WESTMINSTER ABBEY SONG SCHOOL RELOCATION PROJECT
NO. 2 THE CLOISTER
WESTMINSTER ABBEY
LONDON
SW1P 3PA

AN ARCHAEOLOGICAL ASSESSMENT

LOCAL PLANNING AUTHORITY: CITY OF WESTMINSTER

PCA REPORT NO: 13198

SITE CODE: WSA14

MARCH 2018

PRE-CONSTRUCT ARCHAEOLOGY

DOCUMENT VERIFICATION

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CITY OF WESTMINSTER

EXCAVATION

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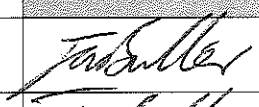
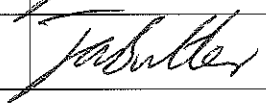
Graphics Checked by:	Jon Butler		March 2018
Project Manager Sign-off:	Jon Butler		March 2018

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An Archaeological Assessment of an Archaeological Excavation for the Westminster Abbey Song School Relocation Project, No. 2 The Cloister, Westminster Abbey, London SW1P 3PA

Site Code:	**WSA14**
Central NGR:	**TQ 3002 7943**
Local Planning Authority:	**City of Westminster**
Planning Reference:	**13/11075/FULL**
Other reference if any:	**13/11076/LBC**
Commissioning Client:	**Westminster Abbey**
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1 ABSTRACT

1.1 Archaeological mitigation works were carried out within the Receiver General's house and garden at No. 2 The Cloister, Westminster Abbey (Figure 1) by Pre-Construct Archaeology Ltd between 10th November 2014 and 19th February 2015.

1.2 The investigation, consisting of an excavation and watching brief, was a consequence of an earlier evaluation that had been carried out in April 2014 (Jorgensen 2014). The work was commissioned by the Dean and Chapter of Westminster Abbey and was necessary to mitigate the impact from the proposed construction, the Westminster Abbey Song School Relocation Project, upon the proven archaeological remains at the site.

1.3 The archaeological work was carried out by Pre-Construct Archaeology under the project management of Chris Mayo with Paw Jorgensen supervising the fieldwork. Professor Warwick Rodwell, OBE, FSA monitored the work on behalf of the Dean and Chapter.

1.4 Natural sand was encountered in the deepest parts of the excavation, the sand being consistent with the Shepperton Gravel Member of the Maidenhead Formation. At its highest point, in the north-east corner of the courtyard, it was recorded at 2.22m OD and in the south-west corner, at its lowest point, it was recorded at 1.90m OD; perhaps indicative of a descent to the south and west.

1.5 The earliest archaeological features on site potentially dated to the Roman period, were a subsoil deposit and two ditches. However, given the scant material evidence it is equally probable that they could be attributed to the 10th-11th century.

1.6 Deposits securely dated to the 10th-11th centuries were interpreted as episodes of land reclamation represented by widespread dump layers followed by the construction of the *Frater* in the late 11th century represented by several wall footings [239].

1.7 Further masonry structures showed the development of the *Frater* into the middle and later medieval periods and some of this activity may be related to the construction of the *Cawagium* above the buttery, potentially including the remains of a staircase.

1.8 A limited amount of activity attributed to the transition between the late medieval and early post-medieval periods was recorded both inside the house and within the garden. Principally these were additional developments to the building followed by demolition deposits resulting from the partial demolition of the *Frater* following the Dissolution of the Monasteries and the construction of new buildings, including a 'dining hall' and a privy, following that event.

1.9 Late post-medieval and modern deposits included further layers of demolition debris derived from the structures in the courtyard being pulled down. Evidence was also seen

for construction works on what became No. 2 The Cloister and re-facing and underpinning of the courtyard wall.

2 INTRODUCTION

2.1 Archaeological mitigation, comprising an excavation and subsequent watching brief, was undertaken by Pre-Construct Archaeology Limited at No. 2 The Cloister, Westminster Abbey between 10th November 2014 and 19th February 2015. The site was centred at National Grid Reference TQ 3002 7943 in the City of Westminster (Figure 1). The site boundaries were defined by the Cloister Walk to Dean's Yard to the north, to the east by buildings forming part of Westminster School, to the south by the *Cellarium* restaurant and to the west by the *Cellarium* Passage. The site was roughly rectangular in shape covering an approximate area of 331m².

2.2 The site at No. 2 The Cloister consisted of the Receiver General's house and garden, the adjacent building was occupied by the Song School and, partially, by the Cloister Walk. Due to a number of other improvement projects at Westminster Abbey the Song School was to be relocated to a new facility. This facility is constructed on the site of the Receiver General's house and garden and involved the installation of a new roof spanning the garden, supported on four pillars with associated localised foundations.

2.3 The site is located within an Area of Special Archaeological Priority as defined by the City of Westminster in their Strategic Policies Map dated January 2013, covering *Lundenwic* and Thorney Island. Westminster Abbey, along with Westminster Palace and St Margaret's Church, is a World Heritage Site (number 426, designated inscription in 1987). The current site is wholly situated within this World Heritage Site. The site also lies within the Westminster Abbey and Parliament Square Conservation Area.

2.4 An archaeological evaluation took place at the site in April 2014, a summary of which was described in a report by PCA (Jorgensen 2014):

The excavation of the five test pits revealed evidence for the medieval development of the site as well as its redevelopment following the Dissolution. The vast majority of the deposits were post-medieval in date and reflected the changing use of the former refectory during the late 16th and 17th century. Evidence for 19th century reconfiguration of the buildings within the site was also seen followed by the establishment of the present courtyard and garden in the 1950s. While the majority of the material recovered was post-medieval in date there was also evidence of medieval alterations to the refectory during the 13th or 14th century. During the investigation the footings of the north and south walls of the 11th-century refectory were also exposed, along with an east-west aligned footing which predated the 11th-century refectory.

2.5 The results of the evaluation led to the design of the archaeological mitigation discussed in this report, which was outlined in the Written Scheme of Investigation (Mayo 2014a).

The objectives of the archaeological mitigation at the site were defined in that document as:

- To determine / confirm the palaeotopography of the site, if possible.
- To determine the presence or absence of prehistoric activity, if possible.
- To determine the presence or absence of Roman activity, if possible.
- To investigate and understand the function of the possibly pre-11th-century wall footing exposed in Test Pit 2.
- To further expose the structural remains relating to the 11th-century *Frater* as found in Test Pits 1-3, and further investigate their construction, use, disuse and demolition.
- To fully investigate other medieval remains such as surfaces, deposits and cut features.
- To fully investigate the form, function and date of post-medieval activity within the yard.
- To further investigate the activity associated with the post-medieval 'dining-room'.
- To investigate / record all archaeological remains and deposits within the impact-zone of the proposed development.
- To establish the extent of past post-depositional impacts on the archaeological resource

2.6 The archaeological excavation was conducted by Pre-Construct Archaeology Limited under the project management of Chris Mayo with Paw Jorgensen supervising the fieldwork. The archaeological work was commissioned by Westminster Abbey and monitored by Professor Warwick Rodwell, OBE, FSA on behalf of the Dean and Chapter of Westminster Abbey.

2.7 The site was recorded under the unique site code WSA14, issued by the Museum of London. The completed archive comprising written, drawn and photographic records will, upon completion of the project, be deposited with the Westminster Abbey Museum under that code.

01/03/18 JB

Figure 1
Site Location
1:10,000 at A4

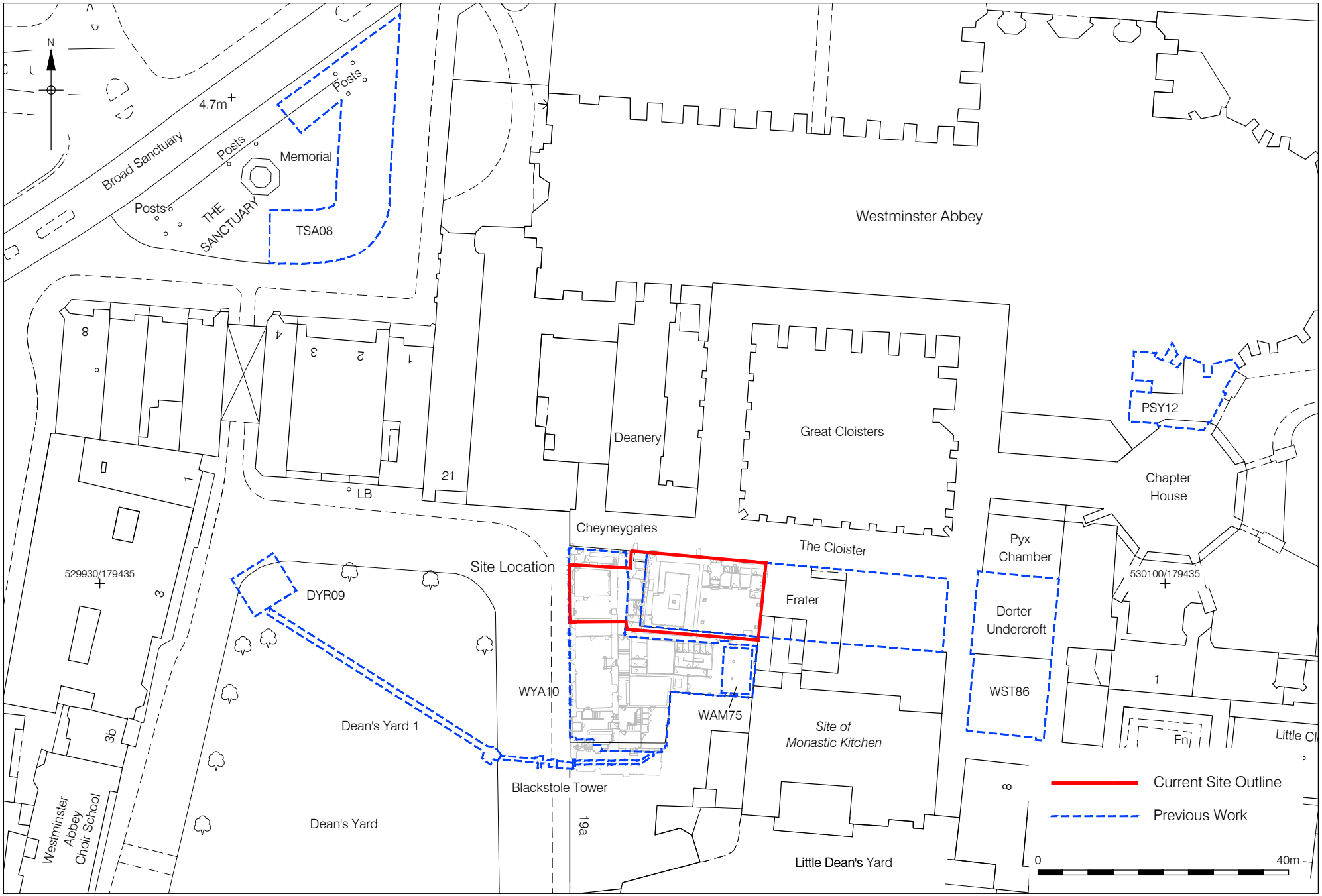

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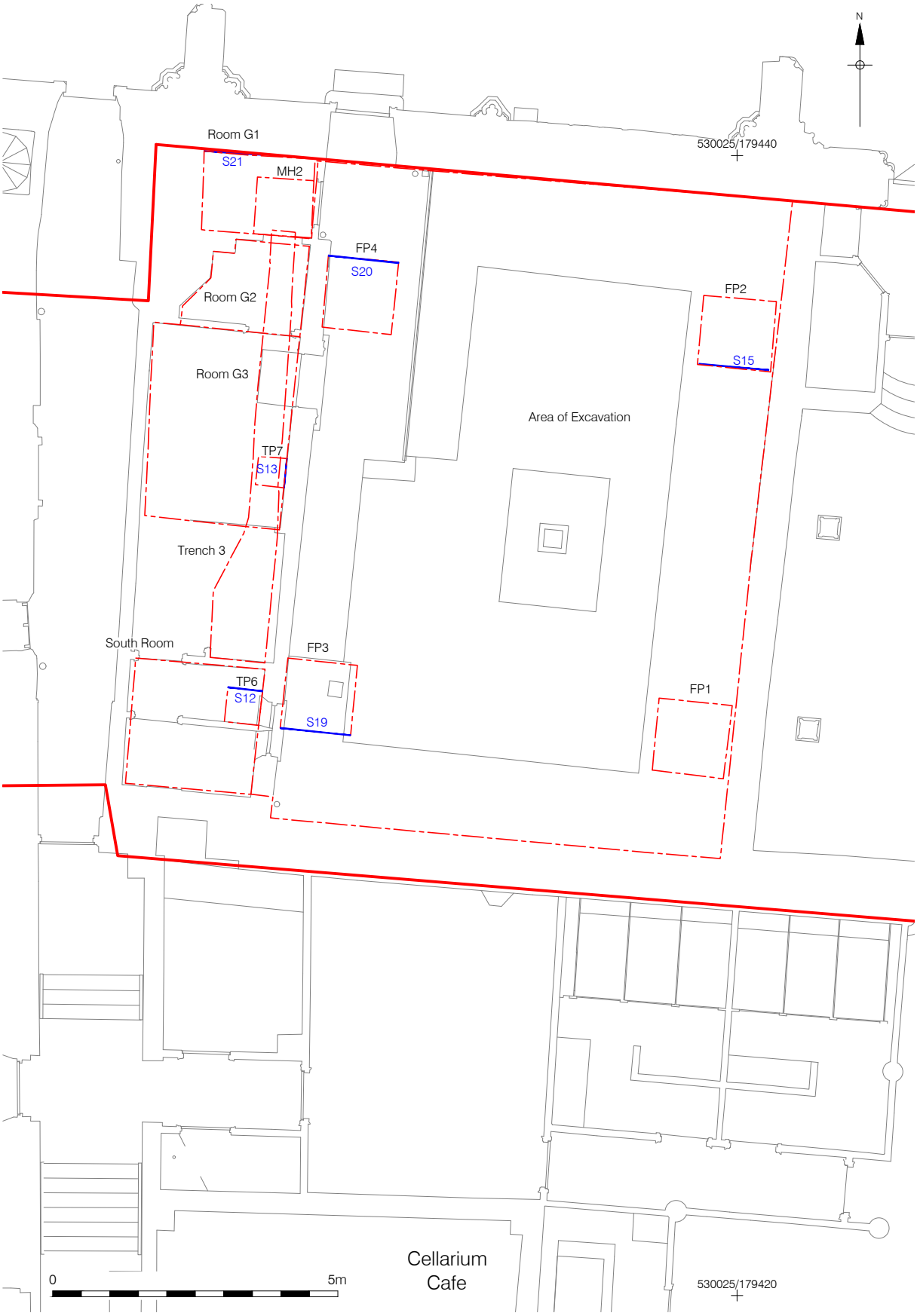
Figure 2
Detailed Site Location
1:800 at A4



Building survey supplied by The Downland Partnership Ltd

01/02/18 JB

Figure 3
Trench Location
1:100 at A4

3 PLANNING BACKGROUND

3.1 Introduction

3.1.1 A planning application was submitted on 5th November 2013 seeking permission to convert the Receiver General's residence at No. 2 The Cloister into a new song school for the Westminster Abbey choir and to convert the old song school into new public toilets. These two properties are adjacent and occupy the west end of the 11th-century *Frater* as well as the first and second stories of the north end of the 14th-century *Cellarium*.

3.1.2 No. 2 The Cloister itself is a Grade I Listed Building and lies within an Area of Special Archaeological Priority as defined by the City of Westminster in their Strategic Policies Map dated January 2013; the Westminster Abbey and Parliament Square Conservation Area and the World Heritage Site encompassing the Palace of Westminster, Westminster Abbey and St Margaret's Church (No. 426, designated inscription in 1987).

3.1.3 Planning permission (13/11075/FULL) and Listed Building Consent (13/11076/LBC) were granted on 31 January 2014. These were dependent on the adherence to certain conditions, several of which pertain to the preservation of the archaeological and architectural heritage values of the site.

3.2 National Planning Policy

3.2.1 The National Planning Policy Framework (NPPF) was adopted on March 27th 2012, and constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.

3.2.2 In considering any planning application for development the local planning authority will be guided by the policy framework set by the NPPF, by current local plan policy and by other material considerations.

3.3 Westminster City Plan: Strategic Policies

3.3.1 Developed in order to ensure consistency with the National Planning Policy Framework (NPPF) Westminster's City Plan, adopted November 2013, forms the key policy document for determining planning applications in Westminster. It outlines the planning policies for the city, including particulars relating to the historic environment. The policy relevant to the current study is S25; which is presented below:

POLICY S25 HERITAGE

Recognising Westminster's wider historic environment, its extensive heritage assets will be conserved, including its listed buildings, conservation areas, Westminster's World

Heritage Site, its historic parks including five Royal Parks, squares, gardens and other open spaces, their settings, and its archaeological heritage. Historic and other important buildings should be upgraded sensitively, to improve their environmental performance and make them easily accessible.

Reasoned Justification

The intrinsic value of Westminster's high quality and significant historic environment is one of its greatest assets. To compete effectively with other major, world-class cities the built environment must be respected and refurbished sensitively as appropriate. Any change should not detract from the existing qualities of the environment, which makes the city such an attractive and valued location for residents, businesses and visitors.

Detailed policies for each type of heritage asset will be set out in the City Management Plan. Area-based characteristics and detailed measures required to protect and enhance heritage assets have been set out in Conservation Area Audit Supplementary Planning Documents and the Westminster World Heritage Site Management Plan.

3.4 **Local Policy: City of Westminster Unitary Development Plan**

3.4.1 The Westminster Unitary Development Plan (UPD), which was adopted on 24th January 2007, sets out planning policies for developing land, improving transport and protecting the environment.

3.4.2 Chapter 10 of the UDP contains policies pertaining to urban design and conservation, of these policies Policy DES 11 specifically relates to Scheduled Ancient Monuments and areas and sites of archaeological priority and potential and Policy DES 16 pertains to the World Heritage Site consisting of the Palace of Westminster and Westminster Abbey including St Margaret's Church.

DES 11: SCHEDULED ANCIENT MONUMENTS, AREAS AND SITES OF ARCHAEOLOGICAL PRIORITY AND POTENTIAL

Aim

10.147 To identify archaeological remains of national and local importance, conserve them in their settings, and provide public access to them. Where new development is proposed on sites of archaeological potential, to ensure adequate archaeological impact assessment, followed by appropriate provision for preservation or investigation, recording, and publication.

(A) Scheduled Ancient Monuments

Permission for proposals affecting the following Scheduled Ancient

Monuments, or their settings, will be granted providing that their archaeological value and interest is preserved:

1) the Chapter House and Pyx Chamber in the Cloisters, Westminster Abbey

2) the Jewel Tower.

(B) Areas and Sites of Special Archaeological Priority and Potential

Permission will be granted for developments where, in order of priority:

1) all archaeological remains of national importance are preserved in situ

2) remains of local archaeological value are properly, evaluated and, where practicable, preserved in situ

3) if the preservation of archaeological remains in situ is inappropriate, provision is made for full investigation, recording and an appropriate level of publication by a reputable investigating body.

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Policy application

10.148 There are three categories of archaeological remains. In order of importance they are:

a) Scheduled Ancient Monuments: nationally important remains which are scheduled under the Ancient Monuments and Archaeological Areas Act 1979

b) Areas of Special Archaeological Priority: areas rich in archaeological remains, where ground works are likely to reveal archaeological remains

c) Sites of Archaeological Significance and Potential: areas where archaeological remains are known or thought likely to exist.

10.149 These locations are listed in the Sites and Monuments Record maintained by English Heritage. The Areas of Special Archaeological Priority are Lundenwic and Thorney Island; Paddington and Lillestone Villages; Marylebone Village; Tyburn Settlement and Ebury Village. The archaeological data produced by the Museum of London and English Heritage provide more detailed information, including further sites and areas of archaeological significance and potential within Westminster. Areas of Special Archaeological Priority are illustrated on Maps 10.3-10.7. Information on these and other sites of archaeological priority and potential are available from the Greater London sites and monuments record

maintained by English Heritage.

10.150 In considering applications for development of land with archaeological potential, the City Council will require an archaeological assessment detailing the potential impact of development upon surviving archaeological remains. Should archaeological evaluation and investigations be required, it must be undertaken in accordance with a written scheme of investigation approved by the City Council. The Greater London Archaeology Advisory Service provides guidance papers detailing these procedures. With respect to policy DES 11 B (3), investigation may include a watching brief and, or, a full excavation.

10.151 The City Council will seek professional archaeological advice as appropriate and will encourage applicants proposing development to do the same. Where development may affect land of archaeological priority or potential, the City Council will expect applicants to have properly assessed and planned for the archaeological implications of their proposals. In this way the Council and the applicant will have sufficient information upon which an informed planning decision, incorporating appropriate archaeological safeguards, may be based. Such safeguards normally consist of design measures to ensure the permanent preservation of archaeological remains in situ or, where that is not appropriate, archaeological rescue investigations in advance of development. The results and finds from archaeological investigations also need to be analysed, interpreted, presented to the public and curated for future use. Attention is drawn to the advice contained within the code of practice prepared by the British Archaeologists' and Developers Liaison Group.

Reasons

10.152 Archaeological remains are important evidence of the City's past and are a valuable historical, educational and tourist resource. They are finite and fragile; once lost, they cannot be recovered. The City Council considers that the archaeology of Westminster is a national as well as a local asset and that its preservation is a legitimate objective, against which the needs of development must be carefully balanced and assessed. The destruction of such remains should be avoided wherever possible and should never take place without prior archaeological excavation and record.

10.153 The most important archaeological remains are scheduled and are protected under the Ancient Monuments and Archaeological Areas Act 1979. Where works to such sites and their setting are proposed, including repair, scheduled ancient monument consent is required.

10.154 The London Plan states at Policy 4.C.10 that boroughs "should give careful consideration to the relationship between new development and the historic environment including archaeological areas, including tidal foreshores…". National planning guidance is set out in PPG16: Archaeology and Planning, issued in November 1990.

10.155 The preservation of Westminster's archaeological heritage is a material planning consideration and applicants will need to show that proposed development is compatible with the objectives of the City Council's archaeological policy. The Council will wish to implement that policy under relevant legislation and statutory guidance and by means of legal agreements and planning conditions.

DES 16: WORLD HERITAGE SITE

Aim

10.188 To safeguard the World Heritage Site.

Permission will only be granted for developments that protect and conserve the character, appearance, setting and ecological value of the World Heritage Site

Policy application

10.189 Although no additional statutory controls follow from the designation of a World Heritage Site, PPG15: Planning and the Historic Environment states, in paragraph 2.22, that the designation highlights the outstanding international importance of the site which should be a key material consideration to take into account when determining planning and listed building consent applications. Great weight is placed upon the need to protect them for future generations. Development proposals affecting these sites or their settings need to be compatible with this objective and require careful scrutiny, often by way of formal environmental assessments, to ensure that their immediate and long term impact are fully evaluated.

Reason

10.190 The member states of United Nations Educational Scientific and Cultural Organisation UNESCO adopted the Convention concerning the Protection of World Cultural and Natural Heritage in 1972. This Convention provided for the creation of the World Heritage Committee which, in 1987, inscribed the area formed by the Palace of

Westminster, St Margaret's and Westminster Abbey as a World Heritage Site, now one of twenty-six in the United Kingdom. This area has thus been recognised as being of 'outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view'

3.5 **Site Specific Background**

3.5.1 On 31st January 2014 Westminster City Council granted Permission for Development (Conditional) to Ptolemy Dean Architects Ltd for the proposed conversion of the Abbey Song School in order to relocate public lavatories and the conversion of the existing Receiver General's house at No. 2 The Cloisters to accommodate the relocated Abbey Song School including the erection of an infill extension within the existing garden area (Application No. 13/11075/FULL). Planning permission was granted subject to a number of conditions including the requirement for archaeological investigation prior to the commencement of the redevelopment (Condition 3):

Condition 3: Pre Commencement Condition

No development shall take place until the applicant (or their heirs and successors in title) has secured the implementation of a programme of archaeological investigation in accordance with a Written Scheme of Investigation which has been submitted by the applicant and approved in writing by the local planning authority. No development shall take place other than in accordance with the Written Scheme of Investigation.

Reason:

To protect the archaeological heritage of the City of Westminster as set out in S25 of Westminster's City Plan: Strategic Policies adopted November 2013 and DES 11 of our Unitary Development Plan that we adopted in January 2007. (R32BC)

3.5.2 In accordance with Condition 3 of the planning permission a Written Scheme of Investigation for an Archaeological Evaluation was prepared by Chris Mayo (2014b) of Pre-Construct Archaeology Ltd and approved by both the Consultant Archaeologist to Westminster Abbey, Professor Warwick Rodwell, and the Archaeology Advisor to the City of Westminster, Dr Jane Sidell of English Heritage. The preparation of the WSI was guided by a briefing document prepared by Professor Warwick Rodwell (2013).

3.5.3 The archaeological evaluation took place in April 2013 during which proven archaeological deposits and features of various periods were encountered thereby demonstrating the need for further archaeological mitigation. A second Written Scheme of Investigation was prepared by Chris Mayo (2014a) and was again approved by Professor Rodwell and Dr Sidell.

4 GEOLOGY AND TOPOGRAPHY

4.1 Geology

4.1.2 The site is located on what used to be Thorney Island, the largest and probably the highest of the islands within the Tyburn delta. The island was located at the confluence of the Tyburn and the Thames rivers. Geologically Thorney Island consisted primarily of sand and gravel overlying London Clay (Thomas *et al.* 2006). It has recently been suggested that it may have been an island within the tidal Thames (Donovan 2016).

4.2 Topography

4.2.2 It is likely that the church occupied the highest point of the former island. This is somewhat corroborated by the levels of the natural sand deposits observed in recent years through archaeological work carried out within the abbey precincts.

4.2.3 While natural deposits were not recorded during the earlier archaeological evaluation within the Receiver General's garden previous archaeological work carried out in the *Cellarium*, to the immediate south and west of the site, and the north-west corner of Dean's Yard has encountered natural sand at maximum heights of 1.35m OD (Jorgensen 2014) and 0.92m OD (Jorgensen 2010; 2015) respectively.

4.2.4 The site is located on generally level ground at an elevation of approximately 4.06m OD.

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

5.1 Palaeoenvironmental

5.1.1 The natural sedimentary depositional sequence in the vicinity of the site has a complex recent geological history stretching back 6000-7000 years, the upper stratigraphy of the basal geology having been formed by alluvial deposition. The early Holocene sequence was characterised by channel margin deposition and the formation of palaeochannel dune systems. The meandering stream of the River Tyburn divided into two branches forming a tripartite division of the land near its confluence with the River Thames. Deposition of sand and gravel between the two branches of the stream commenced around 4350 cal. BP and led to the formation of a riverine dune system known as the Thorney Sand Bed (Sidell *et al.* 2000). This area of firm ground amidst the marshland in the Tyburn delta later became known as Thorney Island (De Maré 1968) on which the current study site is located. Revisions to his model have recently been proposed suggesting that the formation of Thorney Island between two channels of the Tyburn is based on a misinterpretation of the map evidence and is no longer valid and that the island is in fact within the tidal Thames (Donovan 2016).

5.1.2 By the beginning of the Bronze Age the higher ground of the island had become dominated by lime forest, which was later replaced by oak-dominated woodland with hazel, whilst lower-lying areas around the periphery of the island were dominated by alder and sedge vegetation. Deforestation of the island occurred sometime during the Early Bronze Age with evidence for arable cultivation appearing shortly thereafter (Thomas *et al*. 2006).

5.2 Prehistoric

5.2.1 An archaeological excavation carried out by Pre-Construct Archaeology during 2009 towards the north of Dean's Yard, recovered a struck flint of Late Neolithic/Early Bronze Age date (Jorgensen 2010). Archaeological investigations undertaken prior to the extension of the Jubilee Line between 1991 and 1998 revealed evidence for Bronze Age activity along the east side of Thorney Island in the form of a timber revetment along the river as well as possible boundary fences. Environmental data collected during investigation in the 1990s indicated the presence of cereal pollen, suggesting arable cultivation in the vicinity during this period. Although there may have been significant human activity on the island from the Late Neolithic and through much of the Early Bronze Age, there appears to have been a much-reduced presence by the later Bronze Age (Thomas *et al*. 2006).

5.2.2 Evidence for Iron Age occupation is limited and has almost exclusively been recorded in the more elevated areas of the island. It has been suggested that this may have been

due to a major flooding event during the middle of the 11th century AD, which resulted in extensive truncation of Late Bronze Age, Iron Age and Roman deposits along the peripheral areas of Thorney Island (Thomas *et al.* 2006). However, the 2009 excavation in Dean's Yard revealed a single pit that contained a small assemblage of Late Iron Age and early Roman pottery (Jorgensen 2010).

5.3 **Roman**

5.3.1 The Roman settlement of *Londinium* was centred upon the modern day City of London, some distance to the east of Westminster. Whilst no definite Roman features have been recorded during excavations on the former island, artefacts dating to this period have been recovered from a number of excavation sites. In the vicinity of the Abbey itself a number of antiquarian discoveries have been reported including a Roman sarcophagus found on the north side of the Abbey (Poole 1870). Although the sarcophagus itself was probably of Roman origin, it is likely that it was brought to the island and reused during the Saxon period.

5.3.2 Part of a Roman hypocaust and walls are reported to have been observed below the floor of the nave of the Abbey church and two fragments of Roman concrete floor have been recorded near the south side of the cloister and infirmary cloister (Thomas *et al.* 2006). Some accounts of the origins of Westminster Abbey claim that a temple dedicated to Apollo was constructed on Thorney Island in the 2nd century AD., and when it was destroyed by a violent earthquake, King Lucius built the island's first church in its place (Morley 1890). However, no archaeological evidence exists to substantiate these suggestions.

5.4 **Anglo-Saxon**

5.4.1 The main Saxon settlement of *Lundenwic* was focussed on the area between present day Charing Cross and Aldwych to the north-east of the site. During the late Saxon period Thorney Island became an important religious centre. This is reflected by the place name 'Westminster', which derives from the Saxon word 'minster', referring to either the monastery church built on the island by Edward the Confessor or an earlier church on the site. It was consecrated prior to the Norman invasion of 1066.

5.4.2 One of the earliest references to a church derives from Offa's Charter, *c.* AD 785, which refers to *St Peter and the people of the Lord dwelling in Thornea at the awesome place called Westminster* (Barton 1992). The authenticity of this charter has been brought into question by various 20th-century scholars and it seems likely that it is a later forgery.

5.4.3 It is more likely that the foundation of the abbey dates to the reign of King Edgar (AD 959-75) who granted a foundation charter to St Dunstan. The church founded by St

Dunstan was described as a *monasteriolum,* or little monastery, and was inhabited by twelve monks and an abbot (Thomas *et al.* 2006).

5.4.4 Under Edward the Confessor the abbey was refounded and a new church built in stone to replace the earlier building. The anonymous 11th-century biographer of the Confessor stated in *Vita Ædwardi* that Edward's motives for founding a great Abbey church at Westminster were not only in his piety and devotion to St Peter, the favourable location of the place, on the river and close to London, but principally because he wished for himself to be buried there (Field 1996).

5.4.5 Work on the new church commenced in 1045 and, although not completed in its entirety, was consecrated in December 1065. *Vita Ædwardi* states that the new church was built far enough to the east of the existing one to enable services to continue in it; whilst Sulcard in his History of Westminster (written in the 11th century) states that the old church was demolished to make room for the new (Field 1996).

5.4.6 Limited archaeological evidence for a presence during the Saxon period has been found within the vicinity of the site, including land reclamation deposits of Saxon date along with a contemporary partial donkey skeleton identified during investigations at 17 Dean's Yard (Murray 2003). Residual Saxon pottery was also recovered during the 2009 excavation towards the north of Dean's Yard (Jorgensen 2010). A recent excavation within the *Cellarium* and adjacent spaces uncovered the remains of a late 10th or early 11th-century chalk block wall (Jorgensen 2014).

5.5 **Medieval**

5.5.1 In the early medieval period, the pre-established seats of government and law were retained by the Norman Kings in an attempt to legitimise their claims to the throne. The Palace of Westminster, largely built by Edward the Confessor, was to remain the legislative centre and residence for over 500 years (De Maré 1968).

5.5.2 The flow of the Tyburn was heavily impacted upon in 1236 when, on the request of Henry III and the Lord Mayor, a conduit was installed by Tyburn Springs to ensure a supply of clean water to the growing population of the city. While it is unclear exactly how much this impacted on the flow of the river it has been suggested that the stream was reduced to a mere trickle as a result of the piping of the springs (Barton 1992).

5.5.3 Following his return from visits to France in 1242 and 1243, Henry III embarked on an ambitious mission to rebuild Westminster Abbey as a rival to the great abbeys and churches of France. With the assistance of Master Henry of Reynes, the newly appointed Master of the King's Masons, the task of demolishing the old Romanesque church began (Field 1996).

5.5.4 By the time of the king's death in 1272 the work of rebuilding the abbey had not been completed although the unfinished church had been consecrated in 1269. The church was described as 'fully finished to the end of the quire' in 1285 (Field 1996).

5.5.5 On March 29th 1298 a chimney fire at the Palace of Westminster spread and consumed several of the buildings within the monastic precinct next to the palace. The damage caused by the conflagration was outlined in a note in the calendar of St Mary's Southwark. It lists the buildings affected by the fire as the *Dorter*, *Frater* (refectory), *Cellarium* and infirmary of the monastery. Eight years after the fire, in the later part of 1306, the *Frater* was finally being roofed. The fact that eight years transpired before the repairs to the refectory were complete suggests that the damage to the building was severe (Rackham 1910). While the damage to the *Frater* must have been severe it must have been restricted to the upper of the building as is evident by the survival of Romanesque arcading at ground floor level on the interior of the north wall of the building (Robinson 1911). Following the fire work on the nave of Henry III's new church was halted and funding and manpower were instead diverted to the rebuilding of the damaged claustral buildings (Bond 1909).

5.5.6 Following the fire the royal household of Edward I was moved to York for the duration of the rebuilding of the palace on Thorney Island. During the King's absence the integrity of the inhabitants of the monastery was brought into question when the Royal Treasury at the Abbey was burgled. Even prior to the fire Edward had started to divert his attention, and funds, towards St Stephen's Chapel in Westminster Palace and the burglary of 1303 resulted in a further reduction of royal support for the rebuilding of the Abbey (Field 1996).

5.5.7 Work on the ancillary buildings progressed slowly until the later part of the 14th century when a "great fortune" was bequeathed to the Abbey by Cardinal Langham. Even though the money had been intended to aid the completion of the nave, Abbot Litlyngton directed a significant portion of it towards finishing the rebuilding of the auxiliary buildings (Bond 1909).

5.5.8 Documentary evidence from the middle of the 14th century, possibly the 1340s, suggest that the upper storey of the western end served as the *Cawagium*, a dining room where meat could be consumed (Harvey 1993, 41). Like the *Misericorde*, the *Cawagium* existed to allow for a relaxation of the prescribed diet of the Benedictine rule. A similar arrangement existed at Durham, where the west end of the refectory was partitioned off to form a buttery above which was a room known as the *lofte* where meat was served to the monks for their daily meals (Fowler 1903, 86-87).

5.5.9 The *Frater* underwent further alterations during Abbot Litlyngton's tenure. This included increasing the height of the building (Bond 1909), although this work may have been

carried out when the building was repaired after the fire. Rackham (1910) suggested that the surviving tracery of the windows set high in the north wall of the building predate Litlyngton's time and that they are more likely to be a result of the repairs carried out between 1298 and 1306. Rackham does, however, attribute the corbels within the building to Litlyngton, suggesting that the later work involved the reroofing of the *Frater.*

5.5.10 An archaeological watching brief carried out by Pre-Construct Archaeology in The Sanctuary during 2008 revealed walls apparently associated with medieval buildings including the Chapter Clerk's dwelling and the Bishop of London's prison. Several pits and a palaeochannel of medieval date were also recorded (Jorgensen 2008). Further features of medieval date were recorded during the 2009 excavation in Dean's Yard (Jorgensen 2010; 2015). Investigations by PCA in the area of the *Cellarium* and *Misericorde* of Westminster Abbey, immediately east of Dean's Yard have revealed well-stratified medieval deposits, including walls of 11th-13th-century date (Jorgensen 2014). Three 11th-12th-century grave cuts along with other medieval features were recorded initially during an archaeological evaluation carried out by PCA in Poet's Corner Yard to the south-east of the abbey church (Jorgensen 2012), whilst the excavation in the same area uncovered many more.

5.6 **Post-Medieval**

5.6.1 By 1528 the work that Henry III had started nearly three centuries earlier was finally completed with the carving of the screens. Only twelve years later, as a result of the Dissolution of the Monasteries, the deed surrendering the abbey to the crown was drawn up (Bradley 1895).

5.6.2 Following the dissolution of the monastery the precinct was divided up into several properties. By 1544 the area to the south of the great cloister, including the *Misericorde* and the convent kitchen became the property of the Dean while the area to the west of the great cloisters became the property of the newly appointed Bishop of Westminster. This latter property included the Cheyneygates estate (which had been the Abbot's residence), the *Cellarium* and the yard between the *Cellarium* and the *Misericorde*. Four years later, in 1548 the ground within the Dean was granted the ground within the former refectory to the augmentation of his garden (Robinson 1911).

5.6.3 By the time the ground within the *Frater* was given to the Dean in 1548 the building had already been partially demolished. The order to take down the *Frater* had been issued on 5 November 1544 when it was *...agreyd bi master Deaine and the chapiter that Guy Gasken, servant unto the said deaine and chapter shall forthwith in all hast for the awoiding of ferther inconveniences take downe the frater howse...* (Knighton 1997).

5.6.4 The bishopric of Westminster only lasted ten years and was abolished in 1550. When the bishopric was dissolved the property held by the Bishop of Westminster was granted to

Lord Wentworth. Lord Wentworth died the following year where after the house was bequeathed to his son, the second Lord Wentworth. However, during the reign of Mary the monastery was briefly reestablished and the property occupied by Lord Wentworth was given to Abbot Feckenham for his residence (Robinson 1911).

5.6.5 Historic maps dated as early as 1719 show that the west end of the former *Frater* consisted of three ranges of buildings surrounding an open courtyard. By 1849 a fourth range had been added within the southern part of the courtyard. The site appears to have been at least partially redeveloped by 1852. A plan dated to this year shows that the range to the north had been enlarged to further encroach on the open courtyard (WAM(P) 150). The plan identifies this new larger building, which occupied the north-east corner of the site, as a dining room. In the 1950s the site was cleared of buildings, with the exception of the one along the west side and it took up its current function as a courtyard and garden (Ptolemy Dean Architects 2013).

5.6.6 The archaeological mitigation detailed within this report was a result of an archaeological evaluation by PCA earlier in 2014 (Jorgensen 2014). The investigation consisted of five test pits that revealed evidence for the medieval development of the site as well as its redevelopment following the Dissolution. The vast majority of the deposits were post-medieval in date and reflected the changing use of the former refectory during the late 16th and 17th century. Evidence for 19th-century reconfiguration of the buildings within the site was also seen followed by the establishment of the present courtyard and garden in the 1950s. While the majority of the material recovered was post-medieval in date there was also evidence of medieval alterations to the refectory during the 13th or 14th century. During the investigation the footings of the north and south walls of the 11th-century refectory were also exposed, along with an east-west aligned footing which predated the 11th-century refectory.

6 ARCHAEOLOGICAL METHODOLOGY

6.1 The design for the archaeological excavation and subsequent watching brief was outlined in the Written Scheme of Investigation (Mayo 2014a) and was derived and developed from a brief for the works produced by the Consultant Archaeologist to Westminster Abbey (Rodwell 2013).

6.2 Initially all vegetation within the garden was removed both from the site and the enclosing walls, as were the paving, the soil from the raised beds, the fountain, railings and all other garden features. In order to ensure that no archaeological deposits were impacted during these activities the work was monitored by an archaeologist.

6.3 Following the removal of the garden elements the now exposed lower parts of the garden's enclosing walls were cleaned with brushes. Having achieved this the Downland Partnership were then able to survey the standing walls to their full height. The survey comprised scale drawings showing outlines and principal features in each wall and a full set of rectified colour photographs.

6.4 With the survey having been completed it was possible to archaeologically excavate the garden by hand. The excavation was designed to accomplish specific tasks, principally lowering the ground level of the garden and excavation of foundation pits.

6.5 The ground level in the garden was reduced by a depth of approximately 0.40m across the area to the required formation level of 3.35m OD.

6.6 Excavation of the four foundation pits (Foundation Pits 1-4) resulted in trenches of the following sizes:

Found. Pit	Grid Square	Length (m)	Width (m)	Depth (m)	Level base of foundation pit (m OD)
1	105/100	1.20	1.20	1.60	1.73
2	105/105	1.18	1.24	1.53	1.89
3	95/100	1.22	1.20	1.72	1.57
4	95/105	1.26	1.22	1.90	1.48

6.7 In addition to the ground reduction and excavation in the garden various archaeological investigations took place within the Receiver General's house itself, specifically watching briefs on building works in the following areas of the house:

- Manhole (MH2) in Room G1 on the ground floor.
- Works in Rooms G2 and G3 including Trench 3 and Test Pit 7 on the ground floor.

- Works in the South Room including Test Pit 6 on the ground floor.
- Floor board removal in Room F6 on the first floor.

6.8 As the excavation and the watching brief progressed all deposits were recorded on *pro forma* context sheets. Plans were drawn at a scale of 1:20 and sections at a scale of 1:10. A digital photographic record was also kept of all archaeological investigations.

6.9 Temporary benchmarks were established on site at a height of 4.06m OD within the garden and +4.08m OD within the ground floor of the Receiver General's house for levelling purposes.

6.10 The trench was located to the OS grid by means of measurement from fixed points derived from a survey of the site.

6.11 The complete archive produced during the evaluation and excavation, comprising written, drawn, photographic records and artefacts will be deposited with the Westminster Abbey Museum, identified by site code WSA14.

7 PHASED ARCHAEOLOGICAL SEQUENCE

7.1 Phase 1: Natural

7.1.1 The earliest deposit found on site was naturally deposited loose, yellowish brown silty sand with moderate small sub-angular and rounded pebbles. Natural sand was recorded as [173] in Foundation Pit 1, [117] in Foundation Pit [2], [196] in Foundation Pit [3] and [227] in Foundation Pit 4 (Figure 9 Sections 15, 19 & 20). The table below summarises the heights that the natural sand was encountered at in each of the Foundation Pits:

Context no.	Foundation Pit	Maximum height (m OD)	Minimum height (m OD)
117	2	2.22	2.14
173	1	2.06	1.72
196	3	1.90	1.85
227	4	1.97	1.49

7.1.2 The relative heights natural sand was encountered at may indicate a slight sloping of the ground to the south and west, however it should be noted that the sand deposits in Foundation Pits 1, 3 and 4 had all been truncated by later activities making this assertion currently tenuous.

7.2 Phase 2: Possible Roman (Figure 4)

7.2.1 Sealing natural sand and gravel [173] in Foundation Pit 1 was a 0.08m thick layer of fairly loose, mid reddish brown silty sand with occasional sub-angular pebbles [168].

7.2.2 Truncating interface deposit [168] was an east-west orientated ditch [167] filled with fairly loose, dark yellow brown silty sand and occasional small sub-angular pebbles [166]. A single sherd of pottery of a very pale pink sandy fabric from the neck of a jar dated to AD 50-400 and a fragment of brick from AD 55-160 was recovered from fill [166].

7.2.3 Similarly within Foundation Pit 3 natural sand and gravel [196] was cut by a north-south aligned ditch [195] with loose, mid yellowish brown slightly clay sand with occasional small sub-rounded pebbles and a tile fragment dating to AD 55-160 [194] (Figure 9 Section 19). The dimensions for both ditches are detailed in the table below:

Cut no.	Fill no.	Foundation Pit	North-South (m)	East-West (m)	Depth (m)	Maximum height (m OD)
167	166	1	0.60	0.85	0.28	2.05
195	194	3	1.20	0.90	0.31	1.90

7.2.4 Subsoil [168] and ditches [167] and [195] potentially dated from the Roman period but given the scant material evidence it is equally probable that they could be attributed to the 10th-11th century (See Phase 2 below).

7.2.5 Environmental sampling of the ditch fills and subsoil layer [168] found that the majority of seeds and other plant macrofossils were scarce and so little could be concluded regarding the local environment during this period. However, the presence of low numbers of burnt cereals potentially indicated that wheat, and perhaps other species, may have formed part of the diet of the occupants in addition to the flesh implied by the fish bone, mammal bone and oyster shell also found within the samples.

7.3 Phase 2a: 10th-11th Centuries (Figure 4)

7.3.1 Two principal activities were apparent within this phase firstly deposits associated with land reclamation and latterly the construction of the *Frater*, the monastic refectory.

7.3.2 Sealing natural sand and gravel in [117] in Foundation Pit 2 was a 0.16m thick layer of loose, yellowish brown silty sand with occasional small rounded pebbles [110] (Figure 9 Section 15). Interpreted as a land reclamation deposit [110] it was recorded at a maximum height of 2.30m OD and was in turn overlain by a dumped deposit of loose, mottled yellowish brown and dark brown silty sand with occasional charcoal flecks and small sub-rounded pebbles [104]. Dumped deposit [104] contained animal bone, residual Roman CBM, worked stone and pottery fragments dating to AD 970-1100, it was 0.22m thick and encountered at a maximum height of 2.52m OD.

7.3.3 Similarly in Foundation Pit 3 a 0.19m thick layer of loose, yellowish brown silty sand [191] was succeeded by a further land reclamation deposit of loose, mid brown silty sand [190]. Layer [190] was 0.18m thick and found at a maximum height of 2.24m OD; it was subsequently truncated by pit [189].

7.3.4 Sub-circular pit [189] measured 0.75m north-south by 0.52m east-west by 0.18m deep, it was seen at a maximum height of 2.24m OD (Figure 9 Section 19). It was filled by loose, mottled dark brown and dark grey brown slightly silty sand with occasional animal bone, shell fragments, charcoal flecks and small sub-rounded pebbles [188]. Pottery recovered from fill [188] dated to AD 970-1100.

7.3.5 A further deposit of made ground [177] was found within the Receiver General's house itself. Made ground [177] was 0.14m thick friable, dark brown sandy silt with occasional rounded pebbles and pottery fragments that dated from 1050-1150. Encountered during the watching brief in the South Room of the property it was found at a maximum height of 3.17m OD.

7.3.6 The sequence was slightly more complex in Foundation Pit 4. A north-south orientated ditch [207] filled by loose, mid yellowish brown slightly silty sand [206] was seen to cut natural sand and gravel [227] (Figure 9 Section 20). Pottery recovered from the fill dated to 1050-1100. Ditch [207] was 0.30m deep, found at a maximum height of 1.97mOD and was potentially the same feature as ditch [195] in Foundation Pit 3 (See Phase 2a).

7.3.7 Ditch [207] was subsequently sealed by a 0.24m thick land reclamation deposit composed of loose, yellowish brown slightly silty sand with occasional charcoal and shell flecks and fragments [205] and pottery dating from 1050-1100 with occasional residual Roman CBM. Layer [205] was in turn truncated by a small pit [208], measuring 0.55m north-south by 0.30m east-west by 0.44m deep. It was found at a maximum height of 1.99m OD and filled by friable, greyish brown sandy silt with occasional small rounded pebbles [209] (Figure 9 Section 20).

7.3.8 Further successive land reclamation deposits, [204]. [203] and [202] were seen to have capped pit [208] (Figure 9 Section 20). Their details are summarized in the table below:

Context no.	Description	Depth (m)	Max. Height (m OD)
202	Friable, mid yellowish grey with yellow brown lenses silty sand and moderate, charcoal and shell flecks and fragments and occasional sub-angular pebbles, animal bone, CBM and pottery fragments.	0.14	2.37
203	Loose, light mottled grey brown and yellowish brown silty sand with occasional sub-angular pebbles, charcoal and shell fragments and flecks and pottery and CBM fragments.	0.14	2.23
204	Loose, mid mottled grey brown and yellowish brown silty sand with occasional clay lenses, sub-angular and sub-rounded pebbles and pottery, CBM and animal bone fragments.	0.18	2.09

7.3.9 The pottery within layers [202], [203] and [204] dated to between AD 900 and 1250, with the CBM found in all three deposits being residual and Roman in date.

7.3.10 Evidence of the principal structure of the period, the monastic refectory known as the *Frater,* consisted of wall footings [172] in Foundation Pit 1, [257] and [258] (seen in section only; Figure 9 Section 21) in Room G1 inside the Receiver General's house and [264] in Rooms G2 and G3. Each of these chalk footings are described in the table below:

Context no.	Cut no.	Orientation	Description	Length (m)	Width (m)	Depth (m)	Max. Height (m OD)
172	165	E-W	Dressed chalk block footing for wall [171]. Contained pottery dating from 1050-1150.	0.28	0.82	0.23	1.99
257	Unseen	N-S	Roughly hewn chalk blocks with moderately concreted, light brownish yellow, coarse sandy mortar.	1.22	0.60	0.23	3.34
258	Unseen	E-W	Roughly hewn chalk blocks with moderately concreted, mid brown sandy mortar. Contained re-used *op. sig.* Dating from AD 50-400	-	0.38	0.32	3.42
264	Unseen	N-S	Roughly hewn chalk rubble with 15mm thick layer of lime plaster.	6.82	0.72	0.31	3.78

7.3.11 Wall footing [172] was sealed by two dumped deposits in Foundation Pit 1. Firstly by a 0.05m thick layer of fairly loose, dark grey brown sandy silt with occasional charcoal, chalk, mortar and daub flecks and occasional small-large sub-angular, sub-rounded and rounded pebbles [163] and then by a 0.10m thick deposit of fairly loose and friable mid-dark reddish brown sandy silt with occasional chalk flecks and fragments [150]. Pottery recovered from both deposits dated to 1000-1150 and residual Roman CBM was also found. Layer [163] was recorded at a maximum height of 2.10m OD and [150] at 2.28m OD.

7.4 **Phase 3: 12th-14th Centuries (Figure 5)**

7.4.1 Further masonry structures were identified that post-dated the original early medieval *Frater* wall footings. These represented its development into the middle and later parts of the medieval period and comprised footing [70], doorway [265] and foundation [71].

7.4.2 Footing [70], constructed of roughly hewn chalk and lime mortar on an east-west orientation, was recorded during ground reduction in the garden at a maximum height of 3.41m OD. It measured 0.40m north-south by 2.30m east-west by 0.15m deep. CBM retrieved from within the wall dated to 1300-1500.

7.4.3 Constructed of well dressed Caen stone and Reigate stone and lime mortar wall [71] appeared to be the foundation for a column, a door frame or, possibly, a staircase. It measured 0.35m to north-south by 0.45m east-west and was 0.06m deep. It was encountered at a maximum height of 3.32m OD.

7.4.4 Foundation Pit 3 exhibited an extensive sequence of deposits and features dating to the 12th-14th centuries. Pit fill [188] was overlain by loose, very dark grey brown silty sand with occasional shell fragments and small sub-rounded pebbles [185]. A large amount of animal bone was recovered from this layer and it is likely to be a dumped material from a kitchen dating to 1140-1500, based on CBM and pottery retrieved from the deposit. Layer [185] was 0.21m thick and recorded at a maximum height of 2.43m OD.

7.4.5 Analysis of animal bone from kitchen dumped deposits such as [185] indicated a widespread deposition of food waste across the site rather than a specific concentrated disposal area as well as its mixture with other materials. It also indicated that diet was focussed more on sheep, pigs and goat rather than cattle with more expensive, higher status foods represented by the presence of deer and potential cetacean bone originating from a dolphin or porpoise (Appendix 9). Environmental sampling revealed the presence of a variety of fish bone within kitchen dump deposit [134] and various other deposits (Appendix 10).

7.4.6 Kitchen dump deposit [185] was sealed by a 0.07m thick firm, light brown brickearth at a height of 2.45m OD, which was in turn capped by a 0.07m thick deposit of compact dark grey gravel [183] at a maximum height of 2.47m OD. It was considered possible that either [183] or [184] or potentially both layers were deliberately deposited floor surfaces.

7.4.7 Two further successive deposits consisting of silty sand, [182] and [181], were seen to overlie gravel surface [183] at maximum heights of 2.49m OD and 2.60m OD respectively. These layers were in turn truncated by the edge of a possible ditch or pit [179] that was filled by friable, mid-dark brown sandy silt with occasional mortar flecks

[178]. Pit [179] was 0.35m deep and seen at a maximum height of 2.60m OD (Figure 9 Section 19).

7.4.8 A further feature, chalk footing [124] lying within construction cut [158], was recorded as partially cutting potential pit [179]. Footing [124] was of the same construction and alignment as footing [70] and was considered to be part of the same foundation. Footing [124] measured 8.40m east-west by 0.40m north-south by 0.56m deep within Foundation Pit 3 and was recorded at a maximum height of 3.41m OD.

7.4.9 Footing [124] was capped in Foundation Pit 3 by two successive layers of silty sand, [157] and [149].

7.4.10 Dumped deposit [149] was cut by semi-circular posthole [153] filled by loose, mid brownish white silty sand, frequent small fragments of chalk and occasional flecks of mortar and charcoal [152]. Recorded at a maximum height of 2.88m OD it measured 0.09m north-south by 0.18m east-west and was 0.14m deep (Figure 9 Section 19).

7.4.11 Sealing posthole [153] were further successive dump and construction deposits: [143], [138], [137] and [136] which were ultimately capped by 0.14m thick firm, light yellowish brown clay and silty sand brickearth floor deposit [135] that was seen at heights between 3.18 and 3.26m OD.

7.4.12 A 0.28m deep sub-circular cut [126] containing fairly loose, mottled mid brown and dark, yellow brown sand clay with occasional mortar flecks, small sub-rounded pebbles and CBM and pottery fragments dating to 1350-1500 [125]. Interpreted as a robber cut, cut [126] impacted on wall footing [124].

7.4.13 Made ground deposits were also recorded overlying dump layer [150] in Foundation Pit 1, consisting of sandy silt deposits [151] at 2.30m OD, [134] at 2.39m OD, [128] at 2.60m OD, followed by a 0.15m thick compact, mortar floor surface [109] at a maximum height of 2.75m OD and finally by a very thin layer of construction debris, very loose silty sand, [121] at a maximum height of 2.83m OD.

7.4.14 Ultimately a 0.11m thick layer of loose reddish brown sand with occasional sub-rounded and rounded pebbles and very occasional charcoal flecks [69]/[176] was seen to overlie made ground [177], footing [71] and robber cut fill [125].

7.4.15 Doorway [265] in construction cut [266] was cut into the 11th-century *Frater* wall [264] and may relate to the partitioning of the west end of the refectory at this time by the insertion of the east wall of the courtyard. Built of Caen stone ashlar blocks with moulded jambs it dated to 1060-1600 onwards. The base of the door was recorded at a height of 3.52m OD and was seen at a maximum height of 3.80m OD.

7.4.16 Floorboard removal in Room F6 revealed 13 floor joists and enabled dendrochronological testing which indicated construction of both the floor and the walls

occurred around 1387. A number of timbers between the joists exhibited engraving or decoration, presumably executed by the original contractors (Plates 12 & 13).

7.4.17 Also within Room F6 a deposit of dust and sediment was encountered below the floorboards [240].

7.5 Phase 4: 15th-16th Centuries (Figure 6)

7.5.1 A limited amount of activity attributed to the transition between the late medieval and early post-medieval periods was recorded in Foundation Pits 1 and 2 and within Rooms G1, G3 and the South Room of the Receiver General's house.

7.5.2 Within Foundation Pit 1 a foundation [120] was seen within construction cut [246] truncating the surface of sandy silt deposit [151]. Structure [120] was interpreted as the foundation for a thick post-medieval wall; a wall that would ultimately define the eastern extent of the later 'Mr Moor's House' as depicted on the 1719 map. It was composed of cemented light whitish grey lime mortar and blocks of limestone and chalk with occasional charcoal flecks, small pebbles and CBM fragments dating to 1350-1500. Foundation [120] measured 0.95m north-south by 0.49m east-west by 0.50m deep in Foundation Pit 1 and was recorded at heights between 2.73-2.89m OD.

7.5.3 The same post-medieval wall's footing was also seen in Foundation Pit 2 (Figure 9 Section 15). This footing, [100], was also constituted of lime mortar and chalk blocks in the same fashion as footing [120]. It ran 1.20m north-south by 0.90m east-west by 1.07m deep and was found at heights between 2.59 and 2.61m OD. Footing [100] was backfilled by loose, dark brown silty sand [99] and lay within construction cut [101]. Construction cut [101] truncated fill [103] of posthole [103] which in turn cut dumped deposit [104]. Posthole [103] measured approximately 0.30m in diameter and was 0.21m deep, it was found at a maximum height of 2.52m OD.

7.5.4 Footing [100] was also partially backfilled by a 0.18m thick dumped layer of loose, mottled dark greyish black and brown silty sand [98]. Pottery recovered from this deposit dated from 1500-1580 and it was encountered at a maximum height of 2.65m OD.

7.5.5 The 13th-century doorway [265] within Room G3 was blocked using Kentish ragstone and Reigate stone [267].

7.5.6 Within the South Room of the Receiver General's house a dump layer [175] composed of loose, mid greyish brown silty sand with frequent shell fragments was found to seal sand layer [69]/[176] to a height of 3.32m OD. CBM and pottery fragments recovered from this layer dated to 1250-1310 onwards and 1550-1580 respectively.

7.5.7 In Room G1 a number of walls were seen to be built over chalk footings [257] and [258] comprising chalk and Reigate stone wall [254], a later brick repair [255] to wall [254] and the brick footing for the north wall of Room G1 [256] (seen in section only; Figure 9 Section 21). The dimensions and descriptions of these walls are summarized in the table below:

Context	Orientation	North-South (m)	East-West (m)	Depth (m)	Maximum Height (m OD)
254	N-S	1.22	0.60	0.40	3.80
255	N-S	0.52	0.22	0.20	3.83
256	E-W	0.11	0.54	0.46	3.87

7.5.8 Brick footing [256] was constructed from early post-medieval brick and brown lime mortar dating from 1450-1700.

7.6 Phase 5: 16th-17th Century (Figure 7)

7.6.1 The investigation revealed a number of activities on site that potentially dated to the 16th and 17th centuries, principally demolition resulting from the Dissolution of the Monasteries and alteration of previous structures and construction of new builds including surfaces, drains and footings reflecting redevelopment following the aftermath of the partial demolition of the refectory. These features and deposits were found within Foundation Pit 4 and various rooms within the Receiver General's house.

7.6.2 Trench 3, excavated within the Receiver General's house, exhibited dumped deposits [245]/[216] and [244]/[215] surmounted by a number of Reigate stone wall footings [217], [221] and [247] with a later dump layer [243] and a robber cut [220].

7.6.3 Dumped deposit [245]/[216] was composed of 0.32m of friable, mid-brownish grey sandy silt with frequent oyster shell fragments, occasional small sub-angular pebbles, frequent lime mortar fragments. Finds recovered from this layer included CBM dating to 1480-1600 onwards and pottery from 1580-1700 as well as residual CBM dating from the 14th century. Layer [245]/[216] was in turn sealed by a 0.18m thick layer of loose, mid brown and light brownish yellow silty sand and lime mortar with occasional small sub-angular pebbles, charcoal flecks and clay patches [244]/[215] with pottery and CBM fragments dating to the same date ranges as those finds retrieved from the previous deposit. Layer [245]/[216] was found at heights between 3.24-3.40m OD while layer [246]/[215] was recorded at heights between 3.39-3.48m OD.

7.6.4 Footings [217], [221] and [247] within construction cuts [218], [223] and [248] all truncated dump layer [244]/[215]. The character and dimensions of each of these walls are summarized in the table below:

Context no.	Description	Orientation	Length (m)	Width (m)	Depth (m)	Height (m OD)
217	Reigate stone	N-S	0.54	0.30	0.16	3.56
221	Chalk, Reigate stone, Kentish ragstone and lime mortar	E-W	1.10	0.40	0.60	3.82
247	Reigate stone and lime mortar	E-W	0.40	0.36	0.55	3.72

7.6.5 Truncating both [217] and [221] was a square shaped robber cut [220] filled with loose, mottled light grey and light yellowish grey lime mortar and chalk and Reigate stone rubble with occasional charcoal flecks [219]. It measured 0.40m north-south by 0.32m east-west by 0.09m deep and was seen at a maximum height of 3.49m OD.

7.6.6 Footing [247] was overlain by 0.28m thick deposit of friable, mid greyish brown sandy silt with frequent lime mortar and chalk flecks and occasional small-medium sized sub-rounded pebbles [243]. Dump layer [243] was encountered at heights between 3.70 and 3.75m OD and pottery and CBM fragments retrieved from this deposit indicated a date range of 1580-1650.

7.6.7 Also post-dating the *Frater* wall footing [264] in Rooms G2 and G3 were a variety of features including sandy silt trample deposit [274] that was in turn truncated by pit [260]; brick drain [268] in construction cut [270]; clay floor [271] that was truncated by north-south chalk and Kentish ragstone footing [272] in construction cut [273].

7.6.8 Pit [260] was filled by friable, mid grey brown sandy silt [259] with frequent lime mortar fragments, moderate small-medium sub-rounded chalk fragments, occasional charcoal flecks and a variety of pottery dating to 1600-1700, tile and brick fragments dating to 1480-1700 and clay tobacco pipe fragments dating to the 17th century. A small amount of residual *opus signinum* was also recovered from the fill. Pit [260] extended 0.40m north-south by 1.38m east-west by 0.61m deep and was found at a maximum height of 3.76m OD.

7.6.9 Drain [268] was constructed of unfrogged post Great Fire transitional brick and grey sandy mortar on an east-west alignment. It was seen to run 0.40m north-south by 0.40m east-west by 0.23 deep and recorded at a maximum height 3.81m OD. The masonry

dated from 1664-1725 onwards. Drain [268] was filled by friable very dark blackish grey silt with moderate charcoal and mortar flecks [269].

7.6.10 Wall footing [272], constructed of chalk and Reigate stone, extended 1.52m north-south by 0.58m east-west and was over 0.10m deep, it was encountered at a maximum height of 3.53m OD.

7.6.11 Sealing pit fill [259], drain fill [269] and footing [272] was a floor composed of unfrogged red brick and concreted mottled light grey and light brownish grey lime mortar [253]. It extended 3.30m north-south by 2.48m east-west, the floor was 0.05m thick and was found at heights between 3.92-3.97m OD.

7.6.12 Truncating brick floor [253] was construction cut [263] for drain [262]. Constructed of red brick, concreted mid-brown mortar and peg tile, dating from 1480-1700, drain [262] was orientated east-west and extended 0.39m north-south by 2.92m east-west by 0.16m deep. It was recorded at a maximum height of 3.78m OD and filled with loose, black ash and sand [261].

7.6.13 Within Foundation Pit 4 layer [201], a 0.31m thick loose, mid yellow brown sandy silt with occasional CBM chalk and CBM flecks was seen to overlie footing [210] which contained an unglazed Flemish floor tile dating to 1610-1800 which lay within probable construction cut [276]. Layer [201] was itself overlain by loose, light brown and light yellowish brown sand, mortar and chalk rubble [211] that contained CBM dating from 1350-1390 onwards and pottery fragments dating to the middle of the 16th century. Demolition deposit [211] was 0.52m thick and it was recorded at heights between 3.39-3.67m OD.

7.6.14 Additionally, a small number of other deposits and features were also attributed to this phase of activity on site. These include chalk and mortar rubble demolition layers [174] and [212] in the South Room of the Receiver General's house; shallow pit [123] (not illustrated, seen in section only) filled by loose sandy silt with clay tobacco pipe fragments dating to 1660-1680 in Foundation Pit 1 and finally 0.22m deep posthole [132] containing silty sand and demolition rubble including CBM fragments dating from 1480-1700 and residual pottery from 1080-1350 [130]. The relative dimensions and heights these features and deposits were found at are summarized in the table below:

Context no.	Type	North-South (m)	East-West (m)	Depth (m)	Maximum Height (m OD)
123	Pit	0.68	0.24	0.17	2.83
132	Posthole	0.13	0.42	0.22	3.26
174	Demolition	2.40	0.40	0.23	3.56

	layer				
212	Demolition layer	0.84	0.50	0.28	3.67

7.7 **Phase 6: 18th-19th Centuries (Figure 8)**

7.7.1 The 18th-19th century heralded the construction of what is now No. 2 The Cloister and re-facing of the southern wall of the *Frater* was also seen during this phase. Evidence for these developments and other associated activities was abundant both during the archaeological investigations in both the interior and exterior parts of the site.

7.7.2 Within the South Room of the Receiver General's house a brick lined drain with an unglazed Flemish tile base bonded with lime mortar and a Purbeck limestone cover [146] lay within construction cut [161] truncating made ground composed of friable, greyish brown sandy silt with frequent mortar and shell fragments [162]. Tile from drain [146] dated to 1600-1800 while pottery fragments from the made ground deposit [162] dated to the mid-late 19th century. Drain [146] was in turn truncated in part by a square robber cut [156] filled by loose dark grey brown silty sand with frequent lime mortar fragments and occasional small sub-angular pebbles [155]. Cut [156] measured 0.58m by 0.62m by 0.06m and was found at a maximum height of 3.64m OD. All of these deposits were ultimately sealed by brick floor [144] that rested upon a 0.04m thick concreted, light grey mortar bedding layer [145]. Floor [144] was constructed of red Tudor bricks in a loose, brown grey chalky mortar and was seen to slope to the south from a height of 3.87m OD to 3.82m OD towards drain [146] in the south-west corner of the room.

7.7.3 A similar sequence was also revealed in Test Pit 6 in the South Room. The earliest deposit encountered in the test pit was loose, light grey and dark grey brown sandy silt and chalk rubble made ground [56]. This layer was 0.14m thick and was recorded at a maximum height of 3.76m OD. Part of the footing of the east wall of the Receiver General's house [55] was seen to overlie made ground [56]; it was constructed of post Great Fire brick and shelly coal mortar dating from 1750-1900. Footing [55] was overlain by a 0.10m thick layer of silty sand made ground [54] which, in turn, was sealed by a 0.12m thick layer of rubble and silt made ground [53]. All deposits in Test Pit 6 were overlain by brick floor [52] which was part of the same surface as floor [144] (figure 9 Section 12).

7.7.4 A number of investigations took place within Room G3 these included an examination of the west wall of the Receiver General's house [169], constructed of small Stuart type brick pointed in a coal shell mortar dating to 1750-1900 into which was set a north-south orientated timber lintel with a mortise joint at its south end [170]. Lintel [170] measured 1.00m long by 0.10m wide by 0.06m thick.

7.7.5 Test Pit 7, opened within Room G3, contained a loose, mottled dark brown and dark grey brown silty sand with occasional charcoal, mortar flecks and small sub-rounded pebbles [81] at the base of the test pit. Peg tiles recovered from this deposit dated to 1480-1700. Made ground [81] was truncated by construction cut [82] containing wall footing [79], part of the east wall of the Receiver General's house (Figure 9 Section 13). Footing [79] constituted ashlar blocks of Caen stone, early post-medieval red brick and lime mortar dating to 1450-1700 onwards. Brick floor [80] composed of narrow post Great Fire brick and coalified shelly mortar sealed all deposits in Test Pit 7.

7.7.6 A further test pit (TP8) was opened in Room G3. A dumped deposit of loose, mid grey brown silty sand with frequent mortar, chalk and CBM flecks and fragments [154] was encountered in the base of the test pit at a maximum height of 3.70m OD. Brick and lime mortar wall footing [148] capped made ground [154].

7.7.7 Trench 3, passing through Rooms G2 and G3, revealed multiple deposits and features attributed to this period. Cutting made ground [244]/[215] was a Reigate stone and lime mortar wall footing [229] within construction cut [230] which was also backfilled by friable, dark grey brown sandy silt [228]. Wall [222] was constructed over this feature, it was built of narrow Tudor-Stuart brick with shelly mortar dating to 1750-1900.

7.7.8 Also overlying made ground [244]/[215] and robber cut fill [219] was a further made ground deposit [214] composed of loose, light grey chalk and mortar rubble [214] that extended 2.30m north-south by 1.00m east-west by 0.30m thick and was seen at heights between 3.78 and 3.82m OD. Made ground [214] and wall [222] were both overlain by brick underpinning of part of the east wall of the Receiver General's house [224] within construction cut [225].

7.7.9 Additionally, a further brick drain [251] was found within construction cut [252] backfilled by [250] and [249] in Trench 3 as was a further part of the footing for the east wall of the building [238] as previously defined by [55].

7.7.10 The manhole investigation in Room G1 revealed loose, dark grey brown silty sand dump layer [235] containing frequent mortar flecks, occasional chalk and CBM fragments and pottery dating from 1630-1846. It was recorded at a height of 3.48m OD. Dumped deposit [235] was truncated by construction cut [237] containing wall footing [236]. Probably associated with the late 19th-century construction of Cheyney Gates footing [236] was built of chalk and lime mortar and contained a single sherd of pottery dating from 1170-1350, perhaps indicative of re-use of building materials.

7.7.11 A 0.48m thick dumped deposit [234] overlay footing [236] and was subsequently cut by drain [231] within construction cut [232]. Drain [231] was constructed of post Great Fire brick and frogged Victorian type brick and shelly mortar, dating from 1750-1900, and was truncated by the construction cut for a manhole to the east. Drain [231] was backfilled by

loose, dark grey brown silty sand and gravel [233], which was recorded at heights between 3.72-3.88m OD.

7.7.12 The table below summarizes all of the dimensions and heights that the various masonry structures were found at within the Receiver General's house:

Context no.	Location	Orientation	North-South (m)	East-West (m)	Depth (m)	Maximum Height (m OD)
52	TP 6 - South Room	n/a	0.60	0.60	0.09	3.97
55	TP6 - South Room	N-S	0.60	0.40	0.33	4.09
79	TP7 - South Room	N-S	0.50	0.40	0.50	3.96
80	TP7 - South Room	n/a	0.50	0.50	0.10	4.02
144	South Room	n/a	0.46	1.46	0.25	3.76
146	South Room	n/a	2.24	1.30	0.05	3.87
148	TP 8 - Room G3	N-S	0.50	0.26	1.00	3.83
169	Room G3	N-S	5.78	0.26	-	-
222	Tr 3 - Room G2/G3	E-W	0.22	0.53	0.16	3.94
225	Tr 3 - Room G2/G3	N-S	2.30	0.58	0.71	3.94
229	Tr 3 - Room G2/G3	E-W	0.22	0.50	0.39	3.78
231	Room G1	N-S	0.60	0.30	0.24	3.88
236	Room G1	E-W	0.28	0.84	0.40	3.46
238	Tr 3 - Room G2/G3	N-S	-	-	-	-
251	Tr 3 - Room G2/G3	N-S	0.94	0.30	0.18	3.80

7.7.13 As with the Receiver General's house, the garden of the property contained a number of features and deposits that were attributed to this phase of activity on site.

7.7.14 Foundation Pit 1, in the south-east corner of the site, contained masonry relating to walls, a staircase, piping and a possible floor surface.

7.7.15 Potential floor surface [91] was a firm mid reddish brown clay silt with occasional chalk, charcoal and CBM flecks. It was 0.05m and found at a height of 2.79m OD.

7.7.16 The stone walls [115], [147] and [171] were built of Reigate stone, sandstone and lime mortar and late medieval to early post-medieval peg tile dating from 1664-1800 was recovered from wall [171]'s mortar. The dimensions and heights of these structures are detailed in the table below:

Context no.	Orientation	North-South (m)	East-West (m)	Depth (m)	Maximum Height (m OD)
115	N-S	0.26	0.64	0.65	2.72
147	E-W	0.40	0.24	0.25	2.22
171	E-W	0.18	0.82	0.72	2.64

7.7.17 A further corner for a wall or potential spiral staircase base [127] was recorded between walls [115] and [147]; it was constructed of Reigate stone, limestone and tile and lime mortar. Possible staircase [127] measured 0.74m east-west by 0.71m north-south by 0.87m deep and seen at a maximum height of 3.10m OD.

7.7.18 Lead piping [111] and [140], both of which were 50mm in diameter, were encountered in construction cut [112] at a maximum height of 2.90m OD and in construction cut [141] at a maximum height of 2.40m OD respectively.

7.7.19 Lead pipe [112], the latest of these structures, was sealed beneath layer [113], also identified as [90]/[97]/[108], a mixed garden deposit that was 0.51m thick and was recorded at a maximum height of 3.34m OD. Pottery fragments found within this deposit dated from 1760-1830.

7.7.20 Foundation Pit [4] contained brick floor [192] at a height of 2.95m OD that lay in construction cut [186] over bedding layer [193]. A water pipe was found within fill [198], a mid yellow brown sandy gravel at a maximum height of 2.94m OD in cut [197] (Figure 9 Section 20).

7.7.21 Beyond the limits of the Foundation Pits and variety of structures and deposits were revealed during ground reduction works inside the garden of the Receiver General's house. These structures included wall footings, a fireplace and a privy. Samples of brick and mortar from these features dated from 1750-1900. The descriptions and dimensions of each of these features are detailed in the table below:

Context no.	Description	Orientation	North-South (m)	East-West (m)	Depth (m OD)	Height (m OD)
67	Wall constructed of Caen stone, sandstone and brickwork and sandy mortar	E-W with N-S return	0.92	2.88	0.20	3.51
76	Wall constructed of brick and sandier limonitic mortar	E-W	0.63	2.26	0.16	3.50
83	Wall constructed of re-used ashlar Reigate stone blacks and grey clinker brown mortar	N-S	2.80	0.42	0.10	3.46
85	Alteration to footing constructed of re-used Taynton stone ashlar Type F green mortar	N-S	0.80	0.40	0.10	3.40
92	Retaining wall constructed of Caen stone, Reigate stone and occasional brickwork	N-S	11.60	0.32	0.60	3.94
95	Wall footing	E-W	0.46	0.12	0.17	3.55
96	Wall footing constructed of Caen stone and sandstone and grey sandy lime mortar	E-W	0.47	0.15	0.05	3.36
61	Privy wall foundation constructed of unfrogged post Great Fire brick and clinker mortar	n/a	0.89	1.72	0.23	3.45

106	Brick fireplace constructed of frogged yellow brick and lime mortar	n/a	1.74	0.33	0.06	3.49
107	Brickwork surround for fireplace [106]	n/a	0.64	0.35	0.85	3.46

7.7.22 Masonry [67], [76], [83] and [85] composed of brickwork and other, re-used, materials appeared to form three inter connected wall foundations truncated by later activities such as the courtyard fountain. These masonry footings, were indicative of a sub-division of the interior space of the area formerly occupied by the refectory prior to its conversion into an exterior garden area; perhaps smaller domestic areas as indicated by the privy [61] and the 19th-century 'dining room' in the north-east corner of the site incorporating fireplace [106] with its associated flooring [107].

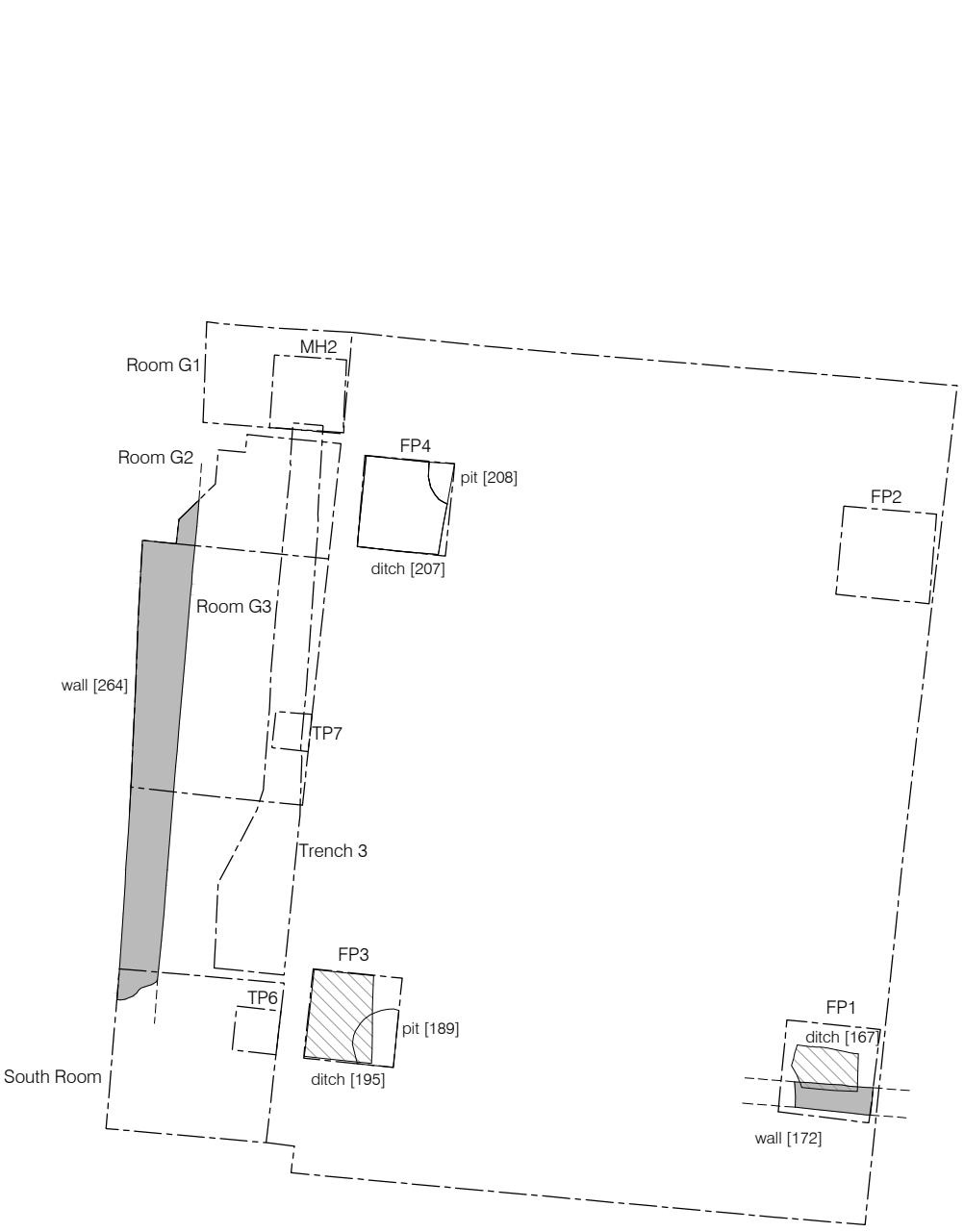
7.7.23 Several mortar surfaces were revealed during the ground reduction in the garden including [47] a concreted, light yellow brown lime mortar and sand with frequent chalk fragments, [62] fairly firm but friable, light-mid whitish grey with dark black grey mottling silty sand and mortar and [105] a loose, light grey layer of crushed mortar. Additionally, external surface [63] composed of compact, mid brown grey sandy silt with light greyish yellow patches of clay silt measuring 3.00m north-south by 4.00m east-west by 0.10m deep and was recorded at a maximum height of 3.46m OD.

7.7.24 Other features included underpinning cuts [58] and [74] to enable re-facing works on the south and east walls of the garden respectively and a variety of garden features including garden soil [75], a firm, light-mid brownish grey silty sand which was truncated by rectangular planter bed [51] backfilled by sandy silt [50] at a maximum height of 3.35m OD. A variety of finds were recovered from planter bed fill [50] including pottery from 1794-1900, residual CBM from 1300-1600 onwards and clay tobacco pipe fragments from the 17th century.

7.8 Phase 7: 20th Century-Modern

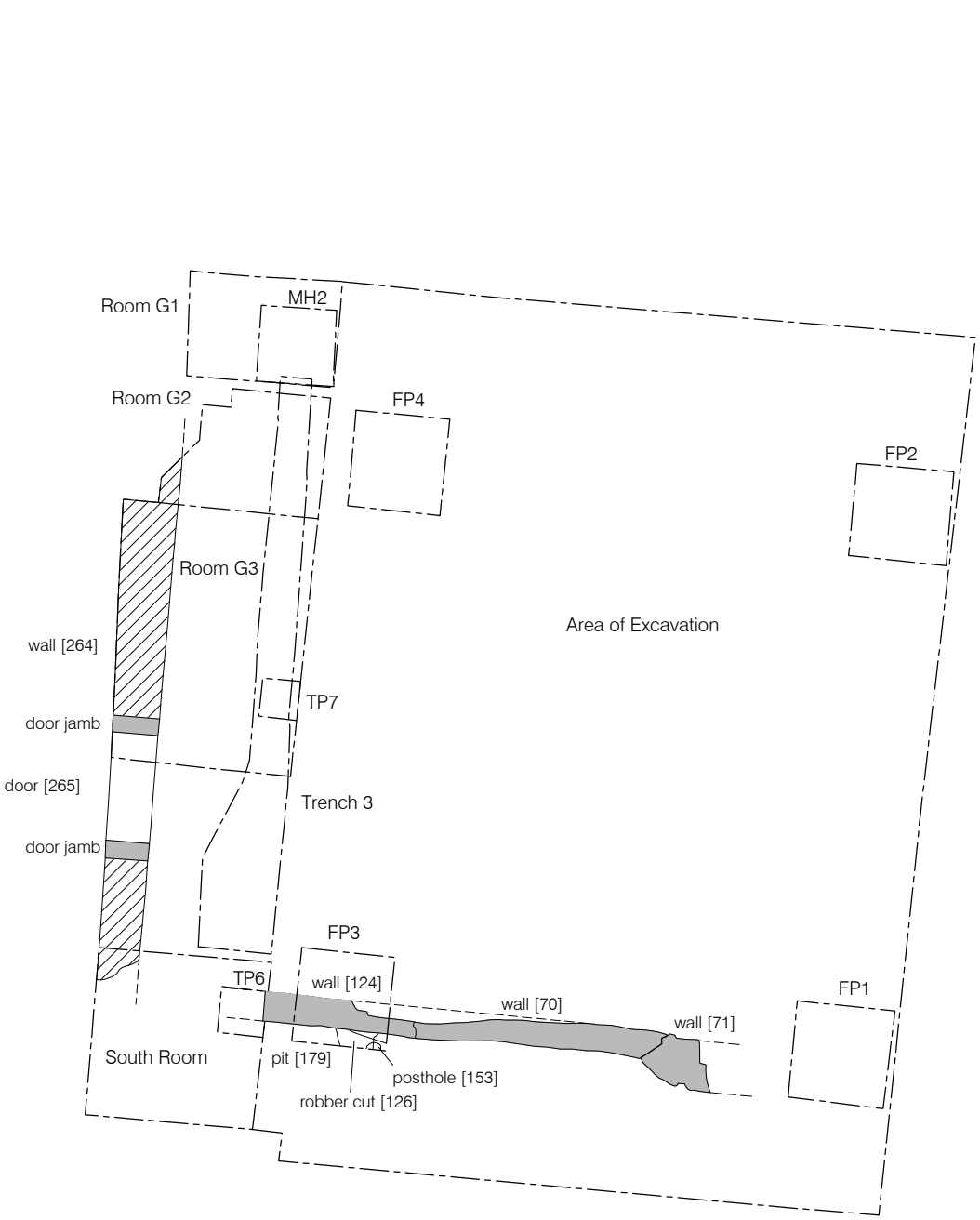
7.8.1 All features and deposits within the garden were sealed by made ground layers [46], [77] and [87] at heights between 3.41-5.58m OD which were cut by planter bed [48].

7.8.2 The paving, vegetation and soil from the raised beds that comprised the courtyard garden of the Receiver General's house capped these deposits [+].



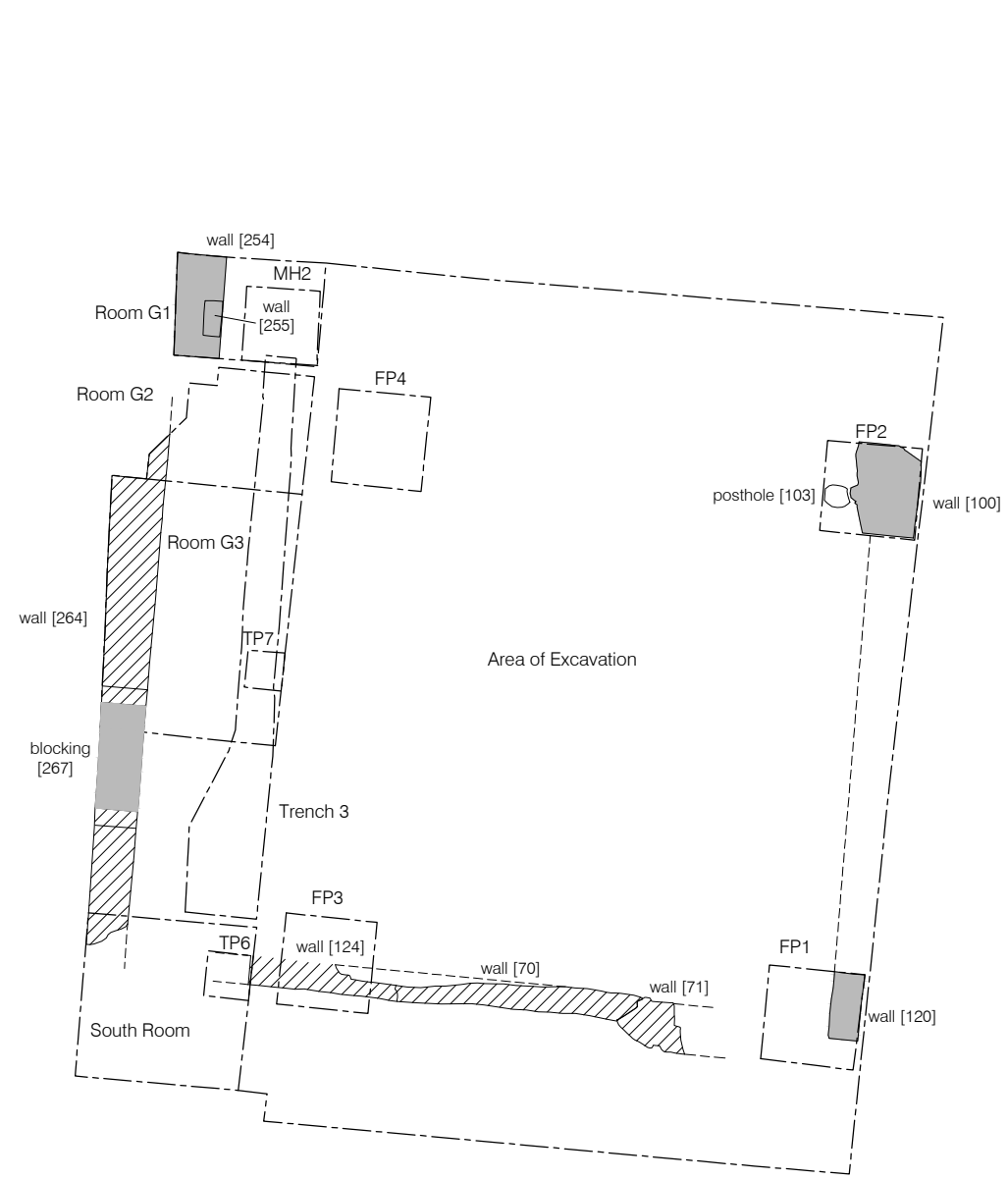
14/03/18 JB

Figure 4
Plan of Phase 2 (potential Roman) and Phase 2A (10th-11th C)
1:100 at A4



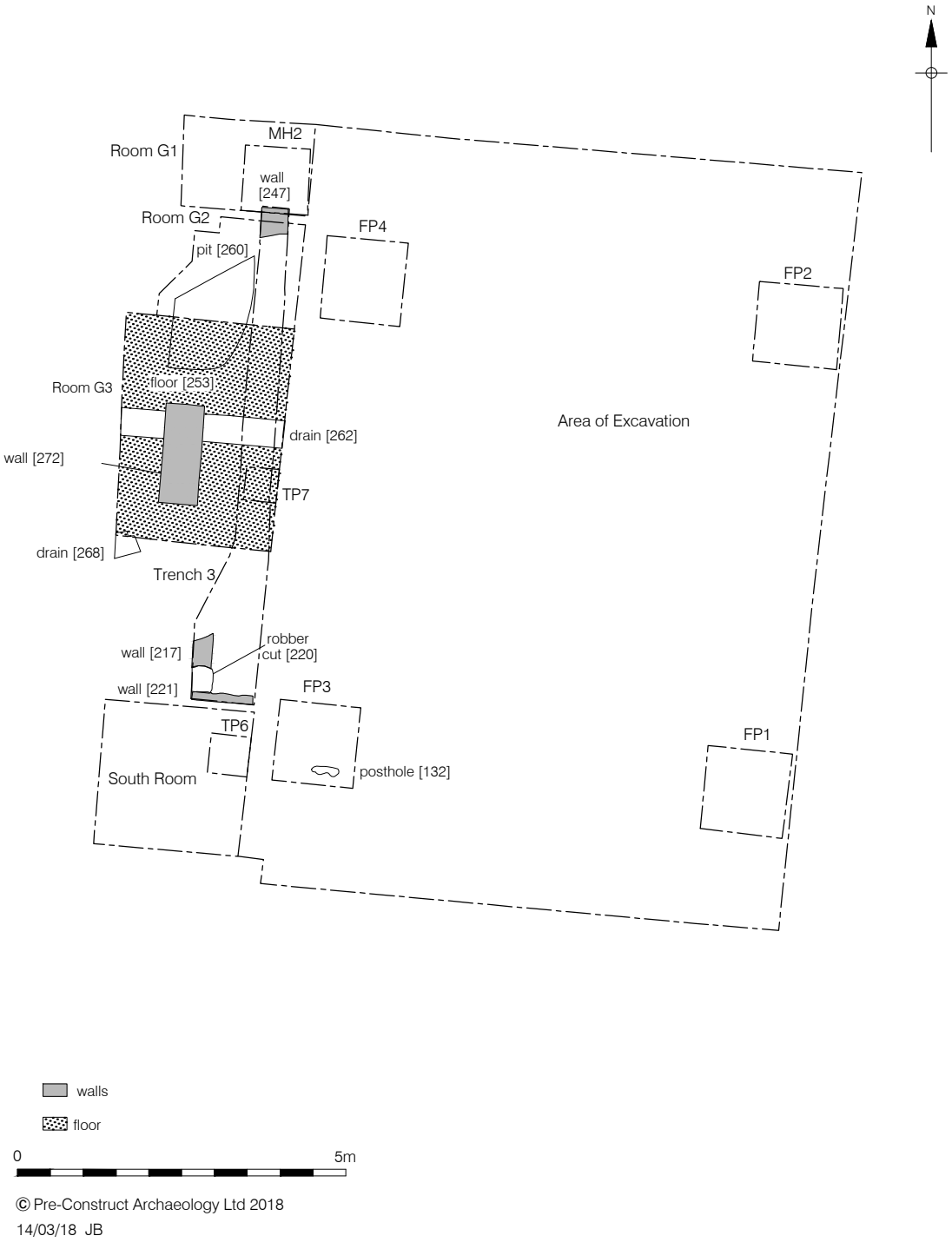
15/03/18 JB

Figure 5
Plan of Phase 3 (12th - 14th C)
1:100 at A4



14/03/18 JB

Figure 6
Plan of Phase 4 (15th - 16th C)
1:100 at A4

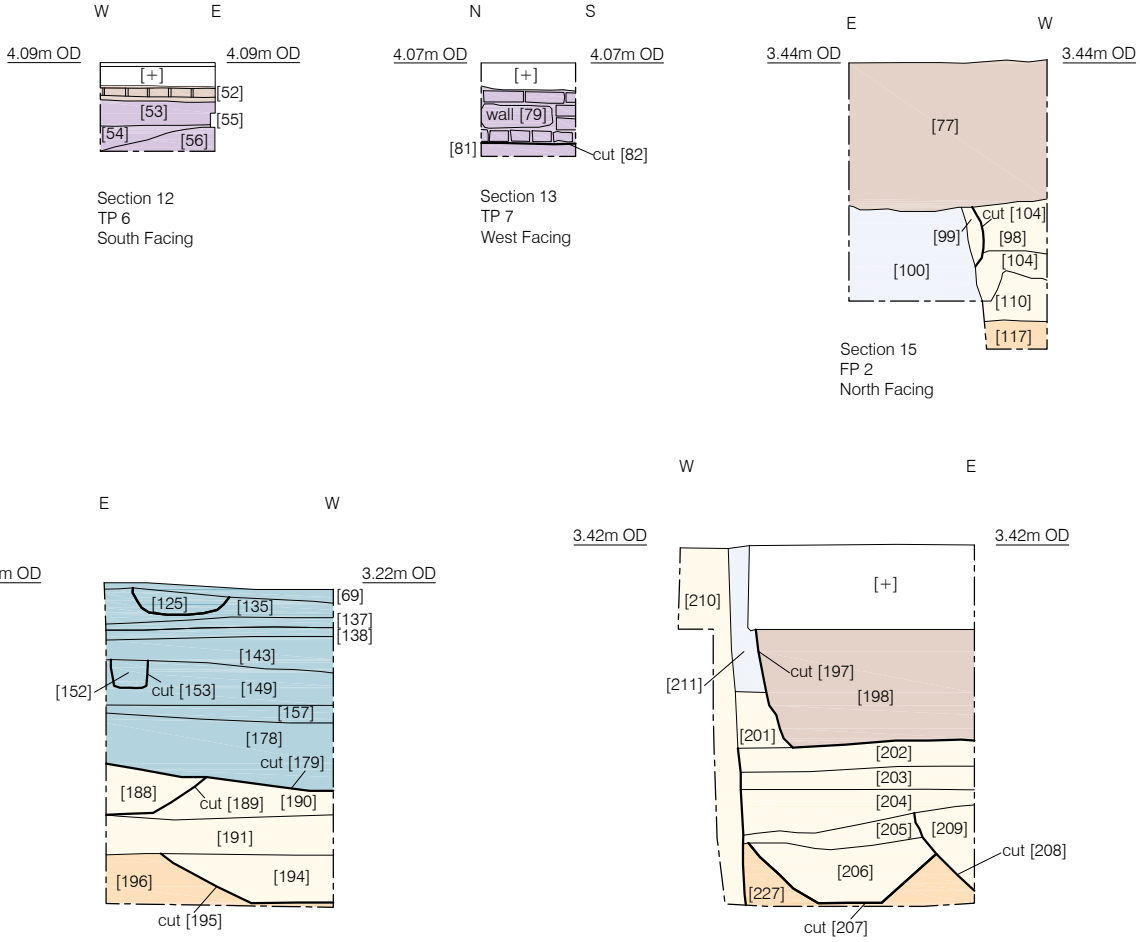


14/03/18 JB

Figure 7
Plan of Phase 5 (16th -17th C)
1:100 at A4

14/03/18 JB

Figure 8
Plan of Phase 6 (18th -19th C)
1:100 at A4



01/03/18 RM/JB

Figure 9
Sections
1:40 at A4

Plate 1: South-west facing view of ground reduction area within the Receiver General's garden

Plate 2: South-east facing view of ground reduction area within the Receiver General's garden

Plate 3: South-east facing view of ground reduction area within the Receiver General's garden (1m scale)

Plate 4: West facing view of ground reduction area within the Receiver General's garden

Plate 5: South facing view of Foundation Pit 2 (0.5m scale)

Plate 6: South facing view of Foundation Pit 1 (1m scale)

Plate 7: West facing view of Foundation Pit 1

Plate 8: Ground reduction in South Room (0.5m scale)

Plate 9: North facing excavation of Trench 3

Plate 10: Ground reduction within the Receiver General's house

Plate 11: Floorboard removal in Room F6

Plate 12: Engraving seen within Room F6

Plate 13: Decoration seen within Room F6

8 PHASED DISCUSSION

8.1 Phase 1: Natural

8.1.1 The earliest stratum encountered during the investigation was naturally deposited silty sand representing the top of the Shepperton Gravel Member of the Maidenhead Formation. It was only encountered in the four deeper foundation pits in the corners of the courtyard of No 2 The Cloister where it was recorded as [117], [173], [196] and [227]. Even though the natural sand was only seen in these four interventions it was considered possible that the top of the deposit sloped down towards the south and west. At the layer's highest point, in the north-east corner of the courtyard, it was recorded at 2.22m OD and in the south-west corner, the lowest point, it was recorded at 1.90m OD.

8.2 Phase 2a: Possible Roman

8.2.1 Ditches [167] and [195] were found in Foundation Pits 1 and 3, the fills of which contained small amounts of Roman material, potentially indicating a possible Roman origin for those features. However, given the scant material evidence it is equally probable that they could be attributed to the 10th-11th century as ditch [195] is on the same alignment as ditch [207], which was dated to the 10th-11th century and may be part of the same feature [207].

8.3 Phase 2: 10th-11th Centuries

8.3.1 This phase of activity principally consisted of episodes of land reclamation represented by widespread dump layers followed by the construction of the *Frater* in the late 11th century represented by west wall footings [239], [240] and [264] and north wall footing [258].

8.4 Phase 3: 12th-14th Centuries

8.4.1 Further development of the *Frater* was represented by footings [70] and [241], doorway [265] and foundation [71]. Some of this activity may be related to the construction of the *Cawagium* above the buttery. It is possible that the chalk footing represents the remains of a staircase leading to the *Cawagium*.

8.5 Phase 4: 15th-16th Centuries

8.5.1 A limited amount of activity attributed to the transition between the late medieval and early post-medieval periods was recorded in Foundation Pits 1 and 2 and within Rooms

G1, G3 and the South Room of the Receiver General's house. Principally these were structural modifications to the refectory as was the construction of a thick post-medieval wall in the eastern part of the property, the footings of which were found within Foundation Pits 1 and 2.

8.6 **Phase 5: 16th-17th Centuries**

8.6.1 The investigation revealed number of activities on site that potentially dated to the 16th and 17th centuries principally demolition resulting from the Dissolution of the Monasteries, and alteration of previous structures and construction of new builds including surfaces, drains and footings reflecting redevelopment following the aftermath of the partial demolition of the *Frater.*

8.7 **Phase 6: 18th-19th Centuries**

8.7.1 The courtyard excavations revealed masonry composed of brickwork and other, re-used, materials which appeared to form three interconnected wall foundations truncated by later activities such as the courtyard fountain. These footings, were indicative of a sub-division of the interior space of the area formerly occupied by the *Frater* perhaps into smaller domestic areas as indicated by the privy [61] and the 19th-century 'dining room' in the north-east corner of the site incorporating fireplace [106] with its associated flooring [107].

8.7.2 Additionally several mortar surfaces were recorded beneath the current house as well as a number of demolition/construction layers. The latter are likely related to the clearance of buildings and construction works on the building that ultimately became No. 2 The Cloister.

8.8 **Phase 7: Modern**

8.8.1 Deposits attributed to this period indicate the demolition of the ancillary buildings and the creation of the courtyard garden in the second half of the 20th century as well as phases of underpinning and re-facing of the south wall.

9 RESEARCH OBJECTIVES

9.1 Original research objectives

9.1.1 The following research objectives were set out prior to the investigation commencing:

- To determine / confirm the palaeotopography of the site, if possible.

  The natural sand of Thorney Island was first encountered at 2.22m OD in the eastern part of the site. From here it sloped down to 1.90m OD in the western part of the site. During a previous archaeological investigation in the north-west corner of Dean's Yard some 70m to the west, the top of the natural sand was reached at 0.64m OD (Jorgensen 2008). When the foundations of 17 Dean's Yard, approximately 70m to the south, needed to be underpinned in 1998-9 the associated archaeological works reached natural sand and gravel at around 0.00m OD (Murray 2003). Recent archaeological investigations in Poets' Corner Yard 0.90m to the north-east recorded the top of the natural sand at 4.18m OD (Jorgensen & Langthorne in prep). This indicates that the natural terrain continued to slope down from the higher ground to the north-east into the low-lying marshland towards west and south.

  During the medieval period the ground level was raised across the entire area to provide more or less level ground upon which to build the church and conventual buildings. This predominantly occurred during the 10th and 11th centuries although it may have started as early as the 8th or 9th century as suggested by the presence of Middle Saxon deposits to the south of the present site (Jorgensen 2014).

- To determine the presence or absence of prehistoric activity, if possible.

  No indication of prehistoric activity was encountered during the course of the archaeological investigations at No. 2 The Cloister.

- To determine the presence or absence of Roman activity, if possible.

  While not definitively established potential Roman activity was recorded during the excavation of the Foundation Pits within the garden of the Receiver General's house. This activity comprised a subsoil deposit [168] and two ditches [167] and [195]. A single sherd of Roman pottery and a fragment of Roman tile were recovered from the ditch fills of [195] and [167] respectively.

However, given the scant material evidence it is equally probable that these deposits could be attributed to the 10th-11th century. Additionally ditch [207], dating to the medieval period, could potentially be part of the same ditch as [195].

- To investigate and understand the function of the possibly pre-11th-century wall footing exposed in Test Pit 2.

  During the evaluation a footing was encountered in Test Pit 2 that was interpreted as a structure which had then been either demolished, renovated or rebuilt to allow the construction of the refectory.

  No evidence of structures that pre-dated the 11th-century refectory was encountered during the archaeological excavation, and ground reduction in the vicinity of Test Pit 2 did not reach the same depth as the test pit being approximately 0.30m higher.

- To further expose the structural remains relating to the 11th-century *Frater* as found in Test Pits 1-3, and further investigate their construction, use, disuse and demolition.

  Several further wall foundations, typically constructed of roughly hewn chalk blocks with moderately concreted, light brownish yellow, coarse sandy mortar, were recorded in Foundation Pit 1 and Rooms G1, G2 and G3. Footings [257] and [264] were orientated north-south and [172] and [258] were aligned east-west. All dated to the 10th and 11th century and were considered to be part of the original construction of the *Frater.*

  They were succeeded by 12th-14th-century wall footing [70] of similar construction to the earlier footings and well dressed Caen stone and Reigate stone and lime mortar structure [71] which appeared to be the foundation for a column, a door frame or a staircase. It is possible that these structures related to the construction of the *Cawagium* above the buttery.

  This development of the refectory appeared to continue into the 15th century, such as the foundation for the eastern wall of courtyard [100], prior to the partial demolition of the building resulting from the Dissolution. A number of demolition deposits such as [174] and [212] were recorded in the Receiver General's house.

- To fully investigate other medieval remains such as surfaces, deposits and cut features.

The archaeological excavation revealed a variety of medieval deposits including 10th-11th-century land reclamation deposits such as [110] and [190], kitchen dumps such as [185] and [134] related to the refectory, surfaces such as brickearth floor [184] and mortar floor [109 which dated to the 12th-14th century and a small number of isolated postholes, [103] and [153], and potential pits or ditches [179] and [207] which dated to the 12th-14th centuries and 10th-11th centuries respectively.

While it was possible in the case of some areas of site, such as Foundation Pit 3, for the examination of an extensive sequence of medieval features and deposits, other parts of site, such as ground reduction areas, did not allow for such full investigation.

- To fully investigate the form, function and date of post-medieval activity within the yard.

  Post-medieval activity principally related to several events, firstly demolition deposits relating to the Dissolution, followed by building works concerned with the construction of new structures in the Courtyard area, such as a privy and various services. The subsequent demolition of many of these structures, shown by further dumped and demolition deposits, and the finally the development on the building on the western side of site that ultimately became No. 2 The Cloister with its courtyard garden including planter beds.

- To further investigate the activity associated with the post-medieval ‘dining-room’.

  The ‘dining room’ was a 19th-century building that was situated in the north-east corner of the courtyard. In Foundation Pit 2 a brick fireplace [106] and its surround [107] constructed of frogged yellow brick and lime mortar was presumably part of this structure as potentially were wall foundations [76], [83] and [85.

- To investigate / record all archaeological remains and deposits within the impact-zone of the proposed development.

  The archaeological investigation, both the excavation and watching brief elements, recorded all areas upon which the proposed building works occurred or will occur.

- To establish the extent of past post-depositional impacts on the archaeological resource.

The archaeological excavation revealed relatively small amounts of modern truncation and a relatively complete archaeological sequence.

9.2 Revised Research Questions

- Does combining the evidence from the current site and the *Cellarium* allow for further clarification of the 10th-11th-century refectory and its development through the medieval period?
- Does combining the evidence from the current site and the *Cellarium* allow for further explication of the buildings that were constructed into the post-medieval period following the Dissolution of the Monasteries?
- How does the layout of this part of the monastery compare to other contemporary monasteries of similar status?
- Can any of the masonry structures, such as footings or the potential staircases, be associated with documentary evidence of specific aspects of buildings thereby clarifying their function?

10 CONTENTS OF THE ARCHIVE

10.1 Paper Records

• Contexts		274 sheets
• Plans		*c.222* sheets
• Sections	21 Sections	21 sheets
• Environmental Sheets		12 sheets

10.2 Finds

• Pottery	5 boxes
• Clay Tobacco Pipe	1 box
• Glass	3 boxes
• Human/Animal Bone	8 boxes
• Cement	1 box
• Ceramic Building Material	8 boxes & 6 crates
• Stone	6 boxes & 6 crates
• Small finds / Metal	7 boxes
• Lithic	2 boxes
• Shell	2 boxes
• Composite material	1 box
• Mortar	4 boxes
• Plaster	2 boxes
• Slag	1 box
• Slate	1 box

10.3 Samples

• Environmental Bulk Samples	12

10.4 Photographs

• Digital Shots	435

11 IMPORTANCE OF RESULTS, FURTHER WORK & PUBLICATION PROPOSAL

11.1 Importance of the Results

11.1.1 The low levels of truncation allowed for a relatively complete archaeological sequence that encompassed potential Roman remains, the medieval construction and development of the *Frater,* its subsequent demolition as a product of the Dissolution of the Monasteries, the redevelopment of the site including a 'dining hall' and privy, further demolition works and finally the development of the residence of the Receiver General and courtyard garden. It should therefore be concluded that the investigation can be seen to make a significant contribution to the understanding of the development and changing use of the area during the medieval and post-medieval periods.

11.2 Further Work

11.2.1 The excavation and watching brief at the Receiver General's property are only part of a wider range of archaeological investigations that have recently been carried out at Westminster Abbey including work within the *Cellarium*. It is proposed that a synthesis of the results of the current investigation and those of the *Cellarium* be attempted in order to achieve the fullest picture of the creation and development of the *Frater,* its demolition and the subsequent development of this part of Westminster Abbey. The archaeological remains will be overlaid on the historic maps to see if the phasing, especially of the later post-medieval remains, can be refined. Subsequent archaeological investigations have taken place at Poets Corner Yard, in the Cloister garth and to the south of the Cellarium on the site of the medieval abbey kitchen. It is proposed that all the recent archaeological investigations within the former grounds of the abbey be published together in a single volume.

11.2.2 Post-Roman Pottery

The pottery has significance at a local level and a short pottery report is required for the publication of the site and it is recommended that five vessels are illustrated to supplement the text.

11.2.3 Clay Tobacco Pipe

The clay tobacco pipe assemblage has little significance at a local level and the bowl forms present are typical for London. None of the clay tobacco pipes show evidence for their manufacture on the site. If a short publication report is required on the clay tobacco pipes then it is recommended that the information is taken from this report.

11.2.4 Ceramic Building Material

It is recommended that a section on the use and reuse of Roman and medieval ceramic building used in the Song School (*Frater* and *Misericorde*) combined with that of the existing text from the *Cellarium* with emphasis on Roman and earlier medieval ceramic building materials from structures within the Abbey and with comparison reports from the excavations at the *Misericorde* (Black 1976, 1977) *Dorter* undercroft (Mills 1995). Note on the use of comparative mortars from the *Cellarium* and Song School excavations in light of the stratigraphic findings for the completed assessment of the Song School. Additionally *c.* 6-10 items of Decorative Floor Tile Designs (Westminster and Penn Tile) not already included in any pre-existing publication for the *Cellarium,* should be illustrated.

11.2.5 Stone

It is recommended a section on the petrology of the stone used in the Song School combined with that of the existing text from the *Cellarium* with emphasis on Roman and earlier medieval stone building materials from structures within the Abbey and making comparison with retained stone from the excavations at the *Misericorde* (Black 1976; 1977) *Dorter* undercroft (Mills 1995) and stone by stone reports from the Pyx Chamber and Refectory wall (Hayward pers. obs.) with comparison with reference collections (BM Natural History) to verify identifications. Also illustration of 6 items of stone moulding is recommended.

11.2.6 Glass

A short publication report is recommended on the glass. Research is required on a small number of items in order to determine if they associated with managing a wine cellar. Six vessels require illustration or photographing.

11.2.7 Metal and Small Finds

The metal and small finds form an integral component of the finds and should, where relevant, be included in any further publication of the site. This is currently planned to include the finds from The *Cellarium*, a site characterised by a stronger medieval component. For the purpose of publication, some finds from The Song School will require x-raying and further research to aid full identification.

11.2.8 Dendrochronology

No specific recommendations for further work were included in the dendrochronology report but the observations and conclusions of this report will be included in any future publication text.

11.2.9 Animal Bone

A combined *Cellarium* and Song School publication would undoubtedly add significant points of interest and comparison concerning the use of major domesticates and also of prestige items. There is perhaps little scope for comparison of exploitation practices, with the exception of the rise in veal usage entering the early post-medieval era. The difference in major domesticate usage, especially concerning pigs, is certainly of interest and should be explored further. Finally, the later post-medieval bone evidence should of course be mentioned but in far less detail in comparison to that from the medieval and early post-medieval phases.

A small proportion of bones are yet to be identified including the cetaceans and some of the bird bones. This will entail visits to external reference collections, namely to Tring Natural History Museum (birds) and either the Cambridge Museum of Natural History or the London Natural History Museum cetacean collection at Wimbledon in London.

11.2.10 Fish Bone

The two largest assemblages (Phases 2 and 3) provide useful additional insight to the diet of the Westminster Abbey monks; expanding on the data obtained by previous studies on fish bone assemblages from other locations within the Westminster Abbey precinct. For the purposes of final reporting and publication it is recommended that the Song School fish bone data is integrated with data already documented for the fish bones from the *Cellarium* excavations.

This final report also should incorporate an overview of the previous studies on fish assemblages from the *Dorter* Undercroft, Sub-vault/*Misericorde* and Dean's Yard. Interesting comparison could also be made with assemblages from other major Benedictine abbeys (e.g. Eynsham Abbey, Oxfordshire).

11.2.11 Human Bone

11.2.12 Although the results of this assessment should be added to any forthcoming publication, it was not recommended that any further work be performed on the disarticulated human bone from this site.

11.2.13 Environmental Sampling

Further specialist analysis is suggested on the wood charcoal from sample <1>, as this could provide useful information regarding the types of fuel that were being burnt, as well as giving an idea of the local vegetation, selection bias notwithstanding. Similarly, in the case of samples <8> and <9>, this material may be useful in order to refine the chronology of these deposits, using radiocarbon dating. Aside from this, no further specialist analysis is recommended, though a summary of the results should however be included in any subsequent site publications.

11.3 Publication Proposal

11.3.1 It was originally proposed that the results of the archaeological investigation would be combined with those of the earlier evaluation at No. 2 The Cloister and the *Cellarium* investigations as detailed in Jorgensen 2014 and published as a peer reviewed article in the *Transactions of the London and Middlesex Archaeological Society*. However, several archaeological investigations have taken placed in recent years in the former precinct of the abbey, including those at Poets Corner Yard, in the Cloister Garth and also on the site of the medieval abbey kitchen. It is now proposed, if funding is available, that all the recent archaeological investigations be published together as a Monograph detailing the results of all the recent investigations and what new insights have been revealed into the complex history of the abbey. If this proves unattainable then the publication of this project will proceed as originally planned within the *Transactions of the London and Middlesex Archaeological Society.*

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12.1 Pre-Construct Archaeology Limited would like to thank the Dean and Chapter of Westminster Abbey for commissioning and funded the archaeological work. We also thank Professor Warwick Rodwell, OBE, FSA for monitoring the project on behalf of Westminster Abbey, and providing continued advice and assistance.

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APPENDIX 1: CONTEXT INDEX

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
1	TP1		S.7	Layer	Garden soil	1.000	1.000	0.210	3.89	3.88	7
2	TP3		S.1, S.2	Layer	Mortar surface	1.000	1.000	0.040	3.47	3.47	6
3	TP2		S.3	Layer	Mortar surface	1.080	1.020	0.360	3.56	3.53	6
4	TP3		S.1, S.2	Layer	Made ground	1.000	1.000	0.360	3.43	3.43	6
5	TP1		S.7	Deposit	Fill of [6]	0.560	1.000	0.250	3.71	3.71	7
6	TP1	6	S.7	Cut	Pit	0.560	1.000	0.250	3.71	3.46	7
7	TP1		S.7	Layer	Garden soil	1.000	1.000	0.070	3.71	3.69	7
8	TP1		S.7	Layer	Mortar surface	1.000	1.000	0.120	3.63	3.62	7
9	TP1	9	S.7	Masonry	North-west-south-east aligned wall	1.000	0.320	0.500	3.47	3.47	6
10	TP1	10	S.7	Masonry	East-west aligned footing	1.020	0.340	0.520	3.50	3.50	6
11	TP5		S.10	Layer	Trample	0.600	0.620	0.020	3.42	3.42	6
12	TP5	TP5	S.10	Deposit	Fill of [13]	0.600	0.400	0.160	3.40	3.40	6
13	TP5	TP5	S.10	Cut	North-south aligned linear cut	0.600	0.400	0.160	3.40	3.24	6
14	TP5	TP5	S.10	Layer	Made ground	0.600	0.220	0.160	3.40	3.40	6
15	TP3	TP3	S.1, S.5	Masonry	Concrete underpinning to the north	0.290	1.000	0.250	3.40	3.40	7
16	TP3	TP3	S.1	Cut	Cut for (15)	0.290	1.000	0.250	3.40	3.15	7
17	TP3	TP3	S.2	Masonry	Concrete underpinning to the east	0.720	0.280	0.250	3.32	3.23	7
18	TP3	TP3	S.2	Cut	Cut for (17)	0.720	0.280	0.250	3.32	3.05	7
19	TP1	20	S.7	Deposit	Fill of [20]	1.020	0.420	0.500	3.47	3.46	6
20	TP1	20	S.7	Cut	Construction cut for (9)	1.020	0.420	0.500	3.47	2.97	6
21	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
22	TP2		S.3	Deposit	Upper fill of [23]	0.640	0.650	0.310	3.58	3.58	6
23	TP2	TP2	S.3	Cut	Construction cut for (32)	0.640	0.650	0.580	3.58	3.02	6
24	TP2		S.3	Layer	Demolition layer	0.820	0.750	0.210	3.29	3.17	4
25	TP2	TP2	S.3	Layer	Layer of crushed chalk	0.680	0.780	0.040	3.01	2.92	2
26	TP2	TP2	S.4	Masonry	East-west aligned footing	0.200	0.650	0.290	3.29	3.00	2
27	TP1		S.7	Layer	Mortar layer	0.200	0.200	0.400	3.50	3.50	5
28	TP3		S.5	Masonry	Stone block	?	0.780	0.180	3.53	3.53	7

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
29	TP3		S.5	Masonry	Brick arch	?	1.000	0.550	3.95	3.92	6
30	TP3		S.5	Masonry	East-west aligned stone wall	?	1.000	0.280	4.18	4.18	2
31	TP1		S.6	Masonry	North wall of the frater	?	1.000	1.000	4.11	4.11	2
32	TP2	TP2	S.4	Masonry	Refacing of south wall of frater	0.150	0.860	1.040	4.32	3.28	6
33	TP2		S.3	Deposit	Lower fill of [23]	0.440	0.650	0.250	3.27	3.27	6
34	TP1			Deposit	Fill of [35]	0.270	0.450	0.370	3.49	3.47	4
35	TP1	35	S.6	Cut	Pit	0.270	0.450	0.370	3.49	3.12	4
36	TP1	36		Cut	Construction cut for (9)	0.320	1.000	0.500	3.47	2.97	6
37	TP2	37		Masonry	East-west aligned footing	0.930	0.750	0.240	3.00	2.76	2
38	TP2		S.3	Layer	Demolition layer	0.680	0.220	0.320	3.01	2.95	2
39	TP2		S.3	Layer	Dump layer	0.280	0.540	0.380	2.94	2.94	2
40	TP3		S.5	Masonry	East-west aligned footing	?	1.000	0.600	3.28	3.28	2
41	TP2	41	S.3	Cut	Unknown function	0.280	0.540	0.380	2.94	2.56	2
42	TP2		S.3	Cut	Construction cut for (26)	?	0.540	0.040	3.01	2.97	2
43	TP1		S.6	Masonry	Footing below (31)	?	1.000	0.370	3.49	3.49	2
44	TP3		S.8	Masonry	14th century wall	1.000	?	0.940	4.20	4.20	3
45	95/95-100, 100/95-110, 105/95-110			Deposit	Fill of [48]	11.610	6.820	0.500	3.76	3.73	6
46	100/100, 100/105	46		Layer	Demolition layer	4.120	5.230	0.160	3.58	3.53	6
47	95/95-100, 100/95-100, 105/95-100	47		Layer	Mortar surface	5.220	6.920	0.020	3.42	3.40	6
48	95/95-100, 100/95-110, 105/95-110	48		Cut	Garden bed	11.610	6.820	0.250	3.50	3.26	6
49	95/95-100, 100/95-100, 105/95-100	49		Layer	Dump layer	5.220	6.920	0.040	3.40	3.38	6
50	100/100, 105/100			Deposit	Fill of [51]	1.850	1.200	0.050	3.35	3.30	6
51	100/100, 105/100	51		Cut	Garden feature	1.850	1.200	0.050	3.35	3.30	6
52	TP6, G.4/G.5	52	S.12	Masonry	Brick floor	0.600	0.600	0.085	3.97	3.96	5
53	TP6, G.4/G.5		S.12	Layer	Made ground	0.600	0.600	0.120	3.87	3.85	5
54	TP6, G.4/G.5		S.12	Layer	Made ground	0.600	0.600	0.100	3.80	3.75	5
55	TP6, G.4/G.5		S.11,	Masonry	Brick footing of No 2 The Cloister	0.600	0.400	0.330	4.09	4.09	5

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
			S.12								
56	TP6, G.4/G.5		S.11, S.12	Layer	Made ground	0.600	0.600	0.140	3.76	3.75	4
57	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
58	100/95, 100/100	58		Cut	Construction cut for refacing [59] of south wall of the frater	0.600	5.580	0.060	3.40	3.28	6
59	100/95, 100/100			Masonry	Refacing of south wall of frater	?	5.340	1.050	4.39	4.39	6
60	100/95, 100/100			Deposit	Fill of [58]	0.600	4.580	0.060	3.40	3.33	6
61	100/100	61		Masonry	Servant's privy	0.890	1.720	0.140	3.45	3.39	4
62	100/100	62		Layer	Mortar surface	0.580	1.300	0.050	3.42	3.37	4
63	100/100	63		Layer	External surface	3.040	4.000	0.100	3.46	3.36	4
64	100/100	64		Cut	Construction cut for [61]	1.640	1.900	0.130	3.37	3.24	4
65	100/100			Deposit	Fill of [64]	1.640	1.900	0.130	3.37	3.30	4
66	95/100, 100/100	66		Layer	Dump layer	1.440	3.420	0.080	3.42	3.38	4
67	100/100	67		Masonry	Caen stone and brick wall	0.920	2.880	0.200	3.51	3.47	6
68	95/100, 100/100	Post-Ex		Layer	Burnt deposit	1.240	2.380	0.050	3.33	3.31	4
69	100/100	Post-Ex		Layer	Sand layer	0.320	1.030	0.120	3.30	3.26	3
70	95/100, 100/100	70		Masonry	Chalk rubble footing	0.400	2.300	0.760	3.41	3.35	3
71	100/100	71		Masonry	Staircase footing?	0.350	0.450	0.060	3.32	3.32	3
72	100/100, 105/100	Post-Ex		Layer	Dump layer	3.500	3.200	0.100	3.38	3.32	4
73	105/100	Post-Ex		Deposit	Fill of [74]	1.440	0.400	0.100	3.38	3.38	4
74	105/100	Post-Ex		Cut	Construction cut for the underpinning of the east wall of the courtyard	1.440	0.400	0.100	3.38	3.28	4
75	105/100	Post-Ex	S.17	Layer	Garden soil	1.020	1.060	0.380	3.38	3.38	5
76	100/100-105, 105/100-105	76		Masonry	E-W aligned wall	0.630	2.260	0.160	3.50	3.45	6
77	100/105-110, 105/105-110	Post-Ex		Layer	Demolition layer	5.580	3.920	0.710	3.38	3.38	6
78	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
79	TP7, G.3	79	S.13	Masonry	East wall footing of No 2 The Cloister	0.500	0.400	0.500	3.96	3.96	5
80	TP7, G.3	80		Masonry	Brick floor	0.500	0.500	0.100	4.02	4.01	5
81	TP7, G.3	81	S.13	Layer	Made ground	0.500	0.500	0.260	3.83	3.83	5

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
82	TP7, G.3	82	S.13	Cut	Construction cut for [79]	0.500	0.050	0.260	3.83	3.67	5
83	100/105, 100/110	Post-Ex		Masonry	North-south aligned wall	2.800	0.420	0.100	3.46	3.37	6
84	100/105	Post-Ex		Masonry	Alteration to [83]	0.570	0.400	0.100	3.41	3.41	6
85	100/105	Post-Ex		Masonry	Alteration to [96]	0.800	0.400	0.100	3.40	3.40	6
86	100/105, 100/110	Post-Ex		Layer	Sand layer	1.320	1.800	0.100	3.41	3.41	7
87	100/100, 100/105	Post-Ex		Layer	Demolition layer	3.800	1.800	0.100	3.41	3.41	7
88	100/105	Post-Ex		Cut	Garden feature	2.600	0.940	0.170	3.41	3.24	7
89	100/105			Deposit	Fill of [88]	2.600	0.940	0.170	3.41	3.41	7
90	105/100		S.17	Layer	Dump layer	1.200	1.200	0.200	3.34	3.22	6
91	105/100	91	S.17	Layer	Floor surface	0.590	0.200	0.050	2.79	2.79	5
92	95/95-110, 100/105-110	Post-Ex		Masonry	Retaining wall	11.600	0.320	0.600	3.94	3.90	6
93	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
94	105/100	94		Layer	Dump layer	0.790	0.340	0.030	2.75	2.72	5
95	100/105	Post-Ex		Masonry	East-west aligned stone footing	0.460	0.120	0.170	3.55	3.55	6
96	100/105	Post-Ex		Masonry	East-west aligned stone footing	0.470	0.150	0.050	3.38	3.38	6
97	105/100	97		Layer	Dump layer	1.200	0.850	0.050	3.09	2.82	4
98	105/105	98		Layer	Dump layer	1.200	0.700	0.180	2.65	2.62	2
99	105/105			Deposit	Fill of [101]	1.200	0.240	0.220	2.52	2.46	2
100	105/105	100		Masonry	Footing for the east wall of the courtyard	1.200	0.900	1.070	2.61	2.59	4
101	105/105	101		Cut	Construction cut for [100]	1.200	0.900	1.070	2.61	1.54	2
102	105/105			Deposit	Fill of [103]	0.300	0.280	0.210	2.52	2.47	2
103	105/105	103		Cut	Posthole	0.300	0.280	0.210	2.52	2.31	2
104	105/105	104		Layer	Dump layer	1.200	0.440	0.220	2.52	2.47	2
105	100/110	Post-Ex		Layer	Mortar spread	0.680	1.800	0.050	3.38	3.38	7
106	100/110, 105/105-110	Post-Ex		Masonry	Brick fireplace	0.330	1.740	0.060	3.49	3.46	6
107	105/105, 105/110	Post-Ex		Masonry	Surround for fireplace [106]	0.640	0.350	0.850	3.46	3.46	6
108	105/100			Deposit	Fill of [112]	1.200	0.850	0.260	2.94	2.94	6
109	105/100	109		Layer	Mortar surface	0.790	0.340	0.150	2.75	2.75	4
110	105/105	110		Layer	Land reclamation layer	1.200	0.400	0.160	2.30	2.29	2

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
111	105/100	111		Lead pipe	Lead water pipe	1.320	0.050	0.050	2.90	2.85	6
112	105/100	112		Cut	Service trench containing [111]	1.200	0.940	0.510	3.34	2.82	6
113	105/100			Deposit	Fill of [112]	1.200	0.940	0.510	3.34	3.34	6
114	105/100	114		Cut	Robber cut	0.220	0.650	0.480	2.56	2.08	4
115	105/100	115		Masonry	East-west aligned stone wall	0.260	0.650	0.640	2.72	2.65	4
116	105/100			Deposit	Fill of [114]	0.220	0.650	0.480	2.56	2.54	4
117	105/105	117	S.14, S.15	Natural	Natural sand	1.200	1.200	0.480	2.22	2.14	1
118	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
119	105/100			Deposit	Fill of [141]	0.980	0.760	0.050	2.51	2.51	4
120	105/100	120	S.17	Masonry	Footing for the east wall of the courtyard	0.950	0.490	0.800	2.89	2.73	3
121	105/100	121	S.16	Layer	Construction layer	0.590	0.210	0.030	2.83	2.81	4
122	105/100	122	S.16	Cut	Pit	0.680	0.240	0.170	2.83	2.66	5
123	105/100		S.16	Deposit	Fill of [122]	0.680	0.240	0.170	2.83	2.83	5
124	95/100, 100/100	124		Masonry	Chalk rubble footing	0.400	2.400	0.760	3.41	3.35	3
125	95/100		S.19	Deposit	Fill of [126]	0.240	0.700	0.280	3.26	3.24	3
126	95/100	126	S.19	Cut	Robber cut	0.240	0.700	0.280	3.26	2.98	3
127	100/100, 105/100	127		Masonry	Staircase footing?	0.710	0.740	0.870	3.10	2.97	3
128	105/100	128		Layer	Trampled surface	0.930	0.290	0.080	2.60	2.56	3
129	105/100			Deposit	Fill of [141]	0.800	0.600	0.120	2.46	2.45	4
130	95/100	130		Deposit	Fill of [132]	0.130	0.420	0.220	3.26	3.24	3
131	105/100			Deposit	Fill of [141]	0.800	0.600	0.050	2.40	2.39	4
132	95/100	132		Cut	Posthole	0.130	0.420	0.220	3.26	3.04	3
133	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
134	105/100	134		Deposit	Kitchen dump	1.200	0.380	0.110	2.39	2.34	3
135	95/100	135	S.19	Layer	Brickearth floor	0.220	1.200	0.140	3.26	3.18	3
136	95/100	136		Layer	Dump layer	0.220	1.200	0.050	3.12	3.09	3
137	95/100	137		Layer	Demolition layer	0.220	1.200	0.070	3.11	3.07	3
138	95/100	138		Layer	Construction layer	0.220	1.200	0.060	3.06	3.04	3
139	105/100			Deposit	Clay lining around [140]	0.580	0.090	0.140	2.47	2.35	4

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
140	105/100	140		Lead pipe	Lead water pipe	0.580	0.050	0.050	2.40	2.35	4
141	105/100	141		Cut	Cut for [140]	0.570	0.650	0.150	2.60	2.30	4
142	105/100			Deposit	Fill of [141]	0.570	0.650	0.150	2.45	2.45	4
143	95/100	143	S.19	Layer	Construction layer	0.200	1.200	0.080	3.00	2.99	3
144	G.4/G.5	144		Masonry	Brick floor	2.240	1.300	0.052	3.87	3.82	5
145	G.4/G.5	145		Layer	Mortar bedding for [144]	2.300	2.280	0.040	3.82	3.77	5
146	G.4/G.5	146		Masonry	Brick lined drain	0.460	1.460	0.250	3.76	3.73	5
147	105/100	147		Masonry	Stone wall atop [127]	0.400	0.240	0.250	3.22	3.22	3
148	TP8, G.3	TP.8	S.18	Masonry	Brick footing of west wall of G.3	0.500	0.260	0.100	3.83	3.83	6
149	95/100	149	S.19	Layer	Dump layer	0.320	1.200	0.060	2.88	2.82	3
150	105/100	150		Layer	Dump layer	0.420	0.390	0.100	2.28	2.27	2
151	105/100	151		Layer	Dump layer	1.270	0.920	0.100	2.30	2.30	2
152	95/100		S.19	Deposit	Fill of [153]	0.900	0.180	0.140	2.88	2.88	3
153	95/100	153	S.19	Cut	Posthole	0.900	0.180	0.140	2.88	2.74	3
154	TP8, G.3	TP.8	S.18	Layer	Demolition layer	0.500	0.250	0.100	3.70	3.70	6
155	G.4/G.5			Deposit	Fill of [155]	0.580	0.620	0.060	3.64	3.63	5
156	G.4/G.5	156		Cut	Robber cut	0.580	0.620	0.060	3.64	3.58	5
157	95/100	157	S.19	Layer	Dump layer	0.320	1.200	0.130	2.68	2.64	3
158	95/100	158		Cut	Construction cut for [124]	0.440	1.200	0.050	2.68	2.64	3
159	95/100			Deposit	Fill of [158]	0.050	0.450	0.050	2.68	2.68	3
160	G.4/G.5			Deposit	Fill of [161]	0.460	1.440	0.120	3.78	3.73	5
161	G.4/G.5	161		Cut	Construction cut for [146]	0.460	1.440	0.120	3.78	3.53	5
162	G.4/G.5	162		Layer	Made ground	2.300	2.280	0.290	3.85	3.80	5
163	105/100	163		Layer	Dump layer	0.850	0.950	0.050	2.10	2.10	2
164	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
165	105/100	165		Cut	Construction cut for [172]	0.760	0.350	0.390	2.11	1.72	2
166	105/100			Deposit	Fill of [167]	0.600	0.850	0.280	2.05	1.99	2
167	105/100	167		Cut	East-west aligned ditch	0.600	0.850	0.280	2.05	1.77	2
168	105/100	168		Layer	Subsoil	0.300	0.850	0.080	2.14	1.97	2
169	G.3			Masonry	West wall of G.3	5.780	0.260				5

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
170	G.3			Timber	Timber lintel	1.000	0.100	0.056			5
171	105/100	171		Masonry	East-west aligned stone wall	0.280	0.820	0.720	2.64	2.54	2
172	105/100	172		Masonry	Chalk footing of [171]	0.280	0.820	0.230	1.99	1.98	2
173	105/100	173		Natural	Natural sand	0.840	0.920	0.340	2.06	1.88	1
174	95/100	174		Layer	Demolition layer	2.400	0.400	0.230	3.46	3.52	4
175	G.4/G.5			Layer	Dump layer	0.400	0.400	0.070	3.32	3.31	4
176	G.4/G.5			Layer	Sand layer	0.400	0.400	0.110	3.25	3.24	3
177	G.4/G.5			Layer	Made ground	0.400	0.400	0.140	3.14	3.12	3
178	95/100		S.19	Deposit	Fill of [179]	0.380	1.200	0.350	2.60	2.55	3
179	95/100	179	S.19	Cut	Pit or ditch	0.380	1.200	0.350	2.60	2.20	3
180	95/100	180		Cut	Construction cut for [67[	1.420	1.620	1.030	3.46	2.43	4
181	95/100	181		Layer	Land reclamation layer	1.140	1.200	0.140	2.60	2.55	3
182	95/100	182		Layer	Sand layer	1.140	1.200	0.070	2.49	2.46	3
183	95/100	183		Layer	Gravel surface	1.140	1.200	0.070	2.47	2.42	3
184	95/100	184		Layer	Brickearth floor	1.200	1.200	0.070	2.45	2.43	3
185	95/100	185		Layer	Kitchen dump	1.200	1.200	0.210	2.43	2.38	3
186	95/105	186		Masonry	"L" Shaped wall section	1.040	0.680	1.130	3.78	3.78	6
187	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
188	95/100		S.19	Deposit	Fill of [189]	0.750	0.520	0.180	2.24	2.22	2
189	95/100	189	S.19	Cut	Pit	0.750	0.520	0.180	2.24	2.06	2
190	95/100	190	S.19	Layer	Land reclamation layer	1.200	1.200	0.180	2.24	2.21	2
191	95/100	191	S.19	Layer	Subsoil	1.200	1.200	0.190	2.09	2.06	2
192	95/105	192		Layer	Brick floor	1.000	0.650	0.080	2.95	2.94	6
193	95/105	193		Layer	Mortar bedding for [192]	1.000	0.650	0.100	2.87	2.87	6
194	95/100		S.19	Deposit	Fill of [195]	1.200	0.900	0.310	1.90	1.85	2
195	95/100	195	S.19	Cut	Ditch	1.200	0.900	0.310	1.90	1.59	2
196	95/100	196	S.19	Natural	Natural sand	1.200	1.200	0.310	1.90	1.85	1
197	95/105	197	S.20	Cut	Cut for water pipe	0.180	1.200	0.660	2.94	2.28	6
198	95/105		S.20	Deposit	Fill of [197]	0.180	1.200	0.660	2.94	2.94	6
199	95/105	199		Layer	Dump layer	0.830	0.420	0.060	2.77	2.68	2
200	95/105	200		Layer	Dump layer	0.830	0.420	0.060	2.74	2.73	2

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
201	95/105	201	S.20	Layer	Dump layer	0.830	1.200	0.310	2.68	2.66	2
202	95/105	202	S.20	Layer	Land reclamation layer	1.200	1.200	0.140	2.37	2.32	2
203	95/105	203	S.20	Layer	Land reclamation layer	1.200	1.200	0.140	2.23	2.20	2
204	95/105	204	S.20	Layer	Land reclamation layer	1.200	1.200	0.180	2.09	2.06	2
205	95/105	205	S.20	Layer	Land reclamation layer	1.200	1.200	0.040	2.01	1.97	2
206	95/105		S.20	Deposit	Fill of [207]	1.200	1.120	0.480	1.97	1.97	2
207	95/105	207	S.20	Cut	North-south aligned ditch	1.200	1.120	0.480	1.97	2.49	2
208	95/105	208	S.20	Cut	Pit	0.550	0.300	0.440	1.99	1.55	2
209	95/105		S.20	Deposit	Fill of [208]	0.550	0.300	0.440	1.99	1.99	2
210				Masonry	Stone footing						2
211	95/105		S.20	Layer	Made ground	3.860	0.640	0.520	3.67	3.39	4
212	95/100	212		Layer	Made ground	0.840	0.500	0.280	3.67	3.67	4
213	95/105	213		Cut	Construction cut for [186]	1.040	0.700	0.120	2.77	2.65	6
214	TR3, G.2/G.3/DG.5	214		Layer	Demolition layer	2.320	1.000	0.300	3.82	3.78	4
215	TR3, G.2/G.3/DG.5	215		Layer	Dump layer	2.100	0.720	0.080	3.48	3.39	4
216	TR3, G.2/G.3/DG.5	216		Layer	Dump layer	0.920	1.000	0.150	3.40	3.40	4
217	TR3, G.2/G.3/DG.5	217		Masonry	North-south aligned footing	0.540	0.300	0.160	3.56	3.56	4
218	TR3, G.2/G.3/DG.5	218		Cut	Construction cut for [217]	0.540	0.300	0.080	3.48	3.40	4
219	TR3, G.2/G.3/DG.5			Deposit	Fill of [220]	0.400	0.320	0.090	3.49	3.49	4
220	TR3, G.2/G.3/DG.5	220		Cut	Robber cut	0.400	0.320	0.090	3.49	3.40	4
221	TR3, G.2/G.3/DG.5	221		Masonry	East-west aligned stone footing	1.100	0.400	0.600	3.82	3.80	4
222	TR3, G.2/G.3/DG.5	222		Masonry	East-west aligned brick wall	0.220	0.530	0.160	3.94	3.94	5
223	TR3, G.2/G.3/DG.5	223		Cut	Construction cut for [221]	1.100	0.400	0.250	3.48	3.23	4
224	TR3, G.2/G.3/DG.5	224		Masonry	Alteration of east footing of No. 2 The Cloister	2.300	0.580	0.710	3.94	3.94	5
225	TR3, G.2/G.3/DG.5	225		Cut	Construction cut for [224]	2.300	0.580	0.490	3.82	3.23	5
226	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID	VOID
227	95/105	227	S.20	Natural	Natural sand	1.200	1.200	0.480	1.97	1.49	1
228	TR3, G.2/G.3/DG.5			Deposit	Fill of [230]	0.060	0.500	0.100	3.78	3.76	4
229	TR3, G.2/G.3/DG.5	229		Masonry	East-west aligned stone footing	0.220	0.500	0.390	3.78	3.78	4
230	TR3, G.2/G.3/DG.5	230		Cut	Construction cut for [229]	0.280	0.520	0.390	3.78	3.39	4

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
231	MH2, G.1	231		Masonry	Brick lined drain	0.600	0.300	0.240	3.88	3.88	5
232	MH2, G.1	232		Cut	Construction cut for [231]	0.600	0.300	0.260	3.88	3.62	5
233	MH2, G.1			Deposit	Backfill of drain [231]	0.600	0.100	0.240	3.88	3.72	5
234	MH2, G.1	234		Layer	Dump layer	1.000	0.880	0.480	3.94	3.86	5
235	MH2, G.1	235		Layer	Dump layer	0.720	0.920	0.400	3.48	3.46	5
236	MH2, G.1	236		Masonry	East-west aligned stone footing	0.280	0.840	0.400	3.46	3.46	3
237	MH2, G.1	237		Cut	Construction cut for [236]	0.280	0.840	0.400	3.46	3.06	3
238	TR3, G.2/G.3/DG.5			Masonry	Footing for the east wall of G3						5
239	TP9, G.3	TP9		Masonry	West footing for the refectory	0.300	0.360	0.360	3.69	3.69	2
240	TP10, G.3	TP9		Masonry	West footing for the refectory	0.380	0.300	0.290	3.66	3.66	2
241	TP11, G.3	TP9		Masonry	Blocked doorway	0.480	0.400	0.320	3.71	3.71	3
242	F.6			Deposit	Dust and sediment under floor boards						7
243	TR3, G.2/G.3/DG.5	243		Layer	Dump layer	4.740	0.500	0.280	3.75	3.70	4
244	TR3, G.2/G.3/DG.5	244		Layer	Dump layer	4.860	0.500	0.180	3.58	3.42	4
245	TR3, G.2/G.3/DG.5	216		Layer	Dump layer	4.860	0.500	0.320	3.40	3.24	4
246	105/100	246		Cut	Construction cut for [120]	0.950	0.490	0.800	2.89	2.09	3
247	TR3, G.2/G.3/DG.5	247		Masonry	East-west aligned wall	0.400	0.360	0.550	3.72	3.72	4
248	TR3, G.2/G.3/DG.5	248		Cut	Construction cut for [247]	0.540	0.420	0.250	3.42	3.17	4
249	TR3, G.2/G.3/DG.5			Deposit	Primary fill of [251]	0.300	0.100	0.230	3.67	3.67	5
250	TR3, G.2/G.3/DG.5			Deposit	Secondary fill of [250]	0.300	0.100	0.050	3.72	3.70	5
251	TR3, G.2/G.3/DG.5	251		Masonry	Brick lined drain	0.340	0.300	0.180	3.80	3.80	5
252	TR3, G.2/G.3/DG.5	252		Cut	Construction cut for [251]	0.340	0.400	0.100	3.72	3.62	5
253	TR3, G.2/G.3/DG.5	253		Layer	Brick floor	3.360	2.480	0.050	3.97	3.92	5
254	G.1	254	S.21	Masonry	Stone seat	1.380	0.600	0.400	3.80	3.79	3
255	G.1	255		Masonry	Brick repair to [254]	0.550	0.220	0.200	3.83	3.82	6
256	G.1		S.21	Masonry	North wall of G.1	0.100	2.000				6
257	G.1		S.21	Masonry	Chalk footing of [254]	1.380	0.600	0.230	3.36	3.35	3
258	G.1		S.21	Masonry	Chalk footing for north wall of refectory	0.980	0.380	0.320	3.42	3.42	3
259	TR3, G.2/G.3/DG.5	260		Deposit	Fill of [260]	1.840	1.160	0.610	3.76	3.70	5
260	TR3, G.2/G.3/DG.5	260		Cut	Pit	1.840	1.160	0.610	3.76	3.15	5
261	G.3			Deposit	Primary fill of [262]	0.190	2.920	0.050	3.68	3.66	5

Context	Trench/Grid Square	Plan	Section	Type	Description	NS	EW	Depth	High	Low	Phase
262	G.3	262		Masonry	Brick lined drain	0.390	2.920	0.160	3.78	3.78	5
263	G.3	263		Cut	Construction cut for [262]	0.390	2.920	0.160	3.78	3.62	5
264	G.3	264		Masonry	Footing for west wall of the refectory	6.820	0.720	0.310	3.78	3.66	2
265	G.3	264		Masonry	Doorway cut into [264]	1.830	0.640	0.380	3.80	3.42	3
266	G.3			Cut	Construction cut for [265]	1.830	0.640	0.380	3.80	3.42	3
267	G.3	264		Masonry	Blocking up of doorway [265]	1.420	0.640	0.260	3.78	3.78	4
268	G.3	268		Masonry	Brick lined drain	0.400	0.400	0.230	3.81	3.80	5
269	G.3			Deposit	Primary fill of [268]	0.180	0.220	0.065	3.65	3.61	5
270	G.3	270		Cut	Construction cut for [268]	0.400	0.400	0.230	3.71	3.57	5
271	G.3	272		Layer	Clay floor	1.800	0.800	0.100	3.50	3.47	3
272	G.3	272		Masonry	North-south aligned stone footing	1.520	0.580	0.100	3.53	3.52	3
273	G.3	272		Cut	Construction cut for [272]	1.520	0.580	0.100	3.50	3.40	3
274	G.2/G.3	274		Layer	Trampled surface	1.510	0.780	0.015	3.70	3.68	5

APPENDIX 2: POST ROMAN POTTERY ASSESSMENT

Chris Jarrett

Introduction

A small sized assemblage of pottery was recovered from the sites (three boxes). The pottery dates from the Roman, medieval and post-medieval periods. None of the sherds show evidence for abrasion and only two sherds are laminated and so the assemblage was probably deposited fairly rapidly after breakage. The pottery consists of mostly sherd material and only two vessels have a complete profile. The pottery was quantified by sherd count (SC) and estimated number of vessels (ENV's), besides weight. Pottery was recovered from 69 contexts and as mostly small (fewer than 30 sherds) sized groups, except for one medium (less than 100 sherds) sized group.

The assemblage consists of 375 sherds/ 256 ENV/7.138kg, of which three sherds/3 ENV/126g are unstratified. The assemblage was examined macroscopically and microscopically using a binocular microscope (x20), and recorded in a database format, by fabric, form and decoration. The classification of the pottery types is according to the Museum of London Archaeology (2014). The pottery is discussed by types and its distribution.

The Pottery Types

The quantification of the pottery for each archaeological period represented is as follows:

Roman: one sherd, 1 ENV, 11g

Medieval: 144 sherds, 82 ENV, 1.536kg

Post-medieval: 230 sherds, 173 ENV, 5.591kg

Roman

The single sherd of Roman pottery consists of the neck of a jar in a very pale pink sandy fabric and was found in context [166].

Medieval and post-medieval

The range of medieval and post-medieval pottery is shown in Table 1 and quantified by sherd count, estimated number of vessels and weight.

Pottery type	Code	Date range	SC	ENV	Wt (g)
Medieval					

Pottery type	Code	Date range	SC	ENV	Wt (g)
Essex					
Harlow sandy ware	HARM	1200-1500	5	2	23.5
Mill Green ware	MG	1270-1350	1	1	1
Hertfordshire					
South Hertfordshire-type greyware	SHER	1170-1350	2	2	12
South Hertfordshire-type fine greyware	SHER FINE	1170-1350	1	1	9
South Hertfordshire-type flint-tempered greyware	SHER FL	1170-1350	1	1	45
London area					
Coarse London-type ware	LCOAR	1080-1200	2	2	11
Coarse London-type ware with early-style decoration	LCOAR EAS	1140-1200	1	1	10
Late London-type ware	LLON	1400-1500	3	2	48
London-type ware	LOND	1080-1350	57	16	286
Shelly-sandy ware	SSW	1140-1220	1	1	65
Surrey					
Cheam whiteware	CHEA	1350-1500	1	1	6
Early medieval Surrey iron-rich sandy ware	EMIS	1050-1150	2	2	18
Kingston-type ware	KING	1240-1400	9	9	452
Surrey-Hampshire					
Coarse Surrey-Hampshire border ware	CBW	1270-1500	19	15	102
Thames valley					
Early medieval gritty ware	EMGY	1080-1200	2	2	31
Early medieval sandy ware	EMS	970-1100	9	7	190
Early medieval shell-tempered ware	EMSH	1050-1150	5	5	40
Early medieval sand- and shell-tempered ware	EMSS	1000-1150	10	6	99
Unknown					
Early medieval sandy ware with calcareous inclusions	EMCALC	1000-1150	2	2	34
Miscellaneous unsourced medieval/post-medieval pottery	MISC	900-1500	2	2	9.5
Imports					
North French yellow-glazed ware	NFRY	900-1200	2	1	5
Red-painted ware with white fabric	REDP WHT	900-1250	7	1	39
Post-medieval					
Britain					
Bone china	BONE	1794-1900	2	2	14
Coloured-glazed refined whiteware	COLGE	1800-1900	1	1	14
Creamware	CREA	1740-1830	8	5	50
English brown salt-glazed stoneware	ENGS	1700-1900	2	2	61
Pearlware	PEAR	1770-1840	1	1	3
Pearlware with under-glaze blue transfer-printed stipple and line decoration	PEAR TR2	1807-1840	1	1	42
Sunderland-type coarseware	SUND	1800-1900	1	1	36
Refined whiteware with under-glaze transfer-printed decoration	TPW	1780-1900	4	4	24
Yellow ware	YELL	1820-1900	1	1	3
Yellow ware with slip decoration	YELL SLIP	1820-1900	1	1	104
Essex					
Metropolitan slipware	METS	1630-1700	1	1	1
Essex-type post-medieval black-glazed redware	PMBL	1580-1700	2	2	23
Essex-type post-medieval fine redware	PMFR	1580-1700	4	3	140
Essex-type post-medieval fine redware with brown glaze	PMFRB	1580-1700	1	1	7
London area					
London-area post-medieval bichrome redware	PMBR	1480-1600	1	1	7
London-area post-medieval redware	PMR	1580-1900	33	30	842
London-area early post-medieval redware	PMRE	1480-1600	36	27	1240
London-area post-medieval slipped redware	PMSR	1480-1650	5	2	203
London-area post-medieval slipped redware with green glaze	PMSRG	1480-1650	20	14	462
London-area post-medieval slipped redware with clear (yellow) glaze	PMSRY	1480-1650	13	10	648
English tin-glazed ware	TGW	1570-1846	4	4	16
London tin-glazed ware with blue- or polychrome-painted decoration and external lead glaze (Orton style A)	TGW A	1570-1650	1	1	1
London tin-glazed ware with plain pale blue glaze	TGW BLUE	1630-1846	2	2	16
London tin-glazed ware with plain white glaze (Orton style C)	TGW C	1630-1846	1	1	6

Pottery type	Code	Date range	SC	ENV	Wt (g)
London tin-glazed ware with pale blue glaze and dark blue decoration (Orton and Pearce style H)	TGW H	1680-1800	1	1	2
Midlands					
Midlands purple ware	MPUR	1400-1750	1	1	22
Surrey-Hampshire					
Surrey-Hampshire border whiteware with brown glaze	BORDB	1600-1700	1	1	25
Surrey-Hampshire border whiteware with green glaze	BORDG	1550-1700	29	13	362
Surrey-Hampshire border whiteware with olive glaze	BORDO	1550-1700	1	1	4
Surrey-Hampshire border whiteware with clear (yellow) glaze	BORDY	1550-1700	14	8	220
Early Surrey-Hampshire border whiteware	EBORD	1480-1550	2	2	11
Surrey-Hampshire border redware	RBOR	1550-1900	6	5	139
Imports					
Chinese blue and white porcelain	CHPO BW	1590-1900	1	1	8
Martincamp-type ware type III flask (red earthenware)	MART3	1600-1650	1	1	16
Frechen stoneware	FREC	1550-1700	13	10	467
Frechen stoneware inscribed band jug	FREC INSCR	1550-1580	1	1	21
Unsourced German stoneware	GERST	1480-1900	1	1	98
German whiteware	GERW	1550-1630	2	2	16
Cologne stoneware	KOLS	1500-1580	4	3	46
Dutch tin-glazed ware	DTGW	1512-1800	3	1	126
Dutch slipped red earthenware	DUTSL	1300-1650	2	2	38
Unknown					
Miscellaneous unsourced medieval/post-medieval pottery	MISC	900-1500	1	1	7

Table 1: WSA14. Quantification of medieval and post-medieval pottery types by sherd count (SC), estimated number of vessels (ENV) and weight in grams (Wt (g)).

The range of the forms recorded in the medieval pottery is shown in Table 2. The early medieval wares are mostly recorded as jars or cooking pots in the handmade coarse wares (EMCALC, EMGY, EMIS, EMS, EMSH, EMSS and the later wheel-thrown SSW), while the finer wares occur as glazed jug sherds in the coarse London-type ware (LCOAR, LCOAR EAS) and imported North French yellow-glazed ware (NFRY). Additionally, sherds from the same imported red-painted ware (REDP WHT) vessel were found in contexts [202], [203] and [204].

The assemblage shows that typically for the high medieval period (13th-early 14th century) in London that it is the London-type redware industry that supplies the table wares: jugs. The latter form also occurs in smaller quantities from Surrey, namely as Kingston-type ware (KING), besides Essex, which include products from Mill Green (MG) and unusually for central London, the occurrence of Harlow medieval sandy ware (HARM): found in contexts [75], [125], [137] and [138]. A rounded jug was also noted in the South Hertfordshire-type flint-tempered greyware (SHER FL: context [49]). Unusually cooking pots or jars (often supplied by the South Hertfordshire industry) could not be readily identified in the 13th-early 14th-century dated part of the assemblage, although these items may be represented amongst the non-diagnostic sherd material.

The late medieval pottery component of the assemblage, covering the period *c*. 1350-1500, is typically for the London area mostly composed of coarse Surrey-Hampshire border whiteware (CBW), dated 1270-1500 and this pottery type occurs mostly in the form of jugs, besides fragments of a cooking pot, a lid and a lobed cup. Non-diagnostic sherds of other late medieval wares are present as Cheam ware (CHEA) and late London ware.

Code	Cooking pot	Cup, lobed	Jar	Jug	Jug, rounded	Lid	Unidentified	Total
EMCALC	2							2
EMGY	2							2
EMIS	2							2
EMS			6					6
EMSH							5	5
EMSS							4	4
LCOAR				1				1
LCOAR EAS				1				1
LLON							2	2
LOND				16				16
SSW	1							1
HARM				2				2
MG				1				1
CBW	1	1		13		1		15
CHEA							1	1
KING				9				9
SHER							2	2
SHER FINE							1	1
SHER FL					1			1
NFRY				1				1
REDP WHT							1	1
MISC						1	1	

Table 2: WAS14: medieval pottery types and the forms that occur in these wares as quantified by ENV

The range of forms recorded in the post-medieval pottery types are shown in Table 3.

Code	Albarello	Bowl	Bowl or dish	Bowl or dish, carinated	Bowl, rounded	Cauldron	Chafing dish	Chamber pot	Charger	Dish	Dish, rounded	Drinking jug	Flask, globular	Flower pot	Jar	Jar, basket handled	Jar, rounded	Jug	Jug, bartmannen	Jug, rounded	Mug, cylindrical	Plate	Porringer	Saucer	Tea cup	Tripod pipkin	Water closet	Unidentified	Total
BONE																									1			1	2
BORDB																												1	1
BORDG	2		3		2		1			1													1					3	13
BORDO																	1												1

Code	Albarello	Bowl	Bowl or dish	Bowl or dish, carinated	Bowl, rounded	Cauldron	Chafing dish	Chamber pot	Charger	Dish	Dish, rounded	Drinking jug	Flask, globular	Flower pot	Jar	Jar, basket handled	Jar, rounded	Jug	Jug, bartmannen	Jug, rounded	Mug, cylindrical	Plate	Porringer	Saucer	Tea cup	Tripod pipkin	Water closet	Unidentified	Total
BORDY			2			2																				1		3	8
CHPO																						1							1
BW																													
COLGE					1																								1
CREA																						3						2	5
DTGW					1																								1
DUTSL											1																	1	2
EBORD												2																	2
ENGS																										1	1	1	2
FREC																			3	7									10
FREC																				1									1
INSCR																													
GERST																			1										1
GERW																												2	2
KOLS																		1		2									3
MART3													1																1
METS																												1	1
MISC							1																						1
MPUR																					1								1
PEAR																												1	1
PEAR																								1					1
TR2																													
PMBL															1													1	2
PMBR																												1	1
PMFR																	1											2	3
PMFRB															1														1
PMR		1	1											10	1		4											13	30
PMRE			1	1		2									2	1	3	1		1								15	27
PMSR																												2	2
PMSRG			3																									11	14
PMSRY			2	1																								7	10
RBOR			1														1											3	5
SUND		1																											1
TGW	1								1																			2	4
TGW A									1																				1
TGW								2																					2

Code	Albarello	Bowl	Bowl or dish	Bowl or dish, carinated	Bowl, rounded	Cauldron	Chafing dish	Chamber pot	Charger	Dish	Dish, rounded	Drinking jug	Flask, globular	Flower pot	Jar	Jar, basket handled	Jar, rounded	Jug	Jug, bartmannen	Jug, rounded	Mug, cylindrical	Plate	Porringer	Saucer	Tea cup	Tripod pipkin	Water closet	Unidentified	Total
BLUE																													
TGW C								1																					1
TGW H																						1							1
TPW		1	2																			1							4
YELL																												1	1
YELL																										1			1
SLIP																													

Table 3: WAS14: post-medieval pottery types and the forms that occur in these wares as quantified by ENV

The *c*. 1480-1600 dated local early post-medieval redware (PMRE) occurs mostly in the form of jars, with smaller quantities of cauldrons and jugs noted, besides bowls or dishes. The latter forms were the only ones noted in the counterpart slipware (PMSRY and PMSRG). The later developed redware PMR, dated from *c.* 1580, occurs also as mostly jars, besides a small number of bowls. However, flowerpots are the most frequent form recorded in this pottery type and indicate that horticulture was an important activity on the study area and the form was mostly recovered from 19th-century dated features.

Products from the Surrey-Hampshire borders include the early whiteware (EBORD), dated 1480-1550 and include sherds of two drinking jugs noted in deposit [75]. The later, sandier whiteware (BORD/B/G/O and Y), dated *c*. 1550-1700, are found as mostly bowls or dishes and smaller quantities of kitchen wares (cauldrons or tripod pipkins), besides table wares, such as a porringer, as well as a chafing dish. The redware from this source (RBOR) is poorly represented in the assemblage and only included the identifiable forms of a bowl or dish and a small rounded jar.

The fine redwares from Essex were mainly identified as only jar shapes and these were recorded in PMBL and PMFR/B, all dated *c*. 1580-1700, although the neck of a closed form occurred in *c*. 1630-1700 dated Metropolitan slipware (METS). The base of a *c*. 1580-1700 cylindrical mug made in Midlands purple ware is an unusual London find for this type of pottery and the item was found in context [212].

All of the English tin-glazed wares appear to have been made in London and are recorded as an albarello and chargers of a 17th-century date, while 18th-century items include three chamber pots (TGW BLUE/C) and a decorated plate (TGW H).

The industrial finewares, mostly made in the Midlands and particularly Staffordshire, date from the mid 18th century and are found mostly as tableware's in the form of plates (CREA and TPW) or bowls (COLGE and TPW), besides a smaller quantity of tea wares: a saucer (PEAR TR) and a tea cup (BONE). Additionally, fragments of two 19th-century water closets are recorded: one example was made in ENGS (context [162]) and the other item was unstratified and made in YELL SLIP and has a brown transfer-printed logo surviving as 'RDNO 195...' and 'THE/ACTIVUS/... DOWN CLOSET'.

The imported pottery mostly consists of 16th- and 17th-century German stonewares that occur in the form of rounded jugs, made in FREC/INSCR, GERST and KOLS. From the Low Countries are recorded a rounded dish made in DUTSL and a tin-glazed ware (DTGW) rounded bowl and both vessels date to the late 16th-early 17th century. The only French import is a red earthenware Martincamp-type ware (MART3) globular flask (context [215]). Blue and white Chinese porcelain (CHPO BW) was noted solely as a mid to late 18th-century dated plate with a garden scene (context [108]).

Distribution

The distribution of the pottery is shown in Table 4 which conveys for each context containing pottery its phasing, size, the number of sherds (SC) and ENV, besides weight. Additionally the date range of the latest pottery is shown (Context ED and LD) and a considered deposition date (spot date). The pottery was recovered from Phases 2-7.

Context	Phase	Size	SC	ENV	Weight	Context ED	Context LD	Spot date
1	7	S	2	2	6	1820	1900	Mid 19th century
4	6	S	3	3	53	1580	1700	1580–1700
8	7	S	1	1	1	1630	1700	1630–1700
22	6	S	1	1	1	1612	1650	1612–1650
24	4	S	5	5	516	1480	1600	1480–1600
45	6	S	9	9	272	1800	1900	1800–1830
46	6	S	7	7	262	1794	1900	1794–1900
47	6	S	6	6	110	1580	1600	1580–1600
49	6	S	5	4	133	1500	1580	1500–1580
50	6	S	6	6	273	1794	1900	1794–1900
62	4	S	1	1	12	1500	1700	1550–1700
63	4	S	3	3	32	1550	1600	1550–1600
66	4	S	2	2	47	1550	1600	1550–1600
67	4	S	1	1	13	1550	1700	1550–1700
72	4	S	3	3	53	1580	1900	1580–1900
73	4	S	1	1	187	1480	1650	1480–1650
75	5	S	17	14	459.5	1580	1900	1580–1650
90	6	S	5	5	100	1807	1840	1807–1840
97	4	S	1		20	1500	1580	1500–1580

Context	Phase	Size	SC	ENV	Weight	Context ED	Context LD	Spot date
97	4	S	1		59	970	1100	970–1100
98	2	S	1	1	10	1500	1580	1500–1580
100	4	S	2	2	19	1550	1700	1550–1600
104	2	S	1	1	20	970	1100	970–1100
108	6	S	6	6	47	1770	1840	1770-1840
113	6	S	4	3	31	1760	1830	1760-1830
116	4	S	2	2	2	1570	1846	1570–1846
119	4	S	2	2	19	1480	1650	1480–1650
121	4	S	3	3	9	1240	1400	1240–1350
125	3	S	41	14	159	1270	1500	1340–1500
130	3	S	3	1	16	1080	1350	1080–1350
131	4	S	2	2	24	1580	1900	1580–1700
134	3	S	4	2	16	1080	1200	1080–1150
136	3	S	2	2	9	1350	1500	1350–1500
137	3	S	23	5	77	1270	1350	1270–1350
138	3	S	1	1	13	1200	1500	1200–1400
149	3	S	6	4	19	1080	1200	1080-1200
150	2	S	3	3	10.5	1000	1150	1000–1100
160	5	S	1	1	16	1580	1700	1580–1700
162	5	S	3	3	81	1700	1900	Mid-late 19th c
163	2	S	5	3	78	1000	1150	1000–1150
166	2	S	1	1	11	50	400	50–400
174	4	S	1	1	8	1240	1400	1240–1400
175	4	S	3	3	91	1550	1580	1550–1580
177	3	S	1	1	9	1050	1150	1050–1150
181	3	S	1	1	5	1080	1350	1080–1350
185	3	S	3	3	81	1140	1220	1140–1150
188	2	S	1	1	6	970	1100	970–1100
190	2	S	1	1	4	1000	1150	1000–1150
201	2	S	1	1	24	970	1100	970–1100
202	2	S	1		5	900	1250	900–1250
203	2	S	2		8	1000	1150	1000–1100
204	2	S	6	3	66	1000	1150	1000–1100
205	2	S	3	3	19	1050	1150	1050–1100
206	2	S	3	3	53	1050	1150	1050–1100
211	4	S	7	3	187	1480	1650	Mid 16th century
212	4	S	5	4	60	1580	1700	1580–1700
214	4	S	25	15	437	1670	1900	19th century
215	4	S	21	12	360	1580	1900	1580–1700
216	4	S	21	11	404	1580	1900	1580–1700
228	4	S	1	1	14	1480	1650	1480–1650
234	5	S	14	12	609	1550	1700	1550–1600

Context	Phase	Size	SC	ENV	Weight	Context ED	Context LD	Spot date
235	5	S	4	1	51	1630	1846	1630–1846
236	3	S	1	1	7	1170	1350	1170–1350
243	4	S	28	18	740	1580	1700	1580–1600
259	5	S	9	7	367	1600	1700	1600–1700
261	5	S	1	1	4	1550	1700	1550–1700
271	3	S	1	1	26	1580	1900	1580–1900
1500	6	S	9	7	47	1740	1830	1740–1800
1501	4	S	1	1	9	1170	1350	1170–1350
1503	3	S	1	1	15	1080	1350	1080–1350

Table 4: WSA14: distribution of pottery types showing the phase, the size/number of sherds (SC), ENV, weight in grams, the date range of the latest pottery type and a spot date for each context pottery occurred in.

Significance of the Collection

The pottery has significance at a local level and the assemblage largely follows the ceramic profile for London. The pottery also reflects activity on Thorney Island and that associated with Westminster Abbey and its environs from the early medieval period through to the 19th century. The pottery is most likely to have been derived from a source on site or in close proximity to the study area. Comparable assemblages have been excavated nearby (Goffin 1995; Murray 2003; Stephenson and Pearce 2006; Jarrett 2015).

It is interesting to note that jars and cooking pots are under-represented in the assemblage for the high and late medieval periods. These forms are usually one of the two main ceramic shapes represented during these periods and would therefore indicate that the study area was not receiving rubbish from the kitchen area of Westminster Abbey.

Potential

The potential of the pottery is to date the features in which it was found in and to provide a sequence for them and a number of vessels would merit illustration or photographing. The medieval and post-medieval pottery is important for demonstrating what activities were happening on the study area between the 11th century and 19th century and how it relates to the occupants of the site.

Recommendations for Further Work

A short pottery report is required for the publication of the site and it is recommended that two vessels are illustrated and one item is photographed to supplement the text.

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APPENDIX 3: CLAY TOBACCO PIPE ASSESSMENT

Chris Jarrett

Introduction

A small sized assemblage of clay tobacco pipes was recovered from the site (one box). Most fragments are in a fairly good condition, indicating they had not been subjected to too much redeposition or were deposited soon after breakage. Clay tobacco pipes occur in seven contexts as small (under 30 fragments) sized groups.

All the clay tobacco pipes (sixteen fragments, of which none are unstratified) were recorded in a database format and classified by Atkinson and Oswald's (1969) typology and prefixed AO. The pipes are further coded by decoration and quantified by fragment count. The tobacco pipes are discussed by their types and distribution.

The Clay Tobacco Pipes

The clay tobacco pipe assemblage from the site consists of five bowls and eleven stems. The clay tobacco pipe bowl types are dated *c*. 1640 to 1710. None of the material shows evidence for makers or other marks. The stems have been dated according to their thickness and more so the size of the bores.

1640-1660

AO6: one spurred, rounded profile bowl with a damaged rim, with a bottered line (a tool was used to finish the rim and make it symmetrical) and there is no evidence for milling. The bowl has good burnishing. Additionally the bowl is burnt. Residual in context [234].

1660-1680

AO13: one heeled, rounded profile bowl with a bottered rim and no evidence for milling, while the burnishing is average. Context [123].

AO15: one spurred, rounded profile bowl with a damaged rim showing evidence of milling and an average quality of finish and the spur is missing. Probably residual in context [1500].

1680-1710

AO21: two tall angled heeled bowls with a rounded front and straight back with cut rims and a good finish. One bowl has its rim missing and the other complete bowl shows no evidence of milling. Contexts [234].

The stems

All of the stems were plain and those that were usually thick and with a pertinent wider bore were broadly dated *c*. 1580-1700 or to the 17th century. These types of stem were only present in contexts [50], [164] and [259]. Stems with fine bores were given a general date of *c*. 1730-1910 and were present in context [119], but also occurred in context [1500] and appeared to be later than the earlier bowl found with the stems.

Distribution

Table 1 shows the distribution of the clay tobacco pipes, showing the phase, number of fragments, the date range of the types and the latest bowl, the types of bowls present, together with a spot date for each context the tobacco pipes occur in. The material was only found in Phases 4-6 dated deposits. Where stems were the only clay tobacco pipe material found in a context then these were given a broad date range based upon the thickness of the item and the size of the bore.

Context	Phase	Size	No. of bowls/frags	Context ED	CTP LD	Part/bowl types	Spot date
50	6	S	1	1580	1910	Stem	17th century
119	4	S	1	1580	1910	Stem	1730-1910
123	5	S	2	1660	1680	x1 AO13, x1 stem	1660-1680
164	Void	S	1	1580	1910	Stem	17th century
234	5	S	3	1680	1710	X1 AO6m x2 AO21	1680-1710
259	5	S	4	1580	1910	Stems	17th century
1500	6	S	4	1730	1910	X1 AO15, x3 stems	1730-1910

Table 1: WSA14. Distribution of the clay tobacco pipes, showing which contexts contain clay tobacco pipes, the trench it occurs in, the number of fragments and the size of the group, the *terminus ante/post quem* (Context ED/LD) for the group and its suggested deposition.

Significance of the collection

The clay tobacco pipe assemblage has little significance at a local level and the bowl forms present are typical for London. None of the clay tobacco pipes show evidence for their manufacture on the site.

Potential

The clay tobacco pipes have the potential to date the contexts they were found in.

Recommendations for further work

If a short publication report is required on the clay tobacco pipes then it is recommended that the information is taken from this report.

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APPENDIX 4: CERAMIC BUILDING MATERIAL ASSESSMENT

Kevin Hayward

Introduction and Aims

Seven palettes and five shoe boxes of ceramic building material were retained from excavation from the multi-period site at the Song School (incorporating the medieval Buttery and *Frater*) Westminster Abbey. This large sized assemblage (737 examples 110.2kg) was assessed in order to:

- Identify (under binocular microscope) the fabric and forms of ceramic building material.
- A phase summary relating the fabric and form of the different ceramic building materials with the separate periods of Roman, early medieval, late medieval and post-medieval activity at the site.
- The compilation of a ceramic building material catalogue relating to the evaluation (WSA14 cbm.mdb) which accompanies this assessment.
- Spot dates of all contexts with building material (combined with stone).
- A separate report (Appendix 5) and catalogue (WSA14 stone. mdb) on the Roman, Saxon, medieval and post-medieval stone accompanies this document.
- Make comparison with the character and form of the ceramic building material assemblage from the adjoining site of the *Cellarium* (Hayward 2013; in prep a).
- Made recommendations for further study and identify any interesting or unusual pieces that warrant retention, analysis and illustration.

Methodology

Recording and analysis was done in-house. All the retained ceramic building material was examined using the London system of classification with a fabric number allocated to each object.

Very small brick, stone and mortar samples were taken from the extant walls of the Song School, whilst in accordance with Pre-Construct Archaeology sampling guidelines for archaeologically excavated walls, two whole bricks and mortar were retained for further analysis.

The application of a 1kg mason's hammer and sharp chisel to each example ensured that a fresh fabric surface was exposed. The fabric was examined at x20 magnification using a long arm stereomicroscope or hand lens (Gowland x10) Matches then made with the London fabric collection.

Consultation of the sections on building materials including stone from recent excavations around the *Misericorde* (Black 1976; Rigold 1977) and *Dorter* undercroft (Samuel 1995, 102-104) provided some

idea of material types. Finally the ceramic building material recorded from the adjoining *Cellarium* excavations (Hayward 2013; in prep a) provided an additional body of data.

Ceramic Building Material

Examples of Roman, medieval, post-medieval and early modern ceramic building materials are well represented reflecting the longevity of occupation at this important site. Please refer to Table 9 for a description and distribution of the mortar types from each period.

Roman (including daub; mortar; opus signinum) 82 examples 16.7kg

Size and form

The Roman ceramic building material, although comparatively small in number and weight when compared with the much larger *Cellarium* excavations (Hayward in prep a), still forms proportionally more than 15% of the brick and tile (all periods). This observation concurs with quantities from other parts of Westminster Abbey including the *Dorter* Undercroft excavations (99.3kg) (Goffin & Crowley 1995, table 6) and Dean's Yard (9kg) (Hayward 2015), all showing just how much Roman material, relatively speaking, lies beneath Westminster Abbey.

All are in a fragmentary state, dominated, as with the *Cellarium* by flattened elements like broken up tegulae and especially brick from the Phase 2 Saxo-Norman dump layers [104] [201] and no curved imbrex. The absence of curved elements would indicate that this group may have been selected from stockpiles of Roman building material from elsewhere in London and used as construction material, perhaps for the earliest Saxon church on the Island.

Tile Fabrics

The Roman fabrics are listed below (Table 1).

Fabric	Kiln Source	Date Range	Weight (kg)	%
2815 Early Sandy Group 2452; 2459a; 3006	Tileries between London and St Albans along Watling Street	50-160	8.8	55.7
2459b; Late Sandy Group	London or Essex	120-250	0.7	4.4
2454 Eccles Group	North-West Kent - River Medway	50-80	1.7	10.8
3060 Radlett Group	Radlett - Hertfordshire	50-120	0.3	1.9
Weald Silt Group 3238	Weald area south of London	60-200	0.4	2.5

Fabric	Kiln Source	Date Range	Weight (kg)	%
Calcareous Group; 2453; 3013	Coastal southern or south-east England	140-250	<0.1	0.3
West Sussex Grog 3054	West Sussex	70-140	3.7	23.4
Reigate Group 3055	Unknown	200-350	0.2	1.3

Table 1: List of Roman fabrics from the Song School Excavations at Westminster Abbey

The early 2815 sandy group (AD 50-160) was by far the most common fabric type. However, what was unexpected were the high proportion of other early fabric groups such as cream-yellow Eccles 2454 (AD 50-80) (10.8%) and especially the Hampshire Grog 3054 (AD 70-140), where nearly a quarter of the assemblage by weight is represented (and all brick). As with the *Cellarium* there was a dearth of late Roman fabrics, suggesting that the consolidated deposits/building materials at Westminster (if salvaged) derived from early buildings in *Londinium* or the immediate surroundings at Westminster.

Brick 37 examples 11.8kg (70.3%)

Forming by far the most frequent and largest elements of the Roman sequence are examples of brick, used particularly in Phase 2 Saxo-Norman consolidation dumps, e.g. [104] [201]. They are also common in the area of the *Cellarium* (Hayward in prep a). Two examples from [102] [104] are partially complete each exceeding 1.5kg. The thickness of some of these fragments 48-57mm, e.g. [201], would indicate that some at least derive from Lydian or Pedalis sized bricks. However, the thickness of a majority 27-32mm would suggest Bessalis sized elements. An interesting example from [104] with an impression of a small plank from [104] may relate to the structure of a kiln.

That they were reused in the footings of later medieval and post-medieval walling is borne out by their presence in the Phase 4 courtyard [100].

Tegulae and Tile 33 examples 3.9kg

Second only to the brick (23.3% by weight) are numerous examples of small broken up flat and flanged elements, that all relate to tegulae. With only the flanged roofing elements identified from these excavations present (see below), selective stockpiling and use of flatter examples of Roman ceramic building material for the consolidation dumps and possible construction material of the earlier Saxon church at Westminster is inferred.

Imbrex

Absent

Cavity Walling 1 example <0.1kg

A solitary angled box flue element [185] in the early Eccles fabric (AD 50-80) represents the sum total of cavity walling elements from the excavations. It may represent a small fragment of an armchair voussoir.

Tessera

Absent

Opus signinum 3104 3 examples 0.5kg

Remnants of hard pink Roman concrete (mortar Type H) were found attached to some Roman brick (e.g. Saxo-Norman dump [102]) or as individual lumps such as those present in the medieval Phase 3 kitchen dump [185] and chalk footing to the stone seat [257]. The *Cellarium* too had a large quantity of remnant opus signinum attached to Bessalis and Lydian sized brick, often reused in later medieval and post-medieval structures.

Daub 3102 5 examples 0.1kg

It is not clear whether some small lumps of orange daub found in Phase 4 flooring [116] [131] are medieval or Roman in date. However, as with the *Cellarium*, these chunks are dispersed widely throughout the sequence and as such require no further comment.

Medieval 157 examples 20.3kg

Unlike the excavations from the *Cellarium* the small medieval assemblage (18.5% by weight) at the Song School is dominated by floor tile (85% by weight). Roofing and coursing tile (peg tile, bat tile, curved tile) on the other hand is of only secondary importance. The medieval walls and foundations, especially Phase 2 (Table 2) are instead constructed out of stone rubble and reused ashlar and mouldings and where present, bonded in Gravel mortar Type B, with some supplementary Roman tile and brick and floor tile.

Context	Fabric	Type	Suffix	Mortar	Phase	Structure
26	3105	S	RUBB			Kentish Ragstone
30	3107; 3143	S	RUBB	-	2	Barnack stone, Reigate stone used in EAST WEST ALIGNED FOOTING S5

Context	Fabric	Type	Suffix	Mortar	Phase	Structure
31	3107; 3119; 3143	S	RUBB	-	2	Barnack stone, Caen stone and Reigate stone north wall of frater S6
37	3101	M		B	1-2	East-west aligned footing
40	3116	S	RUBB	-	2	Chalk rubble east-west aligned footing S5
70	2324; 1810; 3101	FT, M		L	3	Rubble footing east wall of courtyard as [124]
71	3119; 3101	S, M	RUBB	L	3	Staircase footing as [127]
100	2459A; 2587; 3101	TP, RB, M		B		Chalk rubble footing east wall of courtyard as [120]
120	2324; 2894;	FT		B AND L	3	Penn tile used in chalk rubble footing east wall of courtyard as [100]
124	3101; 2586; 3116	TP, S, M		B	3	Rubble footing east wall of courtyard as [70]
257	3101	M		L	3	N chalk footing of north wall refectory
265	3119	S	ASH	-	3	Doorway cut for chalk footing of north wall refectory

Table 2: Phases 2-3 medieval walls Song School WSA14

Roofing and Coursing Materials 44 examples 3kg

With no stone roofing materials recovered (see Hayward in prep a), it is clear that some of the medieval material used to roof this part of Westminster was covered by glazed ceramic tile as well of course as the documented use of lead.

Unlike the *Cellarium*, quantities are much smaller encompassing the standard nailed flat peg tile, shoulder or bat tile and curved tile.

Bat Tile 2272; 2273 (1135-1220) 4 examples 0.2kg

The very thick (16-26mm) glazed curved, shouldered or bat tile made from the very coarse, early sandy and shelly fabrics 2272 and 2273 represent the earliest medieval ceramic roofing associated with this part of Westminster Abbey. They have been dumped in Phase 5 pit fills, e.g. [259].

Curved Tile 2271 (1180-1450) 1 example <0.1kg

A solitary curved tile was recovered from a Phase 4 dump layer [243].

Peg Tile 39 examples 2.8kg

Sandy Fabrics 2271 (1180-1450) 2272 [1135-1220]

Iron Oxide Fabrics 2586 (1180-1500) 2587 (1240-1450)

Organic Fabric 2274 (1080-1350)

Medieval peg tile defined by all or some of these features: splash glaze, a characteristic fabric type, an uneven often thin form with a prominent raised area or plug surrounding the nail hole and coarse moulding sand appears intermittently in the sequence. However, there are notable concentrations in and around the fill [125] of the Phase 3 robber cut [126] and Phase 3 construction [143] and demolition layers [137], whilst it is evident they were used in the footings of Phase 4 walls [100] possibly as bonding courses.

These roofing materials invariably had a soft light brown sandy lime mortar with chalk inclusions and occasional shell attached (T3 see Table 4).

Floor Tile 104 examples 16.2kg

There are a large group of 12th-14th-century plain glaze and decorated floor tile from the Song School excavations. Although the same fabric groupings are represented as the *Cellarium* (with the notable absence of the very fine Norman Tile 3092), their proportions differ widely.

Early Tile 2273 (1135-1220) 2 examples 0.5g

Evidence for the same 12th-century floor tile that turned up in the *Cellarium* Phase 4 mortar surface [232] possibly used to pave the *Misericorde* or *Cellarium* (Hayward in prep a) in the form of dark-brown plain-glazed very thick (36mm) tile in coarse sandy fabric 2273 (1135-1220) turn up reused at the Song School from [1501] and [47]. Examples of this brown glazed tile have recently turned up in London at Bermondsey Abbey (Hayward in prep b) from the late 12th-century conventional church and the 12th-century Cistercian monastic church from St Mary Stratford Langthorne (Barber *et al.* 2004).

Westminster Floor Tile (1250-1310) 2199; 2851 2892; 3081; 12 examples 1.8kg

Locally produced late 13th to early 14th-century medieval decorated and plain glazed Westminster flooring tile is rather poorly represented when compared with the excavations at the *Cellarium* where they form upwards of 80% of medieval floor tile (Hayward in prep a). Three designs have been picked out from [22] [24] [47] (Table 3). Most are made from the fine black and red iron oxide rich, micaceous 2892 fabric with a reduced core or the coarser sandy 2199 and occasionally the very fine sandy fabric 3081 [142] “fine clay group” of Betts (2011; 205-6; fig. 144). Plain glazed examples are typically

yellow and black glazed and would have formed the alternative chequered borders of groups of design, with a singular triangular example from a 16th-century dump layer [243] originally used as a border edge.

Design (Betts number)	Context	No.	Fabric	Description Design
W13	22	1	2851	Three Lions
W133	24	1	2199	Flower petal
W128	47	1	3081	Flower petal

Table 3: Westminster Tile Designs from the Song School

Penn Floor Tile (1350-1390) 1810; 1811; 2324; 2894; 3076 87 examples 13.4kg

In complete contrast to the *Cellarium*, there are considerably later, small 14th century (1350-1390) plain and decorated Buckinghamshire Penn Tiles in the Song School. Many still retain the crisp coloured yellow glaze over slip and a range of designs (Table 4) most of which have been identified from the Eames Catalogue (1980), with the exception of one example. From the area of the Song School, Penn Tile is found in chalk rubble footing structures [70] and [120]. The backing of these was covered in a white lime mortar (Type L).

Eames Design	Context	No.	Fabric	Description Design
E1772	120	2	2894	Lion design
E1909	75	1	2324	Dog chasing stag
E2227	70, 135	2	2324	Large fleur-de-Lys
E2322	70, 215, 245	4	1810, 1811, 2324	Worn floral design
E2354	+, 70	2	1811; 1810	Large decorated petal
NEW	63	1		New design

Table 4: Penn Tile Designs from the Song School

Flemish Calcareous Floor Tile (1380-1550) 1678 calcareous rich 3 examples 0.5g

The few medieval imported plain glazed Flemish calcareous floor tiles were recovered from an unstratified context. That so little of these tiles were used in the flooring from this part of the Abbey can be shown by a similarly small proportion from the *Cellarium* (Hayward in prep a).

Brick 3039nr3042 (1400-1550) 1 example 0.4kg

Part of a very crinkly, small (85mm wide x 39mm deep) late medieval brick was recovered from a Phase 4 dump layer [97]. The form and fabric are typical of local, early-mid 15th-century sandy manufacture.

Mortar 3101 64 examples 3.5kg

Two medieval mortar types could be identified a loose pale cream-gravel mortar (Type B) which is somewhat similar to the very gravelly brown recipe T11 from the *Cellarium* used in the earliest stone masonry features (Hayward 2013) and a very fine white mortar (Type L) used in the backing of the Penn floor tile. A full description of their texture and distribution are given below (Table 9).

Late Medieval -Early Post-medieval – Transitional 352 examples 39.3kg

Dating to the very latest medieval into the 16th and 17th centuries, ceramic building material from this phase is characterised by the use of both a loose grey brown sandy lime mortar (Type A) (Type 6 of the *Cellarium*) and a hard very pale cream white lime mortar with large 15-20mm inclusions of Chalk (Type C) (Type 3 of *Cellarium*). Rather like the *Cellarium* excavations (Hayward 2013), structures from this period mainly relate to flooring surfaces and brick lined drains (Table 5).

Floor Tile 1977; 2318; 2320; 2850; 3063 (1450-1600) 46 examples 6.8kg

Common plain –brown and black glazed Flemish silty floor tiles dating to the late medieval - Tudor period come in two sizes in the Song School. Most are relatively thick (27-32mm) forms that typify the period 1480 and 1550. However, there are a small group of smaller, very thin 18-22mm tiles which are probably earlier (1450-1500). It is interesting to note that no yellow glazed tiles were recovered. Although this observation may merely be by chance, the possibility exists that the flooring decoration dating to the 16th century was a rather plain, drab surface. Examples concentrate in levelling layers at the entrance to the cloisters [1500] and [1501] but later early 17th-century unglazed floor tiles were recovered from brick lined drain [146] and stone footing [210].

Brick 3033; 3046; 3047 (1450-1700) 36 examples 6.9kg

Red Tudor bricks (1450-1700) made of local sandy brickearth form only a small part of the overall assemblage, and were used in three Phase 5 structures, namely brick floor [52] [144] and the east wall footing of No. 2 The Cloister. They are either pointed in a loose brown sandy chalk mortar (Type A) [144] or a hard very pale cream white lime mortar with large 15-20mm inclusions of Chalk (Type C).

Context	Fabric	Type	Suffix	Mortar	Phase	Structure
52	3047	B	PAV	-	5	Paving red brick used in brick floor
79	3046; 3119; 3101	B, S, M	U, ASH	-	5	Red Brick and Caen stone ashlar with a lime mortar possibly Type C in east wall

Context	Fabric	Type	Suffix	Mortar	Phase	Structure
						footing of No.2 The Cloister
144	3126A; 3101; 3033	S, B, M	DR, U	A	5	Large Tudor brick and Purbeck limestone drain cover Type A mortar. Brick floor
146	1977; 3101	FT M	UNGL	C	5	Unglazed floor tile Type C lime mortar. Brick lined drain
210	1977	FT	UNGL	-	-	Unglazed floor tile. Stone footing
262	2276	TP		-	5	Complete early post-medieval peg tile. Brick lined drain

Table 5: Phases 4-6 excavated walls Song School WSA14

Structure	Date	Mortar Type	Description
South wall of refectory	1500-1800	C	Lime mortar
North wall of refectory	1500-1800	C	Lime mortar
F5 east core of wall and sample A	1500-1800	C	Lime mortar
F6 east wall and Sample A	1500-1800	C	Lime mortar
F6 west wall Sample B	1500-1800	C	Lime mortar and red brick 3046
S8 north wall Sample A	1500-1800	C	Lime mortar

Table 6: Phases 4-6 in-situ Song School walls WSA14

Peg Tile 251 examples 24.4kg

2276 (1480-1700); 2586 (1400-1800); 2271 (1400-1800)

Examples of peg tile in the common red London sandy fabric 2276 and lesser quantities of fabrics 2271 and 2586 dominate the earlier post-medieval assemblage (62%). Furthermore, there is up to x10 more post-medieval peg tile than glazed medieval peg tile. This is in complete contrast to the *Cellarium* excavations where x3 more medieval peg tiles were identified when compared with post-medieval peg tile (mainly the strong room), where it is used as Phase 5 coursing and paving materials in the Strong Room (Hayward 2013). They served a similar function at the Song School where a complete peg tile was used in a brick lined drain [262].

Mortar 3101 8 examples 75g

Two mortar types were identified in the in-situ walls (Table 6) and structures (Table 5) associated with the early post-medieval development of the Song School. Type C, a hard very pale cream white lime mortar with large 15-20mm inclusions of Chalk is especially common in the in-situ walls of first and second floor including Room 5, 6 and 8 and the north and south wall of the refectory. These are comparable with Type 3 mortars from the *Cellarium*. If these are the primary bedding mortars then these structures were built or rebuilt between the 16th and 18th centuries. The second mortar type, Type A is a browner sandy lime mortar (Type 6 of the *Cellarium*) associated with the red Tudor brick floor [144].

Later Post-Medieval 140 examples 31.5kg

Later post-medieval alterations, repairs and builds in the Song School were prevalent in the excavated walls (Table 7) as well as the in-situ structures (Table 8). These repointed, replaced and new stone and brick walls, like the *Cellarium* with its subdivision into No.1 The Cloister (north) and 20 Dean's Yard (south) and Blackstock Yard (R10) (Hayward 2013) were bonded by a whole plethora of harder Georgian-Victorian and 20th-century mortars and hydraulic cements (Types D, E, F, J, K) (Table 9).

Context	Fabric	Type	Suffix	Mortar	Phase	Structure
9	3033; 3035; 3261	B B KBRU	U F	-	6	Reused Tudor brick, Victorian-Edwardian machined frogged Medway and kiln brick used in north-west-south-east aligned wall
10	3033	B	U	K	7	Reused Tudor brick in a grey mortar in east-west aligned footing
29	3107; 3032; 3035	B S	U ASH	-	6	Narrow post Great Fire and yellow Medway brick and reused Reigate 1780+ in brick arch
32	3110PM; 3035	B S	U	-		Yellow Medway brick fragments and Portland limestone 1780+ used in refacing south wall of frater
55	3032; 3101	B M	U	E	-	Narrow Post Great fire brick and Coal Type E mortar Late 18th/Early 19th century (repairs?) brick footing No. 2
61	3032, 3101	B M	U	K	-	Narrow post Great Fire brick in a grey mortar 1750-1900 in Servants Privy
67	3032; 3107; 3101	S B M	ASH U	F	-	Caen stone and post Great Fire brick wall in Type F mortar pale green grey woody brick mortar 1750-1900. Caen stone and

Context	Fabric	Type	Suffix	Mortar	Phase	Structure
						brick wall
76	3101	M		D		Type D mortar sandy limonite rich concretionary quartz 1666-1800 east-west aligned wall
80	3032, 3101	B	U	E	-	Narrow post Great Fire brick in coal Type E Mortar 1750-1900. Brick floor
83	3107; 3101	S M	ASH	K	6	Reigate stone ashlar pointed in Type K grey cement 1750-1900 in north-south aligned wall
84	3151; 2276; 3101	S TP M	ASH	K	6	Taynton stone ashlar, peg tile and Type K grey cement 1750-1900. Alterations to north aligned wall [83]
86	3151; 3101	S M	ASH	F	6	Taynton stone ashlar, and Type F Pale green grey woody brick mortar 1750-1900 alterations to east-west lined stone footing [96]
96	3152; 3101	S M		F	6	Corsham Stone and Type F Pale green grey woody brick mortar 1750-1900. East-west lined stone footing
171	2271; 3101	TP M		D	-	Peg tile and Type D Sandy limonite rich concretionary quartz mortar 1664-1800?? Possibly repointed earlier east west aligned stone wall
268	3032nr3033; 3101	B M		K	5	Transitional post Great Fire brick and grey mortar 1700-1800+ brick lined drain

Table 7: Phases 6-7 later post-medieval structures from the Song School

Structure	Date	Mortar Type	Description
F5 east wall and Sample B	1664-1800	D	Sandy limonite rich concretionary quartz mortar
F5 west wall	1850-1950+	J	Modern olive green Roman Cement with post Great Fire brick
S8 north wall	1890-1950+	J	Modern olive green Roman Cement with fletton brick 3038
S8 north wall Phase B	1664-1800	D	Sandy limonite rich concretionary quartz

Structure	Date	Mortar Type	Description
			mortar
S8 west wall	1890-1950+	J	Modern olive green Roman Cement with Fletton brick 3038
S8 chimney	1500-1800	C	F Pale green grey woody brick mortar 1750-1900 and post Great Fire brick

Table 8: Phases 6-7 in-situ later post-medieval structures from the Song School

Brick 25 examples 9.9 kg

Post Great Fire 3032; 3034; (1664-1900) 13 examples 6.3kg

Many of the excavated and in-situ brick structures (Tables 7 and 8) are constructed out of common post Great Fire bricks made from clinker mixed in with poor quality clays. These are mainly small, narrow unfrogged forms, which means that they were used after the introduction of the brick tax in 1776. Despite this wide date range, most of the structures can be dated from the late 18th century until 1900, as their narrow (95-105mm) and thick (62mm+) dimensions conform to the standards of the 1770s brick tax. Similar sized bricks were recorded from the adjoining *Cellarium* in the Victorian wine cellar, and improved drainage to 20 Dean's Yard and constructions associated with Blackstock Yard.

London Yellow 3035 (1780-1940) 5 examples 3.8kg

Yellow bricks manufactured from Estuarine Clays around the Medway were used in London after 1780. They are present in the garden fill [45] and refacing to the south wall of the *Frater* [32]. In the *Cellarium* they are used in the kitchen at 20 Dean's Yard (Hayward 2013).

Victorian Red 3033V (1800-1950) 3 examples 2.4kg

A machine made frogged Victorian reds were used in the garden fill [45] and the west wall of G3 [169]. Similar red bricks were used construction of the well [363] in the area of 20 Dean's Yard (R5) from the area of the *Cellarium*.

Fletton Bricks 3038 (1890-Present Day) 5 examples 0.2kg

Deep frogged dense bricks manufactured from Jurassic Oxfordian Clays from Peterborough only became important from the 1880s onwards. Brick samples retained from in-situ north and west wall of S8 and the fill of the construction cut for the underpinning of the east wall of the courtyard. From the

Cellarium Fletton brick was identified in the west and east half of the south wall [568] [569] of No.1 The Cloister and the brick infill in R17B.

Kiln Bricks 3261 (1850-1950) 1 example 4.2kg

The manufacture of heat resistant, dense refectory bricks made from high alumina Carboniferous clays from the Coal Measures only really began after 1830 following some innovations in blast furnace process which demanded higher temperatures. Their widespread distribution, followed in the 1850s with the advent of larger scale kiln brick production e.g. Glasgow and improved rail and shipping links. A solitary plinth frogged example from demolition layer [77] stamped 3X RMP may have come from a flue perhaps relating to a fireplace where other kiln bricks were identified from a diagonal fireplace in R3/4 of No.1 The Cloister in the *Cellarium* (Hayward 2013).

3498 Gault Brick (1800-1900+) 1 example

An example of a pale cream dense brick manufactured from the Lower Cretaceous Gault clays of Bedfordshire was recovered from a garden soil [7]

Roofing Material

Peg Tile (1700-1900) 2276M 46 examples 2.8kg

A large quantity of modern machine made peg tiles and those with a very fine moulding sand were found in quantity from the fill of the garden bed [45].

Chimney fragments (1700-1900) 2276M 17 examples 1.6kg

Very fine chimney fragments with soot present were recovered from a demolition layer and fill of a garden bed [45] [46]. Their fine moulding sand is consistent with a Victorian manufacture.

Garden Ornamentation 3261 (1850-1950) 1 example 0.3kg

Also from the garden bed feature [45] is a moulded glazed item of garden border ornamentation made from high aluminium clays from the Carboniferous of northern and western Britain.

Mortar; Cement

A summary of Roman, medieval and post-medieval mortar types and concrete as well as their period of use from the excavations at WSA14 are given below (Table 9).

Mortar/Concrete Type	Description	Use at WSA14
Type A Earthy red-brown chalky lime mortar	Red to grey brown loosely compact limonitic lime mortar with chalk lumps 15-20mm in diameter very rare charcoal and red brick flecks	Late medieval early post-medieval 1450-1700 Phase 5 Rare associated with red Tudor brick floor [144] and its mortar bedding [145] and north wall of G1 [246]. Similar to T6 mortar *Cellarium*
Type B Pale cream flint gravel mortar	Pale cream flint gravel mortar with large 15-2mm angular grey flint fragments fine angular sand inclusions set in a soft lime mortar	Medieval 1050-1500 Phase 2-3 medieval stone walling of frater and refectory [37] [100] [120] [124] and features [137] [185] somewhat similar to T11 medieval mortar *Cellarium*
Type C Pale cream-fawn lime mortar with large chalk fragments	Concretionary, hard pale-cream lime mortar with large chalk fragments up to 25mm across see Type 3 *Cellarium*	Later medieval early post-medieval 1450-1600 walling features. Very common. South and north wall refectory, F5 east wall, F6 east and west wall brick lined drain [146]. Also [2] [4] [22] [24] [53] [66]. Similar to Type 3 *Cellarium* mortar
Type D Very hard pale cream quartz rich lime mortar small chalk fragments	Very hard pale cream quartz rich lime mortar small chalk fragments	Post-medieval 1664-1800+. Associated with post Great Fire bricks. Common. FR east wall Area B, S8 north wall Area B, [76] [171]
Type E White lime shell mortar coal fragments	White lime shell mortar with complete small 10mm bivalve shells and coal	Later post-medieval 1750-1900 structures [55] [80] also feature [169] [222] [232] see Type 9 *Cellarium*
Type F Soft pale green grey mortar with organic inclusions	Soft, pale green grey mortar with organic (wood) inclusions flecks of shell, flecks of charcoal giving off grey colour, occasional quartz	Later post-medieval 1750-1900 structures Chimney S8, [67], [85] [96] also features [77].
Type G Hard green grey concrete mortar with flint gravel	Hard green grey concrete mortar with large flint gravel and occasional charcoal	Mid-19th to 20th century “Roman” cement with gravel found with modern roofing tile in garden bed [45]
Type H Opus signinum	Hard, concretionary white to pink cement with 20mm angular chunks of Roman ceramic building materials	Roman [102] [185]
Type I Very hard cream-grey concrete mortar	Very hard cream-grey concrete mortar with small gravelly flint fragments	Mid-19th-20th century “Roman” cement from Flower Bed similar to Type 4 *Cellarium*
Type J Olive green porous mortar no charcoal	Olive green porous textured mortar like Type F but lacking charcoal and wood inclusions	1890-1950+ in structures F5 west wall S8 north wall, and west wall. Associated with Fletton brick
Type K Grey soft clinker mortar	Grey to brown grey soft clinker mortar	1700-1850+ associated with structures having replacement stone ashlar and narrow post Great Fire bricks [10] [61] [83] [84] [268]. See Type 12 of *Cellarium*
Type L very white lime mortar	Fine white lime mortar	Medieval probably 1350-1390+

Mortar/Concrete Type	Description	Use at WSA14
		Penn Tile mortar [70] [71] [120] [257] Similar to Type 7 *Cellarium*

Table 9: List of mortar types identified from the excavation at WSA14

A comparative review of the mortar types (Table 9) from the Song School and the *Cellarium* (Hayward 2013), shows a certain amount of correlation. Of particular note are the similarities between the main medieval gravel mortar Type B of the Song School and Type 11 of the *Cellarium* associated with stone wall construction between 11th and 14th century, e.g. Phase 3 R5 pre *Cellarium* footing [455] [458], Room 17B Wall foundation [962] and Room 14 E-W aligned wall [857] and even the *Misericorde* steps [159]. Two later medieval to early post-medieval mortar (Types A and C) are comparable with Type 6 and 3 respectively, whilst there is a degree of correlation with some of the later Victorian to 20th-century cements. That said, many of the *Cellarium* mortars, especially the earliest medieval Tufa rich Type 13 and 14 mortars are completely absent which may suggest that very early 11th-12th-century walls in the area of the *Cellarium*/*Misericorde* are not so conspicuous in the *Frater*.

Phase Summary

Residual Roman

Unlike the stone assemblage (see Appendix 5), considerably more Roman brick and tile was recovered from the assemblage, (proportionally 15% weight all periods). Largely in a fragmentary state and like the *Cellarium* dominated, by flattened elements especially brick from the Phase 2 Saxo-Norman dump layers [104] [201] with no curved imbrex. Selective acquisition or stockpiling of flattened brick and tile elements for building of a pre-Confessor church/abbey is inferred.

Early Medieval (1060-1150)

Very little of the ceramic building material can actually be dated to this earliest phase. Only the occasional bat or shouldered roofing and plain glazed floor tile, both in the coarse sandy fabric 2273 (1135-1220) may belong here and it is not clear whether some if any of the mortared chalk walls (Type B mortar) actually belong here. Earlier stone types (Barnack; Alwalton) on the other hand are represented. The *Cellarium* area, provides better evidence for earlier builds with mortar types (Type 13 and 14) and Confessor brown glazed floor tile (1070-1120) present as well as early rock types (Quarr, Bembridge, Tufa).

Medieval

It seems likely that the later medieval flooring in this or an adjacent area was decorated in two phases. First between 1250 and 1310 by patterned Westminster Floor Tile and even more so by a range of 14th-century Penn Tile designs (at least six). This is in concordance with the stratigraphic

evidence where a number of floor surfaces were recorded. It is of note that the *Cellarium*, has far fewer Penn Tiles but far more earlier Westminster Tile. Stone walling, using mortar gravel mortar type B was comparable with Type 11 mortar from the 11th to 14th-century walls of the *Cellarium*/*Misericorde* suggesting that some of the walls at least may been constructed during one building campaign. Some of these walls relate align with the south wall of the *Frater* and may relate to a stairwell to the Cawagium.

Later medieval / Early post-medieval

A larger group of standard red peg tile, Tudor brick and Flemish glazed floor tile define this period bonded in two mortar types A and C. Mortar Type C is frequently associated with brick flooring and drainage features but also the construction or maybe repointing of the north and south wall of the refectory, as well as rooms F5 and F6. This period is associated with the construction of a number of new buildings following the demise of the *Frater*.

Later post-medieval

In addition to the usual group of harder Victorian stone materials quarried for use in setts (granite), paving (York stone and other Carboniferous sandstone and ashlar freestone (Portland, Corsham Beds) (see Appendix 5) there is also a number of walls built out of the post Great Fire clinker bricks and later fabrics. More especially these are thin, and small conforming to the brick tax regulations after 1774 and bonded in a range of hard durable gravel mortars, hydraulic cements (D; E; F; G; I; J; K) that typify construction between 1750 and 1900+. Kiln bricks, Gault bricks and Fletton bricks demonstrate that many of these walls, e.g. S8 north and west walls, were constructed/repaired after 1890. Some of the 18th-19th-century walls no doubt relate to the construction of No. 2 The Cloister.

Ceramic Building Material and Stone Spot Dates

a) Sampled in-situ walls and Flower Beds

Prefix F = First floor; Prefix S= Second floor. Number refers to room number

Wall or Feature	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
Flower Bed	3108; 3101	York stone paving slab and Type I Victorian-modern mortar	2	1700	1950	1700	1950	1800-1950	1850-1950
South Wall of	3101	Type C lime	3						1450-1600+

Wall or Feature	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
Refectory		mortar							
North Wall of Refectory	3101	Type C lime mortar	1						1450-1600+
F5 East Wall Core of wall	3101	Type C lime mortar	6						1450-1600+
F5 East Wall Sample Area A	3101	Type C lime mortar	1						1450-1600+
F5 East Wall Sample Area B	3101; 3032R	Red post Great Fire brick and Type D brown lime mortar	3	1664	1900	1664	1900	1664-1900	1664-1800+
F5 West Wall	3101;3032	Post Great Fire brick and Type J modern cement	2	1664	1900	1664	1900	1664-1900	1850-1950+
F6 East Wall Phase A	3101	Type C lime mortar	1						1450-1600+
F6 West Wall Phase B	3101; 3046	Type C lime mortar and early post-medieval brick	2	1450	1700	1450	1700	1500-1700+	1450-1600+
S8 North Wall	3101;3038	Type J modern cement Fletton Brick	2	1890	1960	1890	1960	1890-1960+	1850-1950+
S8 North Wall Phase A	3101	Type C lime mortar	1						1500-1800
S8 North Wall Phase B	3101	Type D brown lime mortar	1						1664-1800+
S8 West Wall	3101; 3038	Type J modern cement Fletton brick	3	1890	1960	1890	1960	1890-1960+	1850-1950+
S8 Chimney	3101; 3032	Type F mortar, post Great Fire brick	2	1664	1900	1664	1900	1700-1900	1750-1900

b) Archaeological features (Evaluation)

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
0	3032; 2586; 2850; 2324; 1811; 3054; 1977; 1678; 3101; 2276; 3063	Narrow and thick post Great Fire brick; later post-medieval peg tile; shallow and thick silty Flemish floor tile glaze; Thick Calcareous glazed floor tile; Penn tile fragments including one with Eames design no. 2354; Roman grog inclusion brick; concrete moulding; modern chimney fragment	18	70	1900+	1664	1900+	1850-1900+	1875-1950+
1	3032nr3034; 2271; 2276	Post Great Fire brick, medieval peg tile, post-medieval peg tile	3	1180	1900	1664	1900	1664-1900	No mortar
2	3101	White lime and sand possibly Type C	1						1450-1600+
3	3101	Grey mortar	1						1700-1850
4	2276;3101	Post-medieval peg tile white lime and sand mortar Type C	2	1480	1900	1480	1900	1480-1700+	1450-1600+
5	3032nr3034; 2586	Post Great Fire brick and medieval to early post-medieval	2	1180	1900	1664	1900	1700-1900	1800-1950

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		peg tile hard grey cement mortar Type G							
7	3498; 2271; 2586; 2276	Gault brick, medieval and post-medieval peg tile some burnt relict Type C on peg tile	5	1180	1900	1770	1900	1770-1900	1500-1800 residual mortar
9	3035; 3261; 3033	Frogged Medway brick; kiln brick, Victorian red	3	1450	1950+	1850	1950	1850-1950+	No mortar
10	3033	Reused twice unfrogged uneven early post-medieval red brick pink mortar on edge and grey on top of this	1	1450	1700	1450	1700	1450-1700+	1700-1850
11	2276; 3101	Peg tile and grey mortar	1	1480	1900	1480	1900	1480-1900	1700-1850
12	2279	Pan tile	1	1630	1850	1630	1850	1630-1850	No mortar
14	2586; 2276	Reused medieval and post-medieval peg tile	2	1180	1900	1480	1900	1480-1900	No mortar
22	2276;2851; 2452; 3033; 2271nr2586; 3101	Westminster floor tile 3 lions W13 design; Roman Bessalis, early post-medieval red brick; early post-medieval peg tile Type C mortar	6	55	1900	1480	1900	1480-1700	1450-1600+
24	2199; 2271; 2586; 2279v	Westminster floor tile design	9	1180	1850	1630	1850	1630-1700+	1450-1600r

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
	3101	W1333, Splash medieval peg tile, coarse pan tile, early post-medieval peg tile Type C mortar?							
26	3105	Kentish Ragstone Tabular block	1	50	1600	50	1600	1060-1600	No mortar
27	3032	Post Great Fire brick	1	1664	1900	1664	1900	1664-1900	No mortar
29	3107; 3032; 3035	Reigate stone ashlar, post Great Fire and yellow Medway brick	3	1060	1940	1770	1940	1770-1940+	No mortar
30	3107; 3143	Reigate stone; Barnack stone rubble	2	200	1600	1060	1600	1060-1600	No mortar
31	3107; 3119; 3143	Reigate stone, Barnack stone and Caen stone rubble	3	200	1600	1060	1600	1060-1600	No mortar
32	3110PM, 3035	Portland stone rubble, yellow Medway brick fragments	2	1630	1940	1780	1940	1780-1940+	No mortar
37	3101	Mortar gravel chalk inclusions off white lime sand recipe Type B mortar	1						1060-1500
40	3116	Chalk rubble	1	50	1600	1060	1600	1060-1600	No mortar

c) Archaeological Features (Excavation)

Context	Fabric	Form	Size	Date range of material	Latest dated material	Spot date	Spot date with mortar

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
45	2276; 3046; 3035; 3261; 3076; 2271; 2318; 3032; 3022; 1811;3101;3153;3119; 3122	Early post-medieval, post Great Fire and yellow Medway brick, garden tile, post-medieval peg tile, Penn tile, medieval peg tile, Eccles; Flemish glazed silt floor tile; concrete gravel mortar Type G Mortar C over 2276, Septarian nodule, Blue Lias mould prob. 17th century Victorian, Caen stone cornice	70	50	1950+	1850	1950+	1850-1950+	1850-1950+
46	3046; 3038; 2276	Early post-medieval brick, Fletton; late post-medieval peg tile and large chimney pot	25	1450	1960+	1890	1960+	1890-1960+	No mortar
47	3120; 3081; 2324; 2272; 2276; 3046; 1977	Totternhoe stone or Magensian limestone column shaft W128 Westminster floor tile, early medieval floor tile, Penn floor tile fragment, Flemish glazed silt floor	35	1135	1900	1480	1900	1480-1600+	1500-1800

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		tile, early post-medieval brick and very large group of peg tile Type 3 mortar							
49	2276	Post-medieval peg tile and chimney pot	4	1480	1900	1480	1900	1480-1800+	No mortar
50	3119; 3107	Medieval mouldings in Reigate and Caen including one with beaked keel late medieval	2	1060	1600	1060	1600	1300-1600+	No mortar
52	3047	Post-medieval local brick paver not glazed	1	1690	1900	1690	1900	1690-1800	Lime mortar not clear
53	2276; 3101	Post-medieval peg tile; Type C mortar	7	1480	1900	1480	1900	1480-1700	1450-1600+
55	3032; 3101	Post Great Fire brick, Type E Shelly coal mortar	1	1664	1900	1664	1900	1664-1900	1750-1900
61	3032; 3101	Narrow unfrogged post Great Fire brick; type K grey clinker mortar	1	1664	1900	1664	1900	1774-1900	1750-1900
62	2276; 3046; 3032	Post Great Fire and early post-medieval brick reused post-medieval peg tile	6	1450	1900	1664	1900	1664-1900	No mortar
63	2324; 2276; 2586	Decorated Penn Tile 4 examples late medieval to	6	1180	1900	1480	1900	1480-1600	No mortar

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		early post-medieval peg tile							
65	2276	Early post-medieval peg tile	6	1480	1900	1480	1900	1480-1700	No clear mortar
66	2276; 3046; 3101	Early post-medieval red brick and large dump of early post-medieval peg tile probably T3 mortar	23	1450	1900	1480	1900	1480-1700	1450-1600+
67	3032; 3101; 3119	Post Great Fire brick; Caen stone ashlar with remnant Type 3 mortar and post Great Fire Type F green woody recipe	4	1060	1900	1664	1900	1750-1900	1750-1900
70	2324; 1810; 3101	Penn Tile Decorated Eames white fine mortar Type L	5	1350	1390	1350	1390	1350-1390+	1300-1500
71	3101; 3119	Mortar Type L; bevelled Caen stone mould	2	1060	1600	1060	1600	1100-1600	1300-1500
73	3038; 2276	Post-medieval peg tile and Fletton Brick	2	1480	1960+	1890	1960	1890-1960+	No mortar not clear if Fletton Brick intrusive
75	3114; 3119; 2892; 1811; 3039; 1977; 2276; 3046; 2271; 3076	Weathered Thassos marble moulding and Caen stone mould plain glazed	58	50	1900	1480	1900	1480-1600+	1500-1800 but also relict 1300-1500 mortar on Penn Tile

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		Westminster, decorated Penn tile Eames 1909; glazed Flemish silty tile, post-medieval red brick and huge dump of peg tile post-medieval ; medieval peg tile Type C mould and Type L with Penn							
76	3101	Type D mortar							1664-1800+
77	3261; 3032	Very large group of worked stone 2 rock types Carboniferous Sandstone paving; Kentish ragstone ashlar, Reigate stone moulding, fine Bath stone and Corsham moulds, Portland Whit Bed and Base bed stone paving, Alwalton marble carving 12th-13th century, Totternhoe or Magnesian, Caen stone chalk, rubble , Barnack Limestone	27	50	1950	1850	1950	1875-1950+	1800-1900+ and relict Type D 1664-1800+

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		carving, Taynton stone cornices brick items and Victorian – 20th century mainly kiln stamped frogged brick, post Great Fire brick relict Type D mortar and Type F							
79	3046; 3101; 3119	Caen stone ashlar, early post-medieval red brick and unclear mortar	3	1060	1700	1450	1700	1450-1700+	Mortar not clear
80	3032	Narrow post Great Fire brick Type E coalified shelly mortar	2	1664	1900	1664	1900	1774-1900	1750-1900
81	2276	Big group of post-medieval peg tiles	9	1480	1900	1480	1900	1480-1700	No mortar
83	3107; 3101	Reused Reigate ashlar Type K grey mortar	2	1060	1600	1060	1600	1300-1600+	1750-1900
84	3151; 2276; 3101	Reused Taynton stone ashlar, peg tile and Type K grey mortar	3	1060	1900	1480	1900	1480-1800+	1750-1900
85	3151; 3101	Reused Taynton stone ashlar Type F green mortar	2	1060	1600	1060	1600	1300-1600+	1750-1900
86	3101	Type K grey mortar	1						1750-1900
90	2271; 2276;	Early post-	13	1180	1900	1480	1900	1600-1900	1700-1900?

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
	2318; 3046; 3126a	medieval peg tile and brick – early post-medieval glazed floor tile; Purbeck limestone rubble from paving possibly Type 5 mortar							
91	2452; 3102	Flecks of Roman tile and daub	3	1500 bc	1600	1500bc	1600	55-400+	No mortar
94	2274	Fragment of thick early medieval peg tile	1	1080	1350	1080	1350	1080-1350	No mortar
96	3101; 3152	Type F mortar chunk of Corsham stone post-medieval	1	1500	1900	1500	1900	1500-1900	1750-1900
97	2276; 3039nr3042	Post-medieval peg tile and very small late medieval red brick	7	1400	1900	1480	1900	1480-1600	No mortar
100	2459a; 3101; 2587; 2850	Medieval peg tile, Roman brick and Type B gravel mortar; Flemish glazed floor tile	4	50	1600	1450	1600	1450-1600	1060-1500
102	2452; 2459a; 3105; 3014	Roman tile and brick; bleached Kentish Ragstone large rubble fragments; Type H mortar opus signinum	4	50	1600	50	1600	55-400+	50-400

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
104	2452; 2459a; 2459b; 3022; 3054	Large group of Roman brick bleached Kent Ragstone blocks one of the bricks has a wood impression	7	50	1600	50	1600	120-400+	No mortar
116	2452; 3102; 1977; 3046; 2276	Roman tile and daub, mainly early post-medieval glazed floor tile, brick and nearly all peg tile	13	1500 bc	1900	1480	1900	1480-1700+	No mortar
118 void context	2276; 3151; 3152; 3153; 3107; 3110; 3135	Late medieval early post-medieval peg tile very large group of worked stones Aberdeen Granite sett, Taynton stone and very fine bath and Corsham mouldings, Blue Lias crisply dressed tomb fragment Reigate stone and Portland mould	10	1060	1950+	1750	1950+	1850-1950	No mortar
119	3006; 2276	Roman tile and early post-medieval peg tile	3	50	1900	1480	1900	1480-1700+	No mortar
120	2894; 2324; 3101	Decorated and plain glazed Penn tiles including	6	1350	1390	1350	1390	1350-1390+	1060-1500

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		Eames design 1772; Type B gravel mortar as [100]							
124	3101; 2586; 3116	Late medieval early post-medieval peg tile, Chalk Type B or Type D mortar not clear	3	1180	1800	1180	1800	1300-1600	1060-1500 possibly later post-medieval
125	1811; 2892; 2586; 2587; 2271; 3101	Westminster and Penn floor tile; medieval peg tile	9	1180	1800	1180	1800	1350-1390+	Mortar not clear
126?	2271; 2586	Reused medieval peg tile	6	1180	1800	1180	1800	1300-1700+	No mortar
128	2452	Roman brick fragments	2	55	160	55	160	55-160+	No mortar
130	2276	Post-medieval peg tile	2	1480	1900	1480	1900	1480-1700	No mortar
131	3102; 3022; 3054; 2276; 3046; 3104	Daub, Roman tile and brick post-medieval peg tile and brick; Roman brick coated with op. sig Type H mortar	7	1500 bc	1900	1480	1900	1480-1700	50-400 residual
134	2452	Roman brick burnt	2	55	160	55	160	55-160	No mortar
135	2324	Decorated Penn tile design 2227 as [70]	1	1350	1390	1350	1390	1350-1390+	No mortar
137	2271; 2452; 3101	Medieval peg tile, Roman tile; White Lias loose tessera fragment	5	50	1800	1180	1800	1180-1450	1060-1500

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		Type B medieval gravel mortar							
138	2271	Medieval peg tile	1	1180	1800	1180	1800	1180-1450	No mortar
142	3117	Chalk rubble	1	50	1600	50	1600	1060-1600	No mortar
143	2271; 2587; 3101	Medieval peg tile and Type B medieval gravel mortar	7	1180	1800	1180	1800	1240-1450	1060-1500
144	3101; 3033; 3126a	Drain cover looks to be made from fine Purbeck limestone Type A brown grey loose chalky mortar Shallow wide Tudor brick 230mm x 115 x 51mm	3	1300	1900	1300	1900	1450-1600	1450-1700
145	3101	Earthy grey brown chalky mortar Type A	2						1450-1700 backing for [144]
146	1977; 3101	Complete unglazed floor tile Flemish- Type C mortar	2	1600	1800	1600	1800	1600-1800	1450-1600+
150	2452	Roman tile fragments	4	55	160	55	160	55-160	No mortar
160	3063	Unglazed or worn Flemish silt floor tile	1	1450	1800	1450	1800	1600-1800	No mortar
162	3105; 2276	Reused Kentish ragstone rubble; late medieval early post-medieval dump of	14	50	1900	1480	1900	1480-1700+	No mortar

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		peg tile with later rhomb nail holes							
163	3054; 3022; 3101	Eccles and Hampshire grog brick opus signinum Type H mortar attached to brick	3	50	140	70	140	70-140+	50-400
Void 164	2276	Peg tile post-medieval fresh	4	1480	1900	1480	1900	1480-1800+	No mortar
166	2452	Roman brick	1	55	160	55	160	55-160+	No mortar
169	3046; 3101	Small Stuart type brick pointed in a Type E coal shell mortar	2	1450	1700	1450	1700	1600-1700+	1750-1900
171	2271; 3101	Late medieval to early post-medieval peg tile pointed (or repointed in Type 4 mortar)	4	1180	1800	1180	1800	1300-1700	1664-1800
175	2892	Plain glazed Westminster floor tile	1	1250	1310	1250	1310	1250-1310+	No mortar
176	1811	Penn tile glaze and design worn off	2	1350	1390	1350	1390	1350-1390+	No mortar
182	2452	Roman brick coarse moulding sand	1	55	160	55	160	55-160+	No mortar
185	3107; 3117; 2452; 2459a; 2454; 3022; 2459c,	Reigate and flint rubble latter from walling large group of Roman cbm including	29	50	1600	1060	1060	1060-1300	1060-1500

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
	3054; 3102; 3101	early sandy, Eccles, Hampshire grog, late sandy, daub; possibly Type B gravel mortar							
190	2459a	Roman cbm fragment	1	50	160	50	160	50-160+	No mortar
194	2452	Roman tile fragment	1	55	160	55	160	55-160	No mortar
201	2452; 3054; 3238	Roman brick sandy, Hampshire grog and silty thick brick fragments	5	50	160	50	160	71-100+	No mortar
202	2452; 3060	Roman tile and brick reused one	2	50	160	55	160	55-120+	No mortar
203	3105; 3055; 2815	Ragstone fragment slither; Late Roman tegulae and early sandy tile	4	50	1600	50	1600	200-350	No mortar
204	2453; 3054	Roman tile and brick	4	55	160	55	160	70-140+	No mortar
205	3238; 2453	Roman late calcareous and silty fabrics brick and tegula	2	71	300	140	300	140-300	No mortar
210	1977	Flemish probable unglazed floor tile	1	1450	1800	1450	1800	1610-1800	No mortar
211	3119; 2324; 2892; 2271	Caen stone moulding very large group of worn Penn Tile no glaze or	23	1060	1800	1180	1800	1350-1390+	No mortar

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		pattern one worn Westminster tile, glazed peg tile							
212	2276	Post-medieval peg tile	2	1480	1900	1480	1900	1480-1700	No mortar
214	2318; 3063; 3046; 1811; 2892; 2276	Another large group of Penn Tile, one Westminster floor tile no pattern, thin early Flemish silt floor tile, early post-medieval brick and peg tile	17	1250	1900	1480	1900	1480-1600+	No mortar
215	1811; 3063;2276; 3107	Penn tile Eames design 2322 Flemish silty floor tile early post-medieval peg tile; Reigate roll holl mould	5	1060	1900	1480	1900	1480-1600+	No mortar
216	2276; 1811	Early post-medieval peg tile and Penn tile fragments some burnt	5	1350	1900	1480	1900	1480-1600+	No mortar
222	3046; 3101	Narrow Tudor-Stuart brick with Type E mortar	2	1450	1700	1450	1700	1600-1700+	1750-1900
228	2271; 2276	Mainly early post-medieval peg tile one medieval	4	1180	1900	1480	1900	1480-1700	No mortar
232	3032; 3046	Post Great Fire brick and frogged Victorian type	2	1450	1900	1664	1900	1750-1850	1750-1900 Should this be [231] brick

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		brick Type E mortar							drain
234	1811; 2324; 3076; 3046; 2452; 2586; 2276; 1977	Group of Penn Tiles some with design markings; early post-medieval brick with stack marks, Roman brick; early post-medieval peg tiles mainly; floor tile glazed	22	55	1900	1480	1900	1480-1700+	No mortar
243	1811; 3076; 2324; 2892; 2271; 3046; 3102; 3107	Group of Penn tiles glaze all worn off and one Westminster floor tile, medieval peg tile and chunk of early post-medieval brick and daub; Reigate moulding with intricate late medieval floral design	20	1500 bc	1700	1450	1700	1450-1700	No mortar
245	1811; 2324	Penn tiles only Eames pattern 2322	4	1350	1390	1350	1390	1350-1390+	No mortar
256	3046; 3101	Early post-medieval brick and Type A brown lime mortar	3	1450	1700	1450	1700	1450-1700	1450-1700
257	3104	Opus signinum reused?	1						50-400+

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
259	2324; 2892; 3076; 2850; 2320; 2586; 2587; 2273; 2271; 3046; 2276; 3104	Some Penn and Westminster floor tile; Flemish glazed floor tile silt, medieval peg and bat tile, early post-medieval brick and mainly peg tile, opus signinum	34	1135	1900	1480	1900	1480-1700	50-400+ residual
261	2276	Early post-medieval peg tile	1	1480	1900	1480	1900	1480-1700	No mortar
262	2276	Complete peg tile used in drain or flue as burnt	1	1480	1900	1480	1900	1480-1700	No mortar
265	3119	Part of Caen stone ashlar	1	1060	1600	1060	1600	1060-1600+	No mortar
268	3032nr3033	Unfrogged post Great Fire transitional brick grey sandy mortar	1	1664	1725	1664	1825	1664-1725+	Mortar not clear 1700-1800
274	2271; 2586	Peg tile unglazed quite fresh medium moulding sand	5	1180	1800	1180	1800	1400-1800	No mortar
1500	1977; 3063; 2318; 2271; 2276	Large group of brown and black Glazed floor tile silty Flemish a few early post-medieval peg tile and medieval peg tile	37	1180	1900	1480	1900	1480-1600+	No mortar
1501	2271; 2272;	Medieval peg and	13	1135	1600	1450	1600	1450-1600	1060-1500

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
	3076; 3063?	bat tile, early 12th century coarse glazed floor tile, Penn Tile and possibly Flemish floor tile T2 mortar							
1503	2271	Late med-early post-medieval peg tile	1	1180	1800	1180	1800	1400-1800	No mortar

Significance and Potential of the Assemblage and Recommendations for Analysis

Overall, the character of the ceramic building material assemblage from the Song School is indicative of later medieval builds when compared with the *Cellarium*. There are no 11th-century Confessor floor tiles, and far fewer 13th-century Westminster floor tiles. Fourteenth-century Penn floor tiles from the Song School are also far more frequent. There are not so many medieval mortar recipes used in the Song School as there are in the *Cellarium*. It is however, possible to link some of these mortars, e.g. Type B Song School with Type 11 of the *Cellarium* suggesting there may be contemporary or near contemporary builds. There is significant 16th-century and late post-medieval development with later 18th- and 19th-century brick walls often bonded or repointed in later Victorian hard mortars and hydraulic cements.

Floor Tile

The only items of artistic merit are a range of Penn and Westminster floor tile designs. The design of one Penn tile requires further analysis to see if it is new to London and any designs not present in the *Cellarium* should require illustration.

Text

The findings from the ceramic building material assemblage at the Song School need to be compared and amalgamated into the bulk text of the existing *Cellarium* publication. This includes the Roman ceramic building material (forms; fabrics, conditions, distribution) including selective reuse of flattened items (brick and tile). The same applies with the medieval floor tile, roofing and bonding tile. It would be worthwhile commenting on the use of different mortar types from the area of the *Cellarium* and Song School seeing where there are similarities (particularly in the medieval phase) and whether these tie in with the stratigraphy or not.

Methodology at Publication stage

Tasks

a) Publication Ceramic Building Material - Combining a section on the use and reuse of Roman and medieval ceramic building used in the Song School (*Frater* and *Misericorde*) with that of the existing text from the *Cellarium* with emphasis on Roman and earlier medieval ceramic building materials from structures within the Abbey – and with comparison reports from the excavations at the *Misericorde* (Black 1976; 1977) and the *Dorter* undercroft (Mills 1995). A note should be made on the use of comparative mortars from the *Cellarium* and Song School excavations in light of the stratigraphic findings for the completed assessment of the Song School.

b) Publication – illustration of *c*. 6-10 items of Decorative floor tile designs (Westminster and Penn tile) not already included in the existing publication for the *Cellarium*.

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APPENDIX 5: STONE ASSESSMENT

Kevin Hayward

Introduction and Aims

Three palettes and two boxes of worked stone were retained from excavation from the multi-period site at the Song School, Westminster Abbey. This large sized assemblage (74 examples 156kg) was assessed in order to:

- Identify (under binocular microscope) the fabric and forms of the worked and unworked stone types to determine the geological character and source of the material.
- Ascertain whether the type and form of the stone can tell us something about the function or even status of the site represented by the different occupation phases.
- A phase summary relating the fabric and form of the different stone types with the separate periods of Roman, early medieval, late medieval and post-medieval activity at the site.
- The compilation of a stone catalogue relating to the evaluation (WSA14 stone.mdb) which accompanies this assessment.
- Spot dates of all contexts with building material (combined with stone).
- A separate report (Appendix 4) and catalogue (WSA14 cbm. mdb) on the Roman, Saxon, medieval and post-medieval ceramic building material accompanies this document.
- Make comparison with the geological character and form of the stone assemblage from the adjoining site of the *Cellarium* (Hayward 2013; in prep a).
- Made recommendations for further study and identify any interesting or unusual pieces that warrant retention, analysis and illustration including those stone mouldings (allocated a worked stone number – WSN) having definitive or unusual stylistic attributes.

Methodology

A preliminary site visit during 2014 examined the petrological character of some of the stone used in the walls of the area surrounding the Song School. However, detailed recording and analysis was done in-house. Stone mouldings having definitive or unusual stylistic attributes were each allocated a Worked Stone Number (WSN). All the retained worked and unworked stone was examined using the London system of classification with a fabric number allocated to each object.

The application of a 1kg mason's hammer and sharp chisel to each example ensured that a fresh fabric surface was exposed. The fabric was examined at x20 magnification using a long arm stereomicroscope or hand lens (Gowland x10) Matches then made with the London fabric collection.

Although there is no published petrological study of the worked stone from Westminster Abbey, consultation of the sections on building materials including stone from recent excavations around the *Misericorde* (Black 1976; Rigold 1977) and *Dorter* undercroft (Samuel 1995, 102-104) provided some idea of material types. Finally the stone recorded from the adjoining *Cellarium* excavations (Hayward 2013; in prep a) provided an additional body of data. Furthermore, recent stone-by-stone analysis of some of the earliest walls from the abbey including the nearby outer refectory wall (Hayward pers. obs.), the Pyx Chamber (Hayward pers. obs) and Cosmati Pavement (Neal & Rodwell in prep) by this specialist was useful in determining petrological character in some detail. The specialist's own stone reference collection of Roman (Hayward 2006; 2009; 2015) and monastic stone types from London was one further source of information.

Local Geology

The site lies in a part of the British Isles dominated by geologically recent Cretaceous and Tertiary sediments. None of these younger sediments, apart from the locally available flints and chalk from the Upper Cretaceous (Upper Chalk) and Septarian Nodules from the London Clay (walling) are suitable for fine carving, quernstone, and hone stone or tesserae production. This means that nearly all of the stone retained from these excavations needs to have come from afar. Fortunately, London's excellent riverine and maritime links afforded to it by the River Thames and its Estuary means that stone could easily be shipped in from native outcrops (Cotswolds; Kentish ragstone; Reigate stone) accessible by river, coastal outcrops (Dorset; Lincolnshire) and those from the continent (Caen stone). For a building as prestigious as Westminster Abbey the draw on a variety of resources, over a thousand year period would have been great. Furthermore, there is the stone assemblage from the Roman and Saxon dumps as well. All these factors need to be considered when examining the stone assemblage from the Song School excavations.

Fabric Overview

Lithotypes

As well as its excellent maritime and riverine links, the draw on resources that this prestigious building had on stone quarrying and supply is illustrated by the great variety of rock types encountered from the excavations at the Song School (22 lithotypes). Most of these are present at the *Cellarium*[1] (Hayward in prep a) with the addition of Barnack stone, Blue Lias, White Lias, Upper Carboniferous sandstone and York stone and two particularly rare lithotypes for London, Alwalton marble and Thassos marble. These are divided up according to function.

[1] Only present in the *Cellarium* are Tufa, Bembridge Limestone, Quarr stone, Ancaster freestone, Beer stone (Hayward 2013; Hayward in prep a). The first three are typical of very early 11th-12th-century stone use in the abbey, perhaps suggesting that the *Cellarium* had more stone types of Saxo-Norman freestone.

Rock Type	Geological Source	Description	Frequency and Use
Freestones			
Reigate stone	Upper Greensand (Lower Cretaceous) Reigate-Mertsham, Surrey	Fine grained micaceous glauconitic limestone	Medieval Early English Roll holl and ashlar mouldings 10 examples 4.7kg
Caen stone sensu stricto	Middle Jurassic (Bathonian) Caen Normandy	Fine yellow packstone	Medieval Ashlar and mouldings 11 examples 20.2g
Taynton stone	Middle Jurassic (Bathonian) Taynton West Oxfordshire	Pale orange-brown banded shelly oolitic grainstone	Medieval cornice mouldings and ashlar 5 examples 19.6kg
Barnack stone	Middle Jurassic (Bajocian) Barnack Village and related outcrops north Cambridgeshire	Very hard yellow-cream sparry shelly oolitic grainstone with prominent high spired gastropods or nerineids	Probably 11th-13th century Rubble in walls could be reused Roman, Saxo-Norman or Romanesque 8 examples 0.4kg in early walls [30] incl North Wall of *Frater* [31] Degraded moulding [77]
Blue Lias	Lower Jurassic Somerset-Avon-Gloucestershire	Very hard splintery dark-grey/black micritic limestone with just the occasional mollusk fossil	Post-medieval 5 examples 21.3kg as ashlar and large trapeizoid blocks [77], highly decorative architectural moulds from [45] [77] [118] could be tomb elements
Alwalton marble	Upper Jurassic (Cornbrash) Peterborough Area	Hard black oyster rich condensed limestone	12-13th century Medieval mould or tomb 1 example

			3.5kg [77] Stone effigies of this date from Peterborough Cathedral.
Thassos or Thasian marble or marmo Greco duro (Price 2007, 63) snow white marble, crystal marble	Basement rocks made of Tertiary dolomitic or calcitic marble (Cape Vathy and Aliki) Isle of Thasos Kaválla, Greece (Price 2007)	White, medium to coarse grained dolomitic (Cape Vathy) or calcitic (Aliki) White coarse crystalline	1 example 0.3kg [75] Stepped Renaissance or Roman architectural element
Totternhoe Limestone or related chalk rock	Upper Cretaceous (Chalk) Hertfordshire and Bedfordshire	Soft chalk rock with a muddy green tinge due to the presence of glauconite	Reused in Type E mortar late medieval early post-medieval roll-holl and shaft moudlings 2 example 3kg [47][77]
Corsham – Monks Park stone	Middle Jurassic (Bathonian) Corsham-Box Wiltshire	Soft fine to very fine white-cream oolitic grainstone	Late medieval to early post-medieval replacement quoin, roll holl, cornice and coping blocks 7 examples 29.5kg
Portland stone (Whit Bed) (Base Bed)	Upper Jurassic (Portlandian), Isle of Portland Dorset	Hard, grey-white oolitic grainstone with oyster fragments and very fine	17tth-19th century replacement ashlar, moulding roll-holl and paving 5 examples 17.9kg
Walling Rubble			
Kent Ragstone/Hassock stone	Lower Cretaceous (Hythe Beds) Maidstone	Hard, dark-grey calcareous sandstone	Roman-medieval Walling Rubble, Ashlar [77] 7 examples 8.7kg Some ins probably Roman (bleached) [102] [104] [106]
Septarian Nodule	London Clay (Eocene) Thames Valley	Concretionary yellow-grey calcareous mudstone	Roman 1 example 0.1kg [44]

Chalk	Upper Cretaceous (Chalk) Thames Basin	Fine white micritic limestone	Medieval used in early walls and [77] 1 example 0.1kg
Flint	Upper Cretaceous (Upper Chalk) Thames Valley	Chemically precipitated dark-grey very fine siliceous sediment breaks with a conchoidial fracture	Medieval 1 example 0.4kg [142]
Paving Materials/Drain Cover			
Purbeck Limestone	Upper Jurassic (Purbeckian) Dorset	Oyster rich dark-grey limestone or very fine light grey limestone	Medieval-post-medieval Drain Cover 4 examples 8kg [144] and paving [90]
Carboniferous sandstone	Upper Carboniferous (Namurian) Northern England Scotland, or Wales	Laminated fine grained sugary sandstone with small organic wisps	Post-medieval Victorian Paving Slab 1 example 10.6kg [77]
York stone or Elland Flags	Upper Carboniferous (Namurian) Yorkshire	Olive green very fine laminated sandstone	Post-medieval Victorian Flower Bed 1 example 7.4kg
Aberdeen or Cornish Granite	Various outcrops in South West England, Lake District and Eastern Scotland	Black and white phenocryst rich coarse grained acid igneous rock	Post-medieval Victorian granite sett 1 example 8.7kg [114]
White Lias	Upper Triassic Somerset/Avon/Gloucestershire	Very fine white micritic limestone with very occasional mollusk fragments	Roman or possibly medieval Border Tessera 1 example 10g [137]
Roofing Materials			
Cornish Slate	Devonian-Carboniferous North Devon and Cornwall	Fine purple to blue fissile slate or metamorphosed shale	Medieval-post-medieval [77] 1 example 0.6kg Complete

Table 1: Different worked stone building materials (mouldings, ashlar, rubblestone; paving, roofing) from the Song School

Freestone – ashlar, mouldings and funerary material 55 examples 120.4kg

Freestone, that is fine, even-grained limestones and sandstones with a soft open porous that enable the rock to be worked or carved in any direction (Stanier 2000; Leary 1989; Sutherland 2003), like the excavations from the *Cellarium* (Hayward 2013; in prep a) are not only the most common material type (77%) from these excavations, there is also a great variety (10) of different geological materials that have been adopted for this purpose. This was to be expected given that the site lies within one of the largest medieval ecclesiastical buildings in London and ultimately a draw on the best quality freestone for carving. A large number were recovered from a late post-medieval demolition layer [77] 55kg.

When compared with the *Cellarium* excavations, the major difference lies with the large quantities of post-medieval freestone materials, especially Portland stone 17.9kg and Corsham type Bath stone 29.5kg particularly from [77]. The *Cellarium* on the other hand has a larger medieval freestone component serviced by the common medieval stone types for London (Reigate, Caen, Taynton, Purbeck) as well as 11th-12th-century stone material types associated with the *Misericorde*, e.g. Tufa, Quarr stone and Bembridge limestone (Hayward 2013; in prep a). This would indicate that much of the earlier medieval stonework from the *Frater* area of the Song School had largely been demolished, or not incorporated into later medieval walls, with fresh consignments of 17th-19th-century stone more common here. Key architectural elements retained for publication illustration are listed below by lithology.

3107 Reigate stone

More of the ornate moulds from these excavations that are suitable for illustration at excavation stage are listed below (Table 2)

Context	Phase	Element	Dimensions
50	Garden Feature Phase 6	Beaked Roll-Holl decoration Early English	51mm diameter
215	Dump layer Phase 4	Moulding roll-holl – ribbed typical late medieval	
243	Dump layer Phase 4	Part of an large ornately carved arched block with floral decoration typically late medieval	120mm x 110mm x 110mm

Table 2: Key architectural elements from the Song School Excavations made from Reigate stone

3114 Thassos Marble

Context	Phase	Element	Dimensions
75	Garden soil Phase 5	Decorated degraded cornice Roman or Renaissance	51mm diameter

Table 3: Key architectural elements from the Song School Excavations made from Thassos Marble

Other than an example of a small roundel in the mid-late 13th-century Bishop's Ware Tombstone from the Cosmati Pavement (Neal & Rodwell in prep), this is the only other example of this coarsely crystalline white marble to have been observed at Westminster Abbey by this specialist. Furthermore, given that a similarly profiled mould in Thassos marble had also been seen in Roman levels at recent Thameslink excavations from Borough High Street, Southwark (Hayward in prep b) then further comment and illustration of this piece is necessary.

3120 Alwalton marble

Context	Phase	Element	Dimensions
77	Demolition Layer Phase 6	Curved wedge element possibly a tomb canopy	230x120x60mm 3.5kg

Table 4: Key architectural elements from the Song School Excavations made from Alwalton marble

Another unusual material type from these excavations was the identification of a wedge-shaped element from a late post-medieval dump [77] made from a condensed shelly Lincolnshire Limestone - Alwalton marble from Peterborough. This could, like the identification of another Lincolnshire Limestone (Ancaster stone) from the *Cellarium* Excavations (Hayward 2013) have been a tomb element, and formed part of the medieval trade in specialist items of stone from the Lincolnshire/Cambridgeshire Mid Jurassic Escarpment (Alexander 1996). The identification of 12th-13th-century tombstones from Peterborough Cathedral made from this material (Hayward pers. obs.) would suggest that it was of a similar date.

3153 Blue Lias

Context	Phase	Element	Dimensions
45	Garden Feature Phase 6	Small intricately carved piece	0.1kg
77	Demolition Feature Phase 6	Crisp stepped profile tomb	13cm thick 3.4kg
118	Unstratified Feature	Highly ornate stepped profile corner tomb	18cm thick 4.8kg

Table 5: Key architectural elements from the Song School Excavations made from Blue Lias

Until recently, very little dark grey compact Blue Lias from Somerset-Avon-Gloucestershire had been identified in carvings from London, perhaps because it is frequently mistaken for the Black Tournai marble from the Carboniferous of Belgium (De Ceukelaire *et al.* 2016). Although firm petrological identification of Tournai has been observed at Westminster Abbey, from the Cosmati Pavement (Neale & Rodwell in prep) and in loose pieces from the Triforium (Hayward in prep c), a Blue Lias source should be assigned to a small group of intricately carved slabby elements from the Song School excavations from a late post-medieval garden feature [45] and dump [77] as well as an unstratified context [118]. Their ornately carved crisply dressed stepped profile is typical of tomb covers probably of post-medieval date. That Blue Lias has been used in funerary monuments in London has only been recently be discovered in late 17th-century grave markers from Bedlam Hospital (Hayward 2017) and the presence of a further very large rectangular slab of this material from the Song School Excavations from [77] suggests that this is the likely function.

Construction Rubble examples 10 examples 9.3kg

Most of the stone used as rubble stone from the medieval and early post-medieval walls of the Song School Excavations, e.g. The *Frater*, consist of very common groups of building stone material types (Kentish ragstone, chalk and flint), seen elsewhere in the Abbey, e.g. *Cellarium* and Pyx Chamber (Hayward 2013; in prep a) supplemented by the occasional Reigate stone, Caen stone and Barnack stone block as well as Septarian Nodule. The identification of Barnack stone, in the walls of the *Frater* [30] [31], is particularly interesting as it is a material associated with some of the earliest 11th-13th-century development and decoration of the Abbey and would suggest that these walls are very early indeed. However, the plethora of Roman/medieval freestone and ragstone materials (Tufa; Jurassic limestones; Hassock stone; Folkestone Beds sandstone; Bargate stone; Bembridge Limestone) seen in the walls of the *Cellarium* is not so evident in the Song School.

Paving, Setts and Drain Covers 8 examples 34.2kg

A whole range of durable stone types that would have been suitable as steps, paving stones, doorway entrances, drain covers and cobbled surfaces were identified from the Song School. Unlike the *Cellarium* where medieval Sussex marble was identified, the group from the Song School have a largely later post-medieval industrial flavour. Most of the paving stones and setts from the 18th to 19th-century dump [77] have come from northern England (York stone; unknown Carboniferous sandstone) or Scotland/ Cornwall (Aberdeen/Cornish Granite), areas that were only really quarried and supplied to London in any quantity after the advent of the railways and larger steam driven ships. Aberdeen type granite cobbles had already been identified on yard surfaces adjoining the *Misericorde* (Black 1977, 194) and *Cellarium* excavations (Hayward 2013).

Part of a large drain cover in a fine Purbeck limestone used in a Phase 5 17th-century brick surface [144] is worthy of further illustration.

Context	Phase	Element	Dimensions
144	Brick surface Phase 5	Drain Cover three large slabs with 22mm wide drainage holes	340mm wide x 55mm thick 7.9kg

Table 6: Drain Cover from the Song School Excavations made from Purbeck limestone

Of interest is the identification of a small border tessera made from White Lias, a pale cream calcareous mudstone from Somerset/Avon from a medieval Phase 3 demolition layer [137]. Although most probably of Roman date, it is of interest to note that this stone type was the key (white/pale yellow) element of the mid 13th-century Cosmati Pavement (Neal & Rodwell in prep). Given the date of feature [137] it could conceivably be a discarded cube thrown away by one of the Cosmati workers. A paving slab of this material was also identified from the *Cellarium* (Hayward 2013.).

Phase Summary

Residual Roman

Only two types of stone (Kentish Ragstone and probably White Lias tessera) relate to the Roman building dumps that were used to raise the ground level prior to the construction of the *Frater*. It is likely that some of the bleached Ragstone blocks from the Phase 2 posthole fill [102] and reclamation dump [104] are of this date. It is possible that a third, Thassos marble carved as a stepped architectural moulding and recovered from Phase 5 garden soil may also be Roman given its identification in Roman Southwark, but it could also be medieval as it was used in the Cosmati Pavement. There was not the variety of materials present in the Phase 2 excavations of the *Cellarium*.

Early Medieval (1060-1150)

Only a select group of rubble materials (Kent Ragstone, Chalk, Flint) and freestone (Reigate stone, Caen stone, Taynton stone, Barnack stone and possibly Alwalton marble) are likely to relate to the construction of the *Frater*. There is not the breadth of materials seen at the *Cellarium* (Tufa, Bembridge Limestone, Quarr stone, Norwegian ragstone), that define the period associated with the construction of the earliest Saxon abbey, the Confessor abbey and especially the Early Norman Abbey. Many of the latter group have also been identified in one or more of the early structures from the Abbey including the Pyx Chamber (Hayward pers. obs.) outer refectory wall (Hayward pers. obs.), *Dorter* undercroft (Samuel 1995) and the nearby East Wall of the *Misericorde* (Black 1976). It is true that fresh consignments of Chalk, Reigate stone, Caen stone and Taynton stone do continue to be used in the later medieval phases.

Brief comment has already been made of the presence of Barnack stone from Lincolnshire included in the walls of the *Frater* [30] [31] in addition to a degraded chunk from a 19th-century dump [77]. Its use in the earliest construction and embellishment of the 11th-13th-century Abbey is known about from capitals and earlier stone-by-stone identifications of the Pyx Chamber (Hayward pers. obs.) and Refectory Wall (Hayward pers. Obs.), This relatively narrow time frame was constrained by the quarry supplies at Barnack and related outcrops running out by the 13th century. The identification of an Alwalton marble moulding is particularly interesting. Normally, a material associated with 12th and 13th-century "interior" tomb carving at Peterborough Cathedral (Hayward pers. obs.), its presence in a 19th-century dump around the area of the *Frater* is possibly the first example known example from the Abbey. This example probably came from a 12th to 13th-century tomb[2] carving.

The outcrops of both Barnack stone and Alwalton marble locate to within 10 miles of one another and are both used in the earlier medieval construction and embellishment of Peterborough Cathedral. Given the widespread supply and use of Barnack stone in the 11th to 13th-century Westminster Abbey, it would make practical and economic sense to have brought along fine polished decorative marbles from north Cambridgeshire too.

Later Medieval

This phase is marked by the survival, albeit recycled in later post-medieval dumps, e.g. [77], of the better quality medieval carvings (mainly roll holl, cornice and floral decoration) in the common stone types (Taynton, Reigate and Caen stone) supplemented by Totternhoe chalk.

Post-medieval phases

A fresh group of freestone materials (Purbeck limsestone, Bath Corsham, Portland Whit Bed, Blue Lias) from the south coastal and western part of the Middle Jurassic belt were used as post-medieval replacement carving stones, grave slabs around the area of the *Frater*. Although these mainly turn up in Phase 6 later post-medieval dumps [77] or unstratified layers [118], it is possible that some at least date to the 16th and 17th centuries where the use of Corsham type stone is shown to occur at Somerset House in the 16th century, but is used in the Victorian Wine Cellar in the Celllarium whilst Portland stone only becomes established after the Great Fire. Blue Lias has recently been identified in late 17th-century funerary slabs from Bedlam and the ornate carvings seen in the Song School excavations may date to this period.

[2] Interior tomb as like Purbeck marble it readily degrades due to prolonged external weathering, and like Purbeck marble can easily polish and take inscription.

The usual group of harder Victorian materials quarried for use in setts (granite) and paving (York stone and other Carboniferous sandstone) are seen in cobbled and paved surfaces from the *Cellarium* (Hayward in prep a).

Significance and Potential of the Assemblage and Recommendations for Analysis

Petrology

Given the absence of any published work relating to the petrology of walling rubble, paving, moulded stone and the smaller (utilitarian) stone objects from Westminster Abbey the variety of stone material types (22) encountered from these excavations warrants at the very least a review, and preferably a more detailed petrological investigation of the geological materials. Some of the materials were not present from the adjoining *Cellarium* (Blue Lias, Alwalton marble, Thassos marble) and are either new to the abbey or very rare examples. Combined with the *Cellarium* (30 lithotypes) the sum total of rock types for both now amounts to 36 types

One or two items of worked stone require further petrological analysis to verify, refine or discount preliminary hand specimen identification. These include the possible Alwalton marble tomb, Blue Lias tomb fragments, and a Thassos marble architectural element (WSN 12). It is possible that this may be achieved by comparing them with known decorative building material collections (British Museum Natural History) or with texts on decorative stone (e.g. Price 2007).

The identification of so many diagnostic medieval stone-types from the Song School excavations should be added to the existing publication text for the *Cellarium* especially on their use in the 11th-13th-century development of this part of the Abbey and petrological links with high quality rock types from the Lincolnshire Limestone Formation (Barnack stone, Alwalton marble, Ancaster stone) which were quarried extensively during the medieval period (Alexander 1996).

Mouldings

The form of four-six items of worked stone moulding require detailed illustration, in particular, the rosette designed Reigate stone moulding, Thassos marble mould and the Blue Lias tomb mouldings.

Methodology at Publication

Tasks

a) Publication petrology - Combining a section on the petrology of the stone used in the Song School with that of the existing text from the *Cellarium* with emphasis on Roman and earlier medieval stone building materials from structures within the Abbey and making comparison with retained stone from the excavations at the *Misericorde* (Black 1976; 1977), *Dorter* undercroft (Mills 1995) and stone by stone reports from the Pyx Chamber and Refectory wall and comparison with reference collection (BM Natural History to verify identifications.

b) Publication – stone moulding form – illustration of 6 items of stone moulding

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APPENDIX 6: GLASS ASSESSMENT

Chris Jarrett

Introduction

A small sized assemblage of glass was recovered from the site (one box). The glass dates to the medieval and post-medieval periods. Most of the fragments show no or little evidence for abrasion and were probably deposited fairly rapidly after breakage. A notable quantity of the glass fragments have natural weathering deposits resulting from burial conditions, especially the medieval/early post-medieval material, which is typically heavily decayed. All of the glass was in a fragmentary state and no vessels are represented by items that are intact or with a complete profile. However, identifiable forms are recorded. The glass was quantified by the number of fragments and where possible the estimated number of vessels and this was recovered from 19 contexts and individual deposits produced only small groups (fewer than 30 shards).

All of the glass (55 fragments, 42 ENV, 505g, none of which was unstratified) was recorded in a database format by type, colour and form. The assemblage is discussed by period, the vessel shapes, *etc*. and its distribution.

The Glass

The assemblage can be dated to the following periods:

Medieval/early post-medieval: 20 fragments, 11 ENV, 106g

Post-medieval: 35 fragments, 31 ENV, 399g

Medieval/early post-medieval

Vessel glass

Two fragments (8g) of vessel glass are recorded and are derived from a rounded fragment, possibly the kick from the base of a bottle. The item was found in context [214].

Window glass

A total of 18 fragments/10 ENV/98g of window glass are dated to the medieval/post-medieval period and all of it was made in natural glass in varying states of weathering. Plain fragments of window pane were noted in contexts [4] and [47] (two fragments each of clear, green-tinted glass) and [166] (two fragments in highly degraded clear glass). Two additional contexts produced cast window glass

with red painted decoration. Context [211] produced nine fragments of such material with nibbled edges and decorated with triangular shapes and leaves, of which one fragment appears to have a ruby red coloured core, a rounded corner and may not have been decorated. Context [216] produced a single fragment of clear glass surviving as a squared corner and an uncertain design. Additionally, a rectangular fragment of cast window quarry was noted in context [245], surviving with a straight nibbled edge. It is uncertain if the fragment is decorated as the surfaces are extremely blackened. A polygonal-shaped window quarry with nibbled edges and an uncertain painted design was also recovered from context [211].

Post-medieval

English wine bottle

Two fragments (122g) of different olive-green English wine bottles were noted in context [45] and survive as a neck fragment, dating to the late 19th-20th century and a basal rounded kick, dating to the 18th century.

English wine bottle, cylindrical, late

The wall and basal angle of a wine bottle (7g) of this type, dating to after *c*. 1740 and made in dark olive green soda glass, was noted in context [62].

Goblet/wine glass

The free-blown item (11g) is made in clear lead glass and survives as the base of the bowl attached to a wider merese, a short length of stem and a rounded knob and the item is dated *c*. 1540-1600 (Willmott 2001, fig.160, 122).

Jar, shouldered

The neck, narrow rounded shoulder and cylindrical wall of a jam-jar shaped vessel, weighing 8g and was made in clear soda glass and dates to the late 19th-20th century. It was found in context [45].

Phial, conical

There are fourteen fragments (12 ENV/189g) of phials belonging to this shape that appear to be all of the same specific type of vessel. These survive as bases with rounded or conical kicks that have embossed on the wall '…R. MINBY'S' and are made in blue green-soda glass that are distinctively

iridescent and weathered. The vessels date to the 19th century and eleven fragments (9 ENV) were found in context [45], while singular fragments occurred in contexts [49], [63] and [109].

Phial, cylindrical

The base of a free-blown clear soda glass vessel of this type and dating to the late 18th-19th century was recorded in context [4].

Phial, globular

This vessel shape survives as an applied, asymmetrical preparation-type rim, attached to a short neck and rounded shoulder, was made in clear soda glass and weighs 13g. The form is dated to the mid 17th-18th century and was recovered from context [108].

Phial, tubular

Made in clear soda glass is recorded the rounded kick and base of a narrow vessel dated to the mid 17th-mid 19th century and this item was found in context [108] and weighs 13g.

Vessel glass

A total of three fragments/3 ENV/22g of vessel glass are recorded. There are two fragments dated to the early post-medieval period and both are weathered natural forest glass shards. One example occurs in clear glass and survives as a rounded fragment, which is discoloured black and has a mortar-type deposit adhering to it and was found in deposit [108]. The second example consists of a thick wall fragment made in pale olive green glass and was noted in context [261]. Found in deposit [90] was the wall and rounded angle of a base fragment, which is made in olive green soda glass and it is weathered. The vessel has the appearance of a mallet-type wine bottle, but is probably earlier in date than the fore mentioned form and the item was dated generally to the post-medieval period.

Window glass

There are recorded a total of ten fragments (resenting some eight items and weighing 14g) of window glass, all of which is made in clear soda glass. The method of manufacture for most of the window glass could not be determined: a fragment found in deposit [90] was dated to the 18th-19th century, while fragments found in contexts [1], [3], [27] are dated generally to the 19th and 20th century. Machine made window glass was noted in contexts [45] and [49] and were dated from the late 19th century and more so the 20th century.

Distribution

The glass assemblage was recovered from Phases 2 and 4-6 and its distribution is shown in Table 1.

Context	Phase	Size of assemblage	No. of frags	ENV	Weight (g)	Forms	Spot date
1	4	S	1	1		Window pane	19th-20th century
3	6	S	1	1		Window pane	19th-20th century
4	6	S	3	2		Phial, window pane	Late 18th-19th century
27	5	S	2	1		Window pane	19th-20th century
45	6	S	18	15	292	English wine bottle, jar, shouldered, phial, conical, window pane	Late 19th-20th c
47	6	S	2	2	1	Window pane	Late medieval to early post-medieval.
49	6	S	2	2	30	Phial, conical, window pane	19th-20th century
62	4	S	1	1	7	English wine bottle, cylindrical, late-type	19th-20th century
63	4	S	1	1	7	Phial, conical	19th century
90	6	S	2	2	15	Vessel, window pane	19th-20th century
108	6	S	3	3	30	Phials: globular and tubular, vessel glass	18th century
109	4	S	1	1	3	Phial, conical	19th century
166	2	S	2	1	2	Window pane	Medieval-early post-medieval
211	4	S	10	4	80	Window quarry, including a polygonal shaped example	Medieval
214	4	S	2	1	8	Vessel	Medieval
216	4	S	1	1	7	Window quarry	Medieval
234	5	S	1	1	11	Goblet/wine glass	1540-1600
245	4	S	1	1	8	Window quarry	Medieval
261	5	S	1	1	4	Vessel	Early post-medieval

Table 1: WSA14: Distribution of the glass showing what forms are present in each context. S: small, M: Medium, L: large (sized assemblages)

Significance of the Collection

The glass has some significance at a local level. The glass types and forms are as would be expected in London area for the medieval and post-medieval periods. The medieval-early post-medieval dated glass is largely fragmentary and highly decayed or weathered. Of interest from this period are the fragments of cast and decorated window glass. The post-medieval forms are largely associated with a pharmaceutical function and include multiple examples of conical phials embossed '…R. MINBY'S' and may reflect a specific use of a room in the complex of buildings associated with Westminster Abbey. The occurrence of medieval and early post-medieval glass in the assemblage is a good indication of the presence of a high-socio economic group on the study area, which would be expected for Westminster Abbey, and this is best represented by the goblet/wine glass dated to the mid-late 16th century found in context [234].

Potential

The potential of the glass is to date the features it occurs in. A small number of vessels require illustration or photographing. The medieval glass includes a few items that merit discussion and inform upon activities with Westminster Abbey. The medieval-early post-medieval window glass has the potential to further understand the architecture of Westminster Abbey. The post-medieval glass has the potential to understand the use of rooms or buildings located on the study area, particularly in reference to the pharmaceutical phials, which may be supported by the documentary evidence.

Recommendations for Further Work

A short publication report is recommended on the glass. Six vessels require illustration or photographing.

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APPENDIX 7: METAL AND SMALL FINDS ASSESSMENT

Märit Gaimster

Around fifty individual metal and small finds were recovered from the excavations. They are listed in the tables below. The assemblage includes some objects from medieval contexts, but appears to above include finds dating from the immediate post-dissolution period (Phase 4). The latter comprise residual objects that can be dated to the 16th century, and likely others associated with pottery from the period. These finds have been included in the Phase 4 table.

Phase 2: 10th-11th centuries

Only one find was recovered from this phase, in the form of a piece of modified animal bone. This consists of a cattle-size sternum (breast bone) which has been punched through the centre (SF 24). The shape of the hole suggests a large nail was hammered through the bone. The reason for this remains unclear.

Phase 3: 12th-14th centuries

A handful of finds came from Phase 3 contexts. Besides nails, they include fragments of iron straps of various dimensions. A small copper-alloy buckle may however be residual from this phase. The buckle is of a simple D-shape, with a sheet pin and a crude pin notch cut into the outer frame (SF 4); it was recovered from a Phase 6 context, where it was associated with late 16th-century pottery. It is possible this object is early modern, but small copper-alloy buckles of this form are also known from the late medieval period (cf. Egan and Pritchard 1991, fig. 55 no. 388, dating from *c.* 1350-1400; Griffiths *et al.* 2007, pl. 13). Other residual medieval objects may include a section of lead water pipe (SF 17) and roofing lead (SF 34); these objects are discussed below.

Phase 4: 15th-16th centuries

Phase 4 contexts produced around fifteen objects, of both metal and bone. In addition, a further eight objects may be dated to this phase, either through type or by association with pottery of the period. The assemblage presents a range of categories including structural fittings or fixtures, dress accessories, cutlery, musical instruments and items associated with trade, literacy and numeracy. Structural fittings are represented by two pieces of lead window came (SF 29), a section of lead pipe (SF 17) and a substantial piece of roofing lead (SF 34). Household furnishings include an upholstery pin with domed head of tinned copper alloy (SF 37) and three pieces of cutlery. A fine, flat bone cutlery handle for a knock-on tanged implement, while from a Phase 4 context, is more unusual for the period (SF 27); the finer Elizabethan knives tended to have through tangs, capped at the end with

a copper-alloy plate or a spherical pommel (Moore 2006, 11-12). Another implement has a long bolster and short wooden scales fixed with copper-alloy rivets, some of decorative tubular form (SF 33). These features would be highly characteristic of a 16th-century knife, but remnants of the working end suggests this may in fact be a sweetmeat fork of the same period (cf. Moore 2006, 10 figure at top). The implement came from a Phase 7 context that also included a fine tang-hafted knife which also likely dates from the same period (SF 28). The fragment of a narrow hone of Norwegian ragstone also belongs to the same group of finds (SF 36).

A few dress accessories are represented by a copper-alloy pin (SF 12) and a small lace-chape with a minute transverse rivet to hold it in place (SF 7; Oakley 1979, 262-63). Coinciding with the late medieval fashion for tighter and more fitted clothing, lace-chapes are ubiquitous finds from the 15th and 16th centuries (Egan 2005, 52-53; cf. Margeson 1993, 22). The small copper-alloy buckle, discussed above, may of course also date from this period. The fragment of a fine bone flute, carved from a goose tibia, is also among the finds (SF 35), as is a well-preserved copper-alloy jeton (SF 5). Used for calculating sums on a chequered board or cloth, the jeton was produced in Nuremberg and, known as rose-and-orb issues, represents to the most prolific group of these products. The jeton was produced by Hans Krauwinckel II, who was a Nuremberg jeton master 1586-1635, and reflects the fashion at the time of including pious mottoes on the back, in this case 'GOTT ALLEIN DIE EHRE SEI' (To God alone the glory). While jetons are frequent finds, two more unusual objects were associated with the residual cutlery above. One is a complete brass scale-pan (SF 31), and the other a possible stylus fashioned from rolled copper-alloy sheet (SF 32). The scale-pan would have been one of a pair, suspended with fine chains from a balance arm. This type of balance is known from the Middle Ages, and continues into the early modern period and beyond; it would have been used to weigh precious or costly items such as coins or spices (cf. Egan 1998, 322-23 and fig. 240 no. 1042; Biddle 1990, 917-18 and fig. 285 no. 3221). The possible stylus has a small opening that may have held a metal pin, and a flattened finial; it has a parallel in a late medieval find from Launceston Castle in Cornwall (Mould 2006, 332 and fig. 11.30 NF 131). This might suggest a residual object, but styli, for writing on wax tablets, continued in use throughout the early modern period (cf. Willemsen 2008).

Phase 5: 17th century

The only find recovered from this phase was a tapering iron strap.

Phase 6: 18th-19th centuries

Around fifteen finds from Phase 6 contexts were associated with later post-medieval pottery. Besides nails other iron objects include a complete padlock, still attached to the lock hasp (SF 2). The hinged lock hasp suggests it originates from a chest. The fragment of a curved copper-alloy mount is likely the remnants of a picture frame (SF 1).

Significance of the finds and recommendations for further work

The metal and small finds from Westminster Abbey Song School provide an insight into previous buildings on site in the late medieval and early modern periods. Besides iron nails, some residual finds, including a small copper-alloy buckle (SF 4), may also date from the monastic use of use of buildings here as part of the *Frater*. The majority of finds, however, may date from the immediate post-dissolution period in the 16th century. This group of objects include fittings and furnishings that could be associated with the reconfiguration of the west part of the *Frater* into private domestic use. Besides dress accessories, particularly interesting finds in this assemblage are presented by a copper-alloy jeton for calculating sums (SF 5), a possible stylus of rolled copper-alloy sheet (SF 32) and a complete scale-pan for a small balance (SF 31). These finds indicate a household of some status, where account-keeping and the handling of coins and precious commodities were part of daily life. Later finds, associated with buildings in the 18th and 19th centuries, are weakly represented, but include a complete iron lock hasp with an *in-situ* padlock (SF 2).

The metal and small finds form an integral component of the finds and should, where relevant, be included in any further publication of the site. This is currently planned to include the finds from The *Cellarium*, a site characterised by a stronger medieval component (Gaimster 2013). For the purpose of publication, some finds from The Song School will require x-raying and further research to aid full identification; these finds are annotated in the tables below. It is recommended that also some of the iron nails are x-rayed for archival purposes; following final publication these, along with undiagnostic metal fragments, may be discarded.

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Table 1: WSA14: metal and small finds by phase

PHASE 2: 10th-11th centuries				
CONTEXT	**SF**	**DESCRIPTION**	**POT DATE**	**RECOMMENDATIONS**
151	24	Bone; cattle-size sternum with nail-size hole punched through centre	n/a	

PHASE 3: 12th-14th centuries				
CONTEXT	**SF**	**DESCRIPTION**	**POT DATE**	**RECOMMENDATIONS**
47	4	Copper-alloy buckle; small D-shaped form with coarsely cut pin notch in outer frame; copper-alloy sheet pin extant; W 15mm; L 15mm; ?late medieval; residual in Phase 6	1550-1600	x-ray
130		Iron ?straps; two corroded pieces; W 10mm	1080-1350	x-ray
136		Iron ?strap; substantial piece; W 60mm; L 255mm+	1270-1500	x-ray
137		Iron nail; incomplete	1270-1350	x-ray
143		Iron nails; three incomplete	n/a	x-ray
149		Iron nail; incomplete with small square head	1350-1500	x-ray

PHASE 4: 15th-16th centuries				
CONTEXT	**SF**	**DESCRIPTION**	**POT DATE**	**RECOMMENDATIONS**
4	37	Tinned copper-alloy upholstery pin with domed head; diam. 12mm; residual in Phase 6	1580-1700	
47	12	Copper-alloy pin; Caple Type C but irregularly crimped head; L 24mm; residual in Phase 6	1550-1600	
	34	Lead waste; substantial triangular sheet; W 105mm; L 140mm; likely roofing lead; also rolled strip of lead sheet; W 12mm; residual in	1550-1600	

		Phase 6		
49		Iron nail; L 10mm; residual in Phase 6	1500-1580	
63	5	Copper-alloy jeton; rose-and-orb; Hans Kravwinckel, Nuremberg; 'GOTT ALLEIN DIE EHRE SEI'; struck on oval flan; diam. 20mm	1550-1600	
	7	Copper-alloy lace-chape; Oakley Type 1 with minute transverse copper-alloy rivet present; L 15mm	1550-1600	
66	27	Bone cutlery handle for implement with knock-on tang; tapering with flat/oval section; L 70mm; W 13 mm	1550-1600	x-ray
119	35	Bone flute of ?goose tibia; incomplete with three finger holes present; L 62mm+	1480-1650	
131		Iron ?spur; heavily corroded fragment only; W 10mm; L 100mm	1580-1700	x-ray
140	17	Lead pipe of overlapping sheet; diam. 45mm; L 670mm+	n/a	
214	29	Lead window came; reeded; two pieces;	1580-1600	
		Iron nails; four incomplete	1580-1600	x-ray
215	30	Copper-alloy mount; tapering rectangular of thin sheet; four iron rivets present; W 35mm; L 85mm	1580-1700	x-ray
216		Iron ?nail; incomplete	1580-1700	x-ray
228		Iron ?nail; incomplete	1480-1650	x-ray
242	28	Iron knife; complete fine tang-hafted blade; W 8mm; L 83mm; residual in Phase 7	n/a	x-ray
	31	Copper-alloy scale pan; circular dished with three fine holes for suspension; diam. 45mm; ht. 8mm; ?residual medieval/early modern; residual in Phase 7	n/a	Further identify
	32	Copper-alloy ?stylus; tapering sheet tube with narrow opening for ?metal point and flattened pointed finial; L 144mm; residual in Phase 7	n/a	Further identify
	33	Incomplete iron scale-tang implement with long bolster; tapering set-back handle with remnants of wooden scales; three tubular copper-alloy rivets at upper end with two solid rivets below; possibly sweetmeat fork; 16th century; residual in Phase 7	n/a	x-ray
	36	Hone of Norwegian ragstone; square-section fragment only of narrow specimen; residual in Phase 7	n/a	

PHASE 5: 17th century				
CONTEXT	**SF**	**DESCRIPTION**	**POT DATE**	**RECOMMENDATIONS**
75		Iron strap; tapering; W 18mm; L 105mm+	1580-1650	x-ray

PHASE 6: 18th-19th centuries				
CONTEXT	**SF**	**DESCRIPTION**	**POT DATE**	**RECOMMENDATIONS**
3	1	Copper-alloy curved mount or frame; fragment only with partly retained angled edges for fixing; W 7mm; L 80mm+	n/a	
12		Iron nail with small rectangular head; L 90mm	n/a	
45	2	Iron padlock; complete in-situ on hinged iron lock hasp; padlock ht. 80mm; hasp W 40mm.	1800-1830	x-ray
	3	Iron fitting; curved strap; W 20mm; object L 105mm	1800-1830	x-ray
		Iron nails; eight corroded, mostly incomplete; one example L 130mm	1800-1830	x-ray
50		Copper-alloy ring enforcement; outer diam. 24mm	1794-1900	
		Iron ?vessel; curved fragment only; L 100mm	1794-1900	x-ray
90		Iron nail; incomplete	1807-1840	
108		Iron nail; complete with clenched shank; L 40mm	1770-1840	

APPENDIX 8: DENDROCHRONOLOGICAL ASSESSMENT

Oxford Dendrochronology Laboratory
Report 2015/08

THE TREE-RING DATING OF TIMBERS FROM A FLOOR AND PARTITION WALL, THE OLD SONG SCHOOL (RECEIVER GENERAL'S HOUSE) WESTMINSTER ABBEY, LONDON (TQ 700 394)

Summary

Two of the large floor joists, two smaller joists over the stone vault, and two studs in a partition wall matched each other and were combined to form a 74-year site chronology that was dated to the period 1313–1386. One of the studs retained complete sapwood, and was found to have come from a tree felled in winter 1386/87, making construction of this floor and wall likely in **1387**, or within a year or two after this date.

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March 2015

The Tree-Ring Dating of Timbers from a Floor and Partition Wall, The Old Song School, (former Receiver General's House), Westminster Abbey, London (TQ 700 394)

BACKGROUND TO DENDROCHRONOLOGY

The basis of dendrochronological dating is that trees of the same species, growing at the same time, in similar habitats, produce similar ring-width patterns. These patterns of varying ring-widths are unique to the period of growth. Each tree naturally has its own pattern superimposed on the basic 'signal', resulting from genetic variations in the response to external stimuli, the changing competitive regime between trees, damage, disease, management etc.

In much of Britain the major influence on the growth of a species like oak is, however, the weather conditions experienced from season to season. By taking several contemporaneous samples from a building or other timber structure, it is often possible to cross-match the ring-width patterns, and by averaging the values for the sequences, maximise the common signal between trees. The resulting 'site chronology' may then be compared with existing 'master' or 'reference' chronologies. These include chronologies made by colleagues in other countries, most notably areas such as modern Poland, which have proved to be the source of many boards used in the construction of doors and chests, and for oil paintings before the widespread use of canvas.

This process can be done by a trained dendrochronologist using plots of the ring-widths and comparing them visually, which also serves as a check on measuring procedures. It is essentially a statistical process, and therefore requires sufficiently long sequences for one to be confident in the results. There is no defined minimum length of a tree-ring series that can be confidently cross-matched, but as a working hypothesis most dendrochronologists use series longer than at least fifty years.

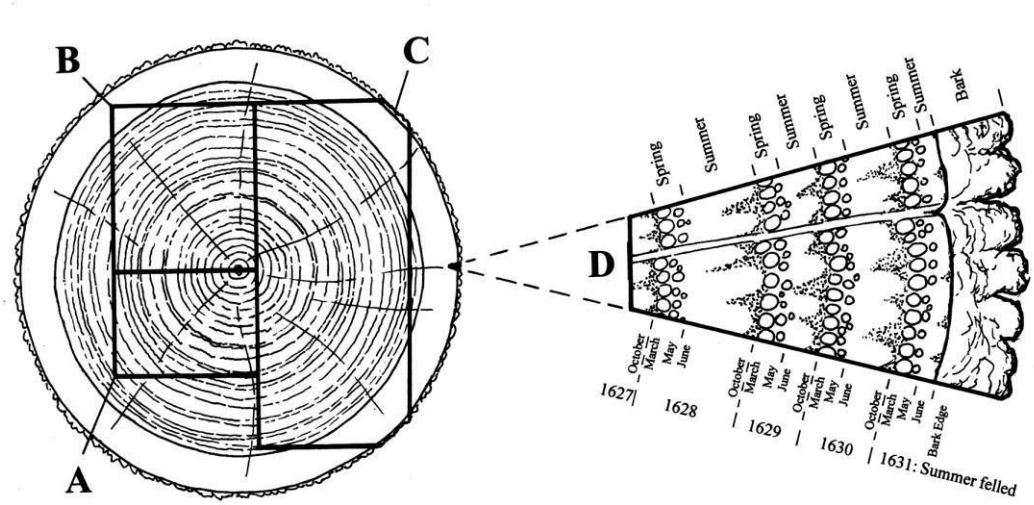
The dendrochronologist also uses objective statistical comparison techniques, these having the same constraints. The statistical comparison is based on programs by Baillie & Pilcher (1973, 1984) and uses the Student's *t*-test. The *t*-test compares the actual difference between two means in relation to the variation in the data, and is an established statistical technique for looking at the significance of matching between two datasets that has been adopted by dendrochronologists. The values of '*t*' which give an acceptable match have been the subject of some debate; originally values above 3.5 being regarded as acceptable (given at least 100 years of overlapping rings) but now 4.0 is often taken as the base value in oak studies. Higher values are usually found with matching pine sequences. It is possible for a random set of numbers to give an apparently acceptable statistical match against a single reference curve – although the visual analysis of plots of the two series usually shows the trained eye the reality of this match. When a series of ring-widths gives strong statistical matches in the same position against a number of independent chronologies the series becomes dated with an extremely high level of confidence.

One can develop long reference chronologies by cross-matching the innermost rings of modern timbers with the outermost rings of older timbers successively back in time, adding data from numerous sites. Data now exist covering many thousands of years and it is, in theory, possible to match a sequence of unknown date to this reference material.

It follows from what has been stated above that the chances of matching a single sequence are not as great as for matching a tree-ring series derived from many individuals, since the process of aggregating individual series will remove variation unique to an individual tree, and reinforce the common signal resulting from widespread influences such as the weather. However, a single sequence can be successfully dated, particularly if it has a long ring sequence.

Growth characteristics vary over space and time, trees in south-eastern England generally growing comparatively quickly and with less year-to-year variation than in many other regions (Bridge, 1988). This means that even comparatively large timbers in this region often exhibit few annual rings and are less useful for dating by this technique.

When interpreting the information derived from the dating exercise it is important to take into account such factors as the presence or absence of sapwood on the sample(s), which indicates the outer margins of the tree. Where no sapwood is present it may not be possible to determine how much wood has been removed, and one can therefore only give a date after which the original tree must have been felled. Where the bark is still present on the timber, the year, and even the time of year of felling can be determined. In the case of incomplete sapwood, one can estimate the number of rings likely to have been on the timber by relating it to populations of living and historical timbers to give a statistically valid range of years within which the tree was felled. For this region the estimate used is that 95% of oaks will have a sapwood ring number in the range 9 – 41 (Miles 1997).



Section of tree with conversion methods showing three types of sapwood retention resulting in **A** *terminus post quem*, **B** a felling date range, and **C** a precise felling date. Enlarged area **D** shows the outermost rings of the sapwood with growing seasons (Miles 1997a, 42)

FLOOR AND WALL, former RECEIVER GENERAL'S HOUSE

The floor consists of a series of 13 floor joists running approximately north-south, with an additional joist in each of the window bays on the west side of the room, these timbers being later additions (Fig 1). On the south side of the room a stone vault from the room below rises close to the floor level, and the continuation of the joists over this section uses timbers of smaller scantling. The stud wall between rooms F5 and F6 retains some original studs apparently arbitrarily cut at first floor level (Fig 2).

SAMPLING

The site was assessed by Dr Dan Miles, who thought that it might be possible to get dates from some of the joists. He did not see the partition wall studs, which were still covered during his visit. He was not available to carry out the sampling.

Samples were taken in February 2015 during extensive repairs and renovation work at the property. The

locations of the samples are described in Table 1, and illustrated in Figs 1 & 2. Core samples were extracted using a 15mm diameter borer attached to an electric drill. They were labelled (prefix **wrgh**) and were polished with progressively finer grits down to 400 to allow the measurement of ring-widths to the nearest 0.01 mm. The samples were measured under a binocular microscope on a purpose-built moving stage with a linear transducer, attached to a desktop computer. Measurements and subsequent analysis were carried out using DENDRO for WINDOWS, written by Ian Tyers (Tyers 2004).

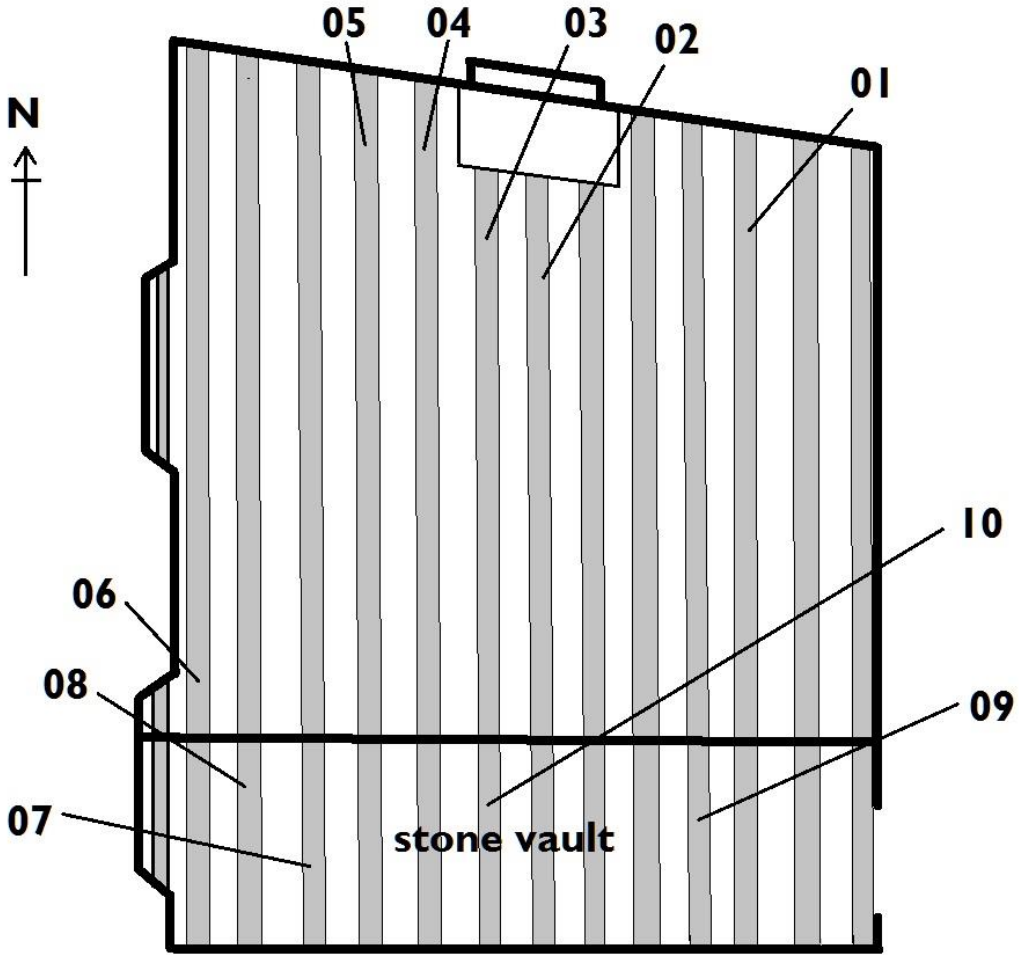


Figure 1: Sketch-plan of the floor sampled for dendrochronology, showing the joists sampled

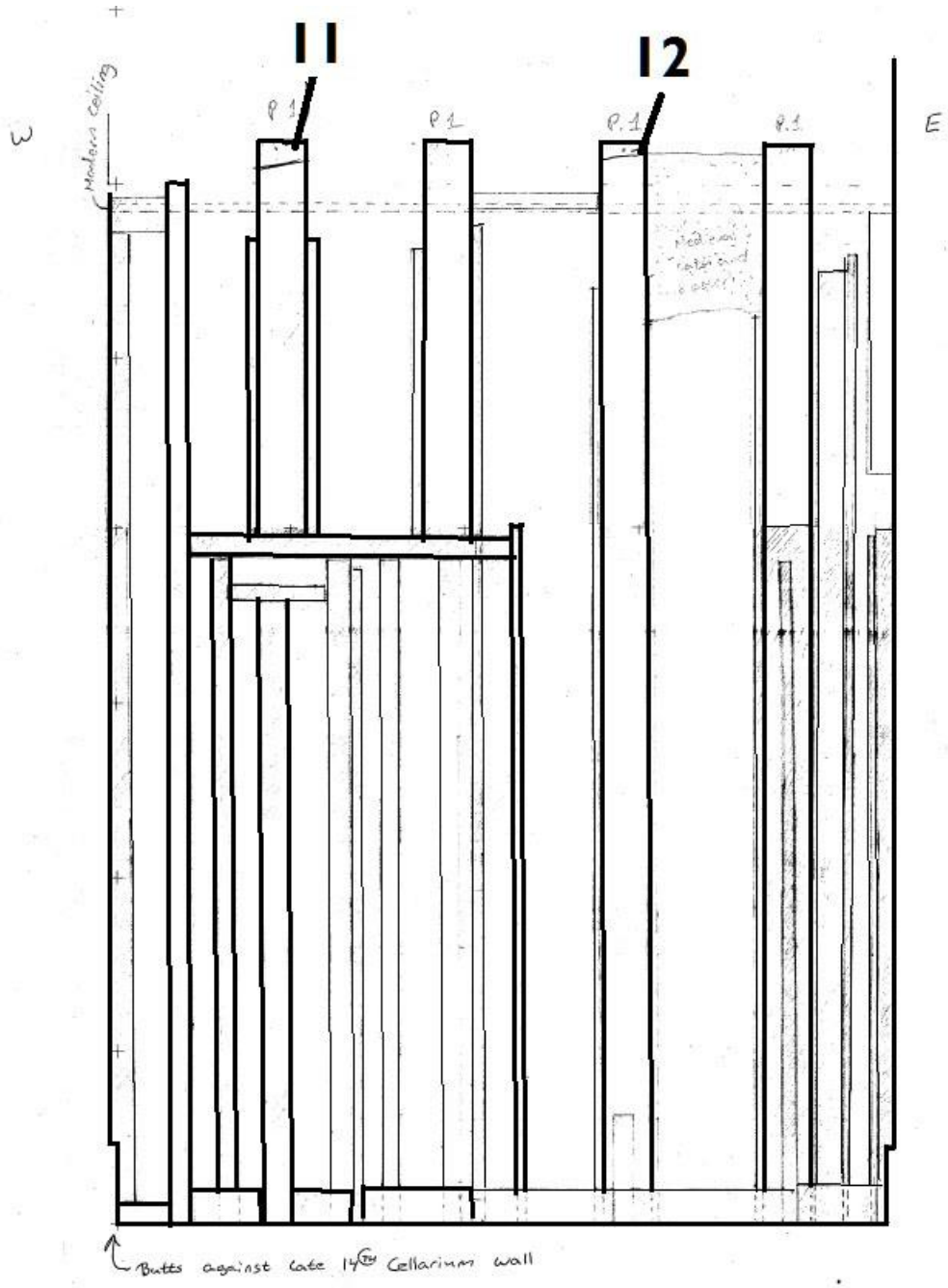


Figure 2: Plan of the partition wall between rooms F5 and F6, showing the studs sampled (adapted from an original supplied by Paw Jorgensen).

RESULTS AND DISCUSSION

Details of the samples are given in Table 1. Four cores were found to have too few rings for further analysis. Two cores were taken from large joist 10 (samples **05a** and **05b**) and these matched each other and were combined into a single sequence for further analysis. Six series were found to match each other (Table 2) and were combined into a 74-year long site master sequence **WARECGEN**. This was subsequently dated to the period 1313–1386, the strongest matches being shown in Table 3. None of the remaining three samples (**06**, **07** and **10**) matched this sequence, nor did they date independently.

The dated series appear to form a single group (Fig 3), most like all felled at the same time. One timber, one of the studs in the partition wall, retained complete sapwood, and was found to have been felled in the winter of 1386/87, making construction of the floor and wall likely in 1387, or within a year or two after this date.

Notes from Prof. Warwick Rodwell, Abbey Archaeologist

Soon after Nicholas Litlyngton was appointed abbot of Westminster in 1362, he began to rebuild the abbot's house, which lies to the west of the great cloister. Henry Yevele, the king's master mason, was the architect. In 2004, ODL dated the floor timbers of the abbot's great chamber (known as Jerusalem Chamber) to 1369-70.

Litlyngton then proceeded to construct an impressive cellarer's range, running south from the SW corner of the abbot's house. The new cellarium comprised a great stone-vaulted undercroft, with a range of domestic and other offices above. The timber samples recently dated came mainly from the floor of the upper range (ie above the stone vault). The most precisely dated sample (1386/87) was taken from one of the original studwork partitions between the upper rooms. Completion of the cellarium probably marked the end of Litlyngton's work at Westminster, since he died in 1387.

ACKNOWLEDGEMENTS

This work was commissioned by Pre-Construct Archaeology on behalf of the Dean and Chapter of Westminster Abbey. I thank Paw Jorgensen for his assistance on-site and for sending on the samples from the stud wall. Warwick Rodwell (Abbey archaeologist) advised on the timbers of interest on-site. I thank my fellow dendrochronologists for permission to use their data.

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Table 1: Details of samples taken from the floor and partition wall at the Receiver General's former House, Westminster Abbey. Joists are numbered from the east side

Sample number	Timber and position	Date of series	H/S boundary date	Sapwood complement	No of rings	Mean width (mm)	Std devn (mm)	Mean sens	Felling date range
Large floor joists									
wrgh01	Joist 3	-	-	H/S	<40	NM	-	-	-
wrgh02	Joist 7	-	-	H/S	<40	NM	-	-	-
wrgh03	Joist 8	-	-	H/S	<40	NM	-	-	-
* **wrgh04**	Joist 9	1315–1364	-	-	50	2.88	1.09	0.27	After 1373
wrgh05a	Joist 10	*1329–68*	*1368*	*H/S*	*40*	*2.80*	*0.92*	*0.20*	
wrgh05b	*ditto*	*1318–66*	-	-	*49*	*2.11*	*0.69*	*0.23*	
* **wrgh05**	Mean of **05a** and **05b**	1318–1368	1368	H/S	51	2.44	0.75	0.22	1377–1409
wrgh06	Joist 13	-	-	3	45	1.96	0.70	0.29	-
Joists over the stone vault									
* **wrgh07**	Joist 11	1313–1365	-	-	53	1.69	0.84	0.24	After 1374
* **wrgh08**	Joist 12	1320–1368	1368	H/S	49	2.45	1.01	0.24	1377–1409
wrgh09	Joist 4	-	-	-	<40	NM	-	-	-
wrgh10	Joist 8	-	-	6	62	1.26	0.46	0.19	-
Studs in wall between rooms F5 and F6									
* **wrgh11**	West stud (4th from east side)	1324–1386	1365	21C	63	1.68	0.86	0.27	Winter 1386/87
* **wrgh12**	Stud 2 from east side	1324–1373	1373	H/S	50	2.05	0.63	0.20	1382–1414
* = included in site master **WARECGEN**		**1313–1386**			**74**	**2.03**	**0.84**	**0.20**	

Key: H/S bdry = heartwood/sapwood boundary - last heartwood ring date; ¼ C = complete sapwood present, including spring vessels of the following year; ½C = complete sapwood, felled the following summer; std devn = standard deviation; mean sens = mean sensitivity; NM = not measured. Pale orange = elm; pale blue = oak.

Table 2: Cross-matching between the dated samples (*t*-values above 3.5 are significant

	t-values				
Sample	**wrgh05**	**wrgh07**	**wrgh08**	**wrgh11**	**wrgh12**
wrgh04	7.6	8.2	5.6	3.6	3.3
wrgh05		5.5	3.9	2.9	2.6
wrgh07			4.4	2.3	3.1
wrgh08				5.6	3.4
wrgh11					8.2

* = overlap less than 20 rings, no calculation made

Table 3: Dating evidence for the site chronology **WARECGEN AD 1313–1386** against dated reference chronologies

County or region:	***Chronology name:***	***Reference***	***File name:***	***Spanning***	***Overlap: (yrs)***	***t-value:***
Regional Chronologies						
England	Southern Central England	(Wilson *et al* 2012)	**SCENG**	663–2009	74	8.0
London	London Master Chronology	(Tyers pers comm)	**LONDON**	413–1728	74	7.3
Site Chronologies						
London	White Tower, Tower of London	(Miles 2007)	WHTOWR5	1260–1489	74	8.7
Surrey	Home Farm, Newdigate	(Bridge 1998)	NEWDIG1	1261–1483	74	7.4
Essex	15 High Street, Gt Dunmow	(Bridge 1999)	DUNMOW	1312–1373	61	7.0
Hertfordshire	Priory Barn, Lt Wymondley	(Bridge 2001)	LWYMON1	1283–1364	52	6.8
Kent	Cowden Church	(Howard *et al* 1999)	CWDASQ01	1257–1439	74	6.8
Kent	Court Lodge Farm, Bilsington	(Arnold and Howard 2009)	BLSNSQ01	1224–1401	74	6.4
Hertfordshire	Ware Priory	(Howard *et al* 1997a)	WAREPRRY	1223–1416	74	6.4
Hampshire	Trees Cottage, Froxfield	(Miles and Haddon-Reece 1993)	TREES1	1294–1359	47	6.3
Kent	St John's Commandery, Swingfield	(Howard *et al* 1997b)	SWNASQ03	1312–1382	70	6.3

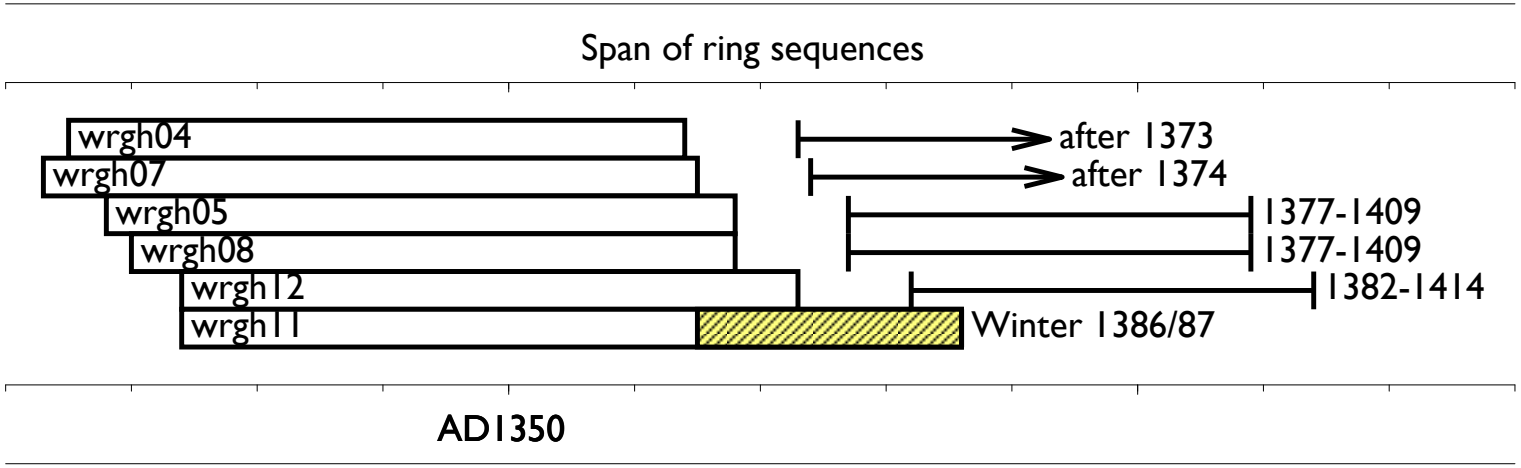

Figure 3: Bar diagram showing the relative positions of overlap of the dated series, along with their interpreted likely, or actual, felling date ranges. Yellow hatched sections represent sapwood rings.

APPENDIX 9: ANIMAL BONE ASSESSMENT

Kevin Rielly

Introduction

Excavations were undertaken within two adjacent properties within the precincts of Westminster Abbey, including No. 2 The Cloister (to the west) and then rooms associated with the Abbey Song School (to the east). Both properties are located along the south cloister walk within the remains of the 11th-century monastic refectory, the *Frater*. Archaeological work was largely concentrated within the western property. The earliest levels revealed and reclamation sumps and some features clearly predating the construction of the *Frater* dated to the 10th/11th centuries (Phase 2) followed by features associated with the refectory including a series of earth floors and some constructional features (Phase 3 - 12th to 14th centuries); with deposition levels pertaining to part destruction of the *Frater* during the dissolution (Phase 4 - 15th to 16th centuries) and the subsequent construction of new buildings, in turn followed by several floor/yard surfaces (Phase 5 - 17th century), demolition and mortar surfaces relating to the construction of No. 2 The Cloister (Phase 6 - 18th to 19th centuries) and finally, further demolition/building in the modern era (Phase 7).

Animal bones were recovered from deposits representing each phase, predominantly from the monastic and dissolution/early post-medieval phases. It should be noted that these results include the bones recovered from both the evaluation as well as the later mitigation trenches. The site assemblage includes a notable proportion retrieved from the bulk samples, with fish being particularly well represented. These have been recorded by Philip Armitage (and see Appendix 10).

It is intended that the information gathered from this assemblage should be published with that from the previous excavation at the *Cellarium*. With this in mind a major aim of this assessment will be to deduce whether or to what extent the data from the Song School assemblage can add to/improve the information already compiled from the *Cellarium*.

Methodology

The bone was recorded to species/taxonomic category where possible and to size class in the case of unidentifiable bones such as ribs, fragments of longbone shaft and the majority of vertebra fragments. Recording follows the established techniques whereby details of the element, species, bone portion, state of fusion, wear of the dentition, anatomical measurements and taphonomic including natural and anthropogenic modifications to the bone were registered. The sample collections were washed through a modified Siraf tank using a 1mm mesh and the subsequent residues were air dried and sorted.

Description of faunal assemblage

The site provided a grand total of 889 animal bones taken by hand collection and a further 1,384 provided by 9 samples. These totals include the 1 and 768 fish bones recovered by hand and by sieving respectively, which are described in a separate report (see Armitage, Appendix 10). All of these bones have been assigned to their respective phases, as shown in Tables 1 and 2. The great majority of the bones had suffered no more than a minimal level of surface damage and while fresh breakage is frequent, the noted level of fragmentation was generally low.

Phase:	**2**	**3**	**4**	**5**	**6**	**7**
Species						
Cattle	23	27	18	6	11	
Equid		2				
Cattle-size	54	60	47	9	14	1
Sheep/Goat	31	25	37	23	28	
Pig	22	11	6		6	
Sheep-size	45	54	103	18	33	
Roe deer	1					
Dog	2			1	55	
Cat	3	1			3	
Rabbit			2		2	
Small mammal	2	1	2		1	
Black rat			1			
Rat		9				
Porpoise/Dolphin	1		1			
Chicken	6	7	25	4	13	
Chicken-size		6	6	1		
Goose		2	2	1		
Mallard	2				1	
Turkey			1			
Woodcock	1					
Fish		4	5	1	1	
Grand Total	193	207	256	64	168	1

Table 1: Distribution of hand collected bones by phase including quantities of fish bones recovered (and see Appendix 10).

Reclamation and early Monastic (Phase 2)

Prior to the construction of the refectory, it would appear that this area was used as a general dumping ground. The great majority of the bones were taken from dump deposits, including some identified as probable reclamation levels. Otherwise this early assemblage was derived from a ditch [167] and a pit [189] these providing 12 and 27 hand collected bones respectively (out of 193), the former also producing 133 fragments from one of the samples (out of a total of 841 sieved bones). There is a notably diverse array of food species in these collections featuring a relatively similar abundance of the major domesticates, with a clearly better representation of sheep/goat and pig from the samples; as well as a minor quantity of poultry and a variety of large and small game animals and birds. There is also an abundance of fish bones but it should be noted that these are derived from 4 samples (and see below Phase 3).

Phase:	**2**	**3**	**4**	**5**
Species				
Cattle	3	3	1	
Equid	1			
Cattle-size	20	33		
Sheep/Goat	21	14		
Pig	19	14		
Sheep-size	191	93	18	6
Roe deer		1		
Cat	83			
Small mammal	6		3	
House mouse	1			
Field vole	2			
Small rodent	4			
Wader		1		
Dove		1		
Quail	3			
Chicken	1	6	1	
Chicken-size	5	7	2	
Goose	2			
Mallard	2			
Passerine	31	3	1	
Uniden bird	8	3		
Amphibian	4	1		
Fish	434	251	63	20

Phase:	2	3	4	5
Total	841	428	89	26
N samples	4	1	3	1

Table 2: The distribution of sieved bones by phase with fish bones limited to quantity recovered (see Appendix 10 for fish bone identifications).

Each of the major domesticate collections is composed of a wide array of skeletal parts, thus signifying general waste. This undoubtedly contains a high status element, as shown by the deer remains and also by the small cetacean, part of a mandible which has been tentatively identified as porpoise/dolphin. Quail is also rather unusual and may be indicative of high living. Other aspects of this collection include a relatively complete cat skeleton partly derived from the lower fill [166] of ditch [167] and partly from the underlying subsoil [168]. Adjoining bones from the one adult skeleton were found in both deposits. Evidence for the skinning of cats has been found at other London medieval sites (as for example from the Guildhall dating to the 12th/13th centuries, Bowsher *et al.* 2007, 342). Apart from a notable quantity of individuals, there was also a number of bones with cut marks, these notably visible adjacent to the orbital and snout areas of the skull (ibid). Unfortunately the skull of the Song School skeleton was rather fragmented, essentially removing the evidence.

The construction and use of the monastic refectory, the *Frater* (Phase 3)

This assemblage was mainly retrieved from various layers and in particular from layers [134] and [185], these interpreted as ‘kitchen’ dumps, providing 133 bones from hand collection and the entire sieved bone collection, all from [134]. This interpretation undoubtedly relates to the recovery of bone concentrations in association with the refectory. However, it can be seen that the domesticate skeletal abundance patterns demonstrate a mixed deposition rather than one concentrated on the meatier parts of the carcass as would perhaps be expected with true ‘kitchen’ waste. There may well be some intermixing from other sources and indeed the general assemblage does show a broad distribution of skeletal parts, similar in this respect to the previous collections. The degree of mixing is clearly shown by the presence of a human bone fragment (in poor condition) amongst the ‘kitchen’ waste collection from [185] (Appendix 11). Further similarities include an approximate parity in the representation of cattle and sheep/goat, both in general and within the ‘kitchen’ waste deposits, although now apparently with less pig. In contrast the sieved collection again demonstrates the abundance of sheep/goat and pig in comparison to cattle.

The range of other food species also follows the previous collection in terms of a rather limited quantity of poultry and a wide range of game species. Affluence is again indicated by the presence of deer and while there is perhaps a lesser quantity, if not a lesser range, of game, this can perhaps relate more to the greater number of samples with bones from the previous phase (see Table 2). Of

interest, amongst the non-food species was the concentration of rat bones found in the fill [125] of robber cut [126]. These represent at least two adult individuals and while not identifiable to species, the relatively closed stratigraphy would suggest they are more likely to be black rat.

Dissolution, demolition and construction of new buildings (Phase 4)

Most of the hand collected bones dating to this phase were retrieved from dump deposits and various features, in particular pit [35] with 83 fragments; while the three sample assemblages were provided by two construction layers [109] and [121] and a burnt horizon [68]. The nature of these last three deposits may explain the rather smaller collection of bones relative to the samples taken from previous phases.

Of particular interest in the hand collected assemblage is the notably high proportion of sheep/goat relative to cattle. This shift in the abundance pattern, compared to Phases 2 and 3, is undoubtedly confirmed by the much larger quantity of sheep-size compared to cattle-sized fragments. In addition, the latter size distinction is also shown in the sieved collection. There is again, however, a general diversity of cattle and sheep/goat skeletal parts, signifying a mixed deposition. The other food species include a good proportion of poultry, possibly including turkey and a relatively minor array of game, here including another small cetacean (a vertebra). This was again tentatively identified as porpoise/dolphin, possibly indicating the continued usage of this expensive comestible. This bone was found in the fill [116] of robber cut [114] and thus could conceivably represent a redeposited medieval item. The dating, however, is rather precise, between 1570 and 1600. The turkey may represent another pricey food item, this dating to a period not long after its introduction to Europe in the early 16th century and thence to Britain by the mid 16th century (Serjeantson 2009, 290; Fothergill 2014, 207-8). Unfortunately this bone is insufficiently complete to assign a definite identification and thus must remain as a large galliform - here including turkey, peacock or possibly capon. This does not diminish, however, an indication of affluence, where all of these galliforms can be linked with good eating and/or expensive tastes.

It should also be mentioned that there may be some doubt concerning the date of the fill containing the ‘turkey’ bone. Of interest here was the recovery of two bones with rat gnawing. This sort of damage is more often found on bones from somewhat later deposits, probably from the latter part of the 18th century, although it can be found on earlier material (see Rielly in prep a).

Further development (Phase 5)

This minor collection was principally derived from various layers, in particular garden soil [75] and made ground [162] with 31 and 26 bones respectively. All of the sieved assemblage came from floor surface [91]. While rather small, this collection again featured a wealth of sheep/goat compared to

cattle bones (note also that sheep-size bones form the major part of the sieved assemblage). There is a limited range of other food species, confined to poultry.

Construction of No. 2 The Cloister (Phase 6)

The predominance of sheep/goat continues into this phase, where most of a reasonably sized assemblage was taken from garden features (96 bones), mortar surfaces (39 bones) and dump levels (20 bones). There are again mixed cattle and sheep/goat skeletal representations, while the other food species collection is mainly composed of poultry and a small contingent of rabbit. The non-food assemblage features the partial remains of an adult dog and a few cat bones, all taken from the fill [50] of bedding trench [51]. The latter probably represents the disturbed remains of an animal buried (consisting mainly of ribs and vertebrae, missing the head and most of the limb bones) in the Abbey garden associated with the Cloister. The late date of this phase collection is confirmed by the presence of a cattle astragalus from a notably large adult individual, this found in mortar surface [3] and probably representing an improved breed and thus dating from the latter part of the 18th century (after Rixson 2000, 215). In addition particularly large cattle-size ribs were recovered from garden feature [48] and another mortar surface [47], some of the latter also showing signs of sawing, another late post-medieval trait (see Albarella 2003, 74).

Modern activity (Phase 7)

This phase provided a single cattle-size rib from garden soil [7].

Conclusion and recommendations for further work

The bone assemblage features a well dated sequence from the earliest occupation of the Abbey monastic settlement through to the modern era. There are significant differences in the quantities of bones involved within the individual phases but there does appear to be sufficient data to offer a comparison through the monastic and the first two centuries following the Dissolution. The level of comparison, however, is largely limited to species quantification, with the better represented species - cattle, sheep/goat and pig, generally offering too little age and size data to provide a detailed review of exploitation practices and/or the size of these domesticates through time. Broad comparisons can however be made with an obvious difference between the early post-medieval and medieval collections, the latter providing a notable proportion of veal aged calves. This follows a general London pattern, as seen for example at Bermondsey at the Thameslink sites (Rielly in prep a) and also amongst the similarly dated *Cellarium* collection (Rielly 2014). This also coincides with a London-wide shift towards a greater use of sheep/goat compared to cattle, as seen here, by the 16th/17th centuries (again see Rielly in prep a).

The species abundance pattern within the medieval phases tends to show an approximate parity between cattle and sheep/goat with a small proportion of pig bones. Now this contrasts with the evidence from the other Westminster Abbey collections, including that from the *Cellarium*, the *Dorter* Undercroft (Pipe 1995) and also Dean's Yard (Rielly 2015). All three of these sites show varying levels of cattle and sheep/goat, generally towards the latter species, coinciding with a notably large proportion of pig. It has been suggested that the abundance of pig is related to the known presence of a piggery at Westminster Abbey, although it is not known when this was established (Rielly 2014). It can be proposed that this difference shown in the Song School collections may relate to quantity or, conversely, could be indicative of dietary differences within certain portions of the Abbey community.

It was noted that there is a wide range of food species other than the major domesticates amongst the monastic and early post-medieval phases, with clear indications of prestige foods as venison and small cetacean (porpoise/dolphin). There were two instances of the latter species, dating to the 10th/11th centuries and then to the 16th century. The earlier may equate with the concentration of cetacean remains, generally small whales rather than porpoise/dolphins found at Bermondsey Abbey as well as the dolphin found at the *Dorter* Undercroft in Westminster Abbey (Pipe 1995), all perhaps pointing to 'rights to take wreck', in this case involving cetacean strandings, given to the Thames based ecclesiastical houses or just possibly the presence of a whale fishery based in the Thames during this period (and see Rielly in prep b; Gardiner 1997, 174-5). The later find may relate to a continuation of the late medieval practice of offering porpoises (or presumably parts of such small cetaceans) as prestige gifts between lordly households (ibid, 190). Such small cetaceans were also found within late medieval levels at the *Cellarium* and at Dean's Yard (Rielly 2014; 2015).

Referring now to the combined *Cellarium* and Song School publication, it can be seen that the assemblage from the latter site will undoubtedly add significant points of interest and comparison concerning the use of major domesticates and also of prestige items. There is perhaps little scope for comparison of exploitation practices, with the exception of the rise in veal usage entering the early post-medieval era. The difference in major domesticate usage, especially concerning pigs, is certainly of interest and should be explored further. Finally, the later post-medieval bone evidence should of course be mentioned but in far less detail in comparison to that from the medieval and early post-medieval phases.

A small proportion of bones are yet to be identified including the cetaceans and some of the bird bones. This will entail visits to external reference collections, namely to Tring Natural History Museum (birds) and either the Cambridge Museum of Natural History or the London Natural History Museum cetacean collection at Wimbledon in London.

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APPENDIX 10: FISH BONE ASSESSMENT

Philip L. Armitage

Introduction

This report presents the results of the assessment of 838 fish bone elements from the Song School excavation at Westminster Abbey. Of these 838 bones, 747 (89%) were assigned to taxa/anatomy. Of the identified material, 732 specimens were from sieved samples and 15 collected by hand during the excavation; the later notably biased towards larger elements from larger species. The fish bones were recovered from six phases, dating from the 10th-11th century to the 18th-19th century, with over half (410/747 = 54.9%/total) of the identified material coming from the earliest (Phase 2) contexts.

Methodology

Species and anatomical Identifications were made using the author's modern comparative osteological collections and with reference to established works. Where precise species identifications could not be determined, these were categorised under taxonomic family. For example, in certain of the *gadidae* (cod family) bones, these were categorised as either "large/medium *gadid*" or "small *gadid*" depending on size, with the latter probably comprising mostly very small/immature whiting. All of the remains recorded as "very small cyprinids" and the very small smelt from context [134] <5> are highly unlikely to be fish caught as human food but were probably from the stomach contents of larger predatory fish, such as pike, gutted during preparation for cooking. Nomenclature of the anatomical elements follows the system of Wheeler and Jones (1969, table 7.1, 122-124). Microsoft Excel spreadsheets showing the complete data sets of recorded anatomies for each species represented in the sieved samples and hand collected material from each phase/context group were prepared for the site archive.

Measurements (in mm) were taken on selected specimens using Draper dial callipers (graduated 0.02mm). Calculations for estimating total length (TL) from the measurements taken on selected fish bone elements employed the regression formulae in the following published sources: Jones and Scott (1985) - whiting; Libois *et al.* (1987) - freshwater eel; Libois & Hallet-Libois (1988) - roach; and Tarkan *et al*. (2007) - rudd. Size (fork length) in mackerel was calculated using the method of Klippel & Sichler (2004). Metrical data (estimated fish sizes) are presented in the spreadsheets prepared for the site archive.

Results

Preservation & modification

The fish bones from the site are well preserved. There is no incidence of burnt bone among the submitted samples; including those specimens from "burnt deposit" [68] <1>. Only a cod postcleithrum from [166] <8> shows evidence of butchery - cut in the manner illustrated by Klippel & Falk (2002, fig. 4, 30). There is a single specimen, a caudal vertebra of a grey mullet from [91] <2> Phase 6 exhibiting evidence of crushing/chewing. As there is no sign of acid etching on this bone it would seem unlikely it passed through the digestive system.

Taxa/species identified

Table 1 provides a summary of the numbers of identified specimens present (NISP) for each species in each of the phases. Overall, the remains of 18 taxa (9 marine, 5 migratory/estuarine and 4 freshwater species) are represented:

Marine:

Cod *Gadus morhua*; whiting *Merlangius merlangus*; haddock *Melanogrammus aeglefinus*; herring *Clupea harengus*; plaice *Pleuronectes platessa*; conger eel *Conger conger*; mackerel *Scomber scombrus*; thornback ray *Raja clavata*; and gurnards family *Triglidae*.

Migratory/estuarine:

freshwater eel *Anguilla anguilla*; thin-lipped grey mullet *Liza ramada*; sea bass *Dicentrarchus labrix*; flounder *Platichthys flesus*; smelt *Osmerus eperlanus*;

Freshwater: pike *Esox lucius*; roach *Rutilus rutilus*; chub *Leuciscus cephalus*; and rudd *Scardinius erythrophthalmus*.

Overall, the assemblages are dominated by marine taxa; with bones of herring, whiting, and plaice/flounder contributing the greatest quantities. Freshwater eel dominates the migratory/estuarine category. With reference to the freshwater species, Phase 2 notably exhibits the greatest variety of cyprinids, including a component of very small specimens unlikely to have been a source of human food (as observed above).

Recommendations

Proposed further research

The two largest assemblages (Phases 2 and 3) provide useful additional insight to the diet of the Westminster Abbey monks; expanding on the data obtained by previous studies on fish bone assemblages from other locations within the Westminster Abbey precinct documented by Jones (1976), Locker (1995), and Armitage (2015a; 2015b) (Table 2). In particular, the Phase 2 Song School assemblage adds significantly to an understanding of the variety of fish consumed at the abbey during

the 10th-11th century; supplementing the data from the adjacent *Cellarium* excavations (site WYA10) analysed by the author in 2015.

For the purposes of final reporting and publication it is recommended that the Song School fish bone data is integrated with data already documented for the fish bones from the *Cellarium* excavations. This final report also should incorporate an overview of the previous studies on fish assemblages from the *Dorter* Undercroft, Sub-vault/*Misericorde* and Dean's Yard. Interesting comparison could also be made with assemblages from other major Benedictine abbeys (e.g. Eynsham Abbey, Oxfordshire (Hardy *et al.* 2003)).

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Table 1: Westminster Abbey Song School. Numbers of identified specimens present (NISP)

Phase	2	3	3	4	4	5	5	6	
Recovery method	sieved	hand	sieved	hand	sieved	hand	sieved	hand	
Marine									
herring	204		148		18		6		
cod	8	1	3	1	1			1	
whiting	84	1	6		9		4		
haddock				1					
large/medium gadoid	5								
small gadoid	6			1					
plaice	3								
flatfish (plaice/flounder)	13	2	13		4		3		
small flatfish (plaice/flounder)	7		1		3		1		
mackerel	2		2						
thornback ray (roker)	15		3						
ray	1								
gurnard (sp.indet.)	1		1						
subtotal	349	4	177	3	35	0	14	1	

Migratory & estuarine									
freshwater eel	31		35		10		1		
thin lipped grey mullet							1		
seabass	1					1			
flounder	3		2						
smelt			1						
subtotal	35	0	38	0	10	1	2	0	
Freshwater									
pike	1		3						
roach	1		2	1			1		
chub	1				1				
rudd	1								
cyprinid (a)	3		5		3				
very small cyprinid	4								
subtotal	11	0	10	1	4	0	1	0	
TOTAL	395	4	225	4	49	1	17	1	696
Unidentified (b)	39	0	26	1	14	0	3	0	83

Notes:

(a) Phase 2: Includes 1 pharyngeal teeth/bone from possible roach x rudd hybrid

(b) Excludes spine fragments (not counted)

Key to Phases:

2 = 10th - 11th century

3 = 12th - 14th century

4 = 15th - 16th century

5 = 17th century

6 = 18th - 19th century

Table 2: Summarised percentage frequencies of the classes of identified fish taxa from Westminster Abbey excavations

Site	*Dorter* Undercroft	Song School	*Cellarium*	Sub-vault/*Misericorde*	Dean's Yard	Song School	*Cellarium*
Period	mid 11th century	10th - 11th cent.	AD 900 - 1150	late 12th/early 13th cent.	late 12th/early 13th cent.	12th - 14th cent.	AD 1150 - 1350
Data source	Locker (1995)	Armitage	Armitage (2015b)	Jones (1976)	Armitage (2015a)	Armitage	Armitage (2015)
Marine	64.9%	88.3%	86.6%	83.2%	84.6%	79.0%	90.2%
Migratory & estuarine	24.6%	8.9%	10.8%	12.2%	11.0%	16.6%	7.0%
Freshwater	10.5%	2.8%	2.6%	4.6%	4.4%	4.4%	2.8%

Total NISP	9431	395	747	351	1092		229	8915

(All assemblages comprise combined sieved & hand-collected specimens)

APPENDIX 11: HUMAN BONE ASSESSMENT

James Langthorne

Introduction

A single piece of disarticulated human bone was recovered during archaeological investigations for the Westminster Abbey Song School Relocation Project at No. 2 The Cloisters, Westminster Abbey. It was recovered from dumped associated with the kitchen and dated to 1140-1150.

The aim of this report is principally to provide a description of this very small assemblage of human bone.

Disarticulated Bone

The disarticulated human bone from dumped deposit [185] consisted of a single fragment of fibula shaft in moderate-poor condition. No traces of pathology were apparent and it was not possible to ascertain either the sex or age of the individual from which the bone originated.

Conclusion

Although the results of this assessment should be added to any forthcoming publication, it is not recommended that any further work be performed on the disarticulated human bone from this site.

APPENDIX 12: ENVIRONMENTAL ARCHAEOLOGICAL ASSESSMENT

Kate Turner

Introduction

This report summarises the findings of the rapid assessment of twelve bulk samples taken during the excavation of land at two sites within the precincts of Westminster Abbey: No. 2 The Cloister, and the rehearsal rooms and archives of the song school. These samples were taken from a series of pits, ditches and archaeological layers, the context information for which is given in Table 1.

The aim of this assessment is to:

1. Give an overview of the contents of the assessed samples;
2. Determine the environmental potential of these samples;
3. Establish whether any further analysis is necessary.

Table 1: Context information for environmental samples, WSA14

Context No.	Cut	Context type	Phase	Interpretation
68		Layer	6	Burnt deposit
91		Layer	6	Floor surface
109		Layer	3	Mortar surface
121		Layer	3	Construction layer
134		Deposit	3	Kitchen dump
150		Layer	2	Dump layer
163		Layer	2	Dump layer
166	167	Deposit	2a	Fill of east-west aligned ditch
168		Layer	2a	Subsoil
185		Layer	3	Kitchen dump
188	189	Deposit	2	Fill of pit
194	195	Deposit	2a	Fill of ditch

Methodology

Twelve environmental bulk samples, of between five and twenty-seven litres in volume, were processed using the flotation method; material was collected using a 300µm mesh for the light fraction and a 1mm mesh for the heavy residue. The heavy residue was then dried, sieved at 1, 2 and 4mm and sorted to extract artefacts and ecofacts. The abundance of each category of material was recorded using a non-linear scale where '1' indicates occasional occurrence (1-10 items), '2' indicates occurrence is fairly frequent (11-30 items), '3' indicates presence is frequent (31-100 items) and '4' indicates an abundance of material (>100 items).

The light residue (>300µm), once dried, was scanned under a low-power binocular microscope to quantify the level of environmental material, such as seeds, chaff, charred grains, molluscs and charcoal. Abundance was recorded as above. A note was also made of any other significant inclusions, for example roots and modern plant material.

Results and Discussion

Residues

Preservation of environmental material in the heavy residues was mixed; wood charcoal was reported in nine of the twelve assessed samples, though, with the exception of sample <1>, concentrations were generally low (<30 fragments per sample). Seven of nine samples contained pieces of suitable size for species to be determined (>4 mm in length/width). Sample <1>, taken from a burnt layer, contained the greatest concentration of material, with over one hundred sizeable specimens. Samples <1>, <2> and <6> also contained a small amount of heavily fragmented, preserved plant material.

Marine shell was identified in 75% of the assessed residues, with the exception of samples <3>, <7> and <9>. Colchester native oyster (*Ostrea edulis*) was the most commonly reported species, being found in seven samples. In most cases shells were heavily fragmented, though complete left and/or right valves were found in samples <10> and <11>, the former taken from a kitchen dump layer and the latter the fill of a 10th to 11th-century pit feature. Sample <11> also contained the highest concentration of marine shell recorded in the Song School assemblage, with both complete valves and fragments of oyster, along with specimens of common whelk (*Buccium undatum*). Low concentrations of unidentifiable shell were found in samples <2>, <4>, <10>, <11> and <12>. None of the assessed samples contained a statistically significant sample; over one hundred complete left and right valves. Terrestrial molluscs were not recorded in these samples.

Zooarchaeological material, including large and small mammalian bone and fish bone, was frequent throughout the assessed assemblage (see Appendices 9 & 10). Fish bone and small animal bone were the most commonly occurring, both being recorded in eleven out of twelve samples. Samples <7> and <10> contained the greatest concentration of the former, with each yielding over one hundred individual bones. Small animal bone was reported in more moderate amounts, with no sample containing greater than one-hundred fragments; the highest abundance was found in samples <7>, <8> and <10>. Eight samples additionally contained low to moderate concentrations of large mammalian bone; as with the small animal and fish bone, samples <7>, <8> and <10> featured the highest density of remains. Unidentifiable fragments were also recorded in samples <1>, <5>, <11> and <12>; those in sample <5> appeared to have been burnt.

Building material, in the form of mortar, tile, brick and stone, was identified in seven samples. Density was universally low, with less than ten pieces per type, per sample. Mortar was the most common, being found in five of the assessed samples. Around 50% of the residues contained low (<10 pieces) concentrations of fragmented pottery. Other cultural artefacts were scarce, with only a small amount of broken glass, iron fragments, and a single copper pin, recorded in sample <1>.

A small number of flint artefacts and burnt flint pieces were reported in eight of the assessed samples. Densities did not exceed ten pieces per sample. In addition, possible industrial residue, in this instance hammerscale and/or slag was identified in samples <6> and <12>.

All the material collected from the heavy residue has been catalogued and passed to the relevant specialists for further assessment. A full account of the material reported is given in Table 2.

Table 2: Assessment of environmental residues, WSA14

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Context No.	**68**	**91**	**121**	**109**	**134**	**150**	**163**	**166**	**168**	**185**	**188**	**194**
Feature No.								**167**			**189**	**195**
Volume of bulk (litres)	9	5	1	10	25	19	23	27	25	8	24	24
Volume of flot (millilitres)	51	2	NONE	10	71	14	96	26	28	30	2	15
Method of processing	F	F	F	F	F	F	F	F	F	F	F	F
HEAVY RESIDUE												
Charcoal												
Charcoal > 4mm	4				1	1	2	2	2		1	
Charcoal 2-4 mm				1	2	1	1		1	1		
Charcoal <2 mm												
Botanical remains												
Chaff	1	1				1						
Molluscs												
Ostrea edulis (fragments)	1	1			2	1		1		1	2	
Ostrea edulis (left valve)										1	1	
Ostrea edulis (right valve)										1	1	
Buccinum undatum											2	
Mytilus edulis (fragments)		1										
Marine fragments (undiff.)		1		1						1	1	1
Bone												
Large animal bone	1				3	2	3	3	2	3	2	
Small animal bone	1	1		1	2	1	3	3	2	3	2	1
Fish bone		2	2	2	3	3	4	3	2	RS	2	1
Burnt bone					1							
Bone fragments	1										2	2
Building material												
Mortar	1	1		1	1	1						
Tile		1			1	1						
Brick										1		1
Stone										1		1
Other material												
Glass				1		1						
Pottery	1		1		1	1	1				1	

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Context No.	**68**	**91**	**121**	**109**	**134**	**150**	**163**	**166**	**168**	**185**	**188**	**194**
Feature No.								**167**			**189**	**195**
Coal		1	1									
Iron				1	1		1					1
Copper pin	1											
Hammer-scale												1
Slag						1						
Burnt flint	1				1	1	1	1	1			1
Struck flint		1										

Key: 1- Occasional, 2- fairly frequent, 3- frequent, 4- abundant

Flots

With the exception of sample <3>, taken from the fill of a 12th to 14th-century construction layer, all of the processed samples produced flots, which ranged in volume from two to ninety-six millilitres. Wood charcoal was present throughout, though concentrations were variable. The majority of samples contained over one hundred pieces, however material was heavily fragmented and only samples <1>, <2>, <5> and <7> contained any of a suitable size for species to be determined (<10 per sample).

Weed seeds were also reported in all of the assessed samples. Both material density and diversity of taxa were universally low, with no single deposit containing more than thirty specimens in total, and the majority of species being represented by less than ten examples. Sedges (*Carex* sp.) were the most commonly observed, recorded in eight samples, goosefoot (*Chenopodium* sp.) and elder (*Sambucus* sp.) were also frequent, both being identified in around 50% of the assemblage. Sample <11>, taken from the fill of a 10th to 11th-century pit, contained the widest range of material, with seeds from seven distinct genera, including duckweeds (*Lemna* sp.) and birch (*Betula* sp.). A moderate amount (<30 specimens) of mineralized seeds were additionally identified in sample <5>, taken from a probable kitchen dump deposit, dated to the 12th to 14th century. Whilst this material was poorly preserved, and seeds were often damaged it was possible to identify specimens of pea (*Fabaceae* sp.), mustard (*Brassica* sp.) and sedge. Probable examples of marsh mallow (*Althaea* sp.), grass (*Poaceae* sp.), rag-weed (*Ambrosia* sp.), meadowsweet (*Fillipendula* sp.) and birds-foot (*Ornithopus* sp.) were also recorded.

Carbonized seeds and/or cereals were identified in seven out of eleven flots; seeds were generally found in very low concentrations (<10 seeds per sample), with the exception of sample <7>, which contained between eleven and thirty specimens of *Poaceae* sp. (grasses). Cereals were more frequent; the greatest abundance and diversity of species was observed in samples <5> and <7>, the former being taken from a 12th to 14th-century kitchen dump deposit, and the latter a 10th to 11th-century dump layer. Wheat (*Triticum* sp.) was common, identified in five samples, though none contained more than thirty specimens. A small number of barley (*Hordeum* sp.) grains were also reported, as well as oat (*Avena sativa*), in sample <7>. Samples <5>, <7>, <8> and <12> additionally

contained a number of grains that were too heavily carbonised to be identified, suggesting that they have been subject to prolonged, high-temperature burning.

Eight of the assessed samples were found to contain terrestrial mollusc shells. With the exception of a small number of complete *Lauria cylindracea* shells, all of the material was heavily fragmented, and too broken for species to be recognised. Sample <10> additionally contained a minimal amount of juvenile shells of indeterminate type.

Fish bones and/or scales were found in all of the assessed samples, apart from samples <11> and <12>. With regard to the fish bone, concentrations were variable across the assemblage, with the majority of deposits containing small to moderate densities. Samples <5> and <7> contained the greatest number of bones, each yielding over one hundred pieces. These samples also produced the largest amount of fish scales, between thirty-one and one hundred specimens, as well as the highest concentration of small animal bone. Mammalian material was also recognised in samples <6> and <9>, though neither produced more than ten fragments.

Combustion residues, including coal/vitreous fragments, slag and/or hammerscale were recorded in samples <2>, <4>, <5> and <6>. Coal/vitreous material was the most common, being recorded in all four samples, with slag and hammerscale only observed infrequently, and in low densities. In terms of other artefacts, a small number of flint flakes were recorded in sample <10>, along with a low concentration of unidentifiable fibres. Roots/tubers were recorded throughout the sample set, which may be an indication of bioturbation.

A full account of the material reported in the flots is given in Table 3.

Table 3: Assessment of environmental flots, WSA14

Sample No.		**1**	**2**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Context No.		**68**	**91**	**109**	**134**	**150**	**163**	**166**	**168**	**185**	**188**	**194**
Feature No.								**167**			**189**	**195**
Volume of bulk (litres)		9	5	10	25	19	23	27	25	8	24	24
Volume of flot (millilitres)		51	2	10	71	14	96	26	28	30	2	15
Method of processing		F	F	F	F	F	F	F	F	F	F	F
FLOT RESIDUE												
Charcoal												
Charcoal >2 mm		2	1	1	3		3		2	1	1	1
Charcoal 1 - 2 mm		4	1	2	4	2	4	1	3	3	2	3
Charcoal <1 mm		4	3	4	4	4	4	3	3	4	4	4
Frags. of ID size		<10	<5	X	<5	X	<10	X	X	X	X	X
Seeds												
Betula sp.	Birch				1					1	1	1
Carex sp.	Sedges	1	1	2		1	2	1			1	1
Chenopodium sp.	Goosefoots		1	1			1			1	1	
Crepis sp.	Hawk's-beards						1				1	
Drosera sp.	Sundews								1			
Erucastrum sp.	Hairy rocket				1			1	1			1
Ficus carica	Fig			1			1					
Fragaria sp.	Strawberries						1		1			

Sample No.		**1**	**2**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Context No.		**68**	**91**	**109**	**134**	**150**	**163**	**166**	**168**	**185**	**188**	**194**
Juncus sp.	Rushes	1										
Lemna sp.	Duckweeds										1	1
Persicaria maculosa	Redshank									1		
Rubus sp.	Brambles		1			1			1			
Rumex sp.	Docks											
Sambucus sp.	Elder			1					1	1	1	1
Sonchus sp.	Sow-thistles										1	
Urtica sp.	Nettles			1								
Viola sp.	Violets						1					
Broken seeds				1								
Unknown												
Mineralized seeds												
cf. *Althaea* sp.	Marsh-mallows				1							
cf. *Ambrosia* sp.	Ragweeds				1							
Brassica sp.	Mustards				1							
Carex sp.	Sedges				1							
Fabaceae sp. (undiff)	Peas				1							
cf. *Fillipendula* sp.	Meadowsweets				1							
cf. *Ornithopus* sp.	Bird's-foots				1							
cf. *Poaceae* sp. (small)	Grasses				1							
Unknown					1							
Burnt seeds												
Anthemis sp.	Chamomiles									1		
Carex sp.	Sedges				1							
Plantago sp.	Plantains				1							
Poaceae (large) undiff.	Grasses								1			
Poaceae (small) undiff.	Grasses				1		2					1
Cereals												
Triticum sp.	Wheat				2	1	2	1	2			
Hordeum sp.	Barley				1		1					
Avena sativa	Oat						1					
Broken/distorted (No ID)					2		2	1				1
Other plant macrofossils												
Roots/tubers (undiff.)		2	1	3	3	4	3	2	2	4	1	3
Wood			1									
Molluscs												
Lauria cylindracea										1		1
Fragments		3		1	3	3		2		3	4	3
Juveniles (no ID)										1		
Other remains												
Insect remains					1				1	2	1	2
Fish bone		1	1	3	4	2	4	3	1			
Fish scales				1	3	1	3		1	1		
Small animal bone					2	1	3		1			
Bone fragments		1									1	
Coal/Vitreous globules			3	3	2	2						
Slag					1	1						

Sample No.	1	2	4	5	6	7	8	9	10	11	12
Context No.	**68**	**91**	**109**	**134**	**150**	**163**	**166**	**168**	**185**	**188**	**194**
Hammer-scale			1								
Unknown fibers									2		
Flint flakes									1		

Key: 1- Occasional, 2- fairly frequent, 3- frequent, 4- abundant

Discussion

Phase 2a - Possible Roman

Three samples were taken from contexts provisionally dated to the Roman period; two from the fills of ditches, samples <8>and <12>, and one from a subsoil layer, sample <9>. Environmental remains were poorly preserved in these contexts; charcoal was present in all of the samples, however the majority of material was too small for species to be determined. A small amount of sizeable pieces were however reported in samples <8> and <9>, which could be used for dating these deposits if suitable cultural material is not present.

As seeds and other plant macrofossils are scarce, little can be said regarding the local environment during this period, though the presence of low numbers of burnt cereals may indicate that wheat, and perhaps other species, may have formed part of the diet of the occupants. Fish bone, small mammal bone and/or large mammal bone were recorded in all of the sampled deposits, the largest concentration being of fish bone, particularly in sample <8>, all of which may also have contributed to local diet. Low frequencies of fragmented oyster were also found, though concentrations were not significant enough to suggest this was being widely consumed.

The generally low concentration of both environmental and cultural material in the Phase 2a samples means that they can tell us little about the environment of the site during this period of use. It may be suggested that these features are likely to contain waste from domestic activity, due to the sparse nature of the remains.

Phase 2 - 10th to 11th Century

Three samples were taken from features dated to the Anglo-Saxon period, two from dump layers and one from the fill of a pit. As with the Phase 2a samples, wood charcoal was recognised throughout, though the concentration of viable material was also low, with less than thirty identifiable pieces per sample. Weed seeds were also present in low frequencies, with no significantly sized assemblages being recorded.

The sample taken from context [163], one of the ‘dump’ layers, contained a moderate amount of carbonised grain, including specimens of oat, barley and wheat, which may be an indication of the continued presence of cereals as part of local diet into the Anglo-Saxon occupation of the site. Fish and mammal bone was additionally recorded, in both the flots and heavy residues, likely to be refuse from domestic activity.

There is also evidence to suggest that marine molluscs, including Colchester native oyster and common whelk, may have been consumed during the 10th to 11th century. A moderate amount of whole and fragmented shell was identified in the fill of pit [189], along with some unidentifiable broken shell.

As with the earlier deposits, the majority of material taken from Phase 2 contexts did not contain a high enough abundance of remains to suggest any specific use for these features, aside from accumulated refuse as part of every-day activity, and no significant environmental assemblages were recovered.

Phase 3 - 12th to 14th Century

Four samples were taken from contexts thought to date to the mid to late medieval period, two archaeological layers and two kitchen dump deposits. As with the majority of the assemblage, environmental preservation was mixed within these samples, with sample <3> producing no flot material whatsoever. Sample <5>, taken from one of the dump deposits, was the only sample to contain any sizeable wood charcoal, as well as producing a small quantity of mineralized seeds and carbonised plant remains, including seeds and cereal grains. Whilst, as with previous periods, a small amount of charred wheat was recorded, the abundance was too low to suggest any intensive cultivation was being carried out. As the concentration of plant macrofossils was also generally poor in these deposits, little can be determined regarding the surrounding environment, or land use practices during this phase of occupation.

A continued abundance of fish, as well as small to moderate amounts of animal bone is these contexts are likely to indicate a continued dietary presence. Based on the evidence from the environmental assemblage, these features are, as before, most likely to represent domestic waste and may have been used as refuse dumps.

Phase 6 - 18th to 19th Century

Two post-medieval archaeological layers, a burnt deposit and a floor surface, were sampled as part of the excavation. Wood charcoal was abundant in the burnt context, [68], though other archaeobotanical material was sparse during this period. A small amount of fish bones and animal bone was also identified, along with scattered fragments of oyster, though not in great enough concentrations to suggest they were a major part of local diet.

Conclusions and Recommendations for Further Work

To summarise, the preservation of environmental remains in the Song School samples was generally poor. With the exception of the wood charcoal in sample <1>, none of the assessed deposits contained an environmental assemblage of a suitable size to warrant further investigation (>100 specimens per type, per sample), and little could be established regarding the changing environment

throughout the periods of occupation. All of the samples were also found to contain significant evidence of rooting, which may indicate that deposits have been disturbed in situ.

Further specialist analysis is suggested on the wood charcoal from sample <1>, as this could provide useful information regarding the types of fuel that were being burnt, as well as giving an idea of the local vegetation, selection bias notwithstanding. Similarly, in the case of samples <8> and <9>, this material may be useful in order to refine the chronology of these deposits, using radiocarbon dating. Aside from this, no further specialist analysis is recommended, though a summary of the results should however be included in any subsequent site publications.

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APPENDIX 13: SHELL ASSESSMENT

Kate Turner

Introduction

An assemblage of whole and fragmented marine shells was recovered during the excavation of land at two sites within the precincts of Westminster Abbey: No. 2 The Cloister, and the rehearsal rooms and archives of the song school. The aim of this assessment was to: (1) determine the degree of fragmentation and preservation of the oyster shell assemblage; (2) quantify the number of oyster shells and record any diagnostic features that may aid in establishing provenance and other key factors and (3) record any other marine shells that were present in this assemblage.

Methodology

The shells from the song school relocation were collected via handpicking by on-site archaeologists during the excavation of the site. For each individual species identified within a context, approximately one in five of the shells were collected, in order to keep sampling representative and systematic. These were then transported off site and carefully hand cleaned using a soft toothbrush, to ensure that none of the external features were damaged or removed.

The first stage of recording the Oyster shell involved separating left and right valves specimens, in order to determine the minimum number of individuals in the assemblage (MNI). Recording was carried out on any valves of a size suitable for measurement (this being defined as any specimen whereupon the umbo/ligament scar is present, alongside the internal adductor muscle scar and at least two thirds of the original shell, as per Winder 2011). Any measurable shells were then placed onto a plain white piece of paper, and the maximum widths and lengths recorded for each valve. Graph paper was used to extrapolate the size of any incomplete specimens (indicated by '>'). Descriptive characteristics such as the preservation of each shell, evidence of infestation and any signs of notches and cuts were also recorded. These observations are recorded in Table 2. A note was also made of any other marine shell that was collected (Table 1).

Whelks were separated into complete (those with an intact spire) and broken specimens, and counted. For cockles, individual valves were counted, in order to determine the minimum number of individuals in the assemblage (MNI).

Results

Oyster shell

Oysters were hand recovered from eleven contexts, dating from the 10th to the 19th century. The majority of the material was found in contexts from Phase 4; dated to the 15th-16th century. The number of measurable left and right valves and broken specimens is shown in Table 1; all of the specimens identified were of the species *Ostrea edulis*, or Colchester native oyster.

Contexts [50], [63], [119], [128], [162], [178] and [200] each contained a minimum number of individuals of less than ten. Context [47], taken from a 18th-19th-century mortar surface, yielded twenty left and right valves, giving an MNI of 11, whilst context [65], taken from the fill of a construction cut for a 15th-16th-century privy, produced an MNI of fourteen individuals, from a total of twenty left and right valves.

Contexts [66] and [175], both taken from 15th-16th-century dump layers, produced the largest amount of material, yielding 65 specimens, with an MNI of 38, and 123 specimens with an MNI of 69 respectively. Preservation of the oyster shells within these samples was mixed. Context [66] showed only a small amount of fragmentation and surface degradation, whereas of the 123 shells identified in context [175] approximately 55% of left valves and 47% of right valves were too badly damaged to be measured. This sample also contained a significant proportion of smaller, thinner shells, likely to be juvenile specimens, which indicates that this is unlikely to be a farmed population, as juvenile specimens are commonly excluded from these collections (Winder & Gerber-Parfitt, 2003). Context [175] produced the only statistically significant assemblage (>100 left and right valves combined).

Table 2 presents a summary of size measurements for measurable specimens from the song school assemblage. Evidence for encrustation and infestation is also recorded.

Marine Shell

Four contexts, [50], [149], [178] and [200], were found to contain non-oyster marine shell. Common whelk (*Buccinum undatum*) was the most frequent species, recorded in three out of the four contexts. The largest concentration was recorded in context [200], taken from a 10th-11th-century dump layer; this sample contained 22 complete specimens and 29 that were broken or heavily damaged. Context [50], taken from the fill of a 18th-19th-century garden feature contained a small number of cockle shells.

Table 1: Quantification of Marine Shell from Westminster Abbey Song School relocation (WSA14)

Context number	Provisional phasing	Dating and Notes	Percentage sampled	Oyster (LV)	Oyster (RV)	Oyster (UMLV)	Oyster (UMRV)	Fragments	Total Number of Left and Right Valves	Oyster MNI	Cockle	Cockle MNI	Whelk (complete)	Whelk (fragmented)
47	6	18th-19th century	20	8	8	3	1		20	11				
50	6	18th-19th century	20		3		1		4	4	2	1		
63	4	15th-16th century	20	3	6	3		1	12	6				
65	4	15th-16th century	20	11	6	3			20	14				
66	4	15th-16th century	20	22	32	5	6	2	65	38				
119	4	15th-16th century	20					5	0					
128	3	12th-14th century	20			1		1	1	1				
149	3	12th-14th century	N/A										8	3
162	5	17th century	20	2	2	4			8	6				
175	4	15th-16th century	25	23	48	31	21	15	123	69				
178	3	12th-14th century	20		3				3	3			6	2
200	2	10th-11th century	20	1			2	2	3	2			22	29
TOTALS				**62**	**100**	**47**	**30**	**26**	**239**	**143**	**2**	**1**	**36**	**34**

Absolute values. Key: RV = right valve. LV = left valve. UM = unmeasurable. MNI = maximum number of individuals.

Conclusions

The results of the assessment of the oyster shell assemblage recovered from the song school relocation suggest that oyster could have been a significant dietary component throughout the various periods of occupation. Samples taken from 15th-16th-century deposits contain the highest abundance of material, indicating that an increased exploitation of this resource occurred during this time. Context [175] produced a statistically significant assemblage that, were there a larger proportion of measurable specimens, could be compared to a background sample in order to gain information on the provenance of the material, as well as methods of harvest. However, because of the high level of

fragmentation and the proportion of smaller, likely juvenile, specimens in this sample, further work is not suggested on this material.

Along with oysters, a small to moderate number of whelks were recorded in contexts from the 10th-14th centuries; like the oysters, it is possible that these will have been consumed as a food source. There is also some evidence to suggest that whelks may have been used for dyeing in the Anglo-Saxon period, which may account for the larger proportion of specimens in context [200].

Due to the limited size of these assemblages, and the percentage of damaged material, no further work is recommended on the marine molluscs; however, a summary of the results should be included in any subsequent site publications.

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Table 2: Detailed Quantitative and Qualitative Analysis of Oyster Shell from The Westminster Abbey Song School relocation (WSA14)

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
47	●		62	68	●						●													
	●		68	73	●				●											●	●			
	●		51	63																		●		
	●		45	45									●											
	●		51	53	●					●														
	●		>56	>55						●		●										●		
	●		43	52	●								●											
	●		44	>50									●											
		●	58	74																				
		●	67	70																				
		●	47	57									●							●				
		●	52	57									●											
		●	36	47									●											
		●	>43	>54									●											
		●	38	47									●											
		●	40	54									●									●	●	
50		●	63	67																				
		●	39	44									●											

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		●	39	33							●		●											
63	●		>67	85	●					●										●				
	●		>49	>62									●											
	●		>35	>41									●									●		
		●	48	58									●											
		●	>33	>44									●											
		●	44	53	●								●											
		●	29	31									●											
		●	38	>44	●								●											
		●	25	32									●											
65	●		44	51																				
	●		>56	59																				
	●		52	59	●		●						●											
	●		51	59			●					●												
	●		>67	76							●													
	●		63	69			●			●											●			
	●		53	>55									●											
	●		47	61																		●	●	
	●		54	59																	●			
	●		>47	50									●											
	●		41	>45			●				●	●												

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		●	56	59																				
		●	46	47									●											
		●	42	>44									●											
		●	40	46									●											
		●	37	41									●											
		●	36	23									●											
66	●		<71	92	●							●		●							●	●		
	●		60	85	●					●														
	●		52	60						●		●	●								●			
	●		60	70	●															●				
	●		62	64														●						
	●		63	71	●														●	●				
	●		55	62															●					
	●		60	60															●				●	
	●		65	>79															●		●			
	●		>51	>63															●					
	●		43	52									●				●		●					
	●		>42	50									●				●		●					
	●		>59	>64									●				●		●	●				
	●		45	>49	●								●				●		●					
	●		>49	>54							●		●				●		●					

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	●		>49	52													●		●					
	●		50	57	●												●		●					
	●		41	49									●								●			
	●		44	56									●				●		●					
	●		41	46									●				●		●		●			
	●		41	>46									●											
	●		>35	47									●											
	●		32	39									●											
		●	50	57									●				●							
		●	41	61							●		●									●		
		●	50	57									●				●							
		●	49	>55									●											
		●	56	59	●								●						●					
		●	44	53									●				●		●					
		●	41	52	●								●						●					
		●	53	>61	●														●					
		●	43	58													●							
		●	43	47									●				●							
		●	54	63													●							
		●	>51	63	●					●	●									●				
		●	50	67									●									●		

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		●	41	46																				
		●	42	50			●						●				●							
		●	39	46									●				●							
		●	43	47									●											
		●	43	53									●											
		●	>42	>50									●				●							
		●	38	44									●											
		●	47	>47	●								●											
		●	46	>44	●								●				●							
		●	>40	>49	●						●		●						●	●				
		●	39	52									●											
		●	37	44									●				●							
		●	36	46									●											
		●	34	51									●									●		
		●	49	57									●					●						
		●	37	47							●		●											
		●	32	38									●											
		●	29	49									●											
162	●		56	55									●											
	●		68	>73																				
		●	41	49																				

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		●	38	46	●																			
175	●		51	>55	●								●											
	●		46	56																				
	●		52	58	●												●					●		
	●		46	>56	●		●																	
	●		>57	64	●															●	●			
	●		48	54																				
	●		50	>61									●						●					
	●		>55	63																				
	●		58	>61	●															●				
	●		>47	>54							●		●											
	●		47	>51																				
	●		44	51									●										●	
	●		37	44																				
	●		>41	49																				
	●		41	>45									●											
	●		28	32									●											
		●	52	63	●																			
		●	60	71	●																			
		●	59	74	●									●	●									
		●	56	56	●																			

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		●	55	70	●								●											
		●	47	50																				
		●	54	42	●								●											
		●	42	53									●						●					
		●	41	54									●											
		●	43	55									●											
		●	>46	58									●											
		●	42	50									●											
		●	52	63									●											
		●	>49	56	●								●											
		●	39	>42									●											
		●	43	51									●											
		●	41	>46									●											
		●	41	48									●											
		●	41	>47									●											
		●	43	49									●											
		●	43	50									●											
		●	51	61	●								●											
		●	39	48									●											
		●	40	44									●											
		●	40	>45									●											

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		●	>45	53									●											
		●	45	50									●											
		●	43	51																				
		●	38	46									●											
		●	44	48									●								●			
		●	43	49	●								●											
		●	36	42									●											
		●	37	39									●											
		●	42	48									●											
		●	41	51	●								●											
		●	36	43									●											
		●	35	41									●											
		●	35	38									●											
		●	39	46									●											
		●	29	42									●									●		
		●	36	42									●											
		●	36	40									●											
		●	34	42									●											
178		●	83	86																			●	
		●	59	64		●																		
		●	52	52															●	●				

Quantitative Data					Parasitic Infestations								Qualitative Observations											
Context Number	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flakey	Colour stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
200	●		88	102	●									●				●						
	64	102			38	1	6	0	1	7	10	5	109	3	1	0	21	3	22	11	10	11	5	0

APPENDIX 14: LITHICS ASSESSMENT

Barry Bishop

Introduction

The excavations at the site resulted in the recovery of a small assemblage of struck flint and unworked burnt stone. This report provides a brief description of the main characteristics of the assemblage, discusses its archaeological significance and potential to contribute to the further understanding of the nature and chronology of the activities identified during the project, and recommends any further work required for it to achieve its full research potential. This text should be read in conjunction with the catalogue which provides further details of each piece, including context, raw material and condition (Table 2).

Quantification

Type	Decortication flake	Flake	Flake fragment	Long-end scraper	Burnt stone (no.)	Burnt stone (wt:g)
No.	1	1	1	1	16	165

Table 1: Quantification of the lithic material from Westminster Abbey Song School

Struck Flint

Four pieces of struck flint were recovered (Table 1). These were all made from a translucent or mottled grey flint with two pieces retaining a rolled cortex indicating that the raw materials for these at least had been gathered from alluvial deposits, probably the gravel terraces exposed in the vicinity. The only chronologically diagnostic piece consists of a well-made long end scraper with the retouch, unusually, executed on its proximal end. It is possible that it was a double-ended scraper as its distal end is missing. Such implements are mostly found in late Glacial or Mesolithic assemblages, although small number of examples continued to be made into the Early Neolithic. The other three pieces are less diagnostic but the flake and flake fragment were both competently struck and most probably

made at some point between the Mesolithic and Early Bronze Age, whilst the decortication flake can only be dated to the prehistoric period.

The struck flint adds yet further evidence for prehistoric activity on Thorney Island, an area where considerable potential for prehistoric activity has previously been demonstrated (e.g. see Wilkinson *et al*. 2000), that had commenced by at least the Early Neolithic period.

Burnt stone

A total of 16 pieces of unworked burnt flint 165g were recovered from eight separate contexts (Tables 1 & 2). The pieces all comprise flint which had been heated to a very high temperature, resulting in them becoming heavily 'fire-crazed', attaining a uniform grey-white colour and undergoing considerable shattering. They are all small fragments and most retain remnants of cortex that is thin and worn, suggesting that they comprise alluvial pebbles. These were presumably either present as natural clasts in the original soils at the site or, as with the raw materials used for the struck flint, were gathered from the local river terrace gravels. Once removed from the soil matrix unworked burnt flint intrinsically undateable but it is perhaps most commonly found on prehistoric sites, sometimes in very large quantities, where it may have been deliberately heated for purposes such as cooking. It has also been occasionally used in some industrial activities, such as glass making, during the historic period and this remains a possibility for the presence of this material at the site. However, the small quantities and low densities present here would perhaps be more compatible with accidental burning from ground-set hearths.

Burnt flint has been recovered from many of the archaeological investigations conducted at Westminster Abbey, often in conjunction with prehistoric struck flint, and adds to the mounting evidence for prehistoric activity on the Thorney eyot.

Recommendations

The struck flint and burnt stone from the site has been examined and catalogued in detail and no further processing or analytical work is required. It does, however, contribute to the growing body of evidence for activity in the area and it is recommended that a brief description of both the struck flint and burnt stone should also be included in any published accounts of the fieldwork. It would be beneficial if this could be undertaken on conjunction with accounts of the prehistoric material recently recovered from other archaeological investigations in and around Westminster Abbey.

Bibliography

Wlkinson, K., Scaife, R., Cameron, N., Sidell, J and Thomas, C., 2000. 'Holocene Environments in Westminister', in J. Sidell, K. Wilkinson, R. Scaife and N. Cameron, *The Holocene Evolution of the London Thames*. MoLAS Monograph 5, 21-63.

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Context	Reference	Decortication flake	Flake	Flake fragment	Long-end scraper	Burnt stone (no.)	Burnt stone (wt:g)	Colour	Cortex	Condition	Suggested date range	Comments
45				1				Mottled dark grey	None	Good	Meso-EBA	Distal end of a thin, narrow flake
68	<1>					4	14	Unknown	Hard. Worn	Burnt	Undated	Heavily burnt flint fragments
98						1	21	Unknown	Hard. Worn	Burnt	Undated	Heavily burnt flint fragments
98		1						Mottled dark grey	Smooth rolled	Slightly chipped	Prehistoric	Narrow primary flake with a severe hinge termination
131			1					Mottled dark grey	Smooth rolled	Slightly chipped	Meso-EBA	Small, quite thin
134	<5>					3	7	Unknown	None	Burnt	Undated	Heavily burnt flint fragments
150	<6>					1	2	Unknown	None	Burnt	Undated	Heavily burnt flint fragments
163	<7>					2	21	Unknown	None	Burnt	Undated	Heavily burnt flint fragments
166	<8>					2	12	Unknown	Hard. Worn	Burnt	Undated	Heavily burnt flint fragments
168	<9>					2	7	Unknown	Hard. Worn	Burnt	Undated	Heavily burnt flint fragments
202						1	81	Unknown	None	Burnt	Undated	Heavily burnt flint fragments
214					1			Opaque mottled light grey	None	Chipped	Meso/ENeo	Well made on a large blade with medium, moderately steep scalar retouch around its convex proximal end. Moderate to heavy wear. Distal end missing. >62x29x10mm

Table 2: Lithics catalogue

APPENDIX 15: OASIS FORM

OASIS ID: preconst1-297535

Project details	
Project name	Excavation: Westminster Abbey Song School Relocation Project, No. 2 The Cloister, Westminster Abbey, London SW1P 3PA
Short description of the project	Part of the works allowing for the relocation of the Westminster Abbey Song School. Following on from an earlier evaluation, the excavation and watching brief took place in various areas in the interior of the Receiver General's house and its courtyard garden and included ground reduction, the digging of foundation pits and removal of floorboards and other interior floor surfaces. Natural sand was found in the bases of the new foundation pits and an archaeological sequence that possibly began in the Roman period and ran through the 10th-11th century construction of the refectory, through its development in the medieval period, its partial demolition following the Dissolution of the Monasteries, the new buildings constructed afterwards in the post-medieval period, the conversion and demolition of those properties to form No. 2 The Cloister and its garden in the 19th century into the modern period.
Project dates	Start: 10-11-2014 End: 19-02-2015
Previous/future work	Yes / Not known
Any associated project reference codes	WSA14 - Sitecode
Type of project	Recording project
Site status	World Heritage Site
Site status	Listed Building
Site status	Conservation Area
Site status	Local Authority Designated Archaeological Area
Current Land use	Residential 1 - General Residential
Monument type	LAND RECLAMATION Medieval

Monument type	WALL FOOTINGS Medieval
Monument type	DITCHES Roman
Monument type	PIT Medieval
Monument type	KITCHEN DUMPED DEPOSITS Medieval
Monument type	MADE GROUND Medieval
Monument type	SUBSOIL Roman
Monument type	FLOOR SURFACES Medieval
Monument type	POSTHOLE Medieval
Monument type	DOOR Medieval
Monument type	STAIRCASE Medieval
Monument type	FLOOR JOISTS Medieval
Monument type	STUD WALL Medieval
Monument type	MADE GROUND Post-medieval
Monument type	DEMOLITION DEPOSIT Post-medieval
Monument type	WALL FOUNDATIONS Post-medieval
Monument type	LEAD PIPES Post-medieval
Monument type	DRAINS Post-medieval
Monument type	WALL REFACING Post-medieval
Monument type	PLANTER BEDS Post-medieval
Monument type	GARDEN SOIL Post-medieval
Monument type	GARDEN SOIL Modern
Monument type	MADE GROUND Modern
Monument type	PLANTER BEDS Modern
Significant Finds	STONE Medieval
Significant Finds	POTTERY Post-medieval
Significant Finds	CBM Post-medieval
Significant Finds	CLAY TOBACCO PIPE Post-medieval
Significant Finds	STONE Post-medieval
Significant Finds	GLASS Medieval
Significant Finds	GLASS Post-medieval

Significant Finds	CBM Early Medieval
Significant Finds	POTTERY Early Medieval
Significant Finds	METAL OBJECTS Medieval
Significant Finds	METAL OBJECTS Post-medieval
Significant Finds	ANIMAL BONE Early Medieval
Significant Finds	ANIMAL BONE Medieval
Significant Finds	ANIMAL BONE Post-medieval
Significant Finds	FISHBONE Early Medieval
Significant Finds	FISHBONE Medieval
Significant Finds	FISHBONE Post-medieval
Significant Finds	HUMAN BONE Medieval
Significant Finds	POTTERY Roman
Significant Finds	CBM Roman
Significant Finds	POTTERY Medieval
Significant Finds	CBM Medieval
Investigation type	"Full excavation"
Prompt	Planning condition

Project location

Country	England
Site location	GREATER LONDON CITY OF WESTMINSTER WESTMINSTER 2 The Cloister, Westminster Abbey
Postcode	SW1P 3PA
Study area	331 Square metres
Site coordinates	TQ 3002 7943 51.498337764927 -0.126669246723 51 29 54 N 000 07 36 W Point
Height OD / Depth	Min: 1.9m Max: 2.22m

Project creators

Name of Organisation	Pre-Construct Archaeology Ltd.
Project brief	Westminster Abbey

originator	
Project design originator	Warwick Rodwell
Project director/manager	Chris Mayo
Project supervisor	Paw Jorgensen

Project archives

Physical Archive recipient	Westminster Abbey Museum
Physical Archive ID	WSA14
Physical Contents	"Glass","Human Bones","Metal","Animal Bones","Ceramics"
Digital Archive recipient	Westminster Abbey Museum
Digital Archive ID	WSA14
Digital Contents	"none"
Digital Media available	"Images raster / digital photography"
Paper Archive recipient	Westminster Abbey Museum
Paper Archive ID	WSA14
Paper Contents	"none"
Paper Media available	"Context sheet","Matrices","Photograph","Report","Section","Unpublished Text"

Project bibliography 1

Publication type	A forthcoming report
Title	Westminster Abbey Song School Relocation Project, No. 2 The Cloister, Westminster Abbey, London SW1P 3PA: An Archaeological Assessment
Author(s)/Editor(s)	Langthorne J., Jorgensen, P.
Date	2017

Issuer or publisher	Pre-Construct Archaeology Ltd.
Place of issue or publication	London
Description	A4 softcover grey literature report.
Entered by	James Langthorne (jlangthorne@pre-construct.com)
Entered on	5 October 2017

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