual evidence may be missing, when in fact they are vastly different, due to the variance in depositional phases. Nevertheless, issues of contamination at Scotch Street were considered minimal due to contexts being clearly defined. This study has however already chosen a biased selection of samples for various reasons.

The Roman and sub Roman strata recovered were examined in this study to try to define the variation of the material recovered from the different periods of the pre Roman, Roman, and Mediaeval. The Roman and sub Roman matrices are then serving the purpose of control samples. The remaining samples were all selected for their periodic phasing to the Mediaeval eras. Again though, they were somewhat biased as others rich in remains or artefacts have been ignored, therefore not revealing the full extent of the information recovered from this site. Time, a limitation in the study, saw knowledgeable selection of samples occur to cover all Mediaeval Period phases on this site.

The above may seem like a tirade of criticism against the value of the sampling strategy used in this case, but it is important to put this investigation in perspective. The activities that would have to be undertaken in order to meet the requirements of a total sampling strategy, within the constraints of a commercial budget, would have been massively time and resource consuming. van der Veen (1985) suggests that a combination of judgement and random sampling methods be undertaken.

The amounts of material excavated would also be problematic, as more sophisticated sampling techniques would produce more samples, without the resources and time available for their study, remembering though that this is an unrepeatable experiment, where no further information can be gathered or analysed. Green (1982:41) also points out the benefits of consistency as a useful attribute of sampling strategies, and so the continued uniform fashion of sampling imposed on all deposits was preferable. This then eliminates variation in the observation of the plant assemblages, which then enables more direct comparisons between these results and others in the same category.

An additional point to highlight concerning the sampling methodology goes beyond the way they were collected to include the number of samples investigated. In this study 10 samples were analysed in depth due to their being specifically Mediaeval and 2 from other periods Table 2 (p93). This period has rarely been studied elsewhere in Carlisle due to the importance attributed by many excavators to Roman material. Samples from pre-Roman and Roman samples from Scotch Street were also assessed for comparison with other sites, such a juxtaposition not having been used before. It is hardly surprising though that an investigative study with limited resources falls to the end of a rating system primarily designed to expose results from full excavations.

The size of the unit of sample is also often a cause of disagreement between the ultimate archivists as English Heritage (1991, 2002, 2006), or cause for heated discussion between specialists and excavators, the latter thinking it unnecessary to remove large volumes of soil just to perpetuate the working life of the archaeobotanist! It is a sad statistic though, especially with relation to commercial archaeology, that often as not a suitably qualified bioarchaeologist is seldom present throughout the progression and interpretation of a site, as was the case here. Sampling strategies are then very rarely revised as excavation progresses.

Some of the samples analysed produced relatively small flots but were rich in seed remains, some containing charred material. van der Veen and Fieller (1982) show that small but rich samples can provide statistically significant sample populations despite deriving from comparatively small samples or sub-samples, especially true of waterlogged conditions where high preservative anaerobic environment produces a high population density as aptly illustrated at Annetwell Street, Carlisle (Goodwin 1989).

Orton (2000) suggests that to accurately represent larger objects that were selected in the ≥4-mm fraction a larger sample is needed than is required for seeds and other objects of the smaller fractions. This is one issue that most definitely occurs in this study. It could however be argued that this bias towards size is mitigated as the larger objects such as bone and timber samples were collected independently of the 'biological' samples. This in itself is though, a selective sampling process, and samples should be removed as large whole earth samples, none of the integral content or matter taken out separately from it as this again skews the results and compromises analysis.

Contamination of samples whilst *in situ* is not seen as a serious problem for this excavation, as the multiple pathways of potential input and high-energy environment are lacking, due to the continued layering and effective burial of the contexts rich in remains as the strata evolved. Green (1982:42) identifies the activity of worm, insect, small mammal and root action as agents that can cause cross contamination between contexts. These were, for the main, absent from these contexts. Small turbation incidents occur within specific contexts, mainly due to pests such as insects and small mammal foragers contained within contexts. These events occurred within the archaeological timescale though, and are not viewed as modern intruders and so are considered part of the archaeological record intact.

4.3.3 Post Excavation Techniques and Procedures

Both chemical and non-chemical forms of flotation provide much poorer recovery of mineralised material than wet sieving according to Badham & Jones (1985:21). My own experience has taught me though (Shaw 2002), and personal comment by Jacqui Huntley has also stated, that mineralised remains are often very hard. Becoming almost petrified, and so very tough, this leads to good recovery of such material during post-excavation processing. It could result though in fragile material, such as outer seed coatings that cannot become mineralised due to their lack of sufficiently dense cell structure, undergoing destruction during processing.

Both wet sieving and flotation have differing advantages, and in some cases on this site samples would have benefited from wet sieving, as would those from potential cesspits where the material was almost waterlogged. The substrate would be used as a whole, introducing a smaller bias to the sampling technique when a lesser sub sample of the

original matrix is still statistically viable as referred to above (Orton 2000). An assemblage is usually analysed as a relative composition of species of plants and other artefacts and ecofacts recovered. This method seeks to describe the assemblage in proportions of the whole (Orton 2000: 157). As stated above, this may produce a biased result depending on the number of, say, seeds per head born by a plant and can give an over positive interpretation that must be taken into account during analysis of results.

There are several other problems arising from incorrect identification of plant material. In some species of plant, the genus may be sufficient to identify the habitat from which any of them came. In others, however, the species themselves are very habitat dependant and each may occupy different niches. To identify the latter then to genus does not give its specific habitat, and unless other plants are present from which to derive this information, it will not be available for the analysis. Care must also be used when assuming that other species of plants are fully associated with each other. It may be that there is an element of contamination, or that the remains from several activities are disposed of in the same context from such actions as floor sweeping, where material from both cooking and preparation areas will be removed during the same exercise.

For various reasons elements of contamination can occur at different levels of post excavation analysis. At site level contexts, especially in poor weather conditions or state of waterlogging can be difficult to define from each other, sometimes leading to the amalgamation of material from several different primary sources, thus introducing errors for all further levels of interpretation and analysis. Seeds can occur as very similar in shape and size and, to the untrained eye that may not have come across these types before, identification may be incorrectly made, leading to misinterpretation.

The method of gauging amounts of seed material present in samples can also be seen as ambiguous. Only charred plant material was assessed as actual counts in this study, the balance of other seeds and plant material were assessed only as a richness score. This richness score is not infallible either, as the taphonomic processes leading to the preservation of plant material can lead to vastly different quantities of plant remains for assessment and interpretation (Carter & Holden 2000: 1), as well as the number of seeds contained on one seed head varying greatly, therefore affecting the viability of the count as discussed above. Waterlogging can preserve many plant species virtually intact.

The effects of charring can lead to good preservation, although it is difficult to interpret the remains as varying conditions, such as the amount of oxygen present when charring occurs, display a high degree of variation in preserved remains. Slow, anaerobic charring of material can though, lead to recovery of most of the deposited material. The difficulty is though, of knowing which type of process the material has undergone, and so attempt a valid assessment to the level of degree to which it has become preserved. Evidence of this can be seen in the charred remains themselves though. Material that has been evenly and slowly charred under good anoxic conditions remains relatively intact with minimal changes to the outer structure. High temperatures though, in the presence of oxygen, can give plant remains, especially grain, a 'blown' appearance, wheat and barley often appear like smaller versions of popcorn, with distended bubbly surfaces making them difficult to identify to genus, let alone species.

Oats do not appear to be so badly affected by higher temperatures, but this may be because their more delicate remains have disappeared from the record altogether. Although seen as one single burning event, and therefore all part of the same context, charred material, particularly grain, can display every type of differential regarding charring resulting mainly from the position of the grain in the fire, hearth or kiln and the amount of oxygen available in the area. Some contexts also displayed a high wood charcoal content, the identification and analysis of which might enable discussion of woodland management practices in the nearby environs. Unfortunately, time limitations meant that this material could not be investigated during this study.

The evidence for crops grown in Mediaeval times has latterly come from sources of waterlogged and charred material recovered from samples during the excavation of various sites; documentary sources, although sometimes more rare, can take the form of illustrations in herbals, and occasionally as finds of preserved herbarium or research specimens, such as those brought back from the travels of antiquaries and explorers such as Darwin (Letts 1999: 32). Available evidence of material present at the time of deposition of the material is then limited regarding the study. The abundance scale, based on Hall & Kenward (1990: 297) has been widely used with repeatable integrity for material examined by Hall and Kenward in the sites at York (Kenward & Hall 1995). It was seen then as a valid method of analysis for the recovered matter.

As stated previously, it would have been useful to analyse the charcoal material to species or at least genus, to assess the potential of the area for producing wood as a resource, and as an indicator of possible coppicing practices in the local environs. Charcoal would be required as a fuel source for high temperature ovens, kilns or furnaces that were known to have been in use on this site. Analysis of such material in this study was limited though by the lack of suitable resources such as high-powered microscopes and reference material, as well as time.

Study of the plant macrofossil remains is likely to be more informative with regard to human activity at the site. Any investigation of changes in general vegetation of the surrounding area through time would require the sub sampling of column (rather than bulk sediment) samples for pollen (Carrott 2004) and again the author is not suitably qualified for the task. As the site has now been developed, this information can no longer be retrieved. From the analysis, various phases of the site revealed differing types of features had been present on them in different eras, and therefore cannot be compared directly; information must therefore be used as a succession of site uses, both domestic, small-scale industrial, as well as a combination of both.

4.3.4 Anthropogenic and Taphonomic Processes Leading to Ecofact Survival

Archaeobotanical analyses inferring crop husbandry practices are limited due to their selectivity in survival within the archaeological record, biased by both cultural and non-cultural factors, and influencing both numbers and types of recovered remains (Popper 1988: 53). They exist as a representation of specific parts of the whole collection pertaining to the people-plant interaction (Hillman 1981). Far from existing as arbitrary incidents, they result from precise cultural events (Dennell 1976; Hillman 1981), the reconstruction of which is attempted by the archaeobotanist.

Various species of plant are processed differently, affecting their chances of entering the archaeological record by preservation methods such as charring (Green 1982: 40-41); some are not then represented at the interpretation stage due to non-preservation (Dennell 1976; Jones 2002). The plant remains studied here were of charred or mineralised component, as they were from hearth or kiln features and cesspits or middens. Heat treatment, as both a food processing technique and a measure to preserve stored foodstuffs by drying, is widely used (Smart & Hoffman 1988: 171-196).

Plant material subjected to low oxygen conditions at temperatures between 250-500^{o}C will undergo full carbonisation (Miksicek 1987: 211-247). Charred remains can be quite fragile when damp (Gale & Cutler 2000: 2). This can result in their destruction or damage during excavation, further affecting the preservation process (Cronyn 2001: 627) and also in post excavation treatment of the material.

As discussed above, both chemical and non-chemical forms of flotation provide much poorer recovery of mineralised material than wet sieving (Badham & Jones 1985:21). During my research however (Shaw 2002), and discussion with Jacqui Huntley (pers. com.) has stated that mineralised remains are often very hard. They can become almost petrified and as such are very tough, thus leading to good recovery of such material. It may be that if only the outer coating is preserved that this material does not survive.

Favourable preservation conditions, as with charred or mineralised material, can then lead to the retrieval of organic remains that produce a valuable suite of information in respect of the depositional environment of the material. This can enable assessment of anthropogenic activity, seasonality and climate as well as elements of the economy associated with the features from which the samples were removed. Macroplant analysis and identification of remains from the selected samples in this study was undertaken with this aim in mind by comparison with modern reference material held in the Environmental Laboratory at North Pennines Archaeology and at University of Durham Environmental Laboratory and the use of reference manuals (see sections 2.6, p52; 2.8, p54; 4.1, p94).

4.3.5 Were the objectives of the aims met?

The aims of the initial excavation and watching brief, as stated in 1.2.1 (p13) were all maintained. All archaeological work was monitored, fully cleaned and recorded; a stratigraphic record was produced as specified by Department of the Environment (DOE) documents Planning Policy Guidelines 15 and 16 (DOE 1990a; 1990b), English Heritage (EH) documents (1991, 2002, 2006), Institute for Archaeologists (IFA) documents (2001a-e) and Edwards (1979), as well as the Project Design (Giecco 2003), and the Assessment Report (Giecco *et al* 2004). All archaeological deposits were recorded and, wherever possible, the depth of archaeological remains was measured.

The condition of the remains was assessed and artefactual material was recovered, especially that useful for dating purposes. Sampling took place of a number of archaeological features to provide palaeoenvironmental material, especially that useful for dating purposes and to further advance the knowledge of the period from which the material was taken. These steps were carried out to the same standard as those above.

Following EH, DOE, IFA and NPAL procedures, a full and complete record of the site prior to the inception of the construction programme was produced, and, wherever possible, the extent, complexity and depth of buried archaeological remains was established. The assessment phase established whether there was any pre-Roman activity on the site and supplemented existing records of Roman and Mediaeval activity in Carlisle. It determined whether traces of Early Mediaeval activity could be identified.

The assessment phase also established the condition of the remains for future management purposes. All artefactual material was recovered, including some that was useful for dating purposes. A total of 86 samples were recovered from various archaeological features to provide palaeoenvironmental material after processing from which to establish both dating and ecological information, as well as provide evidence of anthropogenic activities on the site. An assessment report was produced for the Client as well as for the County Archaeological Service. The report also included any recommendations for further work and details of the method of final publication. It also contained the data set out in the above paragraph (Giecco *et al* 2004).

This study had several different aims to help interpret the material recovered during the assessment of the archaeological fieldwork. The site area was defined in the context of the City of Carlisle and can be seen displayed in Figures 1 to 5 (p4-8). Previous archaeological work carried out in the area is noted in Figure 9 (p18) and discussed in Section 1.4 (p16). There is though, some limitation to this data in that several of the sites have as yet not been written up, even though the interventions were carried out in the latter part of the twentieth century; various sites then can only now be known and referred to by their site code. This creates a difficult path by which to trace the information recovered from them back to their present location.

The methodology of processing and analysis used in the study was explained and interpreted; limitations of the material recovered, procedures and analysis used were critically discussed, aiding similar future studies by seeking to reduce errors limiting the validity of this study. Periods and phases encountered during excavation are discussed in the assessment report (Giecco *et al* 2004). The ethnohistorical data narrates local history of the environs, but it is still difficult to interpret past land uses of this specific area in relation to anthropogenic activities carried out on it, except with map regression.

Plant macrofossils were analysed in this study in terms of methodology and sampling strategy, then critically discussed in Section 4.3 (p137). Analysis of plant macrofossils was assessed and interpreted in terms of species type, with a view to reconstructing past environments. However, analysis was not assessed by statistical methods as the samples were too varied to compare by statistical methods with any measure of validity.

Several academic aims of the post-excavation study of plant macrofossils and other environmental material were carried out, and an archive record of the material used in the study was produced. The types of plants encountered in the samples were established and their habitats discussed. As stated above statistical analysis was not possible to determine trends and patterns, as there was little or no statistical similarity between the samples. The presence of exotic species was discussed and has proved of great interest for the Mediaeval Period of Carlisle.

Material from the Mediaeval Period has been targeted here, as very few studies have been carried out from that period, from all the interventions taking place in and around Carlisle. Information gained from this study has been compared to analysis of previously recovered material from the Mediaeval Period. The condition of the remains was discussed in Section 1.6 (p25) and a future management programme for these was specified. Some material has already been used for dating purposes, as seen in the assessment report (Giecco *et al* 2004), and more is available should it be required in the future to complete the analysis on any portion of the site. The material should remain in good condition with the management programme in place. The analysis report will be prepared from both this and the assessment report, with any other relevant information integrated into it for the Client and County Archaeological Service.

An archive of the post excavation material and the full report will be prepared for the Client and County Archaeological Service, stating its whereabouts. The report will also include any recommendations for further work and details of the method of final publication. All the relevant information relating to this excavation in all the various formats will be made readily available to persons seeking to use it (Orton 2000: 184). As stated in 2.9 (p55) records will be held in various places and can be freely accessed after their deposition there.

Little is known of the Mediaeval Period in Carlisle, as many sites excavated previously in and around the city have discriminately selected the Roman strata for analysis. A bias was then introduced to this study by selecting samples from deposits of Mediaeval date in an attempt to add to the data recovered from that period. This judgement was upheld though by also selecting samples of pre Roman and Roman strata, although in much reduced quantities, to act as controls.

The City of Carlisle, from maps and information discussed above in Chapters 1 and 3, does show Carlisle to have the layout and recorded history of a typical Mediaeval city. The names of the gates that led into the city, built later in the period, and indeed the street name associated with this study, present since the Mediaeval Period, do however tell the tale of its cultural heritage being one of a wide and varied background of ethnic groups, as do the finds recovered from this and other sites. The effect of this study could then be to prove whether the remains are typical of the period and whether the effects of the Roman occupation linger on in the form of exotics brought into the area.

The city, on the border between England and Scotland, and ruled by each in different periods over the centuries, was initially thought by the author to be a place where people avoided putting down firm roots or develop well integrated systems of trade and finance throughout the Mediaeval Period. This may well be proved or disproved by this study. It is seen from the ethnohistorical data in 3.2 though, that periods throughout the duration of the Mediaeval Period in Carlisle saw changing fortunes. Due not only to the fluctuation between Scottish and English rule, but also the influx of material wealth succeeding the mining boom, this was followed by trade shifting away from the County of Cumberland, although certain trade links remained intact, albeit via a different outlet.

The data retrieved from the excavation and watching brief at 42-48 Scotch Street successfully addressed most of the academic aims of the assessment. It provided important information about the depth and condition of archaeological deposits on the west side of Scotch Street, about which minimal archaeological work has been published, especially for the Mediaeval Period. This sequence of activity from the excavation site provides important information on the development of Carlisle. The retrieval of the material from the excavation in itself though presents problems. Areas of the site were seen to have a complete stratigraphic sequence from the first through to the nineteenth century, measuring over 2m in depth. In this respect, the level of survival of archaeological remains at 42-48 Scotch Street far exceeded initial expectations. The expected quantity of material that formed the post excavation archive was also far exceeded. This significant resource must be archived for future study and analysis as resources and new techniques become available.

Organic material from this study is stored in its entirety as flots and retents at the headquarters of North Pennines Archaeology Limited, Nenthead, Alston. A decision may be made in the future to limit the remains of the retents recovered, as storage of these large volumes is difficult in the long term and the main matrix of these is stone. Such a decision will only be made after re-examination of the material to check there are no further useable remains to be removed from them. The flots will be kept in suitably dry conditions in the presence of silica gel to reduce moisture content and so limit degradation of the material. This will be changed regularly as advised by Jenny Jones, conservator at the University of Durham.

A copy of this study will be kept at North Pennines Archaeology Limited, Penrith Library, Carlisle Library, Kendal records Office, Carlisle Records Office and University of Durham Library for future reference. The results taken as the combination of this study, along with the archaeological and faunal presentation, have divulged information on the development and use of this small area of Carlisle from the Roman Period through to the nineteenth century redevelopment of Scotch Street. Full reporting on the excavation will also be held at the above locations and additionally with English Heritage. All primary records associated with the site have been checked, ordered and appropriately stored, and stratigraphic matrices produced. These are held at NPAL headquarters at Nenthead, Alston until they are removed to a suitable archive

depository. The archive will eventually be deposited with Tullie House museum and copies the reports held at Carlisle Records Office and NPAL. Documentation and other relevant archive material can be difficult to access when it has been effectively hidden in the method of storing it, but all efforts will be made to disclose the archive information to both academics and the public for use in future research.

This problem occurred with the Carlisle excavation site at Blackfriars Street (McCarthy 1990). Results for identification of plant macrofossils were stored on microfiche and then inserted to the inside leaf of the back cover of the monograph. Easily lost or mislaid when the book is being used, this data is now increasingly difficult to read as microfiche is damaged through use and machine readers are becoming rare. The written text is difficult to read from them; printing copies from this source is also very expensive and time consuming. It is therefore the intention with this information to make the archive material freely available for research by others in the future. The information gained as a whole from the excavation will also lead to further studies. Additional research will take place on a number of queries raised during the study with the potential to clarify unresolved functional and dating problems. The major difficulty with this potential information is that much of it is contained within unpublished reports, the most important of these reports being the Lanes 2 report and the 58-62 Scotch Street report. Such material may have to rely on research personnel to bring together the information in a bid to collate all the data.

Deposition of the archive on completion of the analysis and publication will eventually be with Tullie House Museum, Carlisle. The Publication report of which this study will form a part will be submitted for publication in the Cumberland and Westmorland Antiquarian Journal in two separate sections. The breakdown will separate the Roman and sub-Roman results from the Mediaeval results. The detailed environmental results will be submitted to Environmental Archaeology, the journal of the Association for Environmental Archaeology. The detailed Mediaeval pottery results will be submitted to Mediaeval Ceramics, the journal of the Mediaeval pottery research group. On fulfilment of all the above, a decision will be made as to where the environmental archive will be kept on completion of all relevant post excavation work. It may be best that it should remain at NPAL, as it needs specialist treatment during storage. In summary, this study forms only a small part of the full analysis of data from the site and

must ultimately be judged in total with all other data. The structural and stratigraphic data from the various phases will form the basis of a synthesised report that will include any additional data gathered from further documentary, environmental and artefactual studies. Further analysis of artefacts will be undertaken to elucidate the functional use of selected items. Artefacts and ecofacts will also be stored at NPAL for further reference.

As is clear from this description and discussion of the methodology and interpretation used during this investigation, it is possible to level criticisms at it from all aspects, sample collection through to data recording. As has been briefly stated, these criticisms should be placed in the context of the operational considerations, research priorities and concessions to time and expenditure, that all affected the techniques selected. Overall, this section usefully highlights some issues of bias within the methodology that was accounted for in the analysis as far as is possible. It also suggests improvements in some areas, steering towards potential alternatives for personnel on other such excavations, during excavation, processing, analysis, interpretation and dissemination of the data.

The material retrieved from the excavation and watching brief at 42-48 Scotch Street successfully addressed most of the academic aims of the assessment. It provided important information about the depth and condition of archaeological deposits on the west side of Scotch Street, on which few archaeological texts have been published, especially for the Mediaeval Period. The information gained as a whole from the excavation will also lead to further studies. Additional research will take place on a number of sources raised during the study with the potential to clarify unresolved functional and dating problems. The major problem with this potential information is that much of it is contained within unpublished reports the most important of these reports being the Lanes 2 report and the 58-62 Scotch Street report.

This study, as can be seen from the above, forms only a small part of the full analysis for material recovered from the excavation and must be judged as a whole. The structural and stratigraphic data from the various phases will form the basis a synthesised report that will include any additional data gathered from further documentary, environmental and artefact studies. Further analysis of artefacts will be undertaken to elucidate the functional use of selected items. Artefacts and ecofacts will also be stored at NPAL for further reference.

5 PUTTING THE PILOT STUDY IN PERSPECTIVE

5.1 LOOKING AT THINGS REGIONALLY

These assemblages can be compared with other sites in Carlisle such as Castle Street and the Southern Lanes to enable environmental data for different periods and areas of occupation and settlement to be used to reconstruct conditions of the eras involved, thus maximising the information for the ancient City of Carlisle. The evidence gathered may also be used to compare different areas of the country with Carlisle, as the city has always been deemed a marginal region, out on a limb from other cities with a similar history of occupation and settlement. The information can then be used in addition to that of Huntley & Stallibrass (1995) to expand our knowledge of the period within the confines of the Mediaeval city walls of Carlisle.

5.1.1 A brief overview of other macrobotanical studies from Carlisle

As previously stated, the macrobotanical assessment of plant remains from the Mediaeval Period in Carlisle has been sadly neglected. A few studies have been carried out and are discussed here. From Bonsall (2005: 31) it was discovered that plant remains were much more abundant at the Mediaeval sites of Rickergate and the Millennium.

The Millennium ditch, from the plant assessment, appeared to have been kept free of vegetation, being the most important section in front of the castle. The ditch at the Rickergate site, from the remains recovered, seems to have become overgrown and used as a dump for waste from fabric production; waste from leather working and cereal preparation was also dumped there, as well as its holding standing water. This was determined from the large quantities of wetland species present.

The Millennium ditch, from the evidence, contained some standing water, but species of wet habitats were not so abundant. Some rushes were found in high counts at Rickergate, but to a lesser degree at the Millennium site. The Rickergate site had high quantities of nettles from dung or faeces contamination that were deposited into the ditch. Differences between species found at Rickergate and the Millennium site may represent local variations in plants growing there, or it has been suggested that the plants were brought in with crops from other areas.

From the evidence assessed by Huntley (1995: 64-75) a variety of cereals were being grown throughout the period although, as previously stated, oats and bread wheat were dominant. Oats and only bread wheat was identified from the samples analysed with a few grains of rye and barley. Rural sites have evidence of production on a local scale, as does Scotch Street, although the commonality of rye viewed by Huntley (1995: 75) is not seen in the Scotch Street samples that were assessed, although the presence of the arable weed cornflower (*Centaurea cyanus*), sometimes associated with rye, is detected in some samples. Peas were also present at Scotch Street as recorded by Huntley, as are exotics as figs.

The evidence from the multi-period site at Blackfriars Street in Carlisle (McCarthy 1990: 319) contains a write up of plant remains that only target the Roman phase. Abundant other material is on microfiche that was not available to the author. There was mention of pits as well as a Dominican Friary from a thirteenth century date onwards, but there was also difficulty in interpreting these remains (McCarthy 1990: 360-1). By this though, McCarthy means that the disturbance of the Roman layers by such activities as the digging of graves in the Mediaeval Period had caused disturbance to those layers by their depth. The author takes this to mean then that, had she been able to read the microfiche, there would have been no reference to any Mediaeval samples, as they were probably never taken.

Although the site at Annetwell Street produced samples from Mediaeval Period contexts (Goodwin 1989), the environmental report states that the samples were not analysed at that time (Huntley 1989: 2). This evidence is probably available now but as one of the Ancient Monument Laboratory Reports it is difficult to locate, as are others, such as the plant remains assessment from The Lanes in Carlisle.

From the Archaeological Evaluation at King Street, Botchergate, Carlisle, (Reference HBSAI 11/04) the report states that there was a high level of truncation, and the lack of stratigraphic security leads to a lack of confidence that the samples will provide a secure date. Information will become known from Mediaeval Period features in Carlisle, as development throughout the city progresses. More sites will be excavated to reveal Mediaeval Period strata. Further environmental material can then be analysed to enhance knowledge of the period.

Post-Roman material was recovered from a well in Castle Street, Carlisle (Goodwin & Huntley 1991: 59). The suite of plant material recovered seeming to be from mixed origins. Hazelnut fragments, sloe stones (*Prunus spinosa* L.) and *Malus* or *Pyrus* pips were also present with a large number of fragments from bracken fronds, possibly the result of discarded or dumped material. Seed quantities were low in count except for the number of bracken frond fragments and hazelnut shells. The fronds may be a result of trying to close down the well or possibly to stop the buckets stirring up the silt. They may have grown around the top of the well and been deposited naturally, or been a dump deposit from animal dwellings. No other features from the period were listed and were assumed not to have been present.

In conclusion, there is little plant evidence recovered or recorded then from the post-Roman Period in Carlisle and few studies have been carried out to completion for later scholars to draw on. This serves to remind the excavators and research personnel at site level of the importance of recording and processing all the strata from sites, and not to be selective in their assumptions that some periods are less important than others are. It is not so important to analyse all the contextual samples but they need to be taken and processed so that they can remain archived for future researchers to draw on and interpret. Samples taken may still not reach the flot tank though, as occurred with those taken by Carlisle Archaeology Unit and housed in Shaddon Mill up until the time the property was sold and the samples discarded.

5.1.2 Carlisle - Part of the Borders or the North of England?

Carlisle is unusual in that it is a northern town of England that borders Scotland very closely. Is it then part of the borders or the North of England? The intermittent rule of Carlisle by the Scots is discussed in 3.2 (p63). This occurred periodically and seemed at times to benefit the people of Carlisle. A Scottish burgh is an incorporated town having its own charter with an element of political independence from the surrounding area, such as the town or city of Carlisle when it was made over to the merchant guilds. The burgh was a modern concept as towns were late to develop in Scotland, having no need to follow the pattern of the Romans who did not occupy the region. Unusually though they bear a resemblance to the English Mediaeval town, with similar strips of frontage building and a type of burgage plot to the rear. (Hall 2002: 7).

Of Edinburgh it was said (Blanchard 1996) neither castle nor burgh were of much substance. During the reign of Malcolm IV when Carlisle was under the thrall of Scotland the castle was set on a defensive freestone volcanic plug, excavations revealing a western postern gate. Domestic wares required for the royal household from archaeological evidence do not reflect the Castle's importance at the time but show its 'urban' character, showing evidence of links to increasingly specialised and interdependent manufacturing networks. Pottery was at this time locally made, possibly in the same places where it had always been made, but was of a refined finish by master craftsmen, being both beautiful and plentiful. (Blanchard 1996).

Craft-workers would have been very skilled but goods were brought in as almost finished products to sell at the burgh markets, as was the food. Edinburgh was much like Carlisle over the 'border'. An insubstantial settlement, even though it was the principal royal seat of the Scottish king's realm, it showed little of the ostentatious display that characterised other royal courts. Although there was extensive pastoral activity in the realm providing the base for an intricate taxation system and characterised the royal demesne, the overall impression the historian of northern Britain gleaned was that, south of the Tay in AD1130, a chronicle of poverty and endemic cash shortages occurred, as there was south of the border in Carlisle. The similarity stretched to Glasgow and other such Scottish towns as well. (Blanchard 1996).

Modern Berwick has little to remind the visitor of its long history and former importance, except for the fragments of the Mediaeval Period castle and walls (Menuge & Dewar 2009: 26). A Roman river crossing also existed at Berwick, reflecting Carlisle's history, the documentation of the first bridge being from the reign of Malcolm IV of Scotland (1153-65) and having been destroyed by flood in AD1199, subsequent ones were also destroyed by floods in AD1294 (Menuge & Dewar 2009: 23).

Civil jurisdiction was from both the crown that appointed a governor of the town, and the municipal authorities, through the mayor and elected officers, as well as the freemen or 'burghers/burgesses' who elected the officers and the towns MPs (Menuge & Dewar 2009: 33). A Carmelite Friary was also present in the town of Berwick (Menuge & Dewar 2009: 37), reflecting the presence of the monastic orders in Carlisle.

It was said by a traveller in the eighteenth century that Carlisle was the key into England on the west as Berwick was on the east (Menuge & Dewar 2009: 6). Berwick was another burgh very similar to Carlisle in that it was on the border, but this time was a Scottish town on the English border.

Here, as in Carlisle, the defence of the town was paramount as a border region, but it was also important to promote trade to allow the town to prosper and be able to use the safe portage that the Tweed offered. This caused a series of tunnels and lanes to be constructed through the ramparts that protected the burgh. (Menuge & Dewar 2009: iv). The town was though still primarily a trading port and market town, an equidistant commercial centre between Newcastle and Edinburgh (Menuge & Dewar 2009: 7).

Again, as with the River Eden at Carlisle, the Tweed formed a natural boundary between Scotland and England, Berwick lying on the northern Scottish side that was subsequently fortified into a Mediaeval town, much resembling Carlisle. It was formerly Scotland's richest Royal Burgh, mainly from the wool trade, and suffered as a consequence of this having a turbulent history. Edward I captured the town in AD1296; the Scots regained it in AD1318, the town changing hands frequently though before the establishment of English rule by Edward IV in AD1482 (Menuge & Dewar 2009: 3). In Berwick, the castle was inside the main fortification (Menuge & Dewar 2009: 4).

The Mediaeval well stood at the heart of the town (Menuge & Dewar 2009: 14) with two mills using the stream that ran to the south of the town. The Northumberland and Durham coalfield were sources of mineral wealth there being a mine just to the south of Berwick, similar to the silver mine wealth of Cumbria (Menuge & Dewar 2009: 20). It should also be noted that trade links stretched overseas through the coastal links that influenced consumers and crafts people (Menuge & Dewar 2009: 27).

The Royal Charter that the town held required that it supplement income from its own property with tolls from markets and wharfage (Menuge & Dewar 2009: 42), again reflecting Carlisle, discussed in 3.2, the freemen were also allowed certain privileges that also had to be funded, and the town was having to promote itself in the extending trade links that were forming, both domestically and also further afield (Menuge & Dewar 2009: 44).

Berwick, as with Carlisle, straddles the border between England and Scotland, it also displays a rural hinterland of sparsely populated agricultural market towns and other small habitations, and although it was a bustling harbour, the gigantic city of Newcastle to the south won on all counts (Menuge & Dewar 2009: 49). Good agricultural land follows the Tweed; the trade was greatly influenced, as in Carlisle, by the ruling powers of the time, whether Scottish or English. Prosperous under Scottish rule due to the wool trade, the thrall of the English crown reduced the backcountry to half the size from the vast taxes levied on the prime agricultural land, while the fishing, especially of salmon and herring, kept the coffers full to a certain extent (Menuge & Dewar 2009: 49).

As stated in Section 3.2, the mining from the North Pennines region of Cumberland ended and new sources were found further to the east in Northumberland and County Durham. The balance of power then shifted away from Carlisle, firstly seen in terms of trade, but secondly due to the fall in the monetary result from its primary source as the silver from the Pennines. Merchants who were not tied to the town then sought to exchange goods for other sources of silver that were removed to their domestic location for processing. The coalfields and fishing associated with trade in Berwick though, continued to thrive well after the Mediaeval Period, the downturn to the town's economy coming with the rule of the English.

5.1.3 Carlisle – is this Northern City Vastly Different from the South?

The state of the country of England during the Mediaeval Period was one of fighting factions. The invasion by the Normans in AD1066 completely changed the way the country was administered, and brought with it an influx of monastic influences and cultural differences from the continent. To the ordinary citizen it probably made little difference except that the system of serfdom became less popular throughout the Mediaeval Period. (Schama 2003).

To the Lords of England though things would never be the same again and they were expected to pay tribute to William the Conqueror, as well as fund his expensive lifestyle. They were then ousted from their comfortable seats in favour of the Norman Lords who William sought to cosset to his own ends. The monarchy, aristocracy and clerical hierarchy all spoke French, thus transforming the English language and culture. (Schama 2003).

Rulers from France linked England more closely with the continent rather than Scandinavia and their trade links. The king now held and had ultimate possession of all the land of England and ousted the English Lords, placed the lands in the hands of French equivalents and built a chain of large defensive castles by which to quell rebellion, both locally and nationally, that continued for five years after the invasion. English lords had the right to petition William to reclaim their lands. (Schama 2003).

Thus began a period of consolidation and control of the new monarchy in the English realm. This had a big effect on the rest of the British Isles, where Wales and Ireland were both brought into the fold of the Normans, as contact between regions was encouraged to aid the nobility to act as a whole rather than separate units. The nobility formed ties with the citizens and interrelations began with the new overlords. This also brought an extensive infiltration of the nobility of Scotland and the inevitable invasion of the institutions and cultural influences that accompanied it. (Schama 2003).

This may seem vastly removed from the far northern city of Carlisle, but at every step links were being formed whereby men, particularly foreign merchants, could move throughout the length and breadth of the country to both purchase and supply all the needs of the residents of the country. The country as a whole was becoming more united in its aims, even though it still contained warring factions at both a regional and a national level. Both these factions occurred at Carlisle, and as a border city region, it was continually dealing with the Scottish influence, sometimes being a part of it.

5.1.4 Carlisle is West of the Pennines but did it have links to the East?

The positioning of Carlisle as west of the Pennines is unusual in that it is also divided from the east by this natural boundary. The larger cities of York and Newcastle lie on the eastern side of the Pennines and have good links with the sea and also navigable rivers, much the same as Carlisle. The city of York is a vast subject to tackle but brief mention is made of it here to put it in perspective as an English city east of the Pennines. The Mediaeval Period in York has been well researched archaeologically and environmental finds are prolific as many of the contexts excavated were waterlogged. Again, trade links were excellent in York, originally stemming from the invasion and settlement by Scandinavian peoples. The links then continued in use by the Anglians, York having become a formidable town by AD1300.

The Norman Conquest brought little change to York, already a thriving city and it continued to grow (Hall 1996: 73). York was always a point where Royalty would stop over on their travels, citizens sometimes benefiting by being so closely linked with the monarch, written records are confirmed here through archaeological interventions (Hall 1996: 75). The status of York as a very English city, with firm trade and clerical links throughout the country, makes the small city of Carlisle pale into insignificance. Being also east of the Pennines York probably new little of the existence or machinations of Carlisle.

Newcastle also held the esteemed position of a city built on firm trade links, with the added bonus of production from the local coalfields. Newcastle was closely associated with the sea routes from Germany and the Scandinavian countries, via which it traded goods to and from these countries through all historical periods, especially the Post-Mediaeval Period with the Hanseatic Leagues. The form of the town of Newcastle though, is much less imposing than that of York, and did not have the same Royal patronage as York, although it was well appointed in post-civil war Britain (Graves 2002: 31-54; 2009: **13**, 385-408). Even so, it was and still is a thriving city and port. Although there is evidence of merchants entering the estuary at Burgh-by-Sands near Carlisle as seen in 3.2 (p63), the continuation of this practice seems to have stopped when trade of the silver and the foreign merchants trading out of there also ceased.

5.2 THE STUDY LINKED TO THE NORTH WEST REGIONAL FRAMEWORK (NWRF)

5.2.1 Introduction to the Concept of the NWRF

A condensed volume for the county of Cumbria summarising the Early and later Mediaeval Periods has not been collated to date (Newman 2006b: 91). A direct connection to the Resource Assessment (Brennand *et al* 2006) as well as the Research Agenda and Strategy (Brennand *et al* 2007) of the Archaeological Research Framework, particularly in that its application is to the North West Region, was made to this study as it addresses many of the criteria associated with the Mediaeval Period. The necessary mutations of many of our Great British cities began after the Second World War when damage had rendered them unworkable as centres of settlement and commerce. (Brennand *et al* 2006: 12). Further north though, in the City of Carlisle and its surrounding environs, metamorphosis occurred more slowly.

In relation to Carlisle, much of the general city plan had remained the same since the Mediaeval and Early Post-Mediaeval Period. By the nineteen seventies though radical alterations were planned for a city centre no longer capable of supporting modern high street shops in its tiny tenements and terraces. (Asquith 1855; Creighton 1889; Ferguson 1890, 1894; Flynn 1995; Gosling 1976; Hutchinson 1794; Jones 1976; McCarthy 1993, 2000; McCarthy & Flynn 1994; Perriam 1992; Rollinson 1978; Zant 1996; Zant & Giecco 1999; Zant & Padley 1996).

The changes in planning and building regulations, as well as funding methods in relation to archaeological investigations had though, already begun to alter the way urban regeneration was monitored (Department of the Environment 1987, 1990a, 1990b, 1990c; Edwards 1979; English Heritage 1991). By 1990 Planning Policy Guidance note 16 (PPG16) (Department of the Environment 1990b), saw the initiation of archaeology as a valid component of the planning process. From this stemmed the need for the inclusion of archaeological appraisal before any developments and interventions began in archaeologically sensitive areas.

Not only did this increase the need for archaeological processes to be executed (Darvill & Russell 2002), but it also led to the further development of support tools such as geophysics, archaeobotany and archaeozoology to maximise the knowledge gained from archaeological interventions. This resulted in a more extensive dataset for all periods encountered through archaeological intervention to be consolidated for future reference. (Brennand *et al* 2006: 7).

The Archaeology of North West England (Brennand *et al* 2006, 2007) seeks to produce a comprehensive Research Framework for the North West Region. Referred to from this point on as the North West Regional Framework (NWRF), it details aims, through the dissemination of data recovered from the counties of the North West of England, including Cumbria, to eventually give a complete depiction of all archaeological periods. The NWRF was written by people well acquainted with and extremely knowledgeable about the archaeology of the North West region from first hand experience. It therefore brings together a realistic set of goals for future researchers to address (Brennand *et al* 2006: 8).

Within the NWRF, the Mediaeval Period as a whole is addressed as the Early Mediaeval (Newman 2006b: 91) and the Mediaeval Period (Newman 2006a: 115) in relation to the Resource Assessment (Brennand *et al* 2006). The Research Agenda and Strategy (Brennand *et al* 2007) sees it as the Early Mediaeval (Newman & Brennand 2007: 73-94) and the Mediaeval (Newman & Newman 2007: 95-114). From the NWRF Resource Assessment an insight into the state of archaeological knowledge in the present, seen here as 2006, defines the archaeological resources of the North West counties. (Brennand *et al* 2006).

It also seeks to identify the voids in knowledge that occur within the archaeological device for this sector. This can then be used to identify and define priorities for the region, or in the case of this study the county of Cumbria and in particular Carlisle. A means of targeting the missing areas of knowledge, these aims can then be written in to Project Designs for all stages of archaeological works, be they recording or interventions, to help fill the gaps in the knowledge. (Brennand *et al* 2006).

The Resource Agenda (Brennand *et al* 2007) follows on from the Resource Assessment (Brennand *et al* 2006), and includes a Strategy setting out priorities and proposals for delivery of future research, work programmes and changes in working practice to promote research objectives. (Chitty & Brennand 2007: 7). Issues tackled within the Research Agenda are the curation, configuration and methodology of projects that affect the calibre and administration of archaeological research in the North West sector. Developing from this, a Strategy delineating the recommendations and order of precedence for the conveyance of all ensuing research, agendas and methodologies and relating to projects that will ultimately advance the aims to deliver research designs more appropriately is also included. (Brennand *et al* 2007a).

The Research Agenda as it developed threw light on the fact that there were several research issues to be considered. These could not necessarily be applied to all sites or in the same context relating to all the factors to be considered such as methodology and regionality. Agenda issues varied from those encompassing all time intervals whilst others were more specific. (Chitty & Brennand 2007: 7).

This pilot study is specifically concerned with the Mediaeval Period and although there is little evidence from the remains for the Early Mediaeval Period, it will be considered. The Research Agenda of the NWRF seeks to identify voids in knowledge as well as evaluate the capacity for tackling these and so begin the process to determine suitable critical methods to address the problems, here tackling only Cumbria as a region, and in particular Carlisle. This is however a very narrow view and to see the complete picture would require the input not only from associated regions but also those of other nations that are known to have been involved with the trade that went on from and to the county of Cumbria and also the City of Carlisle. (Chitty & Brennand 2007: 8).

More ephemeral clues should also be sought for the identification of changes in the Early Mediaeval Period where artefactual evidence is lacking, such as land-use and vegetation change differences, seen as the beginning of major socio-cultural changes in economy and settlement patterns. To recognise the defining point of such changes newer methods need to be used such as soil micromorphology and absolute dating techniques that can specifically differentiate between periods and can be used to clarify any interactive buffer periods or crossovers between cultures of different methodologies entering into the palaeoenvironmental record relating to the archaeology of a period. (Chitty & Brennand 2007: 8).

The discovery and excavation of most archaeological sites is carried out as part of the planning process and as such is funded by the developer with Project Designs delineated by the regions Archaeological Curator. Formerly lacking within the Project Design it is now viewed as appropriate to incorporate research aims by means of scientific and other techniques into the document, developer led archaeological sites often being the only ones active within the North West Region, and therefore an important resource for research evidence, a prime aim of the NWRF. (Chitty & Brennand 2007: 12).

The NWRF also aims to ultimately work towards a national set of goals to be adhered to for the recovery of information from archaeological studies by setting out standards to be achieved and best practice methodologies to be adhered to. It is important then that timings and costings in Project Designs must be as accurate as possible. (Chitty & Brennand 2007: 12).

Curatorial problems associated with excavation archives occur with archival materials relating to Cumbria on several levels. Approaches to staffing are difficult both in relation to lodging the archive and the fact that specialists in curation of archives are seldom employed within the Cumbria Museums Service, even in Carlisle. This has a major long-term effect in that the recording and location of such deposited archives may be neither accurate nor secure for those who wish to research the material in the future, a nationwide problem associated with staff and funding cuts. It is also probable that the unit lodging the archive has failed in its duty to deliver the entire documentary and digital evidence as well as the artefacts and ecofacts (Chitty & Brennand 2007: 16, 18).

5.2.2 Relating the Pilot Study to the NWRF for the Early Mediaeval Period

The Early Mediaeval Period, as discussed above, extended on from the end of the Roman occupation although hard evidence, particularly within the conurbation of Carlisle, is limited. For many years, whilst the importance was recognised of the 'dark earth' deposits overlying Roman towns in the south-east of England, horizons, whether dark or otherwise, above Roman sites in the North were given little or no priority, since they contained only Roman pottery and were declared 'residual'. This southernocentric view has meant that these layers have tended to be removed as a block, sometimes even by machine, and excavation techniques were not sufficiently formulated to attempt to identify any detailed phasing within them, nor to record accurately the material from them. (Newman 2006b: 96).

In analytical programmes, the material from them in towns such as Carlisle, was largely ignored because of this assumed residuality and thus, even in published reports, this crucial period of change has largely been ignored, or is grossly under-represented. Similarly, rural sites containing only a few sherds of Roman pottery have traditionally been dated to that period, particularly in excavations previous to the advent of radiocarbon dating. Recently, the adoption of such absolute dating as a relatively routine technique in rural excavations has demonstrated a far more complex picture. (Newman 2006b: 96). It may be that other fractional remains of the Early Mediaeval Period that existed at Scotch Street were not identified to that period during the excavation, and that limited artefact and ecofact recovery of the era could shed no further light on accurate dating by typological methods.

The Early Mediaeval Period in Cumbria saw major cultural changes due to the influx and subsequent change in socio-political strategies to that of the migrant peoples of the Scandinavian continent. In essence, this should lead to the recovery from archaeological sites of a more distinguishable typology and clearer understanding of the forms of artefacts and ecofacts that may present from sites of relevant date. These need to be thoroughly investigated and reported though to add to the valid chronologies held as archival material, there being a much greater change in Cumbria from other regions, both locally in the North West as well as nationally (Newman & Brennand 2007: 75, 76). (Newman & Brennand 2007: 74).

The Early Mediaeval Period is difficult to identify, not least due to the fact that within a city or town environment, continuity of settlement was almost guaranteed. That and the fact that there were fewer differing peoples in the North West region makes it even more difficult to diagnose. Social changes though through this period were vast and moved towards what we more familiarly know as the Mediaeval Period. (Newman & Brennand 2007: 73, 75). It may be that, during the excavation at 42-48 Scotch Street, specific geoarchaeological techniques could have been effectively used that led to the recognition and relevance of soil build ups, and dark earths recovered from pertinent contexts, between the fading Roman influences and the approaching mantle of the Mediaeval Period, and that may have led to an understanding of their taphonomic formation. (Newman & Brennand 2007: 75). This can be seen as an area where the NWRF Research Agendas aims were not fulfilled and are still not seen as a typical inclusion in commercial excavation Project Designs or are ignored by archaeologists.

The Early Mediaeval Period encompasses the elusive Viking era (Newman 2006b: 91). Although this is a phase encountered on the site, no relevant samples were recovered from it, as it seemed to be a period of relative inactivity. All the samples used in this study were from the Mediaeval Period, generally seen to be between AD1066-1485. In relation to the Early Mediaeval Period then, this study cannot contribute any further information to fill in any of the gaps in the data that is sadly lacking in both the Resource Assessment (Newman 2006b: 91-114) and the Research Agenda and Strategy (Newman & Brennand 2007: 73-94). More regard to specific contexts from this period, even though they seemingly lacked signature, should have been given to assess their content and characteristic format.

There is now though an expanding compilation of archaeological data recovered in recent years. However, the ethnohistorical material that defines the chronologies of Cumbria, with particular reference to Carlisle, is difficult to extrapolate from the actual archaeological evidence. (Newman 2006b: 93). Many of the settlement patterns in evidence during the Early Mediaeval Period were probably based on timber structures, the remains of which during this excavation, were possibly obliterated by the soil build up seen in Figure 10 (p31). Although the cobbling seen there remained in use, it probably dated from the Late Roman Period and continued in use into the Early Mediaeval. There may be finds from this period but, as this information is not categorised in the assessment report, it is not readily available at this time. It is unfortunate that this period is largely void or undetected from the excavation as it would have been a useful tool in relation to the NWRF.

The archaeological evidence for the Early Mediaeval Period has been more detectable in the wider Cumbrian landscape and more localised settlement sites within it (Railton 2008, 2009). This may reflect the difference in the type of settlement patterns used throughout this period, before the nucleations of towns and cities became the natural progression due to social changes. Regeneration of woodlands in Cumbria has also been dated to the sixth century, although some areas were left cleared, indicating that it may have been the first clearance of the Lake District. (Newman 2006b: 94). This would also support the theory of differing land use patterns, the incomers from Scandinavia favouring their old system of large tracts of land that were divided equally on inheritance by their birthright.

Early Mediaeval Period dates have been detected from wood recovered during excavation of archaeological sites near the centre of Carlisle (Newman 2006: 94), indicating the presence of structures during this era, but none were recovered from this period at 42-48 Scotch Street. The Early Mediaeval Period then still seems ephemeral within the city walls of Carlisle. In relation to the Early Mediaeval Period, this study can contribute little to the data. It does indicate that at 42-48 Scotch Street, although information gleaned relating to the period was sparse, there was anthropogenic activity during it. This was seen as the build up of the soil layer Context (371), and the construction of Building 5 as seen in Figure 10 (p31), with the subsequent cutting of several small pits that contained large post pads as seen in Figure 11 (p32).

Later Mediaeval Period features however heavily truncated this area. The post pads seen in Figure 11 (p32), pointed to a method of construction unseen in buildings previously fabricated on the site, and are typical of the Early Mediaeval Period. Unfortunately, they are also evidenced in the twelfth to thirteenth century in Carlisle. It should be noted though from the limited data recovered, that this period of history throughout Carlisle should be targeted in future interventions.

In recent years, the vital role played by absolute dating of material in the growth of our understanding of the Mediaeval Period in general is self-evident. The number of sites dated in such a manner is not yet sufficient, however, to allow this closely dated sequence to be applied to any cultural assemblages. In addition, the abundance of waterlogged deposits of the Early Roman Period in places such as Carlisle does not extend into the later Roman levels, and thus the only waterlogged material from the Early Mediaeval period recognised as yet comes from features, such as wells and a very few pits. There is visibility of the so-called Dark Ages in the North West Region – the remains and contexts are just harder to differentiate from the later periods. Re-evaluation of archived material as well as remains from sites such as 42-48 Scotch Street needs to be achieved to attempt to link into the NWRF Research Agenda to further our knowledge of the Early Mediaeval Period, for the region, and particularly in this case for Carlisle. (Newman & Brennand 2007: 94).

5.2.3 Relating the Pilot Study to the NWRF for the Mediaeval Period

According to the NWRF Research Agenda for the Mediaeval Period (Newman & Newman 2007: 95) much of the North West would have been on the boundaries of economic and political considerations, much the same status as that of the archaeological investigations carried out there, where these are also limited and produce little evidence of material culture. There was little commercial establishment in the period. This resulted in a lack of available merchandise with which to provide future evidence of material culture. It is thought though that more degradable materials such as horn, leather and wood were still utilised during this period, perhaps an echo of cultural aspects inherent from their Scandinavian forefathers. It appears that, where other parts of the country suffered settlement desertion that resulted in serious demographic changes, the North West region may have responded differently (Newman & Newman 2007: 95). This could have arisen due to the influences from across the Scottish border.

The chronology of artefacts for the Mediaeval Period is still limited and known to be skewed across the region, fewer artefacts being recovered in Cumbria than say Cheshire. Small amounts of twelfth century pottery have been recovered from Carlisle but there are no assemblages worthy of further research to date. The differences between Cumbria and the other counties in the North West region were noticeable. Populations were centred in small, scattered villages and towns in Cumbria and were less dense here, probably as a result of a less prolific economy to support them. (Newman & Newman 2007: 95).

It has already been stated that data acquired regarding the Mediaeval Period in Cumbria, and especially the City of Carlisle, has, to date, been sadly lacking in preference of targeting the Roman statistics. Throughout the course of the work carried out on this site though, there was no discrimination in relation to recovery of information. The opposite was in fact true of this pilot study as discussed in 2.7 (p53) in that it specifically utilised the data from the Mediaeval Period, seeking to apply it to fill in some of the gaps in the NWRF in an attempt to identify areas where further research is needed.

To achieve a thorough search of existing information regarding an area such as the one carried out in the study it is vital to assess archives relating to unpublished excavations. Retrieving and recording any residual excavation archives recovered and locating their whereabouts can prove difficult, as found in relation to this study, especially in relation to excavators who have since moved on or even died. The temporary archiving of much of the post-excavation material from the Millennium Excavation in Carlisle within Shaddon Mill resulted in many of the organic remains being destroyed on the purchase of the Mills by developers (Giecco *pers comm.*), resulting in the loss of important post-excavation information for comparison. (Chitty & Brennand 2007: 17-18).

This excavation site is one of the few in the north of the region relating to the NWRF that exhibits contexts from the Mediaeval Period. This reflects the skew in settlement patterns within the region. Higham (2004) omits Cumbria in his account of the Mediaeval Period for the region, even though comparison could lead to a clearer understanding of the differences between Cumbria and the rest of the region (Newman 2006a: 115). It has also been discussed in this study and in Newman (2006a: 115) that much of the contextual information from Mediaeval Carlisle was destroyed during the nineteenth and twentieth century commercialism and urbanisation of the city.

Work on the rural landscape though for the period (Atkin 1985; Winchester 2000) may enhance this study by providing information for a more complete account of the era. Other such evidence from the rest of the region will also help map changes and differences between areas (Newman 2007: 116-7). This will lead to a complete narrative of settlement patterns and interconnections that form the cultural links, although Mediaeval settlement patterns in Carlisle in general seem to adhere to those visible from OS maps in the nineteenth century (Newman 2007: 116-7), except that the current extant buildings are mainly from the nineteenth century.

My presence during the post-excavation analysis of material from the excavation at 42-48 Scotch Street led to a more integrated analysis of the archaeological data and the environmental study, in relation to the animal bone and the plant remains. This is one of the objectives of the NWRF (Brennand *et al* 2007: 23), although the incorporation of a specialist member of staff onto a unit is always a risk as they then have limited use unless they are prepared to dual role.

This can be of great advantage though, as in the field larger excavations can be monitored for sampling and other scientific methods by the specialist supervising as a field archaeologist, and should be seen as a positive way forward. These specialists can also be used to carry a basic knowledge of other scientific techniques and have the ability to action these if necessary, as in the use of soil biological activity assessment, one of the resources requiring monitoring under the initiatives of the NWRF (Chitty & Brennand 2007: 23).

The wood recovered from the excavation at 42-48 Scotch Street was not suitable for dating by dendrochronology, the method that, along with archaeomagnetic dating, is the most useful form for the Mediaeval Period. From other excavations in Carlisle though, this method has enabled the creation of an accurate chronology of pottery sequences and types to be formulated (McCarthy & Brooks 1992: 221-2; Newman & Newman 2007: 95). As the pottery from 42-48 Scotch Street was analysed by Brooks who carried out the chronology work for pottery from the Mediaeval Period, the dating of the Scotch Street pottery is considered valid with reference to the context dating. Although not part of this study, these results provide more evidence for the Mediaeval Period in Carlisle.

The main problem with any excavation in Carlisle, excepting The Lanes, is the excavation of the actual street frontages. Largely redeveloped during the Victorian Period, cellaring destroyed much of the stratigraphy of the possible interface between the structural remains and the backplots of Mediaeval Carlisle leading to a void in the record, an inevitable loss of information. (Newman & Newman 2007: 104). This study, due to the damper climatic conditions of the area, has contributed well preserved almost waterlogged organic remains for analysis, a positive discrimination of the locale. This can then apprise, as per the NWRF Research Agenda, the National Agenda, and give rise to other associated information such as woodland management and tree species types utilised in the area. The study has also added to the knowledge of development of the urban conglomerate and the associated links with trade and industry, important to the NWRF in understanding why these nucleations advanced. More work needs to be carried out though on the role of monastic influences in relation to trade and industry, and interlacing this information with the remainder. (Newman & Newman 2007: 97).

As previously stated the excavation of a site is only a small part of a site director's responsibilities as witnessed from the Millennium Excavation in Carlisle. Importantly a project should be carried through to the end and all post excavation methods completed with publication as the natural conclusion. As stated in the NWRF Research Agenda (Newman & Newman 2007: 102, 104) environmental and geoarchaeological samples do not remain in stasis after removal from a site. As discussed above, many of the samples from the Millennium Excavation have actually been discarded, as there were no funds to carry out the work to its conclusion and the storage unit was sold (Giecco *pers comm.*). Their limited usefulness, as they were excavated in the 1990s, would have been questioned. In prime condition, data recovered from them could have served to answer important questions about the Mediaeval Period including those of health and hygiene, particularly in relation to epidemics in urban contexts (Newman & Newman 2007: 102).

It is difficult to determine accurate patterns of the ongoing mutation and growth of Carlisle, and its historical progression, from the first anthropogenic land use in this area of Cumbria (Newman & Newman 2007: 102, 104). It is not definitively known that there was a settlement form on the site of the existing city prior to the Roman Period. The Early Mediaeval Period is not much known either, this study failing to add much to the information known to date. (Newman & Newman 2007: 102, 104).

Most Cumbrian towns, including Carlisle, have a market place, but again, the origins of them are little known to the point of not knowing whether the town developed around the market place or vice versa. Scotch Street is close to the area of the market in Carlisle and may have been influenced by it in terms of development. Work also needs to be done on the Castle development to further understand the city and its metamorphosis through time to envisage the changes going on in the populace of the various periods, particularly in relation to the Mediaeval Period. (Newman & Newman 2007: 102, 104).

In the Mediaeval Period, towns and cities were seen as areas not just of cultural exchange but also where new ideas and even inventions were discussed and disseminated, as people became acquainted whilst trading and exchanging at the markets. These ideas would then be taken further afield where intercourse would continue on the subject with a new audience. (Newman & Newman 2007: 102).

It may be possible to track these material discoveries through the archaeological investigations and the historical documentary evidence but only with the integration of data from all the regions, as well as the complete analysis of any excavation material and resultant publication of the same. This challenge would go a long way towards achieving some of the goals of the NWRF Research Agenda of towns and cities as innovative centres (Newman & Newman 2007: 103). Further studies need to be carried out on the manufactories and agrarian economies of Cumbria and Carlisle, pulling together this information to realise what made the area a valid system.

The constant affrays between the English and the Scots along the Border resulted in several important sieges such as the ones of AD 1296 and 1315, as well as sackings in some cases. These inevitably had an effect on urban development, as discussed from the documentary evidence in 3.2 (p63) when the siege of AD1315 was seen as the cause of the decline of the suburb of Caldewgate. (Newman & Newman 2007: 109). The very tangible divisions and use of urban space exhibited legal stipulations against the Scots in Carlisle. Not only the felons but also the Scots were entrenched at the limits of the backplots (Graves 2002: 183), where the impact both socially, and in terms of urban development needs to be considered (Newman & Newman 2007: 104).

In relation to 42-48 Scotch Street, the moist deposits have yielded up evidence of organic materials including some traces of fabrics that are yet to be identified. This material will help build a picture of ordinary life in the area (Watson 1998: 234). Plant remains such as mosses in relation to cesspits also give examples of plants used from outside the general area of the site, probably brought in from outside the city walls. All aspects of local life need to be studied to complete our knowledge of the social ranks encountered within the society of the time (Newman & Newman 2007: 104).

In the case of this study it is thought that an adequate bulk-sampling programme was initiated, seen as an initiative of the NWRF Research Agenda (Newman & Newman 2007: 104). It would have benefited the results though if an environmental archaeologist had been present throughout the excavation to advise on any changes necessary to the sampling strategy. There is data still to be retrieved from some of the samples as parasite remains. Already identified at the assessment stage (Carrott 2004), the eggs of the whipworm can be measured to determine whether they were human or supine in nature. Comparison with other sites yet to be written up (Newman & Newman 2007: 104) would also have benefited this study.

5.2.4 Influences that have Affected the City and the Archaeology

It must be remembered that the remains secured during the excavation at 42-48 Scotch Street are anthropogenic in nature; the artefacts and ecofacts recovered from the Mediaeval Period were items handled and used by people in relation to their everyday lives and sometimes formed part of their beliefs. They were discarded or lost, to become part of the stratigraphy in the archaeological record of the site. As such, they can in turn be used to develop a body of knowledge to chronicle common beliefs and associated customs. (Newman & Newman 2007: 114).

In relation to the NWRF Research Agenda they should be included in an in depth synthesis of such material, as part of the proposal to manage the archaeology of a colonisation that not only deals with cultural remains, but also begins to understand the societal interactions exhibited in the Mediaeval prospect (Finch 2002: 113), an important consideration in relation to the NWRF Research Agenda. (Newman & Newman 2007: 114).

The importance of the church in every aspect of Mediaeval life must not be forgotten. Interestingly few Mediaeval Period burials have been recovered from Carlisle that would serve to enhance the picture of health and lifespan of the populace. There is much documentary evidence concerning vernacular religious practices and other folklore beliefs, although no significant archaeological work has been carried out relating to this. The superstitious Mediaeval people tended to manifest these beliefs physically by use of an article they could relate to, such as a deliberately placed item or a bent coin, to manifest the spiritual world as something concrete and understandable to themselves, an object of superstition almost. The problem is that evidence of these practices can be difficult to observe in the archaeological record. Evidence from the excavation at 42-48 Scotch Street of vernacular religious practices may exist in the form of artefacts that may not have been recognised during initial recording of them, and could even have been manifested as organic remains. Such remains can provide a deep insight into the ordinary person and their beliefs. Re-examination of the artefacts and ecofacts could prove useful in detecting such material, and add to the knowledge of the site in relation to full publication and the NWRF Research Agenda. (Newman & Newman 2007: 106).

Many structural remains from the Mediaeval Period in Carlisle have identified the use of large timbers, suggesting there was a good supply of large hardwood trees within the area. As the cultural remains, such as the wooden bowl recovered from the excavation, are also assumed to be those made from organic materials collected from the area, and probably linked to the deep-rooted origins of the populations from Scandinavia, there would have been an obvious need for a sustainable supply of coppiced woodland. (Newman & Newman 2007: 111-2). These coppices could also have been used as fuel sources for industries such as the pottery kilns excavated on the site, as it utilised small wood sections (Huntley 2000: 78-9). Analysis of the artefacts from the excavation is therefore an important issue for future research with reference to those of organic origin.

The pottery kiln recovered during the excavation of 42-48 Scotch Street is an important data resource. Pottery manufacture is the most archaeologically visible industry (Newman & Newman 2007: 112). The kiln from the site not only provided artefactual remains for examination and collation but more importantly it yielded an absolute date by which to define the stratigraphy of the contexts, as well as an accurate typology to be used for future reference (Newman & Newman 2007: 112, 113).

This fulfils one of the major research aims of the NWRF in that there is a crucial need to examine and classify pottery production sites of all types and examine their relationship with the dispensing of the merchandise associated with trade and exchange (Newman & Newman 2007: 112-3). The identification of the pottery kiln during the excavation reveals a small-scale industry. This needs to be linked into the organization of the administrators who set these commercial enterprises in motion, or backed them in relation to supply and demand issues, requiring extensive work to fulfil the NWRF Research Agenda with reference to the identification of their estate-based, monastic and secular infrastructures, such as woodland management practices utilised (Gilbert 1983; Newman & Newman 2007: 112).

5.2.5 Further Aims Relating the NWRF to the Archaeology of the Region

There is still much work to be done in the study of palaeoenvironmental material from archaeological sites in Cumbria, as these in the past have been very sporadic particularly in the historic period (Chitty & Brennand 2007: 22). This could aid further study by determining land-use patterns and woodland management strategies. It is an aim also to trace the beginnings of the threads of regional, national and international trade and commerce that scholars are now seeking evidence of (Graves 2003: 31-54).

A further initiative of the NWRF is that of research into religious houses and whether they existed and / or continued before and after the Norman Conquest in Cumbria (Newman 2006a: 128). Little is known about these specialised social orders in Cumbria, particularly Carlisle, and their interaction with the communities in which they were based. There method of land use though made a significant difference to the region as a whole (Newman 2006a: 129). Further interpretation of the machinations of these complex centres of, not only religion, but also commerce and learning, need collating.

Cartographic evidence identifies areas of Carlisle that have been used for wool and linen processing (Higham 1997: 104). There was some textile preservation in the moist samples from the excavation that will reveal the personalised aspect of the people who worked or lived on and around the site when these depositions were formed. The monastic orders were known to have been involved in textile and food production as well as other industries (Aston 2000: 144-9). These need to be further investigated relating to their possible links with the site at Scotch Street.

Identification of the intensification in cultivation, and growth of communities during the enhanced climatic conditions, has been recognised in southeast Scotland up to the fourteenth century, after which a retreat occurred due to the Little Ice Age (Newman 2006a: 121). Possibly seen as a connection between Cumbria and the periodic Scots control over lands and assets of the region, this could reveal the basis behind knowledge recovered from documentary sources discussed earlier in the study. This may result in a useable model from which other similar parallels can be interpreted where a region has shown a capacity for the recovery of such information (Newman 2006a: 121).

There is now though an expanding compilation of archaeological data that has been recovered in recent years from other excavations. However, the ethnohistorical material that defines the chronologies of Cumbria, with particular reference to Carlisle, is difficult to extrapolate from the actual archaeological evidence. County records of artefacts from the Mediaeval Period also tend to be inaccurate as they relied heavily on the finder's often-incomplete accounts of their retrieval. (Newman 2006b: 93).

Sites from the period also sometimes failed to be defined, except in the case of burials, before the 1970s, only becoming known during the course of interventions related to other periods. Numbering approximately ten to date, these sites have made a substantial difference to our knowledge of the period, particularly as they now encompass palaeoecological information from which new inferences relating to farming and woodland management practices can be learned. (Newman 2006b: 93).

More sites from the Mediaeval Period, such as The Maltsters' Arms (Giecco 2004), still need to be published in order to advance our knowledge of urban industries. Slightly outside of the main city, this excavation would inform about the industries that were undertaken outside the city walls. It may also be possible to learn why such centres developed outside the nucleus of the city. Was it due to health and safety issues or was it the spatial limitations of the inner cities, when larger kilns and metal working hearths needed open areas around them to access and work them effectively? An understanding of the process in relation to the structural remains could seek to answer these questions in relation to the NWRF Research Agenda (Newman & Newman 2007: 104).

Another important specialised industry relating to Carlisle are the lead mining centres based on the town of Alston. An in depth study relating to the infrastructure has to some extent been carried out by Blanchard (2001) but other work could contribute much if the archaeology of sites known to have been part of this infrastructure were tackled (Newman & Newman 2007: 104). There is documentary evidence for exploitation of the Alston Moor mines from the twelfth century (Newman 2006a: 133). It is a sad fact though that much of the documentary evidence from the mining industry at Alston has been lost, both by fire and also the changes of ownership that occurred, the remainder of the data then being transported to Belgium, the base of the new owners. Technology and field evidence of Mediaeval lead and silver mining are poorly understood, despite historical evidence for nationally-important silver extraction in the Alston area in the twelfth century. In part a consequence of more recent mineral extraction techniques as a result of the practices of hushing and open cast mining that have recently removed earlier remains. Mediaeval lead-mining has received virtually no archaeological study within the region, but major field evidence is likely to survive in the multi-period mining landscapes of the North Pennines.

Evidence of Mediaeval Period mining may be more easily identifiable at outlying sites such as Ashknotts, where later activity has been less extensive. The same applies to smelting; there is evidence for lead smelting in the Mediaeval Period at several sites in Cumbria (Newman 2006a: 132). Little archaeological survey or interventions have been carried out with the specific task of discovering mine workings and / or associated settlements in the areas from which the silver is known to have come. The recent ongoing survey by English Heritage of the North Pennines Area of Outstanding Natural Beauty may detect important archaeological evidence of these areas by the use of modern survey techniques. This could then lead to new interventions of important zones within the region being carried out.

There have been few cohesive attempts to bring together data on assemblages, as seen in part in this case study of palaeoenvironmental information, to compare and contrast the urban situation with that of rural and high status sites to provide a working differential from which to gauge future excavations. This work could provide a model relating interactions and the range of reciprocal engagement between differing social classes as stated in the NWRF Research Agenda (Newman & Newman 2007: 114).

5.2.6 The Aims and Objectives in Context

The objectives of the study were to evaluate the project in its entirety with reference to the Resource Assessment (Brennand *et al* 2006) and the Research Agenda and Strategy (Brennand *et al* 2007) of the Archaeological Research Framework, particularly in its application to the North West Region and to the Mediaeval Period. The ultimate intention of the study was also to disseminate the information gleaned from it to a much wider assemblage in the archaeological forum as well as other interested parties. The results of the study can now be used by academics, professionals and the public alike, thus increasing the knowledge of both the subject and the region.

The first aim of the study was to define the city of Carlisle by chronicling history of both the site and the city. The excavation of the site at 42-48 Scotch Street has been well defined historically in the first and third chapters here, both in terms of cartographic and documentary evidence respectively. The narration fails to provide though a broader knowledge of the whole county and the region of today that is most often characterised as the North West, particularly with reference to the NWRF (Brennand *et al* 2006, 2007). As described in the opening paragraph many people from other regions today have no real comprehension of the positioning of the City of Carlisle, or even the County of Cumbria, formerly Cumberland and Westmorland. An accompanying delineation of the city in its wider regional and national contexts would have been useful in providing a resource by which to compare the evidence described here.

The relation of all archaeological work undertaken throughout the area was listed in the aims of the study. The cataloguing of numerous archaeological projects carried out in and around the area of Carlisle has been attempted here. It was however difficult to achieve due to the problems of archiving and publication brought about by the lack of synthesis by the relevant personnel of material recovered from archaeological investigations. The study has brought to light the amount of work that needs to be done before a full and accurate catalogue of archaeological data can be utilised in future research. Archaeologists are constantly failing in their duty when information from archaeological studies is not presented in a format that future researchers can interpret, in terms of local but also national and international approaches to investigations.

In relation to previous archaeological work carried out in the past, information from some excavations or watching briefs are missing from the record, and can be substantial, such as analysis of the Millennium Excavation in Carlisle. When the excavation company went into liquidation, post-excavation work was halted. Recently, information has begun to be salvaged from material recovered during this excavation by English Heritage and Oxford Archaeology North. The operators involved left it difficult to trace back or gain access to, information relating to many smaller interventions and watching briefs undertaken by them and have not carried these through to post-excavation analysis. Many still work in the discipline of archaeology, seen by the author as a failure in their duty to complete research undertaken as part of their contract.

A full definition of the reasoning and methodology of this pilot study has been carried out here that probably exceeds the aims and objectives of the initial pilot study. Serious problems were encountered during the research for this study in terms of information that was not readily available for use in interpreting the results from other archaeological studies in and around the area. It could be claimed that to narrate the whole of the methodology for the initial assessment phase from the site of 42-48 Scotch Street in relation to the archaeology was excessive. Here I would argue though that, as a researcher who wishes to pass on all data recovered, in an understandable and useable format, or at least provide evidence by which to trace it, this information seeks only to provide a full and integral record of all the facets of the unrepeatable experiment from which the study arose. From then inception of the work at 42-48 Scotch Street as a building recording survey to the completion of the final watching brief on the site.

The NWRF Resource Assessment and Research Agenda have been discussed at some length above, one of the primary aims of the pilot study. The Research Strategy of the NWRF is the buffer by which progress for the aims and objectives of the NWRF Research Agenda is judged (Brennand *et al* 2007: 159). Within the priorities of the research strategy, it is noted that the demarcation between the end of the Roman administration and the commencement and / or continuation of life in the Early Mediaeval Period within the North West region has not been properly comprehended. This is a major interface seeing the complete removal of one set of strategies by which people lived and the inception of another set onto the same population.

There was a decline, not only of the associated military operations, but also of the administration that ordered and organised the military and the populace of the county throughout the period of the Roman occupation. As discussed above the definition and dating of structural remains and their associated deposits for the Early Mediaeval Period that followed the Roman occupation are difficult to interpret, even when they are encountered as they are more ephemeral. (Brennand *et al* 2007: 176).

Again the following Mediaeval Period, beginning with another occupation and a different regime by the Normans in AD1066 had a major effect on the whole of the country. The early part of this period, still hard to detect compared to other regions, may have altered little this far north. The later part of this period sees the evolution from the Mediaeval world and its ways to the early modern regime, witnessing great changes with the dissolution of the monasteries that caused major localised changes in both land-use trends and economic strategies. (Brennand *et al* 2007: 176).

It is difficult to comprehend why these major critical changes in government are so hard to detect in the archaeological record. To state that it is due to the lack of true integration of the people of Carlisle with the wider world is naïve to say the least. Documentary evidence discussed here alone describes the trade in silver and various exotics across the city as well as with neighbouring regions and internationally. It may be that the true nature of the archaeology is not being detected.

The influx of the Scandinavian peoples remains visible in more rural areas, possibly due to the metamorphosis of their original settlements into more solid structures as they became more permanently settled. It may be that in the conurbation of Carlisle the ephemeral timber and turf structures associated with Norse habitation in the Early Mediaeval Period were immediately replaced by buildings that were more substantial. This may have been related to the trade and industrial use of the area following the Early Mediaeval Period. This could be seen as being in response to the influx of peoples from other regions and therefore possibly different incoming ethnicities as trade and industry links improved both locally and nationally, discussed previously in 3.2 (p63).

5.2.7 Conclusions Related to the North West Regional Framework

The aims of the NWRF Research Agenda (Brennand *et al* 2007) have been mainly addressed in terms of recovery of much of the data that was locked within the contexts recovered from the excavation at 42-48 Scotch Street. There was, however, more information to be gleaned had the need for these techniques been written into the Project Design and recognised by the excavation personnel.

Most important of these would have been geoarchaeological methods used on various matrices encountered, specifically those from the Early Mediaeval Period, to determine types of soil enhancement techniques used, if any, and identify the types of land use for the Early Mediaeval Period on the site of the excavation at the present day 42-48 Scotch Street.

The work of development-orientated archaeological commissions to this period is viewed in new light. Seen in the past as thorns in the sides of the advancement of construction both large and small, they are now seen as contributing much to the dataset for the Mediaeval Period. This can especially be said in relation to rural, pre-urban or pre-industrial sites lacking in artefacts and ecofacts but still recognised by the use of modern techniques in archaeology. (Newman 2006b: 114).

Thought needs to be given not only to the piecing together of links in past worlds but also making available methods of integrating research patterns from regions and nations to formulate those tenuous links that eventually create the full similitude of past peoples and societies in relation to how they really functioned. Not only should regional boundaries be bridged, but also links should be sought between periods (Chitty & Brennand 2007: 8).

The identification and absolute dating of the pottery kiln at 42-48 Scotch Street, associated with the typological artefacts retrieved from it, will serve to add absolute data to the pottery sequence across the region. The deposits sampled and analysed from the excavation at 42-48 Scotch Street also enhance the future research aims and can be linked to future excavations with remains from the Mediaeval Period. (Newman & Newman 2007: 114).

The way forward in relation to retrieving information from excavations throughout the region as well as in a wider context is to target relevant scientific methods suitable for recovery of such information. Not only a costly business this research also relies on a level of knowledge from the excavation personnel to recognise the need for the techniques and to realise the benefits that these could yield.

Alternative approaches are that specialists be brought in to tackle the procedures or that personnel are equipped to carry them out during the term of the excavation. Scientific methods, should they become a normal part of the commercial archaeological framework, would provide a wider dataset from which missing, more transient signatures in the archaeological record can be found. (Chitty & Brennand 2007: 10).

The implementation of such techniques as absolute dating along with geoarchaeological methods though will see an increased cost to the developer. Absolute dating techniques are already becoming more regularly used, even in the recovery of information from an apparently definitively dated site by typological methods. (Chitty & Brennand 2007: 10). Absolute dates recovered can lead to the deduction of whether there was transference of artefactual and structural patterns from one period to another, an approach little seen before.

The ongoing problem of excavations that remain unpublished impacts nationally and is not confined to area, period or site type; nor can a single organisation be singled out, though the excavation directors are sometimes limited by the large amount of resultant post-excavation and publication work produced in that the original agreed funding has expired and further monies for post-excavation work are not forthcoming from developers who see their responsibilities at an end.

The implementation of PPG16 (DOE 1990b) has led to assured funding with which to analyse most archaeological sites at risk. Remaining a greater problem though, is the fact that publication is still not guaranteed by its requirements. Seen as part of the Project Design of most reputable companies carrying out archaeological assessments, the often too limited post-excavation funding, and lack of time before the next project is begun to aid the cash flow, the publication of many sites does not get due consideration.

This however puts all the data, in whatever form, at risk, both physically and in relation to validity. The experiment cannot be repeated! There also needs to be much easier access to the grey literature produced from excavations to ensure the information is disseminated within the archaeological and the academic community. One of the ultimate aims of this study and the original excavation was to publish the results. (Chitty & Brennand 2007: 18). This was achieved in part here and will be concluded with the compilation of all the data from the site in the form of a Monograph.

It is vitally important that information in all its forms be readily available for future use and interpretation by proper curation of all the archival material concerning an excavation, and that it be lodged with a suitable museum. Deposited archives will eventually evolve as part of the Historic Environment Records (HERs) where they will encompass, via a comprehensive index, a record of the location of all available sources relating to archaeological studies. They will provide a starting point for access by researchers, be they academics or members of the public. They will be used to formulate future research strategies and could ultimately be based at regional depositories. (Chitty & Brennand 2007: 16-17). This will prove invaluable for conjoining archaeological data critical to local, national and international research and understanding of ethnographies of the people who actioned the events leading to formation of the archaeological record.

In relation to the NWRF for the Mediaeval Period then, this pilot study, along with data from the main excavation, can be seen to have demonstrated a closely dated artefact sequence, associated with an absolute date by archaeomagnetic methods. Unfortunately, it failed, due to lack of knowledge on the part of the personnel involved, to augment the palaeoenvironmental sampling with geoarchaeological analysis.

It is acknowledged here that further work needs to be done to disclose the role of monastic establishments operating within Cumbria and Carlisle to assess their influences on trade and industry as well as land use patterns. A similar study should be carried out relating to private estates and their modus operandi. Other important issues to be tackled, only touched upon here, is distinct analysis concerning townships, manorial estates, frontiers and ethnicity issues, particularly in this case with Scotland. (Newman & Newman 2007: 95, 97, 101).

In relation to the NWRF there is also a need to characterise the growth of the city of Carlisle and expansion of its boundaries, particularly in relation to the Mediaeval Period, as it will result in an understanding of the complex archaeology that was recovered (Newman & Newman 2007: 204). Targeting the location of Mediaeval burgage plots and houses within the city of Carlisle would seek to corroborate the historical data and may lead to the firm identification of some of the city properties referred to in the documentary evidence; this in turn would contribute to a structured plan of Mediaeval Carlisle. The distinct lack of published material from such sites as The Lanes in Carlisle denies us the opportunity of studying the most important urban excavation in the northern region of England (Graves 2002: 179) for comparison.

This Pilot Study does however bring to light the lack of integration of information from different regions that would seriously enhance the knowledge and understanding of remains from areas linked through interactions between them when the history and archaeology of these sites was being formulated. In this case the constant interaction between Scotland and the County of Cumbria is immensely important, as are some national reciprocal actions such as the transport of the salmon from Carlisle to Chester discussed in 3.2.2 (p64) above, documented in the Pipe Rolls (Parker 1905).

There seems to have been little attempt to pull together the threads of different regions into the trade links and associated movement of peoples into systems that would depict societies and their actions more realistically. There is also a much wider region out there, seen here partially as the influx of merchants and products that they traded in from foreign lands, particularly Europe and Scandinavia. The tenuous links are being pulled together at last by academics (Graves 2002: 177-84) who realise the potential for delivering the complete structural pattern of trade and industry in the Mediaeval World that was not the introverted self-contained system disseminated in the past but a far reaching network of journeymen plying their trades and wares far and wide.

Where much of the Mediaeval origins of buildings are reused through to the present day, and discarded settlements are redeveloped, it is difficult to envisage all facets of the Mediaeval Period in the North West and particularly Carlisle (Newman 2006a: 143). Publications are still sadly lacking concerning Carlisle and Cumbria, with little reference to formulating an understanding of the links with Scotland.

It can be seen from the limited research carried out in this study that the complete configuration and interrelation of Mediaeval life in Cumbria, particularly the city of Carlisle has only been touched upon. There are many more paths to explore before a comprehensive understanding of the methodologies of life in the Mediaeval Period for the region and Carlisle in particular can be grasped. Seen as a Pilot Study to identify areas of work relating to the NWRF Resource and Research Agendas still to be tackled for all levels of the Mediaeval Period it is now firmly embedded in the future aims and objectives of archaeological research in the North West Region.

5.3 Where Does Carlisle Fit in a National Sense?

The North West Regional Framework for the Mediaeval Period seeks to enhance the published material from the era and to increase the number of published works, as the definition of precise chronologies for material culture has been curbed in this period (Newman & Newman 2006: 95). The identification and interpretation of the excavated site, along with the work carried out here and in the future, will seek to fill in some of the gaps relating to the Mediaeval Period in the most north westerly city of England.

As more sites are recovered for the period endeavours should be made by archaeologists and post-excavation specialists to complete research, but particularly to write up and publish results. This will help to promote the recording and interpretation of the distribution of Mediaeval Period artefacts and ecofacts across the region and enhance the interpretation of trade routes and associated movements of peoples as well as livestock, both regionally and nationally, as it has been transcribed during this study that trade links stretched far out from the City of Carlisle.

6 CONCLUSIONS AND PROPOSALS FOR FURTHER STUDY

Any study can still be valued a success despite problems if it fulfils its core aims. In the case of 42-48 Scotch Street, these were to locate in situ archaeological deposits on the site and to gain some insight into how they were formed (Giecco *et al* 2004). The intention here was not to exhibit a comprehensive and overly representative archaeobotanical study, but to provide sufficient data to augment the standard archaeological observations and archive to reach the above aim, particularly relating to the Mediaeval Period. The techniques used should be ones that maximise the pursuit of the primary research aims. This rationalisation enables tailoring of the 'best' or the most precise practices that are in synergy with the aims and constraints of the research that has been achieved during the methodology for this study.

The aims of the initial excavation as a precursor to this work, as well as the aims of the study itself, were seen to have been addressed. Should any further work be required statement was made here to the fact and how it will be carried out in the future; time scale though will ultimately depend on the time and funding available to the personnel involved in concluding the work. It was a remit of the original Project Design and the Project Brief from the County Archaeologist though that this should be carried out.

This study has ventured to interpret from the matrices recovered at 42-48 Scotch Street the physical changes brought about by the social transformations for this limited area of Carlisle. It sought to link this to the greater portion seen as the whole county using cartographic, documentary and experimental evidence together. This was seen as an attempt to address some of the issues that required addressing in relation to the North West Regional Framework Resource Assessment, Research Agenda and Strategy (Brennand *et al* 2006, 2007).

Several areas of research were not considered in this study or remain incomplete. As a pilot study for the Mediaeval Period though, specifically relating to the NWRF, the research presented here defines the agendas that still need to be addressed in relation to further research. This further work would then seek to fill in as many of the gaps as it is qualified to in relation to the NWRF Research Agenda (Brennand *et al* 2007) in the future for the Mediaeval Period as a whole.

The study will also serve to identify those areas of incomplete research relating to the Mediaeval Period from the initial excavation at 42-48 Scotch Street in relation to full publication. As the contexts recovered from the excavation were mainly from the Mediaeval Period, the results from the commercial work and also this study can be seen to fill in some of the missing information in the North West Regional Framework as set out in its aims. Time restrictions limited the extent to which the author was able to relate the different elements of this and other assessments of the excavation to each other. This will be done in the full publication of the excavation when the remaining samples recovered from the excavation will also be discussed. Other restrictive elements still occur, as various sites have still to be fully written up; scholars cannot therefore interpret full records of Mediaeval or Roman phases of archaeology from Carlisle. References to some of these interventions is listed in Appendices under the title SMR and NMR records. The lack of analysis of these sites extends the inaccuracy and limited availability of the grey literature related in Section 1.4 (p16) entitled Previous Archaeological Work Done in the Area, where missing references pepper the text. This is still seen as a problem although primary archives are becoming more accessible.

Phase 6 of the excavation proved extremely hard to date but was an intriguing phase of the excavation, dating from the late fourth century to the twelfth century in the period conveniently referred to as the Dark Ages or Early Mediaeval Period. Pottery from Phases 6a and 6c was exclusively Roman in date, though it may be residual and includes small quantities of late fourth to early fifth century wares. This area could have produced evidence of the interface between Phases 6 and 7 as the reinstated road and associated cobbling recorded were the only area from which the red gritty ware of late fourth or early fifth century date was recovered. This then indicated that after Phase 6 secondary deposition occurred during the beginning of the later Phase 7.

From Phase 6, determined as the Early Mediaeval Period, a homogenous dark earth context (371) overlay many of the former Roman Period features. A sequence of twelfth century pitting from Phase 7 of the site was also sealed by a build up of Mediaeval Period garden soil (125). The formation of these soils, possibly the interface of Early and later Mediaeval Periods, is yet to be ratified to their origins or formation processes; such as whether there was there a gradual build up of soil in areas of wasteland or was it the deliberate importing of soil for agricultural purposes.

Further indicators may be found in samples still to be assessed from the excavation, along with the interpretation of the heavy pitting also seen in Phase 7, denoted as the Middle Mediaeval Period. Interpretations of these soils by micromorphology assessment would have added much to the knowledge of them, particularly in the Early Mediaeval Period where little information for the era was recovered from the site.

To address the ethnohistorical aspect of the study various historical data, usually in the form of documents, were searched. This was extremely time consuming and sourcing the material was sometimes difficult as links to them were tenuous at times. References from other sources invariably provided the clues needed to locate the relevant material. Texts from the later Mediaeval Period seemed particularly hard to find and as such are somewhat lacking in the study. This is however offset by the limited presence of contexts from this period as the levelling and cellaring seen on the site prior to the erection of Post-Mediaeval structures from the eighteenth to the twentieth centuries had, for the main, truncated them.

An in depth critical assessment of the methodologies used is listed in various areas of the study, an effort being made to address these criticisms here or in the future. A major criticism by the author is that an environmental archaeologist was not present at all stages of the excavation to hone the sampling strategy in to the aims and objectives of the assessment phase seen in 4.3.2 (p139) above. Advice may then have been given about coring for pollen, extraction of the waterlogged or very moist matrices by a more suitable method, as well as indicating the need for soil micromorphology analysis of some contexts following English Heritage Guidelines (Jones 2002). These practices would have improved the results obtained from the matrices.

Analysis by archaeomagnetic principals of a kiln feature (Outram 2003) resulted in it being dated by absolute means within the archaeological strata of the excavation. Against this, all other strata above and below that context can be levied, used in conjunction with the finds evidence coming from the contexts. There is though a differential between the absolute date and the typologically dated pottery retrieved from this phase. As a dating technique, typology relies on categories of artefacts being designated to an era the date of which is known, but not always from an absolute date. Investigation of this variation may alter the dating associated with this type of pottery.

The complex series of what were assessed as small-scale pottery kilns or ovens seemed to have served the dual purposes of kiln and grain drier as charred grain was recovered from the samples associated with them. It would be beneficial in the future to assess and identify the types of wood used as the fuel source to detect any changes throughout the sequence of use of the features. Further benefit would have been gained from woodland management studies as there were several wooden artefacts and structural or lining pieces of wood recovered from the site but this is a study that can be carried out at a later date if the material is kept under the correct conditions. The results proved the botanical material retrieved reflected the social and economic changes for the period studied. Exotics were found in contexts from the thirteenth century and reference was made to the exotic spice cumin in the ethnohistorical data used in payment of a tax levied in the same period, both reflecting the existence of foreign trade routes to the outpost of Carlisle detected in the ethnohistorical data discussed in Section 3.2 (p63).

The trade links from the Roman Period to the north though are known to have died out with the withdrawal of the Romans, so these later trade links were, as discovered from documentary sources, renewed or revised during this period due probably to the silver production from the area. The study also proved that the control samples of the Roman and Post-Mediaeval Periods were vastly different from those studied from the Mediaeval Period. It should be noted for future research that all the archaeology encountered in an area should be addressed rather than selecting the period of interest to the particular archaeologist running the site, or the people holding the purse strings. On the whole then the study answered the questions and aims of the research agenda and this, along with the further work to be carried out, will vastly increase our actual knowledge of the Mediaeval Period in Carlisle and reinforce that gleaned from the ethnohistorical data or possible even prove it wrong on occasion.

Industrial practices were being observed in this small area of Carlisle throughout the Middle and Late Mediaeval Period as evidenced by the pottery kilns and metalworking debris recovered during excavation. These remains were closely linked with domestic life seen in the plant remains recovered from domestic rubbish and cess. The pottery kilns had secondary domestic uses as grain driers or cooking hearths determined from charred plant remains recovered from relevant samples. Some pit fills were also of cess and domestic rubbish that may have been periodically removed from the area.

Although there was a differential in recovery of material from differing types of feature, there is no indication whether this was due to varying practices carried out on the site in different eras, or discrimination in preservation of the matrices. Matrices from older eras were deeper and presented as moist or waterlogged. Those from features that were more recent, were generally drier and as such would serve to preserve plant remains less successfully. To understand more fully this perceived disparity it is essential that the complete suite of samples be analysed in the future in an effort to answer this question. Evidence from the cesspits suggests that fruits and nuts were gathered as food sources. Grain was also recovered and, as it was dried, was probably used as a human food source. In the future, this evidence should be interpreted combined with the animal bone assessment (Cussans 2004; van Derwarker & Peres 2010) to gain further insight into diet and health in this period.

Evidence of domestic and industrial practices were seen to have been carried out during the periods of activity observed throughout most phases, in the matrices recovered during excavation. Various fluxes seem to have occurred in the use of this small area of Carlisle throughout the whole of the Mediaeval Period though. The area seems to have been mainly a site of small-scale industry and waste dumping, with little evidence of a true settlement pattern. It must be remembered though that the actual street frontage of this site was removed during phases of later Victorian period construction; substantial buildings from the Mediaeval Period, seen in the map regression of Section 1 (p1) would then have been removed. The area of excavation then would have initially been behind the Mediaeval city's main commercial establishments. Supporting street front trading by providing the wares with which to carry it out, the possible addition of food sources could have been locally supplied and prepared, along with the provision of onsite toilet facilities, regularly cleaned out to limit the ensuing fetid stench!

It appears that it may not have been the repeated invasions of the Scots that made Carlisle a poor city, but more the lack of hard cash. Once the silver was in production it was put to good use until the mining of it and the associated trade moved to other areas, leaving Carlisle the poor relation again, the same degree of wealth not having been seen in the city since. Another major problem with the further development of the city of Carlisle in the later Mediaeval Period appears to be the loss of suitable access by boat from the sea or any of the rivers.

Other major cities such as York and Newcastle had good links to the sea. There is evidence of merchants entering the estuary at Burgh-by-Sands as discussed in 3.2 (p63). The continuation of this practice into later eras seems to have stopped, as did trade in the silver and that of the associated foreign merchants who traded out of there. This was probably a result of the transference of the silver trade to the North East region. The Port of Carlisle is now heavily silted and unnavigable.

The Solway is a very wide estuary and as such silts up from the various rivers that exit into it from both sides of the border. The obvious effects of this are the silting up of the channels. The main ports used to this day are those towards the open sea on the Irish Sea coast in West Cumbria and those towards Whithorn in Dumfries and Galloway, little sea traffic is seen in and out of the higher Solway estuary. It is sometimes possible it is said locally, to walk cattle across the estuary if the channels are well known. Shallow channels seem to be a major problem with the area, not allowing traffic from the sea to enter closer to the city. This is a link seldom considered in relation to why the city of Carlisle failed to grow and expand, as did others similarly situated near the coast.

Many changes must be wrought to tackle the aims and objectives of the NWRF Strategy that range from re-evaluation of archived material to determining better funding strategies to ensure research is brought to a conclusion (Brennand *et al* 2007a: 159-93). This study has highlighted though the need for the integration of datasets that are able to meld the interfaces of different adjacent periods such as the Roman and the Early Mediaeval. Huge voids occur in the knowledge of these intersections in cultural changes and how greatly they affected the populace; more analytical study is urgently needed. There was obviously some continuation in cultural approaches of the settlement systems between periods of the area.

Changes in administrative and military methods were huge in the transient intervals seen between the Roman and Early Mediaeval Periods, as well as the Early and the later Mediaeval Periods, when wholly different management regimes were implemented. These signatures must be visible within the matrices of the archaeological record and a conscious effort should be made to apply more defined research methods in the future to recover the information locked within them.

The results taken as the combination of this study along with the archaeological and faunal presentation have divulged information on the development and use of this small area of Carlisle from the Roman Period through to the nineteenth century redevelopment of Scotch Street. The most important work to follow this to completion is to integrate the various assessments and other areas of study together to present the data in a full and complete monograph. This would be the first large-scale study of the Mediaeval Period done for the City of Carlisle.

It is then possible through this study, to compare the historic documentary and cartographic material with the hard evidence recovered by archaeological intervention for the Mediaeval Period. This is however a very narrow view and to see the complete characterisation of the excavation site would require the input not only from associated regions but also those of other nations that are known to have been involved with the trade that went to and from the County of Cumbria and particularly the City of Carlisle. (Chitty & Brennand 2007: 8).

Fundamentally, this pilot study is but a minor portion of the whole narrative and must ultimately be tied into the regional and nationwide sequences. It must also consider the interactions of the ethnicity and identity of the border regions of which it is a part to inform the recreation of the broader picture, reporting also on the exploitation of the uplands and woodlands that lay beyond the city boundaries.

Archaeologists must become well versed in recognising the fact that the excavation they are undertaking is only a small isolated area. As such, this needs to be linked, through further research, with localised, regional, border-wide and countrywide boundaries as well as worldwide issues. Traces of these links exist in the documents and data studied in relation to the excavation (Graves 2003: 31-54), exhibited physically in forms such as the fig seeds recovered from these samples or documentary references to cumin as a method of payment in kind discussed (p66 & 86) (Newman & Newman 2007: 114).

The study has proved that the city of Carlisle had international connections in the Mediaeval Period but that much more research needs to be accomplished to further understand the machinations of these ephemeral links.

Clarke's comment (1973: 17) that

> *"Archaeology in essence then is the discipline with the theory and practice for the recovery of unobservable hominid behaviour patterns from indirect traces in bad samples"*

leaves the archaeobotanist to unravel the oblique indicators from the fallible residues recouped from excavations, by personnel who often reach incorrect decisions about the removal of such remains due to their lack of knowledge or expertise, resulting in the loss of important information.

All that can be said with surety then, in relation to this and most other archaeological studies, is that the remains recovered from the samples taken during the excavation were actually present at the time of deposition. This with the exception of modern intruders that were deposited during the excavation and are usually difficult to define from archaeological material. This does not mean however, that no other ecofacts were present at that time; only that an unknown quantity and type of ecofacts did not survive the journey through the ages enduring the various chemical and physical processes to which they would have been subjected.

The excavation at 42-48 Scotch Street has though, in a limited way, furnished the researcher with suitable material for archaeobotanical investigation. This in turn has answered questions relating to the historical Mediaeval Period in Carlisle. Ultimately, the study has achieved the goal of reconciling some of the outstanding issues for the Mediaeval Period in relation to the NWRF; it has also identified areas of knowledge that still need to be addressed.

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Appendix 1: Data Tables for Charts 1, 2 and 3

TABLE A: CHARRED AND UNCHARRED PLANT REMAINS

	Arable	Cultivars	Grass	Heath	Ruderals	Tree	Wetland	Wide niches
C157Ch	2	3						3
C157U	1				1	1		3
C204Ch	1	4			1			2
C204U								
C205Ch	1	3			2			3
C205U	1							1
C216Ch	2	3			1		1	6
C216U								
C194Ch		5						2
C194U								
C181Ch		3						1
C181U	4				1			4
C474Ch		3						
C474U	5			1	3	4	1	11
C661Ch								
C661U	4				3	3		6
C662Ch								
C662U	3			1	7	4	3	8
C304Ch								
C304U	3	1			1			3
C679Ch								
C679U	2	2		1	1		2	6
C683Ch								
C683U	1		1		1		2	7

TABLE B: CHARRED PLANT REMAINS

	Arable	Cultivars	Ruderals	Wetland	Wide niches
C157 S1	2	3			3
C204 S6	1	4	1		2
C205 S7	1	3	2		3
C216 S8	2	3	1	1	6
C194 S14		5			2
C181 S10		3			1
C474 S47		3			
C661 S70					
C662 S71					
C304 S29					
C679 S76					
C683 S77					

TABLE C: UNCHARRED PLANT REMAINS

	Arable	Cultivars	Grass	Heath	Ruderals	Tree	Wetland	Wide niches
C157 S1	1				1	1		3
C204 S6								
C205 S7	1							1
C216 S8								
C194 S14								
C181 S10	4				1			4
C474 S47	5			1	3	4	1	11
C661 S70	4				3	3		6
C662 S71	3				7	4	3	8
C304 S29	3	1			1			3
C679 S76	2	2		1	1		2	6
C683 S77	1		1		1		2	7

Appendix 2: Scotch Street Context Data.

Scotch St, Carlisle															
Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
100	MD	A1-A9	Layer	101											
101	MD	A1-A9	Layer	204,344	100						1,2,3			1' 29-34	18-19th
102	17-18TH	A2	Cut	151	103						1,2,8,9,31,34	6' 2	11' 29	3' 21-22. 10' 13	
103	17-18TH	A2	Fill	102	101					102	1,2	6' 2	4' 8-10	3' 12-13	13/14th C
104	MD	A1,A2	Cut	116	104						1,2,9				
105	MD	A1,A2	Masonry	109	100					104	1,2				
106	M	A2	Cut	151	107						2	6' 1			
107	M	A2	Fill	106	110					106	2	6' 1			12/early 13th C
108	M	A1	Fill	253	226					253					late 14th-16th
109	MD	A2	Layer	104	105						2				
110	M	A2	Layer	107	155,207,455	124,232		155,207,455			1,2,8				late 14-16th
111	M	A2	Cut	330	112	241	330		112		2,8	16' 1			
112	M	A2	Fill	241	384	218		221		241	2,8,25,31,34	16' 1	11' 29-36. 12' 6-7	10' 13. 13' 36	13-mid 14th
113	M	A2	Fill	329	247					221	2,8,25,31	16' 1	11' 29-30	10' 13	13th C
114		A2	Fill	290	216					252	2,8,25	5' 10. 16' 1	6' 7-8. 12' 6-7	13' 36	15th/16th
115	M	A2	Layer	330	246			241			2,8,25	16			13th/14thC
116	M	A1-A9	Layer	161	101			102,104,256,548,546			2,77,85	5' 1. 78' 2. 93' 1			latest 18th
117	M	A2,A3	Layer	157	101						2				14th early 15th
118	M	A2	Layer	168	101						2,8,25,38				mid 13/14th
119	17-18TH	A1	Masonry	210	121,123,226		121,123			201	1,14		6' 12. 5' 17	6' 18. 7' 26. 66' 18-17	
120	17-18TH	A1	Masonry	122	101					121	1	5' 2			
121	17-18TH	A1	Cut	119	122		119,220		122		1,9	5'2			
122	17-18TH	A1	Fill	121	120					121	1	5' 2			13/14th C
123	17-18TH	A1	Masonry	119	214			214			1				
124	M	A1-A9	Layer	125	466	232					4,8,10,19	5' 1. 93' 1	2' 4-6.	3' 35	13/14th C
125	M	A1-A9	Layer	126,128,419	124,344,328						8,9,10,13,19,25,26,30,34,38,47	5' 1. 5' 5. 16' 1. 20' 1. 27' 3. 63' 1,81' 3-4. 93' 1. 93' 3	2' 4-6	3' 35	17th latest

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
126	17-18TH	A1,A2	Layer	116	101							5' 1	2' 4-6. 6' 21-24	7' 14-17	12/early 13th C
127	M	A1,A2,A7	Layer	128	125							5' 1. 78' 2	2' 4-6	3' 35	
128	M	A1,A2,A7	Layer	129,447	125						17,23,45,91	5' 1. 78' 2	2' 4-6	3' 35	
129	EM	A1,A4	Layer	134	128						35,42,54'2	5' 1. 37' 3. 81' 4. 93' 1. 93' 3. 100' 1	2' 4-6	3' 35	13/14th C
130	M	A1,A2	Cut	126	131		126		131			5' 1	2' 4-6	3' 35	
131	M	A1,A2	Fill	130	125					130		5' 1	2' 4-6	3' 35	
132	MD	A1,A2	Cut	124	133		124		133			5' 1	2' 4-6	3' 35	
133	MD	A1,A2	Fill	132	136					132		5' 1	2' 4-6	3' 35	
134	R	A1,A2	Layer		129							5'1. 100' 1 111' 1. 111' 2	2' 4-6	3' 35	
135	MD	A1,A2	Layer	116	136							5' 1	2' 4-6	3' 35	
136	MD	A1,A2	Layer	133,135	137							5' 1	2' 4-6	3' 35	
137	MD	A1,A2	Layer	136	138							5' 1	2' 4-6	3' 35	
138	MD	A1,A2	Layer	137	100							5' 1	2' 4-6	3' 35	
139	M	A1	Cut	234	140		110		140		1,9	7' 1	4' 11-13. 4' 5-7	3' 16. 3' 9	
140	M	A1	Fill	139	101					139	1	7' 1	4' 5-7. 4' 11-13	3' 9. 3' 16	13th c
141	M	A3	Cut	243,144	652				652	141	3,12,22,126	11' 1	4' 14-15. 5' 6-7	6' 27. 3' 8	
142	M	A3	Fill	177	101					141	3	11' 1	5' 6-7. 6' 3-5	6' 27. 7' 33-36	mid 13th/ 14th
143	M	A3	Layer	259	141			141			3,12	11' 1	5' 6-7	6' 27. 3' 8	
144	M	A3	Layer	263	141			141			3,12	11' 1	5' 6-7. 6' 15-16	3' 8. 7' 22-23	13/14th C
145	M	A3	Cut	186	148,259		148,259		186-178	146	3,12,22,99	11' 1	5' 6-7	6' 27	
146	M	A3	Layer	178	144					145	3,12	11' 1	5' 6-7	6' 27	12/early 13th C
147	M	A3	Layer	477	148						3,12,22				12/early 13th (but context has pipe frag)
148	M	A3	Layer	147	100						3,12,22				12/early 13th C
149	M	A2	Layer	118	101						8,38,45				
150	M	A2	Cut	159	151		159,165				8,9,31	7' 3. 7' 4			
151	M	A2	Fill	150	102					150	8	7' 3			18/ 19 c
152	17-18TH	A1	Fill	153	110					153	1				
153	17-18TH	A1	Cut	110	152		110				1				
154	M	A3	Fill	171	177					141		11' 1			13/14th c
155	VOID		Cut	110	467				467		9				
156		A3	Cut	142	157		142		157		3,12,22	7' 2	4' 25-27. 5' 1-3. 4' 28, 31-33	6b' 30, 35-36	

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
157	17-18TH	A3	Fill	156	100					156	3	7' 2	4' 36-37		
158	17-18TH	A1	Cut	125	159						9	7' 4	4' 36-37.	6' 31- 32	
159		A1	Fill	158	150					158	9	7' 4	4' 36-37.	6' 31- 32	
160	M	A1,A2	Cut	159,165	161		159,165				8		4' 34-35	6b' 33-34	
161	M	A1,A2	Fill	160	116					160	8		4' 34-35	6b' 33-34	
162	M	A2	Cut	125	163						4,10	5' 4	5' 4, 11.	4' 24, 28, 29. 6b' 24,28,29	
163	M	A2	Fill	162	164			164		162	4	5' 4	5' 4	4' 28-29	mid 13/14 c
164	M	A2	Cut	125	165						4	5' 3			
165	M	A2	Fill	164	160			160		164	4	5' 3			13/14th C
166	M	A2	Cut	352	167						8,25	41' 2			
167	M	A2	Fill	166	170					166	8,25,38		14b' 1-2	13' 14	
168	M	A2	Fill	170	169					166	8,25,38	41' 2	14b' 2, 12-13	7' 11-12.13' 14, 7-8	mid 13th/14th C
169	M	A2	Layer	168	124					166	8,25		14b' 1-2	13' 14	
170	M	A2	Layer	167	168					166	8,25,38		14b' 1-2	13' 14	
171	M	A3	Fill	359	176					141		11' 1	5' 6-7	6' 27	13th/14thC
172	M	A2	Layer	124	116						8				
173	M	A2	Cut	125	174						18,25		6' 1-2	7' 37	
174		A2	Fill	173	198					173	18,25		5' 16. 6' 1-2.	6b' 19. 7' 37	one 18th c sherd, otherwise 14th C (also clay pipe
175	M	A1	Cut	196	199				199		10,30				13/14th C
176	M	A3	Fill	171	177					141		11' 1	5' 6-7	6' 27	13/14th C
177	M	A3	Fill	176	142					141		11' 1			13/14th C
178	M	A3	Fill	179	146					145		11' 1	5' 6-7	6' 27	
179	M	A3	Fill	180	178					145		11' 1	5' 6-7	6' 27	
180	M	A3	Fill	181	179					145		11' 1	5' 6-7	6' 27	
181	M	A3	Fill	182	180					145		11' 1	5' 6-7	6' 27	
182	M	A3	Fill	183	181					145		11' 1	5' 6-7	6' 27	
183	M	A3	Fill	184	182					145		11' 1	5' 6-7	6' 27	
184	M	A3	Fill	187	183					145		11' 1	5' 6-7	6' 27	13/14th C
185	M	A3	Fill	188	187					145		11' 1	5' 6-7	6' 27	13/14th C
186	M	A3	Fill	145	188					145		11' 1	5' 6-7	6' 27	13/14th C
187	M	A3	Fill	185	184					145		11' 1	5' 6-7	6' 27	
188	M	A3	Fill	145	187					145		11' 1	5' 6-7	6' 27	13/14th C
189	M	A1	Cut	125	190						10,13	5' 8	6' 6	7' 32	
190	M	A1	Fill	189	124					189	2,10,13	5' 8	6' 7	7' 32	
191	M	A1	Layer	306	193					305	10,19	20' 1. 32' 2. 27' 3	8' 15-16, 26-27	9' 4-5	12/early 13th C

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
192	M	A1	Layer	193	194					305	10,19	20' 1	8' 15-16, 26-27	9' 4-5	12/early 13th C
193	M	A1,A3	Layer	196,308	192					305	30' 1. 10,19,26,33	27' 3. 32' 2. 81' 3-4	8' 15-16, 26-27. 1	9' 4-5. 10' 20-21. 8' 19-	12/early 13th C
194	M	A1	Layer	192,320	307					305	10,19,30,33	32' 2. 20' 1. 27' 3. 7' 4-7	8' 15-16. 11' 10-11,18-20	10' 25-26, 21-20	12/early 13th C
195	M	A1	Layer	307	102						10	20' 1. 27' 3			13th C
196	M	A1	Layer	306	193						10,26,30,33	20' 1. 27' 3	8' 33-34		
197	M	A2	Cut	174	198			174			8	5' 5			
198	M	A2	Fill	197	124					197	8	5' 5. 96' 1. 78' 2			13/14th C
199	M	A1	Layer	125	305			305			10,26				
200	M	A2	Layer	247	204,252					221					
201	17-18TH	A1	Cut	116	210						14' 1	93' 2	6' 12. 5' 17	7' 26. 6b' 17-18	13/14th C
202	M	A2	Cut	125	231						25,38,45,61,53,68,118	5' 6. 15' 3			
203	17-18TH	A2	Fill	231	124					202		6' 6			14/15th C
204	M	A2	Layer	205	116					252	2,8	16' 1			
205	M	A2	Layer	114	204	200,291		252		252	8				
206	M	A1	Fill	238	256					207		15' 2	6' 9-10. 8' 3-4, 17-18	7' 28-29. 9' 25-26, 13-14	13/14th C
207	M	A1	Cut	124	206	139					10	15' 2	6' 9-10	7' 28-29	
208	M	A2	Cut	110	209						2,8,31, 34	5' 7			
209	M	A2	Fill	208	101					208	2,8	5' 7			
210	17-18TH	A1	Fill	201	119					201	14' 1	93' 2	6' 12	7' 26	
211	M	A1	Cut	125	212						13, 17	5' 9	6' 13	7' 21	
212	M	A1	Fill	211	116					211	13,10	5' 9	6' 3	7' 25	13/14th C
213	MD	A1	Fill	214	101					214	14	93' 2	6' 11	7' 27	mid13/14th C
214	MD	A1	Cut	123	213						14	93' 2	6' 11	7' 27	
215	M	A1	Layer	309	306										12/early 13th C
216	M	A2	Layer	291,217,276	114					252	23,25,123	5' 10	6' 17-20, 29-30	7' 18-21	
217	M	A2	Layer	113	293	247				252	10,8,18,25,23	5' 10. 27' 3	15' 1-2	14' 19	12/early 13th C
218	M	A2	Fill	329	221	112		221		241	18,25,23		8' 11	9' 20	12/early 13th C
219	M	A2	Layer	204	101						25				
220	17-18TH	A1	Layer	116	121			121			1				13/14th C
221	M	A2	Cut	329	113		112		329		1,10,,18,25	5'10. 16' 1			
222	M	A1	Fill	223	125					223	14' 1. 1. 17	15' 5	6' 14	7' 24	

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
223	M	A1	Cut	128	222					222	14' 1. 1, 17	14' 3. 14' 2. 15' 5	6' 14 8' 9	7' 24. 9' 22	
224	18th-19th	A1	Fill	225	227					226	14' 1		6' 25	7' 13	
225	18th-19th	A1	Masonry	226	224					226	14' 1. 10. 14		6' 25, 28	7' 10, 13	13/14th C
226	18th-19th	A1	Cut	119	225		119				14' 1		6' 25, 28	7' 10, 13. 9' 23	
227	MD	A1	Layer	224	101										19th c & 4 mod drainpipe frag
228	17-18TH	A1,A2	Cut	116	229						17,23		6' 21-24	7' 14-17	
229	17-18TH	A1,A2	Fill	228	126					228					
230	M	A3	Layer	352	124						25			7' 11-12	
231	M	A2	Fill	202	203					202		15' 3			12/early 13th C
232	M	A2	Layer	274	172	124					25	15'4	8' 1-2, 11	9' 27-28, 20	13th C
233	M	A2	Layer	125	232	125					18	15' 4		9' 19	late12/early 13th
234	M	A1	Fill	235	124						10				
235	M	A1	Cut	206	234					234	10				
236	M	A1	Cut	223	237						17	15' 5	8' 9	9' 22	
237	M	A1	Fill	236	116					236	17	15' 5	8' 9	9' 22	13/14th C
238	M	A1	Fill	207	206					207	10	15' 2			late12/early 13th
239	M	A1,A2	Cut	128	240						17	11' 2	8' 10	9' 21	13/14th C
240	M	A1,A2	Fill	239	125					239		11' 2	8' 10	9' 21	13/14th C
241	M	A2	Cut	245	112	111	245		112		2,8	16' 1			
242	M	A2	Masonry	218	243					221	18		8' 12	9' 18-19	13/14th C
243	M	A2	Cut	242	244					221	18		8' 13	9' 17	12/early 13th C
244	M	A2	Cut	243							18		8' 14	9' 16	
245	M	A2	Layer	246	241			241				16' 1			
246	M	A2	Layer	115	245			241				16' 1			
247	M	A2	Fill	113, 244	200, 295	217				221	29,124, 31,25	16' 1. 20' 3	11' 12-15	7' 8-9. 10' 23-24	13/14th C
248	M	A1	Cut	125	250						17. 21' 2,35	8' 21-22	11' 12-15	7' 8-9. 10' 23-25	
249	M	A1	Fill	250	127					248	17. 21' 2	8' 21-22	11' 12-15	7' 8-9. 10' 23-26	13/14th C
250	M	A2	Fill	248	249					248	17. 21' 3	8' 21-22	11' 12-15	7' 8-9. 10' 23-27	14th C
251	M	A1	Cut	125	255		125				10	21' 1	8' 35	10' 35	
252	M	A2	Cut	200, 295	293,29 8,217		200,2 95		292		18' 1,23,25 ,31	16, 5' 10			13/14th C
253	M	A1	Cut	254	108				108		35,42				
254	M	A1	Layer	129	341,32 3,253										
255	M	A1	Fill	251	256					251	10	21' 1	8' 35	10' 35	13/14th C

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
256	M	A1	Cut	255	257						10	21' 1	8' 35	10' 35	
257	M	A1	Fill	256	124					256	10	21' 1	8' 35	10' 35	mid 13/14th C
258	M	A3	Cut	303,313	618	317					22' 1	27' 1. 81' 1-2. 27' 4	8' 36. 11' 1, 23-24	10' 33-34, 17-18	
259	M	A3	Fill	289	145			145		258	22' 1	27' 1			12/early 13th C
260	M	A3	Fill	296	289					258	27' 1	81' 1			18/19thC
261	M	A3	Layer	531	264			264			22				12/early 13th C
262	M	A3	Layer	268	459						22		8' 33-34	10' 36	
263	M	A3	Layer	477	526	526					22' 1				
264	M	A3	Cut	261	304		261				22,126,99				
265	VOID	A1	Cut		267										
266	VOID	A1	Fill	267						265					
267	VOID	A1	Fill	264	266					265					
268	R	A3	Layer	501	503	489					22,66,67,71,126	63' 4	17b' 12-13, 24-25. 11' 25-26	18' 19. 10' 15-16	
269	M	A2	Cut	125	270		125				23	28' 1	11' 6-7. 8' 30	10' 29. 9' 3	
270	M	A2	Fill	269	271			271		269	23	28'1	11' 6-7. 8' 30	10' 29. 9' 3	13th C
271	M	A2	Cut	232	272		170		272		23	28' 1	8' 30	9' 3	
272	M	A2	Fill	273	232					271	23	28' 1	8' 30	9' 3	13th C
273	M	A2	Cut	125	274		125				23				
274	M	A2	Fill	273	232					273	23				
275	VOID	A2	Layer								23				
276	M	A2	Fill	277	216					252	23,123				
277	M	A2	Fill	298	276					252	23				
278		A1	Cut		279						24' 1				
279		A1	Fill	278							24' 1				
280		A1	Layer			281					24' 1				
281		A1	Layer			280					24' 1				
282		A1	Cut		285						24' 1				
283	M	A1	Cut	128	284						24' 1				
284	M	A1	Fill	283	128					283	24' 1				13/14th C
285		A1	Fill	282						282	24' 1				
286	M	A1	Fill	310	305			305		301	26	11' 3	8' 31-32. 11' 16-17	9' 2. 10' 22	late12/early 13th
287	M	A1	Fill	288	301			301		288	26	20' 4	8' 31-32	9' 2. 10' 30	
288	M	A1	Cut	125	287						26	20' 4	8' 31-32	9' 2. 10' 30	12/early 13th C
289	M	A3	Fill	260	259					258		27' 1. 81' 1			
290		A1,A2	Layer	292	114					252		16' 1			12/early 13th C
291	M	A2	Layer	292	216	200,205				252	123,23,124	5' 2	11' 12-15.	10' 23-24	13/14th C

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
292	M	A2	Layer	293	291					252	124	5' 10. 16' 1	11' 12-15.	10' 23-24	
293	M	A2	Layer	252	292					252	125,124,29	20' 3 16' 1	11' 12-15.	10' 23-24	13/14th C
294	M	A2	Cut	247	295						124,29	20' 2	11' 8-9	10' 27-28	
295	M	A2	Fill	294	252			252		294	124,29	20' 2	11' 8-9	10' 27-28	13/14th C
296	M	A3	Fill	311	260					258		27' 1. 81' 1			
297	M	A3	Fill	618	311					258		27' 1. 81' 1			late12/early 13th
298		A3	Layer	293	276						23' 1,123	6' 1			
299	R	A1	Fill	300	124					300	26	27' 2	11' 2-3	10' 31-32	3-4th, 12early 13th
300	R	A1	Cut	125	299						26	27' 2	11' 2-3	10' 31-32	
301	M	A1	Cut	287	310		287		286, 310		26	11' 3	8' 31-32. 11' 16-17	9' 2. 10' 22	
302	M	A3	Fill	312	296					258		27' 1. 81' 1			
303	M	A3	Fill	304	258			258		264	22	27' 4			12/early 13th C
304	M	A3	Fill	264	303					264		27' 4			
305	M	A2	Cut	571	570		571				30' 1,26,33	32' 2. 27' 3	12' 3-5	10' 1-6. 3' 1-4. 6b' 15-17, 20-23	
306	M	A2	Layer	306	196					305		27' 3			
307	M	A1	Layer	194	195					305	30' 1	27' 3 20' 1			
308	M	A2	Layer	215	193	191				305		27' 3. 32' 2		10' 1-5	
309	M	A2	Layer	305	215					305		27' 3			
310	M	A1	Fill	301	286					301		11' 3	11' 16-17.	10' 22	
311	M	A3	Fill	297	296	312?				258		27' 1. 81' 1			
312	M	A3	Fill	258	302					258		27' 1. 81' 1. 32' 1			12/early 13th C
313	EM	A3	Fill	314	312							27' 1. 32' 1			
314	EM	A3	Fill		313							32' 1			
315	M	A1	Fill	318	125					316		81' 4	11' 31-32	10' 11-12	12/early 13th C
316	M	A1	Cut	598	326		598		326		62	81' 4	11' 31-32	10' 11-12	
317	M	A3	Cut			258									
318	M	A1	Fill	326	315					316		81' 4	11' 31-32	10' 11-12	
319	M	A1	Layer	193	320					305	30,33				
320	M	A1	Layer	319	194						30,33	32' 2			
321	MD	A3	Layer	116	100							32' 1			
322	R	A1			338		374, 375		338		35,44				
323	VOID	A1		459	129						35				
324	VOID														13th C

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
325	VOID														
326	M	A1	Fill	594	315					316	62	81' 4	11' 31-32	10' 11-12	12/early 13th C
327	VOID	A2	Layer								30				
328	M	A2	Cut	125,149	330		125		330,112		34,38,45,53,58,	16' 1	12' 27-28	13' 24	
329	M	A2	Fill	221	113					221	45	16' 1	12' 27-28	13' 24	13th C
330	M	A2	Fill	328	115			241		328		16' 1	12' 27-28	13' 24	1st half of 13th
331	M	A1	Cut	125	355						35,40,113, 59,54' 2,65,69 ,74,50' 4,79,95 ,121	39' 1. 93' 2-3	12' 33-34. 17' 25-26	13' 19-20. 16' 11	14th early 15th
332	M	A1	Fill	356,354b						331	59	39' 1. 93' 2-3			14/15th C
333	M	A1	Layer	129	334						35	37' 3. 37' 1			14th early 15th
334	M	A1	Layer	333	128						35	37' 3			
335	M	A1	Layer	129	334						35,40	37' 3			13/14th C
336	M	A1	Cut	129	337					337	35,42	32' 3			
337	M	A1	Fill	336	125					336	35	32' 3			
338	M	A1	Layer	129	128						35, 44				
339	M	A2	Fill	349	125	348				349					
340	M	A1	Layer	129	128						35,42				
341	M	A1	Cut	254	342		254		342		35				
342	M	A1	Fill	342	128					341	35				
343	M	A1	Layer	129	125	335									
344	MD	A4	Layer	332,422	466	124					36,47	93' 3. 93' 1			
345	MD	A4	Layer	483	478					36,47					
346	M	A1	Cut	338	347		129		347		35,42	32' 4			
347	M	A1	Fill	346	125					346	35	32' 4			
348	M	A2	Fill	349	339	339				349		37' 2	12' 29-30	13' 22-23	
349	M	A2	Cut	128	348		128		348		42	37' 2	24' 30		
350	M	A2	Cut	486	662		486		##########		38,45,56,53	41' 1. 81' 2-3	14b' 1-2. 12' 31-32. 14b' 5-8	13' 14. 13' 11,21	
351	M	A2	Fill	363	125	352				350	38	14' 1. 81' 2	12' 31-32	13' 21	
352	M	A2	Fill	363	166,230	351				350	38	14' 1. 81' 2	12' 31-32	13' 21	mid13th/mid 14th
353	M	A1	Fill	355	356					331		39' 1			
354	M	A1	Fill	355	332					331		39' 1			14th C
355	M	A1	Fill	331	354,353					331		39' 1			13/14th C
356	M	A1	Fill	353	332					331		39' 1			
357	M	A2	Cut	362	358		362				38	39' 3. 39' 2	14b' 3-4,9-11	13' 13	

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
358	M	A2	Fill	357	116					357	38	39' 2	14b' 3-4,	13' 13	13/14th C
359	M	A3	Fill	651	171					141		11' 1			
360	M	A1	Cut	129	591		125				42	93' 1-2			
361	M	A1	Fill	592	124					360	42	933' 2			13/14th C
362	M	A2	Layer	125	357						38,43		14b' 9-	13' 9	
363	M	A2	Fill	661	352					350		41' 1. 81' 2			13/ early 14th
364	M	A2	Cut	129	365						38	39' 3	14b' 9-	13' 9	
365	M	A2	Fill	364	125					364	38	39' 3	14b' 9-11	13' 9	
366	M	A1	Layer		129										
367	M	A2	Layer	149	125						43				13/14th C
368	R	A1	Fill	400	129					400	44' 1. 46' 1	46' 2. 81' 4. 93' 1			4th
369	R	A1	Layer	371	370						44' 1. 46' 1. 49	46' 2	15' 3-5	14' 16-18	
370	R	A1	Layer	369	129						44	93' 1			3rd, 12/early 13
371	R	A1,A2,A4	Layer	372, 432,431,436	372						44,46,, 65,69,74	93' 3			3-4th, 13/14th
372	R	A1,A2,A4	Layer	371	400						44,46,49,51		14b' 33-34	14' 28-29	3-4th
373	R	A1	Layer	371	129						44				
374	R	A1	Fill	415	129					415	44				
375	R	A1	Layer	414	129						44			13' 9	
376	R	A1	Layer	414	389-399		389-399				44		14b' 35-36	14' 20-27	
377	R	A1,A4	Layer		371						44,69				
378	M	A2	Fill	444	125					445	45				
379	VOID									445					13/early 14th C
380	M	A2	Fill	378	381					445	45				
381	M	A2	Fill	380	387					445	45				
382	M	A2	Fill	387	378					445	45				4th
383	R	A2	Fill	452	405			405		452	45	54' 1	15' 35-36	16' 15, 27-28	4th
384	M	A2	Fill	112	221			221		328	45				
385	M	A2	Layer	388	125						45				
386	R	A2	Layer	459	414,452			452			45,53,44	81' 3			
387	M	A2	Fill	381	382,149					445	45				4th, early 13th
388	M	A2	Layer	490	385, 128	129					45				
389	R	A1	Cut	376	129						44				
390	R	A1	Cut	376	129						44				
391	R	A1	Cut	376	129						44				
392	R	A1	Cut	376	129						44				
393	R	A1	Cut	376	129						44				

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
394	R	A1	Cut	376	129						44				
395	R	A1	Cut	376	129						44				
396	R	A1	Cut	376	129						44				
397	R	A1	Cut	376	129						44				
398	R	A1	Cut	376	129						44				
399	R	A1	Cut	376	129						44				
400	R	A1	Cut	369	368						46' 1. 44,49,51	46' 2. 81' 4			
401	M	A4	Cut	124	402					402	47	39' 4			
402	M	A4	Fill	401	116					401	47	39' 4			19th c
403	R	A5	Layer		101						48				
404	R	A5	Layer		101						48				
405	R	A5	Layer		101						48' 1				
406	R	A5	Layer		101						48				
407	R	A5	Layer		101						48				
408	R	A5	Layer		101						48' 1				
409		A4	Fill	410						410		39' 5			13/14th C
410		A4	Cut		409							39' 5			
411	R	A1	Layer	424	369						49,51	93' 1	15' 8-9	14' 13-14	
412	R	A4	Cut	124	413						47	50' 1			
413	R	A4	Fill	412	116					412	47	50' 1			13/14th C
414	R	A1	Layer	370,368	129						44				
415	R	A1	Cut	414	374		414				44				
416	R	A1	Cut	529	510						68				
417	VOID	A4	Fill	423	420	422,425				418	47	57' 1			
418	18th-19th	A4	Cut	426	423		426				47	57' 1			
419	18th-19th	A4	Fill	420	344					420	47	57' 1. 100' 1			14/15th C
420	18th-19th	A4	Cut	422	419						47	57' 1			
421	M	A4	Layer	124	116						47				14/15th C
422	M	A4	Fill	423	420	425,417				418	47	57' 1			15th/16th
423	M	A4	Fill	418	422	429				418	47	57' 1. 100' 1			15th/16th
424	R	A1	Layer	371	411						51' 1				3-4th
425	M	A4	Fill	423	420	422,417				418	47				15th/16th
426	M	A4	Layer	448	418	125				427	47	57' 1	100' 1		14/15th C
427	M	A4	Cut	125	450						47,50' 4,79,83	57' 1. 100' 1	17b' 20-21.	18' 21-22	
428	M	A4	Fill	449	426	448				427		100' 1			
429	M	A4	Fill	418	422	423				418					16/17th
430	R	A1	Layer	459	372,386						52,75,55	93' 1			2-3rd
431	R	A1	Layer	430	371						52				

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
432	R	A1	Cut	430	374						52				
433		A1,A4	Layer	484	441						52,79,83				
434	R	A1	Layer	435	371						52				2-4th
435	R	A1	Layer	440	434						52				
436	R	A1	Layer	440	371						52				
437	R	A1	Layer	440	434						52				
438	R	A1	Layer	435	371						52				
439	R	A1	Cut	459	484,459						52,55				
440	R	A1	Fill	430,433	372,431,432, 435-438					439	52	39' 6			
441		A1,A4	Layer	433							52,79				
442	M	A1	Cut	129							52				
443	R	A1	Layer	441	440						52		15' 22	14' 1-2	2-3rd
444	M	A2	Fill	445	378					445					13/14th C
445	M	A2	Cut	454,474	444						45,53,56,61,68,118		14' 31-34	16' 29-30	
446			Cut		447										
447			Fill	446	128					446					2nd
448	M	A4	Fill	449	426	428				427	47	57' 1			13/14th C
449	M	A4	Fill	450	448					427	47	57' 1			13/14th C
450	M	A4	Fill	427	449					427	47	57' 1. 100' 1			4th, 13 th C
451	M	A4	Layer	371	129						47	57' 1			13/14th C
452	R	A2	Cut	386	383						45,61,58	54' 1			
453	M	A2	Cut	481,476	454						45,56,53		15' 33-34	16' 29	
454	M	A2	Fill	453	445					453	45				13/14th C
455	M	A1	Cut	110	456		110		456		1				
456	M	A1	Fill	455	100					462	55,75				
457	M	A4	Fill	418	423					418	47	15' 33-34			mid 13/14th C
458	EM	A4	Layer	372	129						47				
459	R	A1	Layer	439	430						55	81' 3			late 2nd, 12/early 13th C
460	R	A1	Layer	632	523,521,613						55,62,70	64' 2. 81' 4	17' 27-28. 17' 23-24	16' 8-10, 14. 18' 3-6, 34-35. 24' 33-34	
461	R	A1,A2	Fill	472	462			462		472	55,58	54' 3	17' 3-4	16' 25	early 2nd
462	R	A1	Cut	461	521						55,58				
463	M	A2	Cut			445					60	57' 2	17' 1-2	16' 26	
464	M	A2	Fill	380	387	381				445	60	57'2	17' 1-2	16' 26	2-4th,12/early 13th C
465	M	A4	Fill	482	483					466	54' 2	32' 6		16' 24	mid 13/14th C

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466	M	A4	Cut	124	482		124		##########		54' 2,65,69,74,50'	32' 6			
467		A1	Fill	155	100					155	9				
468	M	A4	Cut	129	498						65,74,50'4,79,	63' 1. 93' 3	17' 35-36	16' 3	
469	M	A4	Fill	600	125					468	54' 2	63' 1. 93' 3	17' 35-36, 9	16' 3, 19-24	3rd, 13/14th C
470	M	A4	Fill	471	125					471	54' 2				2nd
471	M	A4	Cut	497	470						54' 2				
472	R	A1	Cut	459	461						55,58	54' 3. 100' 1	17' 12-13	16' 16-17, 25	
473	M	A2	Cut	476	677						60,61,53,68,11	57' 3. 57' 2	17' 10-11,14-1	16' 16,18	
474	M	A2	Fill	677	445					473	60,59	57' 3. 57' 2	17' 10-11,14-	16' 16,18	2nd, 13th C
475	M	A2	Cut	430	476						60,53,68		17' 10-11	18' 18	
476	M	A2	Fill	475	473					475	60,53		17' 10-11	18' 18	12/early 13th C
477	R	A3	Layer	459	##########			315,530,526			126				late 2nd, 13th/14th C
478	M	A4	Fill	345	479					466		32' 6			2nd, mid 13/14th C
479	M	A4	Fill	478	116					466					14/15th C
480	M	A2	Cut	459	481		459				56' 1 53	32'5			
481	M	A2	Fill	480	453,485			453,485		480	56' 1	32' 5			12/early 13th C
482	M	A4	Fill	466	465					466	79,83,95	32' 6		22' 26-28	13/14th C
483	M	A4	Fill	465	345					466		32' 6			
484	R	A4+A1	Layer	615	433						62,70,45				
485	M	A2	Cut	481	486						53,68,118				
486	M	A2	Fill	485	350					485			17' 27-28	16' 8-9	late 2nd
487	R	A1	Layer	500	459	459						64' 2			3-4th, 13/14th C
488	R	A1	Fill	494	116										
489	R	A3	Layer	501	503	268									12/early 13th C
490	M	A2	Layer	459	446			446			61,53				3rd, 13/early 14th C
491	R	A1	Cut	459	493				493,492		58,62,1	64' 1	17' 33-3	16' 4	
492	R	A1	Fill	493	430					491	58	64' 1	17' 33-3	16' 4	late 2-3rd
493	R	A1	Fill	491	492			316		491	58	64' 1	17' 33-	16' 4	2nd, 12/early 13th C
494	R	A1	Cut	459	488		459								
495	R	A1	Cut	459			459								
496	M	A4	Fill	603	497					468		63' 1	17' 35-36	16' 3	
497	M	A4	Fill	496	600					468		63' 1, 93' 3, 100' 1	17' 35-36	16' 3	

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498	M	A4	Fill	468	603					468		63' 1	17' 35-36	16' 3	13/early 14th C
499	R	A1	Layer	459	430							82' 4			
500		A1	Layer		487							64' 2			
501	R	A2	Layer	loe	529,268						68,71,118,66,67	81'2			mid to late2nd, 13th C
502	R	A3	Fill	504	459					504	66	63' 2			2nd, 12 early 13th C
503	R	A3	Layer	268	504	504					66,67,71	63'3	17b' 22-23	18' 20	
504	R	A3	Cut	503	502						66,67	63' 2			
505	MD	A8	Layer	508	100						76		17b 16-17	18' 25-26	14/15th C
506	R	A4	Layer	559	371						69,74,50' 4	57' 4, 93' 3	17b' 18-19	18' 23-24	12/early 13th C
507	EM	A4	Layer	371	129						69				
508	M	A8	Fill	543	505						76	17' 26-27	18' 17-18		13/early 14th C
509	R	A2	Cut	501	619				619		68				
510	R	A2	Masonry	416	459					416	68				
511	M	A6	Layer	512	100						72		17b' 14-15	18' 27,36	13/early 14th C
512	M	A6	Cut	515	511									17' 14-14	
513	M	A6	Fill	512	511					512	72		73' 1		
514	R	A6	Cut	518,516	514						72		17' 14-15	18' 27	
515	R	A6	Fill	514	512	539				514	72		17' 14-15	18' 27	
516	R	A6	Layer	loe	512	620					72		17' 14-15	18' 27	
517	R	A6	Layer	loe	511						72		17' 14-15	18' 27	
518	R	A6	Layer	loe	517,519						72		17' 14-15	18' 27	
519	R	A6	Layer	loe	518						72		17' 14-15	18' 27	
520	R	A2	Layer	460,558,610	614,671						113,,68,121,122				2nd -3rd, 13th C
521	R	A1	Cut	460	522						70,55	50' 5			
522	R	A1	Fill	521	459					521	70,113	50' 5			
523	R	A1	Layer	460	525						70				
524	R	A1	Layer	632	416			416			70,113				
525	R	A1	Layer	523	487						70,113				mid to late 2nd
526	M	A3	Cut	263	637		263				66,67,71				
527	R	A4	Cut	578	559						50' 4,79,74,87,89,95,121				3rd
528	M	A3	Fill	637	175	175				526	67				12/early 13th C
529	R	A2	Layer	510	459						84				2nd-early 3rd, 14th C
530	EM	A3	Cut	477	314	317	477				71				

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531	EM	A3	Layer	313	261					530	71				
532	R	A4	Layer	561	371						50' 4				2nd-4th
533	R	A8	Layer	641	534						76,98	78' 1	17' 16-17	18' 25-26	
534	R	A8	Layer	533	555						76,97,94,98	78' 1	17' 16-17	18' 25-26	
535	M	A8	Layer	574	552			552			76				2nd, 13/14 th C
536	R	A8	Layer	580	552			552			76,80	78' 1			
537	M	A8	Fill	554	543					552	76	78' 1	19' 1-2	18' 9-10	2nd, 13th C
538	M	A4	Cut	371	539						54' 2,65,69				
539	M	A4	Fill	538	129					538	54' 2. 65	50' 2			
540	M	A4	Cut	371	541						54' 2. 65,69				
541	M	A4	Fill	540	129						54' 2. 65				
542	R	A4	Layer	568	371						65,69,50' 4				
543	M	A8	Fill	537	508					552	76,92	78' 1			late12/early 13th C
544	M	A7	Cut	116	545						77,85,92	90' 1	17' 3-4	18' 36	
545	M	A7	Fill	544	116					544	77,85	90' 1	17' 3-4	18' 36	13th C
546	M	A7	Cut	544	547		544				77,85	78' 2	17' 3-4	18' 36	
547	M	A7	Fill	546	101						77,85	78' 2	17' 3-4	18' 36	
548	M	A7	Cut	116	549						77,85	82' 1	17' 3-4. 19' 32-33	18' 36. 20' 21	
549	M	A7	Fill	548	563					548	77,85	82' 1	17' 3-4	18' 36	3rd, 13th C
550	R	A4	Cut	606	551						50' 4, 79, 83	50' 6			3rd-4th
551	R	A4	Fill	550	371					550	50' 4	50' 6			
552	M	A8	Cut	535,536	508		535,536		590,537,554,590		76,80,84,88,98,106	78' 1			3rd-4th
553	M	A8	Fill	590	554					552		78' 1	19' 3-4	18' 7-8	13th C
554	M	A8	Fill	553	537					552	80,84,88,94	78' 1	19' 3-4	18' 7-8	
555	R	A8	Layer	534	587						94,97	78' 1	23' 14-16	22' 15-17	
556	R	A4	Cut	634	557						83	50' 7			
557	R	A4	Fill	556	542					556	50	50' 7			
558	M	A7	Layer		520							78' 2			
559	R	A4	Fill	527	506					527		79,83			
560	R	A4	Layer	583	577			577			79,83	93' 3	21' 3-4		
561	R	A4	Layer	634	532						79,83	100' 1			12/early 13th C
562	R	A4	Layer	606	532						79,83				13/14th C
563	M	A7	Layer	549	564						82' 1	19' 9-12	18' 1-2		
564	M	A7	Fill	548	116					548		82' 1			
565	M	A7	Cut	545	566						77,85	82' 2	19' 30-31. 21' 15-19	20' 22-23.	

566	M	A7	Fill	585	546			546		565	77,85	82' 2	19' 30-31.	20' 20-23	late 4th, 14/15th C
567	R	A4	Layer	581,582	441						79,83				
568	R	A4	Fill	540	129	541				540	79				late 4th
569	M	A8	Layer	572	575			575			80				12/early 13th C
570		A1	Cut	129	571				571		35	81' 3-4			
571		A1	Fill	570	305					570	35	81' 3-4			
572	R	A8	Fill	529	569					529	80	78' 3	19' 28-29	20' 24	
573	R	A8	Cut	576	572		576		572			78' 3			
574	M	A8	Fill	575	535					575	80	78' 4			
575	M	A8	Cut	569,587	574		569,587					78' 4			
576	R	A8	Layer	586	573			573			84		19' 34. 21' 19	20' 37,6	late 2nd,13th C
577	R	A4	Cut	560,606	578						79,83	86' 1			
578	R	A4	Fill	577	527			527		577	79,83	86' 1			
579	R	A8	Layer	576	569						84		19' 34. 21' 19-2	20' 37,6	12/early 13th C
580	R	A8	Layer	685	536						84,88	78' 1	19' 34	20' 37	
581	R	A4	Layer	433	567						83				
582	R	A4	Layer	433	567						83,79,95				
583	R	A4	Layer	584	560						87	93' 3			
584	R	A4	Layer	605	583						89				2nd
585	M	A7	Fill	565	566					565	85	82' 2	19' 30-31. 21' 1	20' 22-23	
586	R	A8	Layer	589	576	588					88		21' 19-20	20' 6	
587	R	A8	Layer	555	536,575			575			88,94		21' 19-	20' 6	
588	R	A8	Layer	589	576	586					88		21' 19-2	20' 6	
589	R	A8	Layer	555	586,588						94		21' 34-35. 23' 7	22' 29-30, 20	
590	M	A8	Fill	552	553					552	94,97,98		21' 34-35. 23'	22' 28-29.	late 12/early 13th
591	M	A1	Fill	360	592					360		93' 1			
592	M	A1	Fill	591	361					360	42	93' 2			
593	M	A1	Layer	125	124							81' 4			
594	M	A1	Fill	316	326					316		81' 4			
595	M	A1	Cut	129	596							81' 4			
596	M	A1	Fill	595	597					595		81' 4			
597	M	A1	Fill	596	598					595		81' 4			
598	M	A1	Fill	597	316			316		595		81' 4			
599	R	A4	Layer	613	634						95			22' 31	
600	M	A4	Layer	497	469					468		63' 1. 93' 3			
601	M	A4	Cut	125	602							93' 3			
602	M	A4	Fill	601	116					601		93' 3			
603	M	A4	Fill	498	496					468			63' 1. 93' 3. 100' 1		

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
604	M	A1	Fill	331	355							93' 3.			
605	R	A4	Layer	616	584						95,121				
606	R	A3	Layer	616	550						83				
607	M	A1	Fill	608	332					331		93' 2			
608	M	A1	Fill		607					331		93' 2			
609	M	A1	Fill	331	607					331		93' 2-3			
610	R	A4	Layer	loe	520,613						95,121				late 1-early 2nd
611		A2	Layer	306	371							93' 3			
612	R	A4	Cut	613	634						95				
613	R	A4	Layer	610	616						70,113, 95,121	100' 1	26' 33-36		2nd, 13th C
614	R	A4	Layer	520	615						95,121				
615	R	A1,A4	Layer		482						95,62				2-4th
616	R	A4	Layer	613	605,606						95,121				13th C
617	R	A8	Layer	620	589						97		23' 14-16	22' 15-17	3rd?, 13/14th C
618	M	A3	Fill	258	312					258		81' 2			
619	R	A2	Fill	509	459					509					
620	R	A8	Layer	639	617						106,98		23' 24-25	24' 18-19	early 2nd
621	R	A9	Layer	134	622,666						119,120	101' 1. 111' 2.111' 3	28' 14-15	27' 16-17	
622	R	A9	Layer	621	623							101' 1. 111' 1			
623	R	A9	Layer	622	625							101' 1			
624	R	A9	Masonry	623	625							101' 1			
625	R	A9	Layer	624,674	626						116,120	101' 1. 111' 1			
626	R	A9	Layer	666,625	663						114,117	101' 1. 111' 1			
627	R	A9	Layer	663	628						110, 112, 114, 116, 117, 120	102' 1. 111' 1. 111' 3. 101' 1			
628	R	A9	Layer	627	629						110	101' 1. 111' 1	28' 1-2	27' 25-26	
629	R	A9	Layer	653	640,643						104' 2. 104' 1. 105. 109. 112. 114. 117. 129	101'1. 102' 1. 111' 1. 111' 3			late 2nd to early 3rd
630	MD	A9	Fill	101	100							102' 1			
631	M	A9	Cut	640	678						105	102' 1	25' 22-23	24' 20-21	
632	R	A1	Layer	633	460							115' 1			2nd
633	R	A1	Layer	loe	632						70' 1	70' 2			

Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide No's	Col Print No's	pot dating
634	R	A4	Layer	612,599	556,561			556							
635			Void												
636	M	A9	Fill	642	101					631	105	102' 1	25' 22-23	24' 20-21	
637	M	A3	Fill	526	528					526	71,67				2nd 12/early 13th C
638	R	A8	Layer	641	533								25' 24-25	24' 118-19	14/15th C
639	R	A8	Layer	650	641,620						106		25' 24-25	24' 18-19	
640	M	A9	Layer	629	631			631			104' 1	102' 1			R3rd,12/early 13th C
641	R	A8	Layer	639	638						106		25' 24-25	24' 18-19	none
642	M	A9	Fill	678	636					631	105	102' 1	25' 22-23	24' 20-21	12/early 13th C
643	M	A9	Layer	649	648						107	108' 1			2nd-3rd
644	M	A9	Cut	648	679						107,109	108' 1	25' 30-34	24' 15-16	
645	M	A9	Fill	679	101					644	107	108' 1	25' 30-34	24' 15-16	12/early 13th C
646	M	A9	Fill	631	642	678				631	105	102' 1	25' 22-23	24' 20-21	12/early 13th C
647	R	A9	Layer	685	663						109,110,112	111' 1	26' 24-25	24' 4-8	
648	M	A9	Layer	643	644						107	108' 1		24' 7-8	
649	M	A9	Layer	653	629						112	111' 1			none
650	R	A8	Layer	loe	590						106		25' 24-25	24' 18-19	none
651	M	A3	Fill	652	359					141	11' 1				
652	M	A3	Fill	141	651					141	11' 1				
653	M	A9	Layer	664	640,649						109,110	111' 1. 108' 1			
654			Void												
655	R	A9	Layer	663	653						110,112				2nd-4th
656	R	A9	Fill	668	667					668	110, 112, 114, 116, 117, 119, 120	111' 2	28' 4-9, 14-15	27' 20-23, 16-17	3rd-4th, 13/14 C
657	R	A2	Fill	658	444					445					
658	R	A2	Fill	459	657					445					
659	R	A2	Fill	660	658					445					
660	R	A2	Fill	445	449					445					
661	M	A2	Fill	662	363					350		81' 2			
662	M	A2	Fill	350	661					350		81' 2			13th C
663	R	A9	Layer	626	627						112,114				2nd-4th
664	R	A1	Layer	665	632							115' 1			
665	R	A1	Layer	663	664							115' 1			
666	R	A9	Layer	667	626						119	111' 2	28' 14-15	27' 16-17	
667	R	A9	Layer	656	666						119,12	111' 2	28' 14-	27' 16-17	

											0		15		
668	R	A9	Cut	621	656		621		656,667		120	111' 2	28' 14-15	27' 16-17	
Context number	Phase	Area	Type	Above	Below	Same as	Cuts	Cut by	Filled by	Fill of	Plans	Sections	Col Slide	Col Print No's	pot dating
669	R	A9	Cut	621	670		621		670,		119,12		28' 18	27' 14	
670	R	A9	Fill	669	675					669	119,12		28' 18-	27' 14	
671	R	A1	Cut	520	672										
672	R	A1	Fill	671	524					671					2nd
673	R	A2	Layer		510						118				
674	R	A9	Layer	622	625						119				
675	R	A9	Fill	670	680					669	120				
676	M	A2	Layer	473	474					473		57' 3. 57' 2	17' 10-11,14-15	16' 16,18	12/early 13th C
677	M	A2	Fill	473	676					473					
678	M	A9	Fill	631	642	646				631		102' 1	25' 22-23	24' 20-21	
679	M	A9	Fill	644						644	109				2nd
680	R	A9	Layer	666,625,67	681										
681	R	A9	Layer	680	629										
682			Void												
683	R	A9	Layer	loe	134										
684	R	A8	Layer	555	580						113				
685	R	A9	Cut	628	663						113				
686	R	A9	Cut	134	666										
687	R	A9	Fill	621	622							111/1			
688			Void									111/1			
689			Void												
690	EM	A1	Postpad	373	129						45				
691	EM	A1	Postpad	338	129						45				
692	EM	A1	Postpad	373	129						45				
693	EM	A1	Postpad		129						45				
694	EM	A1	Postpad		129						45				
695	EM	A1	Postpad		129						45				13/14th C
MODERN															
17th-18th century															
MEDIEVAL															
early medieval															
ROMAN															

Appendix 3: The Archaeomagnetic Dating Report.

THE ARCHAEOMAGNETIC DATING

BY ZOE OUTRAM

This report describes the archaeomagnetic investigation of the hearth surface from the site of Scotch Street, Carlisle. Samples were collected by the insertion of sampling tubes into the hearth surface. The sampled feature recorded a consistent, stable magnetisation, which may be indicative of the geomagnetic field in which the structure was last cooled. This produced the possible age ranges of 1370-1400AD or 255-245BC.

Orientated archaeomagnetic samples were taken from a feature described as a kiln. The objectives were to investigate the stability of burnt material of this nature and from this period for archaeomagnetic dating. Zoe Outram carried out the sampling and measurement programme, the aims of which were:

- to provide a date of last use of each hearth;
- to investigate the duration of use of the hearth sequence.

ARCHAEOLOGICAL CONTEXT

The grid reference for the site of Scotch Street is NY 404 553. It is located within the centre of Carlisle. The feature (**305**) consists of a large halo of red material (**194**) surrounding a black carbon-rich deposit. The feature was described as a kiln, and therefore it was thought that the red material would have been sufficiently fired to record the geomagnetic field.

SAMPLING

Samples were taken from cleaned horizontal surfaces within the hearth deposit, using the tube method, as the material was soft. There were no visible signs of slumping. The area of burning was substantial enough to allow 13 tubes to be inserted to the feature. Samples were orientated using a magnetic compass, as there appeared to be no local disturbances to the geomagnetic field caused by the feature itself or other factors. In the

laboratory, the exposed surface of the samples was cleaned and the Munsell reference code recorded (see below). They were then seale
d and stored in a damp, refrigerated environment.

Sample	Munsell	Reference Description
1	5YR 4/4	Reddish brown
2	5YR 4/2	Dark reddish grey
3	5YR 4/4	Reddish brown
4	5YR 4/3	Reddish brown (with black flecks, 5YR 2.5/1)
5	5YR 4/3	Reddish brown
6	5YR 4/3	Reddish brown
7	5YR 4/3	Reddish brown
8	5YR 4/3	Reddish brown
9	5YR 4/2	Dark reddish grey
10	5YR 4/4	Reddish brown
11	5YR 4/3	Reddish brown
12	5YR 4/3	Reddish brown
13	5YR 5/3	Brown

MEASUREMENT

The direction of the remanent magnetisation was measured using a Molspin fluxgate spinner magnetometer. The stability of the magnetisation was investigated by the stepwise demagnetisation of three pilot samples in fields of 2.5, 5, 7.5, 10, 12.5, 15, 20, 30, 40, 50, 60, 80 and 100mT (peak applied field), with the remanence being measured after each step. From a study of the pilot sample behaviour, an alternating field of 5mT was chosen to provide the optimum removal of the less stable component, leaving the magnetisation of archaeological interest. After partial demagnetisation in this field, sample remanences were re-measured .

RESULTS

The intensity of natural remanent magnetisation was variable, ranging from 16-149 x 10-6 Am2kg, possibly reflecting inhomogeneous firing or varying concentrations of remanence-carrying minerals. All samples had a strong enough magnetisation to be measurable and the strength of magnetisation of all samples was consistent with having been heated. All of the samples subjected to stepwise demagnetisation demonstrated that the magnetisation comprised a single component, which was stable. This indicated that the material retained a magnetic field from the last time of heating. Further magnetic analyses would be required to identify the origin of the magnetisation.

After partial demagnetisation, the archaeomagnetic vectors were well grouped with the exception of three samples that were significantly different from the modal range. On their removal, the small U95 value suggests that the remaining samples all record the same magnetic field. The size of the U95 is within the recommended range for fired structures (Tarling & Dobson 1995).

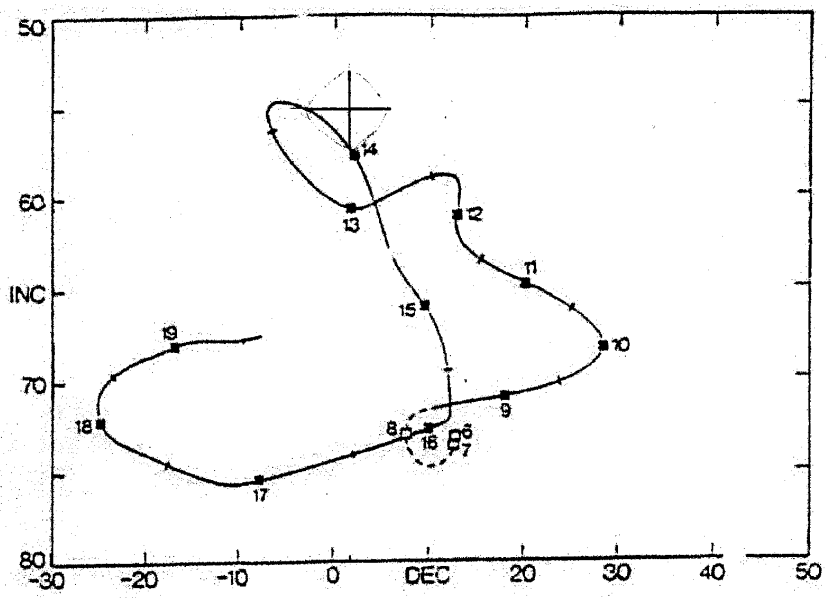
DATING OF MAGNETIC DIRECTION

The mean declination and inclination after demagnetisation for the hearth was corrected to Meriden, the reference locality for the British calibration curve, using the standard method (Noel & Batt 1990). Due to the large change in the directional information on correction to Meriden, the alternative correction was utilised for this site, producing the data recorded in table 21. The corrected mean site direction was then dated by comparison with the Clark calibration curve in the conventional manner, shown in table 20, and the date is given in the table.

On calibration it is clear that the position of this sample on the Clark curve covers a region that is fast moving in both the declination and inclination. This has resulted in a very small age range proposed for the feature. In Archaeomagnetic dating it is often necessary to give multiple possible date ranges as the earth's magnetic field has had the same direction at different times in the past. Where this has occurred it is necessary to rely on archaeological information from the site to discount or accept the possible date ranges. For this site the late 14th-early 15th century AD date is more appropriate.

SUMMARY AND CONCLUSIONS

In conclusion, the samples were readily measurable and appeared to record a stable magnetisation, consistent with previous heating to above the Curie temperature. The magnetic directions obtained were very closely grouped, suggesting the hearth did indeed provide a record of the geomagnetic field at the time of last cooling and not been subject to significant disturbance.



Archaeomagnetic calibration curve for Britain

Figures are 100's of years, BC (-) and AD, ticks indicate half-century points. The declination and inclination scales are in degrees and the data has been normalised to Meriden. The curve above covers AD600-AD1975 and below covers 1000BC-AD600 (after Clark et al, 1988).

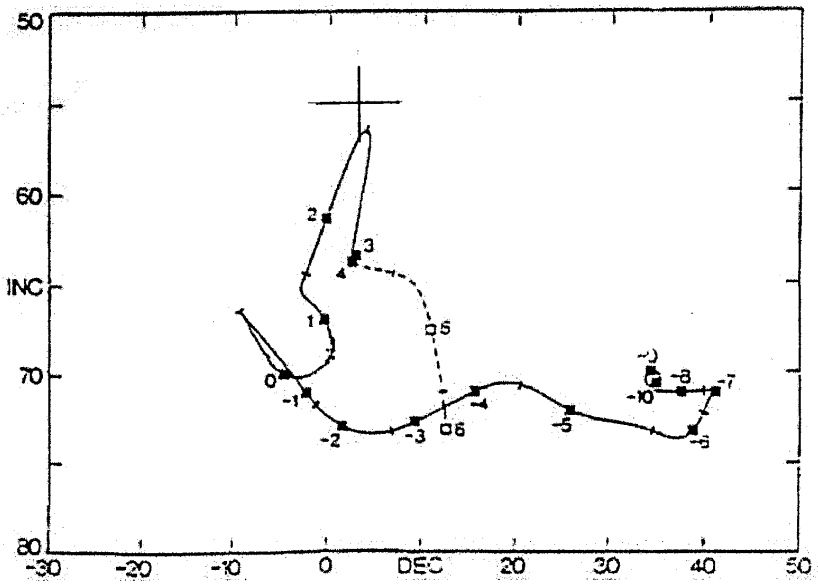


Figure 1: Calibration of Archaeomagnetic sample NHPT03 Car-A

Appendix 4: The Dendrochronology Assessment.

THE DENDROCHRONOLOGY by Ian Tyers

Four samples of timbers excavated from a site at 42-48 Scotch Street, Carlisle, by ARCUS Dendrochronology Laboratory, University of Sheffield was carried out as a dendrochronological assessment.

Preliminary assessment of the samples concluded that all of the samples had some dendrochronological potential. Standard dendrochronological methods (see e.g. English Heritage 1998) were applied to samples (table 21). The tree-ring sequences from three of these were found too cross-match with each other (table 22) and with reference chronologies (table 23, figure 49). It is important to appreciate that although the dendrochronological dates will not change in the future, any of these results are of necessary interim and liable to change, particularly as aspects of re-use and repair are revealed by post-excavation analyses. The other measured sample was not found to cross-match reference chronologies and is undated by the analysis reported here.

Three types of dating result are usually obtained by dendrochronological analysis. Firstly where a sample is complete to bark-edge a precise year of felling is obtained directly from the date of the last ring on the sample, where there is a good survival of this outer ring it is some times possible to assign seasons to the felling period, the principal distinctions are between early spring, early summer and winter.

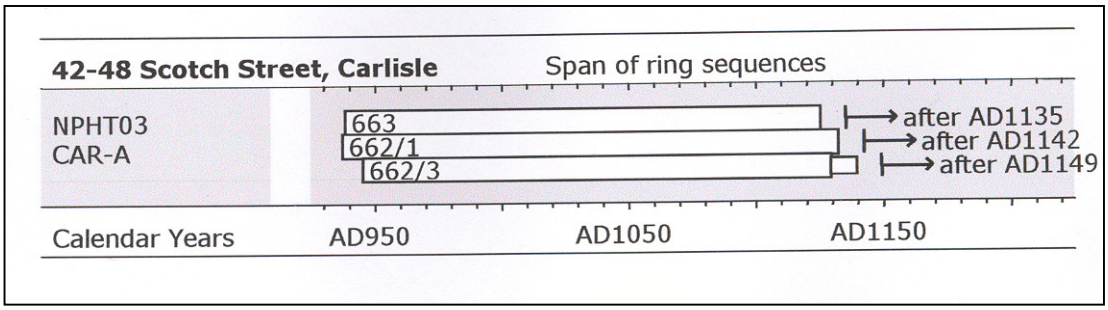
Where the sample has some sapwood, but is not complete to the bark-edge a felling date is obtained by applying the maximum and minimum numbers of rings of sapwood normally seen in oaks for the relevant areas, to the relevant samples. The range 10-46 has been used in this report. Finally, where no sapwood survives a *terminus post quem (tpq)* date is obtained by adding the minimum number of sapwood rings likely to have been lost to the date of the latest surviving ring. This type of date is very much less useful then the two other types since a great number of rings could have been lost either through ancient carpentry practice, or poor site preservation and thus the felling of such material may be considerably later than the tree-ring date.

Results and discussion

Four large timbers were delivered, these were sub-sampled and analysed. The timbers wee subsequently discarded. Three separate timbers with the same context or sample number 662 were assigned arbitrary sub-sample numbers 662/1, 662/2 and 662/3. A summary of the findings is presented in table 21, all the material was identified as oak (*Quercus* ssp*).*

The timbers were all recovered from medieval pits believed to date from 13th/14th century. The relatively tight clustering of the end-dates obtained from the tree-ring analysis may indicate that these timbers derive from only a single period. However it is also possible that several nearly co-eval phases are present that cannot be distinguished due to the absence of sapwood and bark. The most likely interpretation is that the samples are from the second half of the 12th century (the latest sample is 662/3 and this was felled no earlier than AD 1149).

The dated timbers match each other fairly well (table 24) and the sequences correlate well with contemporaneous reference sequences from across northern and central England and Southern Scotland (table 25). However the best correlations are with other material excavated in Carlisle, hence in all probability these trees were originally growing in, or near to, Carlisle.



Bar diagram showing the relative and absolute positions of the dated samples from the earliest possible felling date based on the date of the ring sequence and absence of sapwood.

Sample/ sub-sample	Species	Rings	Sapwood	Growth (Mm/year)	Sequence date	Interpreted Date
662/1	Oak	196	-	1.47	AD937-AD1132	After AD1142
662/2	Oak	82	-	2.27	UNDATED	-
662/3	Oak	185+10	-	0.99	AD945-AD1129	After AD1149
663	Oak	188	-	1.05	AD938-AD1125	After AD1135

Sample details from the 42-48 Scotch Street excavations

KEY: +10 includes additional unmeasurable rings at the outer edge

	662/3	**663**
662/1	*4.83*	*4.71*
662/3		*9.89*

	Scotch St
Cumbria Wasdale Beck log boat (Groves and Tyers unpublished)	**7.21**
Cumbria, Carlisle Annetwell Street (Groves 1990)	**8.65**
Cumbria, Carlisle, Millennium project (author in prep)	**8.61**
Cumbria, Carlisle, 'The Lanes" northern area (Groves 1996)	**13.78**
Cumbria, Carlisle, 'The Lanes' southern area (Groves 1993)	**12.78**
East Midlands regional chronology (Laxton and Litton 1988)	**6.61**
Scotland, South Central regional chronology (Baillie 1977)	**5.67**
Tyne and Wear, Gateshead Bridge (auther unpubl)	**5.70**

Correlation *t*-values (Baillie and Pilcher 1973) between the dated sequences
Correlation *t*-values (Baillie and Pilcher 1973) for the composite sequence '**Scotch St'** constructed from the three datable sequences at their synchronised position and a series of independently dated chronologies from England.

Appendix 5: The Intestinal Parasite Assessment.

ASSESSMENT OF SOIL SAMPLES FOR THEIR POLLEN, INTESTINAL PARASITE EGGS AND OTHER MICROFOSSIL CONTENT by **John Carrott**

Four small sub samples were submitted to Palaeoecology Research Services Limited (PRS), County Durham (table 4). Investigation of their content of pollen, the eggs of intestinal parasitic nematodes and other microfossils were examined. All of the samples were from pit fills, one of Roman date and the remainder from medieval and late medieval cesspits.

Sample number	Context number	Context description
47	474	Fill of late Medieval cesspit. Wet, silty clay with organic inclusions.
71	662	Fill of Medieval cesspit. Black silty soil, rich in organics.
72	672	Fill of Roman pit, dark brown gravelly soil, with charred wood and bone inclusions.
75	678	Fill of late Medieval cesspit. Grey/black clayey silt, rich in organics.

Table 1. Details of samples sent for parasitological analysis.

Pollen grains and/or spores were present in all but one (context 672) of the deposits examined. The remains from contexts 474 and 662 were quite well preserved, whereas those from context 678 were rather fewer in number and often fragmented or crumpled.

Two of the samples (from contexts 474 and 662) contained appreciable numbers of eggs of intestinal parasitic worms indicating a significant faecal component to these deposits. The eggs were almost all of *Trichuris* and were mostly very well preserved, often retaining both polar plugs. Comparison of these eggs (via a few spot measurements) with data for modern trichurids indicated that they were almost certainly of the whipworms of either humans or pigs (or perhaps of both). The low ratio of *Ascaris* to *Trichuris* observed may suggest the faecal content to be of primarily human origin.

A small amount of additional study of the pollen from these deposits is perhaps warranted to investigate the wider landscape. Measurements of those trichurid eggs retaining both polar plugs should allow a determination of the likely source (or sources) of the faecal content of these deposits to be attempted via statistical means.

Methodology: The samples were examined for the eggs of intestinal parasitic nematodes using the 'squash' technique of Dainton (1992). Assessment slides were scanned at 150x magnification with 600x used where necessary. Although primarily for the detection of intestinal parasitic nematode eggs, the 'squash' technique routinely reveals other microfossil remains, and where present these have also been noted.

Results: The results of the investigations to determine the presence/absence and state of preservation of microfossils (in particular pollen and parasite eggs) are presented below in context number order. Archaeological information provided by the excavator is presented in square brackets.

Context 474 [fill of late medieval cess pit] **Sample 47:** The 'squash' was mostly organic detritus, including 'large' fragments of plant tissue with a trace of inorganic material. Sixteen *Trichuris* eggs were noted and one of ?*Ascaris*. The *Trichuris* eggs were very well preserved, with almost half (7) of those seen retaining both polar plugs; all these eggs were measurable. Other microfossils were also present including diatoms (at least 4 forms) and pollen grains/spores and some unidentified fragments of micro-invertebrates. Two live soil nematodes were also seen.

Context 662 [fill of medieval cess pit] **Sample 71:** The 'squash' was mostly organic detritus with some inorganic material. Many pollen grains/spores (including fungal spores), fragments of plant tissue and phytoliths were present, and there were a few diatoms (one type recorded). Twenty-three extremely well preserved *Trichuris* eggs were seen. Thirteen of these eggs retained both polar plugs and were measurable.

Context 672 [fill of Roman pit] **Sample 72:** The 'squash' was mostly inorganic, with a little organic detritus, and a few phytolith fragments and diatoms (one type seen). No eggs of intestinal parasites were noted.

Context 678 [fill of late medieval cess pit] **Sample 75:** The 'squash' was mostly inorganic but with much organic detritus. Some diatoms (of at least two types), fragments of ?phytolith, and a few pollen grains/spores were all present. Preservation of the remains was rather poor, with most of the microfossils being broken or crumpled. No eggs of intestinal parasites were noted.

Discussion and statement of potential: Pollen grains and/or spores were present in all but one (**672**) of the deposits examined. The remains from contexts 474 and 662 were quite well preserved, whereas those from context 678 were rather fewer in number and often fragmented or crumpled. Further investigation of the pollen content of these samples may give some indication of the general vegetative landscape, but narrow interval sampling from column samples would be required to investigate any evidence for changes through time. Two of the samples (**47** and **71** from contexts **474** and **662**, respectively) contained appreciable numbers of eggs of intestinal parasitic worms indicating a significant faecal component to these deposits. The eggs were almost all of *Trichuris* and were mostly very well preserved, often retaining both polar plugs. Comparison of these eggs, via a few spot measurements, with data for modern trichurids (Ash and Orihel 1984; Kassai 1998) indicated that the eggs seen were almost certainly of either *Trichuris trichiura* (Linnaeus) or *T. suis* (Schrank), the whipworms of humans and pigs respectively, or perhaps of both. It is particularly difficult to distinguish these two species purely by visual examination of their eggs, as the normal size range for the eggs of *T. trichiura* is a wholly contained subset of that for *T. suis*.

When, as here, large numbers of measurable trichurid eggs are present, a statistical approach to their identification, or the determination of the presence of more than one population, may be attempted, but this is beyond the constraints of an assessment. Similarly, the eggs of the ascarids *Ascaris lumbricoides* (Linnaeus) and *A. suum* (Goeze), the roundworms of humans and pigs, respectively, (though some parasitologists believe that there is just one species of *Ascaris* that infests both humans and pigs) are morphologically almost identical. Taylor (1955) has remarked (also in relation to medieval remains) that a high ratio of *Ascaris* to *Trichuris* eggs may indicate pig rather than human faeces. Conversely, the low ratio observed here (only a single *Ascaris* egg being identified, and that tentatively, from context 474) may suggest the faecal content to be of primarily human origin. Small quantities of microfossil remains had survived in the other two sub samples examined (**672** and **678**), albeit in rather poor condition, but neither gave any additional intestinal parasite eggs.

Appendix 6: The NMR and SMR Records - various.

63 SCOTCH ST/GLOBE LANE/OLD BUSH LANE

Location

63 SCOTCH ST/GLOBE LANE/OLD BUSH LANE; Carlisle; Carlisle; Cumbria; England
OSGB Grid ref. - NY 401 560
Lat/Lon (OSGB36) - 002 56 02 W 54 53 42 N

Subject type and period

Building, Medieval
Ditch, Roman
Pit, Roman
Post Hole, Roman

Project dates

1981 -

Responsible for Work

Historic Buildings and Monuments Commission

Record maintainer

English Heritage, National Monuments Record

Resource Name

 English Heritage National Monuments Record Index to Microfilmed Archaeological Archives

Depositor's Id No.

3686

Type

Collection

Accessioned

20 Jun, 2002

ADS Record ID - NMRMIC-3686.

Email from Jo Mackintosh, HER officer, Cumbria County Council, regarding SMR 5065 referred to in the main dissertation.

There is no reference to Tom Clare's unpublished report (or anything he may have written up later) in NPA's report. The only reference I have under SMR 5065 is:

T Clare & GGS Richardson, 1976, A Salvage Operation in Scotch Street, Carlisle, unpublished draft report

The reference for Redfearn's work is:

H Redfern, 1921, Notes on a Roman Well discovered in the Courtyard of the Blue Bell Inn, Scotch Street, Carlisle, CWAAS XXI, p253-256

Under 5065 I've also got 'Anon, 1976, In search of the city's past, Evening News And Star, p3' (but no actual copy of the article here), if that's any use.

Regards
Jo

Jo Mackintosh
Historic Environment Records Officer
ENVIRONMENT | Cumbria County Council
County Offices | KENDAL | Cumbria | LA9 4RQ
Tel: 01539 713432 | Fax: 01539 773439
http://www.cumbria.gov.uk/planning-environment/countryside/historic-environment/HER.asp

-----Original Message-----
From: Patricia Shaw [mailto:teeshuk@yahoo.com]

Sent: 17 January 2010 15:01
To: Mackintosh, Jo
Subject: A query arising from SMR record number 5065

Hi Jo

My name is Patricia Shaw and I am doing a research masters with Jacqui Huntley.

Reference is made to Tom Clare carrying out work on 58-62 Scotch Street, Carlisle which remains unpublished but is summarised within SMR 5065.

It also says that Redfearn undertook an earlier rescue excavation at 62 Scotch Street in 1920.

Could you possibly forward me any references held within the SMR concerning these two entries from the Scotch Street assessment report of 2004 by North Pennines Archaeolgy Limited?

Any help would be very much appreciated. Thanks, Trish.

Carlisle SMR and NMR records

SMR	Site Name	Description	NGR(N)	NGR(Y)	Period
5075	Coins Market	Findspot	340300	555700	Roman
5071	English Gate	Findspot & Gate	340180	555590	Roman/Medieval
18951	Fountain, Court Square, Carlisle	Fountain	340220	555560	Post-medieval
19222	Roman Flagon, Botchergate	Findspot	340360	555540	Roman
19811	Slater's Mill, James Street	Cotton Mill	340190	555400	Post-medieval
40709	Auction market, South Henry St	Livestock Market	340600	555500	Post-medieval
40754	Dias' Pawnbrokers, South Henry St	Building	340590	555370	Post-medieval/Modern
40830	10 Botchergate	Iron works	340308	555564	Roman
40831	10 Botchergate	Pit and Well	340300	555555	Medieval
40832	Palace Cinema King Street	Cinema and Social Club	340520	555340	Modern
40833	St. Cuthbert's, Botchergate	Parsonage	340530	555350	Post-medieval
40834	King Street/114-120 Botchergate	Boundary Ditch, Pit	340540	555330	Roman/Medieval
40985	Methodist Chapel, Cecil St	Methodist Chapel	340415	555674	Post-medieval
41005	L & C Railway/ L &NW Railway	Railway	340437	555263	Post-medieval
41028	Collier Lane, Botchergate,	Foundry	340353	555503	Post-medieval
41030	Carrick's Water Gate Lane	Hat Factory	340152	555477	Post-medieval
41031	High Brewery, Water Street	Brewery	340220	555460	Post-medieval
41032	Corporation Mill	Corn Mill	340168	555492	Medieval
41033	Gasworks, Brown's Row	Gas Works	340358	555452	Post-medieval
41034	Recovery House, Collier lane, Botchergate	Infectious Disease Hospital	340403	555400	Post-medieval
41036	Christ Church, Botchergate	Chapel of Ease	340512	555369	Post-medieval
41049	Brick Fields, Upperby, Carlisle	Brickworks	339608	555135	Post-medieval

SMR	Site Name	Description	NGR (N)	NGR (Y)	Period
41062	Congregational Chapel, Cecil Street, Carlisle	Congregational Chapel	340527	555574	Post-medieval
41066	Crown brewery, Crown Street	Brewery	340435	555431	Post-medieval
41070	School of Industry, Botchergate	School	340500	555404	Post-medieval
41074	Waterloo Foundry, James Street	Foundry	340194	555465	Post-medieval
42000	Botchergate Smithy	Blacksmith's Workshop	340556	555399	Post-medieval
42001	Mary Street Smithy	Blacksmith's Workshop	340370	555626	Post-medieval
42002	British School, Mary Street	School	340355	555646	Post-medieval
42003	Dye Works, Botchergate	Dye Works	340425	555459	Post-medieval
42005	Maryport and Carlisle Goods and Coal Depot	Goods Shed, Goods yard, and Railway	340370	555269	Post-medieval
42024	Citadel Station	Railway Station	340254	555504	Post-medieval
42029	London and North Western Railway Goods Station, Crown Street	Goods Station	340445	555286	Post-medieval
41046	Christ Church School for Girls and Infants	School	340480	555377	Post-medieval
40968	Carlisle Tran System	Tran Depot and Tramway	341025	555025	Modern
42031	North Eastern Railway Line	Railway	340617	554995	Post-medieval
42032	Maryport and Carlisle Railway Line	Railway	340514	55478	Post-medieval

ID	LB SMR No	EH Listed Building No	Building Name	NGR (N)	NGR (Y)	Grade Listed
1	25472	386630	Nos. 1-15 (odd), County Hotel, Botchergate	340315	555620	II
2	25475	386632	Nos. 2, 4 and 6, The County Bar, Botchergate	340296	555562	II
3	25536	386632	The Cumbrian Hotel, Court Square	340276	555539	II
4	25473	386633	No. 17, The Caledonian Public House, Botchergate	340328	555599	II
5	25490	386647	No. 10, Larch House, Brunswick Street	340519	555638	II
6	25533	386689	Citadel Station, Court Square	340239	555536	II
7	25534	386690	Detached West Wall of Citadel Station, Court Square	340219	555437	II
8	25535	386691	Midland bank, Court Square	340284	555586	II
9	25563	386722	Crown Court, adjoining offices and gate arch	340212	55617	I
10	25564	386723	Nisi Prius Courthouse, associated offices and gate arch	340250	555669	I
11	25665	386831	No. 15, Portland Square	340594	555664	II
12	25666	386832	Nos. 16-19 (consec), Portland Square	340571	555657	II
13	25488	386833	No. 20, Portland Square	340553	555645	II
14	25667	386834	Nos. 21 and 22 Portland Square	340511	555653	II
15	25668	386835	No. 23 Portland Square	340491	555689	II
16	25669	386836	No. 27 Portland Square	340476	555724	II
17	25670	386837	No. 28 Portland Square	340473	555737	II
18	25671	386838	Wall and railings around central gardens	340589	555694	II
19	25705	386875	Nos. 1-21 (odd), Tait Street	340494	555511	II
20	25612	386878	Nos. 10-30 (Even), Tait Street	340523	555504	II
21	27813	386877	Nos. 25, 27 and 29 Tait Street	340530	555550	II
22	27814	386878	Nos. 32, 34 and 36, Tait Street	340560	555545	II
23	25706	386879	Nos. `-9 (consec),The Crescent,	340304	555664	II
24	25707	386880	Statue of Earl of Lonsdale	340266	555654	II
25	25733	386909	The Crescent Inn, Warwick Road	340302	555709	II
26	25474	479909	No. 22, Cumberland Inn, Botchergate	340343	555535	II
27	27799	495205	Lonsdale Cinema, Warwick Road	340370	555710	II

Appendix

Title	Description	Location	Associated people/organisations	Subject(s)	Period(s)	Intervention(s)	Project dates	Archive contents/location	Bibliographic & other refs	ADS Record ID
CASTLE STREET English Heritage, National Monuments Record - English Heritage National Monuments Record Index to Microfilmed Archaeological Archives		CASTLE STREET, Carlisle, Carlisle, Cumbria, England	Carlisle Archaeological Unit	Building, Building, Inhumation, Pit, Road	Early medieval, Roman, Early medieval, Early medieval, Roman	1981				NMRMIC-4806
BLACKFRIARS STREET English Heritage, National Monuments Record - English Heritage National Monuments Record Index to Microfilmed Archaeological Archives		BLACKFRIARS STREET, Carlisle, Carlisle, Cumbria, England	Carlisle Archaeological Unit	Building, Plough Marks, Road, Vicus	Roman, Prehistoric, Roman, Roman	1977				NMRMIC-4807
63 SCOTCH ST/GLOBE LANE/OLD BUSH LANE English Heritage, National Monuments Record - English Heritage National Monuments Record Index to Microfilmed Archaeological Archives		63 SCOTCH ST/GLOBE LANE/OLD BUSH LANE, Carlisle, Carlisle, Cumbria, England	Historic Buildings and Monuments Commission	Building, Ditch, Pit, Post Hole	Medieval, Roman, Roman, Roman		1981			NMRMIC-3686
CROWN AND ANCHOR LANE English Heritage, National Monuments Record - English Heritage National Monuments Record Index to Microfilmed Archaeological Archives		CROWN AND ANCHOR LANE, Carlisle, Carlisle, Cumbria, England	Carlisle Archaeological Unit, Historic Buildings and Monuments Commission	Pit, Town, Town	Early medieval, Medieval, Roman		1982			NMRMIC-3687
ANNETWELL ST English Heritage, National Monuments Record - English Heritage National Monuments Record Index to Microfilmed Archaeological Archives		ANNETWELL ST, Carlisle, Carlisle, Cumbria, England	Carlisle Archaeological Unit, Historic Buildings and Monuments Commission	Bronze Working Site, Building, Building, Courtyard, Industrial Site, Pit, Plough, Road, Settlement	Roman, Post Medieval, Roman, Roman, Roman, Medieval, Prehistoric, Roman, Roman, Medieval	1975, 1981/86	1973 - 1977			NMRMIC-2406