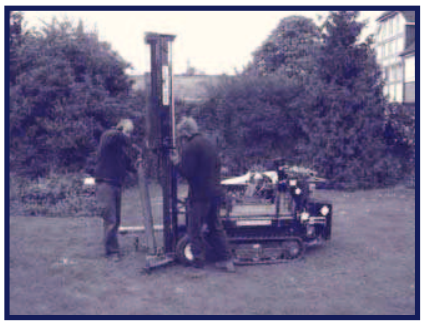
The Pilgrims' School
Cathedral Close
Winchester
Hampshire



Post Excavation Assessment and Research Design (Incorporating Second Phase Evaluation, Geoarchaeological Survey and Watching Brief 2006-07)

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THE PILGRIMS' SCHOOL, CATHEDRAL CLOSE, WINCHESTER, HAMPSHIRE

POST-EXCAVATION ASSESSMENT AND RESEARCH DESIGN
(Incorporating Second Phase Evaluation, Geoarchaeological Survey and Watching Brief 2006-07)

By Carl Champness and Steven Teague

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1 INTRODUCTION

1.1 Project background

1.1.1 Oxford Archaeology (OA) were appointed as the Archaeological Contractor by The Pilgrims' School in advance of a construction programme to extend their pre-preparatory and sports facilities at Cathedral Close, Winchester (Scheduled Ancient Monument - Hants 585). During August 2005 Oxford Archaeology excavated three evaluation Trenches (Fig. 2 Trenches 1-3) on the site of the proposed development, the results of which are documented in a report (OA 2006a).

1.1.2 Based upon the results from the evaluation in 2005 design parameters were established by Richard Massey (Inspector of Ancient Monuments – English Heritage), Tracy Matthews (Sites and Monuments Officer – Winchester City Council) and the Cathedrals Fabric Commission (England) to minimise damage to the buried heritage resource from the development. These were integrated, by The Pilgrims' School, into a Design Statement (Nov. 2005) which was submitted to the Department for Culture Media and Sport (DCMS) for Scheduled Monument Consent (SMC) and consent granted in March 2006 with the following conditions:

- excavation of a further single trench to be located towards the western end of a proposed new swimming pool;
- a borehole transect to be undertaken across the long axis of the proposed swimming pool
- archaeological sampling of material from specified augering at selected proposed pile locations;
- examination and recording of archaeological deposits revealed specifically by the removal of the previous swimming pool and generally during all ground works associated with the development.

1.1.3 A Written Scheme of Investigation (WSI) for the archaeological work was drawn up to respond to the requirements of the SMC in consultation with Dr John Crook (Archaeological Consultant for Winchester Cathedral) and Tracy Matthews (OA 2006b).

1.1.4 The work took the form of an archaeological evaluation Trench (Trench 4), targeted boreholes on two E - W transects at c. 5 m intervals and a watching brief during construction works (see Fig. 2). The evaluation and borehole investigation were undertaken between 30th May - 1st June 2006 and the watching brief from 20th July 2006 until 15th February 2007.

1.2 Location and geology

1.2.1 The site lies within the SE corner of Winchester Cathedral Close within the gardens located in the eastern part of the present curtilage of The Pilgrims' School (centred on National Grid Reference SU 4829 2905). It is bounded to the south by the Close Wall, to the west by the existing school classrooms, to the north by the Deanery Garden and to the east by a strip of land forming part of the school's garden adjacent to the Mill Stream. The site is situated on the valley floor to the west of the River Itchen that flows from north to south.

1.2.2 The site formally formed a largely flat garden area, with hard surfaced tennis courts, to the east of the main school buildings (Stancliffe Building, Millennium Building and Selwyn Building) at *c.*33 m aOD. A swimming pool was situated within the northern part of the site.

1.2.3 The geology of the site comprises Upper Chalk of the Cretaceous Epoch, athough a small east-west anticline exposing Middle and Lower Chalk is located less than 1 km to the southeast, in the Chilcomb area (BGS sheet 299D). It is overlain by floodplain gravels dating from the late Quaternary period which are in turn overlaid by Holocene peats and floodplain/alluvial silts.

1.3 Archaeological and historical background

1.3.1 The archaeological and historical background of the site has been detailed in an Archaeological Assessment Report (Crook 2005) and is summarised with additions from recent fieldwork by Oxford Archaeology (OA 2005). Only a brief summary of the main archaeological context of the site has been presented below.

1.3.2 The site lies on the former floodplain of the River Itchen, before the river was diverted towards the east on its present course (James 1997, 30-1). The Iron Age oppidum of Orams Arbour lies to the northwest. The site lies within the later historic walled city in an area which successively comprised part of the Roman *civitas* of *Venta Belgarum*, the Saxon town of *Wentanceastre*, and the medieval city of Winchester. The archaeological resource within the walled city is recognised as being of national importance and the Cathedral Close is regarded as of special archaeological value with an active status as a Scheduled Monument.

1.3.3 A brief summary, reproduced from the report (OA 2006), of the results of the 2005 evaluation is presented below (see Figure 2):

Between July - August 2005, Oxford Archaeology undertook an archaeological evaluation at The Pilgrims' School, Winchester in order to provide information concerning the impact of the proposed development upon potential archaeological remains. Three trenches were excavated revealing that deeply stratified, dry and waterlogged, archaeological deposits survive below deep accumulations of post-medieval dumping and garden soils. The finds and environmental evidence retrieved from the waterlogged deposits showed excellent preservation. The water table was observed between 31.62 and 31.64m aOD.

Trench 1 measured 8m x 2m and was located against the southern limit of the site. It showed that the latest significant archaeological levels fell away sharply towards the north from 32.80 m aOD to 31.66 m aOD. Two phases of Roman defences were revealed - a later defensive wall superseded an earlier earthen/turf rampart. A possible post-Roman intra-mural track was seen to run adjacent to the wall. A medieval cess/rubbish pit lined with oak boards (with exceptional preservation of organic remains) was also found. The existing Close wall was constructed upon the foundations of the demolished Roman defensive wall, during the 12th-13th century or later. Later medieval soils were dumped in the area. Extensive 18th century dumps of building rubble (containing medieval architectural fragments) overlay the medieval sequence, which were in turn sealed by successive garden soils.

Trench 2 was 1.5 m square and situated within a restricted area towards the north of the site. Significant archaeological levels were not reached and lay below the base of excavations at 32.00 m aOD. The post-medieval building rubble dumps observed in Trench 1 were seen to extend into Trench 2 and contained, of note, a fragment of 14/15th century stone basin/font.

Trench 3 measured 8.8 m x 2 m and was located near to the northern perimeter of the site. Significant archaeological levels were reached at 31.45 m aOD. Naturally deposited river gravels were encountered at 30.56 aOD and were overlain with thin organic silts and sands that contained pottery datable to AD 150-200. These deposits suggest a shallow water/flooded landscape, with indicators of slow-moving or even stagnant, nutrient-rich water. Of note in this phase of works was the absence of the 'Fen Peat' located some 40 m to the SW during previous work (COAS 1999) at a depth of 30.55m aOD and thought to form between c.6,500 BP and 2,000 BP. This would indicate that the prehistoric deposits and environmental regime in the valley floor is varied. Sealing these earlier silts was a layer comprised mainly of flint and chalk demolition[?] 'rubble' that contained fragments from a diverse range of tile forms and painted plaster, well-preserved constructional iron nails and fittings, parts of leather shoes, and several coins dating to the later 3rd century. This deposit represented deliberate dumping derived from a high status building, possibly in the vicinity and probably in an attempt to reclaim the low-lying land in the valley bottom. From the late Roman period a thick accumulation of organic silts developed, implying the area remained too damp for permanent habitation. Preserved within these deposits were a number of small timber posts, and clusters of stakes, perhaps part of a fish trap. The area remained susceptible to seasonal flooding possibly until the 17th century. There was an absence of the later rubble layers seen in Trenches 1 and 2, and successive garden soils were seen instead.

1.4 Scope of this document

1.4.1 This assessment report outlines the results of the second phase of archaeological work and includes more detailed assessment of biological and sedimentary evidence in order to address specific research aims that exist over the development of the Roman town. The work aimed to incorporate all the results of the previous evaluations and borehole work to provide a comprehensive depositional sequence and indicate the archaeological potential of the data collected.

1.5 Acknowledgements

1.5.1 The archaeological field excavation and watching brief was supervised by Steve Teague with the assistance of Martin Greening. The geoarchaeological fieldwork was supervised by Carl Champness and was undertaken by CC Ground Investigations who carried out the drilling of the boreholes. The project was managed by Ben Ford.

2 PROJECT AIMS

2.1 Aims

2.1.1 The project attempted to address the following specific research aims:

- To characterise the post-glacial development of the area
- To locate the pre-Roman course of the River Itchen and any evidence for its management during the Roman and later periods
- To establish any evidence for pre-Roman use of the site and/or its suitability for habitation or other uses during this period.
- To determine when was the area was suitably drained to allow for habitation during the Roman period and what was its nature and development?
- To establish the date of the Roman *agger* and town wall.
- To recover evidence for the Roman intramural street and/or other streets and for the buildings that flanked them.
- To establish the post-Roman nature of the site, particularly for evidence of the breakdown of the Roman drainage infrastructure.
- To recover any evidence for early-middle Saxon use of the site, particularly given the proximity of the site to the Old Minster and the Saxon Bishop's palace.
- To recover evidence for the establishment of the Saxon *Burh,* particularly for the refurbishment of the town defences.
- To determine if the 9th-century street grid extended into this quarter of the walled city, and evidence for an intramural street (possibly located upon the Roman *agger*).
- To recover any evidence for the incorporation of the site into the monastic precinct.
- To determine the monastic use of the site and if horticultural, what type of plants were grown.
- To reconstruct the changing past landscape within an absolute dating chronology.
- To create a cross section through the geology and the depositional sequence of the development area
- To integrate the results of this work into the previous work to give a coherent and thorough overview.

2.1.2 The primary aims of the geoarchaeological survey were set out as follows:

- To characterise the sequence of sediments and patterns of accumulation across site, including the depth and lateral extent of major stratigraphic units, and the character of any basal land surface pre-dating these sediments.
- To identify significant variations in the deposit sequence indicative of localised features such as topographic highs or palaeochannels.
- To identify the location and extent of any waterlogged organic deposits and retrieve suitable samples in order to assess the potential for the preservation of palaeoenvironmental remains and material for scientific dating.
- To clarify the relationships between the sediment sequences and other deposit types, including periods of 'soil', peat growth, archaeological remains, and the effects of relatively recent human disturbance, including the location and extent of made-ground.

3 METHODOLOGY

3.1 Evaluation (Trench 4)

3.1.1 A single trench (Fig. 2: Trench 4) measuring 3 m x 2 m was located in exact accordance to the WSI in order to access the impact of the deepest formation level of the proposed swimming pool (this level was 31.785 m aOD). Initially the Trench was mechanically excavated to a depth of *c* 1.2 m below ground level (b.g.l) — the maximum depth that the Trench could be entered without shoring. At this point excavation ceased and the long (west) and short (north) sides of the Trench were drawn and photographed. After recording, mechanical excavation continued to or just above the water table, reached at *c* 31.88 m aOD -although significant archaeological levels were not reached. During this work the Trench was enlarged on each side by c.1 m and reduced to a depth in order to form stepped sides to allow safe access. The trench was then recorded. A slot, approximately 0.10m in depth, was hand-excavated along the western side of the Trench to formation level.

3.2 Geoarchaeological assessment

3.2.1 The geoarchaeological assessment comprised 16 borehole samples arranged in two transects (see Fig. 2) and targetted on two alignments of the piled foundations for the proposed development (Fig. 8: BH 1-8, Fig 9: BH 9-16). A program of 8 boreholes was placed at 5m intervals along the northern-most alignment of piled foundations on a broadly E-W alignment. A further 8 boreholes (Transect 2) were placed 5m apart along the south side of the proposed swimming pool (the southern most alignment of piled foundations) on a broadly E-W alignment. The aim of the survey was to obtain spatial data, combined with the data from previous excavations, to provide a comprehensive coverage of the site sequence and its geoarchaeological potential.

3.2.2 Ordnance Survey co-ordinates were retrieved for each sample location with the use of digital mapping and hand tapes with surface heights transposed from the Cathedral benchmark (35.95 m aOD). The boreholes were drilled using a Terrier percussion rig

capable of extracting continuous 100 mm diameter cores in 1 m lengths suitable for geoarchaeological and palaeoenvironmental assessment. Each location was drilled until the underlying gravel had been proven. The cores were returned to OA premises where they were extruded and logged.

3.2.3 The lithological data from the borehole logs was inputted into geological modelling software (©Rockworks 2006) for analysis and correlation of deposits into key stratigraphic units. These units have been used to demonstrate the nature and the extent of the sediment accumulation patterns across site. Various cross sections and elevation plots have been produced in order to illustrate the main points of the discussion (Figs. 7-9). A plot of the bedrock surface was also produced in order to identify the underlying early Holocene landscape that was buried by later alluvial and archaeological make-up deposits. This data was added to earlier work and formed a continuation of a borehole survey conducted by Context One Archaeological Services with Dr Keith Wilkinson during June 1999 (COAS 1999).

3.2.4 Two representative sedimentary sequences (BH 3 and BH 13) were selected for the assessment of the preservation of palaeoenvironmental remains and detailed sediment analysis. The selection of these sequences was based on the perceived character, interpretative importance and chronological significance of the strata under investigation in relation to the project aims. These samples were assessed for the preservation of plant remains, pollen, insects, snails and diatoms.

3.2.5 The geoarchaeological assessment was undertaken following guidelines set out by English Heritage (EH 2006). Environmental sampling procedures were in accordance with the OA Environmental Sampling Guidelines and Instruction Manual (OA 2000), that is based on guidelines presented by English Heritage (2002). Samples for sediment analysis (soil micromorphology, phosphate and soil chemistry) were also processed in order to further characterise the sediment sequences and identify signatures potentially indicative of human activity. They will also allow for the extraction and selection of material suitable for Radiocarbon dating.

3.3 The watching brief

3.3.1 The watching brief involved the monitoring of all significant groundwork during the course of the development (nominally all works in excess of 1 m depth) by means of regular and co-ordinated visits when appropriate. All groundworks took place above the significant archaeological levels as dictated by the Design Statement (Nov. 2005). Representative records (drawn sections and photographs) were made for each major groundworks intervention (see Fig. 2), as follows:

- Demolition of the old pool (see Fig. 3 - Section 500)
- Construction of a new manhole (see Fig. 4 - Section 502)
- Groundbeam excavations for new pre-preparatory block (see Fig. 4 - Section 503)

- Groundbeam excavations for new changing room block (see Fig. 4 - Section 504 and Fig. 5 - Section 505)
- Formation of the south ring-beam for the new swimming pool (see Fig. 5 - Sections 506 and 507)
- Excavations to the formation level of the new swimming pool (see Fig. 6)

4 RESULTS: DESCRIPTIONS

4.1 Evaluation

(Fig. 2, Trench 4 and Fig. 3, Section 400)

4.1.1 The earliest deposit (406) was reached at 31.98 m aOD (1.51 m b.g.l) and comprised a clean and friable pale grey silty clay containing much calcium carbonate precipitate — presumably formed by the percolation of the underlying water-table. This deposit was at least 0.20 m thick -its basal level lay below the excavated level of 31.78 m aOD. Contained within it was a fragment of late 17th - 19th century storage jar and small sherd of Roman pottery. Also recovered was a fragment of late medieval ridge tile and a fragment of 17th - 19th century roof tile.

4.1.2 Overlying (406) was a fairly flinty firm mid grey silty clay (405). It was 0.47 m thick and contained fragments of early slate (medieval?) and a fragment of medieval roof tile. It probably represented an accumulated garden soil. Overlying this soil but confined to the eastern edge of the trench was a dump of mortar rubble (404), to a visible depth of 0.37 m. It contained frequent chalk lumps and fragments of CBM/brick and *c* 17th-early 18th century bottle glass. This appears to represent a dump of rubble probably derived from demolition and robbing of structures elsewhere —similar and contemporary with rubble (103) found in Trench 1 (OA 2005). On the western side of the trench this was overlain by a dump of mid greyish-brown silty loam (403) that measured 0.49 m thick. Overlying this sequence was the existing topsoil (400 and 401) and a buried tarmac surface (402).

4.2 The watching brief

Demolition of the old swimming pool (Fig. 2, Section 500)

4.2.1 The former swimming pool was located immediately east of the Stancliffe Building, its internal area measuring 12.80 m x 5.50 m. The upper surface of the pool was constructed upon a raised bank raised *c* 0.70 m above the surrounding ground level at *c* 34.15 m aOD. Demolition of the pool entailed breaking up its basal slab and then infilling it with the levelled bank. This methodology did not allow for a view of the profile of its construction cut, although a short strip was purposely exposed at its deepest end to allow for a representative drawn section to be made.

4.2.2 The underside of the slab of pool at its deepest end was found to occur at *c* 32.85 m aOD, or *c* 0.67 m below the extant ground level. This concurred with a dark humic soil (500), which represented the recent topsoil/garden soil on which the bank had been built. It is clear therefore that the construction of the pool did not impact upon archaeological levels which were found to occur at 31.40 m aOD at the west end of Trench 3 (OA 2006).

Construction pit for new manhole (Fig. 4 - Section 502)

4.2.3 All drainage and services trenches were dug to depths of less than 1 m revealing relatively modern soils and are not reported here. However a trench for the insertion of a manhole was excavated immediately to the east of the Science block. It measured *c* 2.60 m x 2.40 m, and was dug to *c* 31.33 m aOD, a depth of 2.20 m b.g.l. The trench was unshored and close inspection of the deposits could not be safely made, although a sketch profile of its west side was achieved.

4.2.4 The earliest deposit comprised buff-coloured mortar rubble (503) that occurred at *c* 31.70 m aOD, or at *c* 1.87 m below the existing surface. It was fairly clean, and in excess of *c* 0.37 m in thickness, apparently largely devoid of coarse fragments of rubble or building material — suggesting it represented a single dump of robbing debris. Above was a clean homogeneous mid grey-brown silty clay (502), *c* 1.05 m thick, containing occasional slate and CBM fragments — almost certainly post-medieval garden soil. Above this was the extant topsoil (500).

The new pre-preparatory school (Fig. 4 - Section 503)

4.2.5 Trenches for the installation of the ground beams were excavated to a level of *c* 32.35 m aOD in accordance with the architect's foundation scheme (Fig. 2). This effectively entailed an excavated depth of *c* 1.00 - 1.40 m below the existing surface. Significant archaeological levels in this area are as defined in Trench 3 of the evaluation occur below 31.40 m aOD. Throughout the trench the basal level of the homogenous dark grey loamy garden soil (502) - pertaining to post-medieval use of the site- was not reached. Near to the eastern end of the new block the garden soil was absent and had been replaced by dumps of mortar rubble (504) - largely devoid of coarse components apart from occasional brick and tile fragments. The rubble was seen to overlay garden soil (502) and therefore is of post-medieval date — seemingly infilling and levelling a large depression situated to the east.

The changing rooms (Fig. 4 - Section 504, Fig. 5 - Section 505)

4.2.6 Trenches for the installation of the ground beams were excavated to a level of *c* 32.35 m aOD in accordance with the architect's foundation scheme (Fig. 2). The foundation trench along its southern side was somewhat shallower at *c* 32.80 m aOD or approximately 0.80 m below the extant ground level. Significant archaeological levels in this area — as defined in Trench 2 of the evaluation — occur below 31.95

m aOD towards the north and at 32.80 m aOD at its highest point in Trench 1 (within 1 m of The Close wall) at 32.80 m aOD.

4.2.7 Dumps of mortar rubble, similar to those observed on the east-side of the new pre-preparatory school, were found over much of the area (Fig. 2) although a thin strip of earlier post-medieval garden soil occurred along the western side and within the southern foundation trenches. The undersides of these deposits were not breached and therefore significant archaeological levels were not exposed. Section 504 (Fig. 4) illustrates the western extent of the rubble dumping identified within the eastern end of the new pre-preparatory school (Fig. 4, Section 503). The earliest deposit (507), a homogeneous dark grey brown silty clay loam, is equivalent to the post-medieval 'garden soil' identified elsewhere. Overlaying this soil and tipping away towards the east were dumps of mortar rubble (505, 506) largely devoid of coarse material apart from small fragments of brick and other ceramic building material.

4.2.8 Further dumping of mortar rubble were observed alongside the western footings of the new building (Fig. 2, Section 505). Here clean mortar rubble (509) was observed to tip away towards the west, partially overlying post-medieval 'garden soil' (510). It is likely that this rubble is the same as the 17th or 18th century rubble found at the northern end of Trench 1, excavated in 2005.

The new swimming pool (Fig 5 - Sections 506 and 507, Fig. 6 - Section 508)

4.2.9 The new swimming pool was constructed in two main stages over a protracted period. The foundation trench for the ring-beam along its southern side was first excavated and the concrete beam formed — presumably to provide stability and protection to the nearby Close wall - located 2.3 m away. The trench was excavated to its formation depth of 32.15 m aOD, or *c* 1.45 m below the surface of the extant gravel path, and measured *c* 0.60 m - 1.00 m with somewhat unstable sides - hindering safe inspection in places. However two representative sections were drawn (Fig. 5, Sections 506 and 507). The main excavation for the pool entailed a trench measuring *c.* 21 m x 11 m, undertaken in 3-4 spits until its formation level of 31.785 m aOD was reached, undertaken over a period of several weeks. A drawn section (Fig. 6, Section 508) was made of its northern side.

4.2.10 The earliest deposit revealed within the ring-beam trench comprised a deposit (515) of compact mid-brown clay (Fig. 5, Section 506) revealed near the base of the trench at 32.02 m aOD. This deposit directly underlay a thick dark-grey silty loam (514) - indicative of the post-medieval garden soil that overlays the site. This deposit, presumably a dump, measured at least 0.14 m in thickness. The deposit was absent at the west end of the ring-beam trench and here the earliest level was represented by a dark grey silty clay, context (517), (Fig. 5, Section 507), over 0.38 m thick and containing lenses of mortar. This was overlaid by a thin dump of light brown clay containing patches of mortar (516) that was in turn overlain by the post-medieval garden soil 514.

4.2.11 The earliest deposit revealed within the excavated area of the swimming pool comprised a clean and seemingly homogenous mid to dark grey silty clay loam (519) that occurred on its western side, (Fig. 6, Section 508), that was over 1.30 m in thickness. Due to the proximity of the water table, its lowest visible level could not be closely examined. This deposit is stratigraphically identical to the post-medieval garden soils seen elsewhere on the site — and is also equivalent to the garden soils (404 and 405) that were examined in more detail within Trench 4 (Fig. 3, Section 400). These soils were absent over the eastern part of the pool, where dumps of mortar rubble (518) were present (Fig. 2 and Fig. 6, Section 508). At the north-western corner of the pool the garden soils were also absent and similar mortar rubble levelling layers (521 and 522) were observed (Fig. 6, Section 508). Recovered from the mortar rubble (518) was a large rim sherd from a late 17th - 18th century storage jar, along with a fragment of post-medieval brick and fragments of late medieval floor tile. The nature and date of these deposits suggests they are contemporary with similar deposits found in evaluation Trenches 1 and 4 (and elsewhere on the site) seemingly filling at least three large depressions/features.

4.3 Deposit model

4.3.1 The study combined with data retrieved during the previous evaluations and geoarchaeological investigations on the site has served well in characterising the broad morphology of the sub-surface stratigraphy underlying the present ground surface at the site. It has helped to develop a basic understanding of the sedimentation sequence and the types of environment in which deposition occurred. The proposed depositional sequence is summarised in Table 1.

Table 1: Summary of sedimentary sequence

Elevation	Units	Context	Inferred environment
33.7 m - 32.75 m aOD	**Unit VII: Topsoil**	(1001, 2001, 3001, 4001, 5001, 6001, 7001, 8001, 9001, 10001, 11001, 12001, 13001, 14001, 15001 & 16001)	Modern topsoil soil that has developed during the post-medieval period.
33.1 m - 31.2 m aOD	**Unit VI: Post-medieval makeup**	**a) Gravel dumps** (9004-9007, 10004, 11003, 12004-12005, 13005, 14005, 15004-15005, 16004-16005) **b) Garden soils** (1002-1003, 2002-2004, 3002-3003, 4002-4003, 5002, 6002-6003, 7002-7003, 6002, 7002-7003, 8002, 9002-9003, 10002-	Rubbish and other material dumped on the floodplain in order to reclaim the land and raise it above the level of flooding. Also includes rubble deposits used to backfill possible medieval features.

Elevation	Units	Context	Inferred environment
		10003, 11002-11003, 12002-12003, 13002-13003, 14002, 15002-15003, 16002-16003)	
32.25 m - 30.85 m aOD	**Unit V: Medieval deposits**	**a) organic alluvium** (1004, , 4004, 5003, 6005, 7004, 8003-8004,); **b) Bank** (2006 & 3005) & c) Stabilisation horizon (2005 & 3004)	Return to wetter conditions on the floodplain possibly associated with overbank flooding of the predecessor of the Mill Stream and other managed local watercourses.
31.65 m - 30.6 m aOD	**Unit IV: Roman deposits**	**a) Sand bar deposits** (4007, 4008, 5004, 5005, 6007, 7007 & 8006), **b) Gravel and chak dumps** (1005, 2007 4005 7005 8005); **c) Peaty alluvium** (2008, 3007, 4005, 6006, 7006, 9008, 10006, 11005, 12007, 13010, 14004) and **d) Rampart deposits** (10005, 11004, 12006, 13006, 13007 13008, & 13009)	Early activity identified on the sand bar, followed by drainage of the floodplain and diversion of the river. Gravel and chalk dumps associated with beginnings of reclamation. Construction of the agger in the late 2nd century, capped with a stone wall in the late 3rd century.
31.25 m- 28.4 m aOD	**Unit III: pre-Roman alluvial/fluvial deposits**	**a) Channel deposits** (1006-1007, 2009-2011, 3008-3011, 4006) and **b) floodplain deposits** (9009-9012, 10007-1009, 11006-11007, 12008-12009, 13011-13014, 14005-14008, 15006-15007, 16006)	Floodplain environment with meandering channels with areas of reed swamp and flood meadow. Prehistoric activity focussed around the wetland edge and gravel/Tufa islands.
29.25 m- 30.60 m aOD	**Unit II: Gravel**	(1008, 2012, 3012, 14009, 5006, 6008, 7009, 8008, 9013, 10010, 11008, 12010, 13015, 14009, 15008 & 160070)	Pleistocene deposits accumulating within a high environment braided streams during spring snow melt.
	Unit I: Chalk		Bedrock

4.4 Pre-Holocene deposits and basement topography

4.4.1 Unit I: Chalk. The geology of the site is mapped as Upper Chalk overlain by floodplain gravels (BGS sheet 299D) which are in turn overlain by Holocene peats and alluvial silts. The bedrock was not reached in any of the boreholes, but angular chalk fragments recorded within the lower sequence potentially indicate outcrops in the immediate vicinity.

4.4.2 Unit II: River gravels (29.25 m-30.60 m aOD): This unit directly overlies the bedrock geology and consists of a light grey well sorted rounded pebble gravel.

4.4.3 These deposits represent high-energy deposition, which accumulated in a cold periglacial environment relating to the development of braided river systems that date from the late Pleistocene (*c* 20-10,000 BP). These types of deposits are typically found in river valleys and consist of gravel bars that formed due to high seasonal flow associated with melting snow during the spring. Any archaeological material within these deposits are unlikely to be *in situ*, although prehistoric flint work has been previously recovered from the gravel surface from the site (COAS 1999).

4.4.4 The surface of the gravely sand and stiff clay deposits essentially defines the topography of the early Holocene landscape (Fig. 7). Bates (1998) refers to this as the 'topographic template' and suggests that variations in the template largely dictated the patterns of subsequent landscape evolution, as flooding and sedimentation ensued during the prehistoric period.

4.4.5 The plot of the gravel surface illustrates the topography prior to major Holocene sedimentation and shows that there were gradually lower elevations at the edge of the Stancliff building, likely to represent a former prehistoric channel of the River Itchen. The model has also revealed that the edge of the floodplain may be located near to or possibly on the line followed by the old school building, along with The Pilgrims' Hall. Previous investigations within this area of the site have identified the remains of both Roman and medieval buildings that were overlain by dry ground deposits of dark earth and post-medieval deposits. Floodplain deposits have been previously identified (COAS, 1999) within the school courtyard indicating a gradual shallowing of the floodplain in this location. The eastern boundary of the floodplain is likely to be located just east of the Mill Stream, near to Wolvesey Palace — where excavations revealed substantial remains of Roman buildings and streets (Biddle 1975, 321-6).

4.5 Holocene sedimentation sequence

4.5.1 Unit III: Pre-Roman Floodplain deposits (29.30 m - 31.25 m aOD): These deposits consists of a natural alluvial/fluvial sequence of silty peat (Unit IIIa), calcareous silty (Unit IIIb), silty sand (1007, 2010 & 3010) and basal peat (2011, 3011, & 9012) overlying gravel within borehole Transect 1.

4.5.2 These deposits are confined to the western edge of the site due to the presence of the gravel bar that rises above the level of prehistoric flooding. A more extensive pre-Roman sequence is represented in borehole Transect 2, consisting of a sequence of alluvial/fluvial deposits of calcareous silt (9009, 10008-10007, 10006, 12008 13011 & 14005), silty peat (130012, 14006, 15006 & 16006), calcareous silt/tufa (14007, & 13013), and woody peat (9010, 1009, 11007, 12009, 13014, 14008) overlying gravel. The floodplain sequence (Unit IIIb) indicates that for most of the prehistoric period the site would have been a continually changing wetland environment with a network of shifting slow-moving channels with frequent overbank flooding.

4.5.3 There is at least two phases of transition represented within the sequence from organic deposits to minerogenic calcareous silts/tufa deposits. The more organic deposits of the sequence are likely to be representative of wetland environment, for example reed swamp or alder carr-woodland. The other more minerogenic parts of the sequence may indicate periodic overbank flooding or shallow flow. The higher energy sandy silt deposits are likely to represent fluvial deposition within a former channel of the River Itchen. As the sequence processed, the texture of the deposits became finer, indicating that the rate of channel flow was slowly decreasing throughout the prehistoric period.

4.5.4 Any archaeology found in association with these deposits is likely to have undertaken a moderate degree of reworking. Also the type of archaeological activity represented in this type of environment is likely to be associated with trapping or utilising water resources.

4.5.5 Unit IV: Roman deposits (31.65 m - 30.6 m aOD)**:** The earliest Roman deposits identified within the sequence consisted of sandy rubble deposits (Unit IVa) which were also encountered within Trench 3 (323) on a gravel high. These deposits produced dating material from 2nd century AD (early-mid Roman period) indicating activity on the higher ground on the floodplain. It is likely that the channel and the floodplain were still active at this time, making the surrounding area unsuitable for habitation.

4.5.6 Chalk rubble deposits (Unit IVb) identified in Transect 1 appear to have been used to level out the undulating topography of the floodplain and help infill the former prehistoric channel. During the previous geoarchaeological assessment (COAS, 1999) these deposits were interpreted as evidence of demolished buildings in the vicinity, which still requires confirmation.

4.5.7 The accumulation of an organic silt clay/peat (Unit IVc) indicates that after this initial phase of activity the area was progressively becoming wetter mostly likely as a response to rising ground water levels.

4.5.8 Unit V: Medieval deposits (30.85 m to 32.25 m aOD)**:** The post-Roman layers consist of thick deposits of silty clay/building rubble overlying a thin layer of organic silts and silty peats.

4.5.9 The organic alluvial silts (Unit Va) are laterally extensive across Transect 1. This is probably an organic alluvium that reflects increasing wetness during the post-Roman period.

4.5.10 A silty clay deposit (Unit Vb) identified within Borehole 2 and 3 within Transect 1 may represent a dump, possibly a medieval bank.

4.5.11 Unit VI: Post-medieval makeup deposits (31.2 m to 33.1.25 m aOD)**:** Overlying these deposits are thick accumulations of chalk and flint rubble within a silt clay matrix (Unit VIb), consisting of a mixture of dumped post-medieval rubbish and building rubble deposits.

4.5.12 Unit VII: Modern garden soils (31.2 m to 33.1.25 m aOD)**:** The post-medieval deposits are overlain by a silty loam that makes up the modern garden soil of the school.

4.6 Biostratigraphy

4.6.1 The earliest deposits identified on the site are from the basal peat deposit (3011) between 29.60 m aOD (-3.77 m bgl) and 29.30 m aOD (-3.90 m bgl) from the palaeochannel identified in Borehole 3, which has been radiocarbon dated to the c.6,142±82 BC (OxA-17233) placing it in the mid-late Mesolithic period. Pollen was too poorly preserved to be interpretable, but the waterlogged plant remains produced a reasonable diversity of taxa, including wood fragments, and several mollusca and insect remains. The snail and diatom assemblage indicated slow-flowing water species within a channel relatively free from vegetation.

4.6.2 The upper horizon of deposit 3011 shows signs of disturbance indicating a possible erosional contact and a potential hiatus in the sediment sequence. The pollen profile in the upper part of the channel silts has a rich herb community, which includes pollen types typical of moist soils, and is consistent with a later disturbed environment when compared to the main floodplain sequence. Detailed sediment analysis and enhanced nutrient levels may suggests that latrine waste and other rubbish may have been used to infill the channel after the channel had been diverted in the mid/late Roman period.

4.6.3 The main floodplain sequence identified in Transect 2 between 29.30 m aOD (-3.56 m bgl) and 31.25 m aOD (-2.12 m bgl) started to accumulate from the c.5669±50 BC (OxA-17170) in Borehole 13, placing it within the late Mesolithic period. The pollen profile consisted of tall woody and arboreal taxa that are dominated by *Alnus* (alder) and *Corylus* (hazel) pollen, with the presence of *Tilia* (lime) and *Ulmus* (elm). The preservation of the pollen was generally good from the basal deposits and indicated a lack of reworking. Only *Alnus* and *Corylus* grains were poorly preserved suggesting that this material may be reworked from older material.

4.6.4 The local environmental indicators like snails, waterlogged plant remains and insects suggest wet open conditions with trees nearby the immediate area throughout much

of the mid-late Holocene. The waterlogged plant remains are not well preserved and there were signs that the deposits may have previously dried out. The small identifiable assemblage consisted of evidence of wet marshy conditions with *Mentha sp*, (Mint), *Juncus sp*. (rush) stinging nettles and decaying *Ranunculus* (buttercup) seeds. This was supported by the snail assemblage that consisted of a totally open wet grassland fauna up until the early Roman period. They included *Vallonia pulchella*, *Succinea* or *Oxyloma*, *Cochlicopa lubericella*, *Trichia l.c. Hispida* and *Cepaea sp*. A small range of freshwater species of *Valvata Cristata*, *Valvata piscinalis* , *Bithynia sp*. and *Lymnaea truncatula* were also present. The presence of both a typical damp grassland fauna with an amphibious element have been previously thought to indicate floodmeadow (Robinson 1992). Diatoms were not preserved within these deposits, probably due to repeated wetting and drying or high alkalinity of the samples.

4.6.5 The first evidence of clearance within the sequence is recorded quite early on at 30.57 m aOD (-2.47 m bgl) from a peat deposit (13011) that was radiocarbon dated to *c* 4278.5±55.5 BC (OxA-17231). This broadly matches the regional pollen picture of an early phase of late Mesolithic woodland reduction of trees like elm at around 5,600 years BP in this part of southern England (Greig 1986). This is followed by a possible phase of secondary woodland regeneration of locally growing elm and lime, with alder and hazel pollen possible being reworked, at a depth from -2.345m bgl. This deposit produced a radiocarbon date of *c* 3997.5±48.5 BC (OxA-17232), placing it within the early Neolithic period. Evidence of a further second phase of woodland clearance comes from the palaeochannel deposits (3008, 3009, & 3010) and the disturbed soils on the gravel high (322) within Trench 3. This is consistent with the more regional pattern of clearance from the Iron Age that has been identified by Greig (1996) again citing Watson (1982).

4.6.6 The earliest significant archaeological activity identified on the site comes from the high area of gravel that was previously identified in Trench 3. This activity on the higher ground has been dated to the 2nd century AD based on pottery. In addition to the rich collection of finds, the gravel high deposits produced a well-preserved assemblage of waterlogged plant remains, and a charred spelt wheat and glume base. The assemblage included a few seeds of aquatic and waterside plants, *Potaogeton* (pondweed sp.) *Lycopus europaeus* (gipsywort) either representing plants that were growing in and around pools or seeds that had washed in. The presence of several food remains, including imported luxury fruits and nuts like *Ficus carica* (fig) and *Juglans regia* (walnut) indicate that faecal material was present. The origin of the waste may have been sewage discharge into the river that had been washed into the deposits through episodes of flooding, or more locally deposited waste.

4.6.7 A compact layer of flint and chalk rubble (Unit IVb) appears to represent a deliberate period of dumping onto the floodplain surface in order to create a usable surface within Transect 1. This dumped material was also used to level off undulations within the floodplain and fill in the former course of the prehistoric river channel. This deposit was dated to the late 2nd and 3rd century AD in Trench 3 (319) and

within the previous borehole survey (COAS 1999) and reflects an attempt to reclaim the floodplain during this period. The diatom assemblage consisted of a range of non-planktonic aquatic species. The species include the consistent presence of a number of *Fragilaria* taxa (*F. brevistriata, F.construens* var. *venter, F. lapponica, F. pinnata*) which are early colonisers of new and ephemeral aquatic habitats.

4.6.8 The insect fauna from the reclaimed late Roman surface on the high area of gravel suggest the local landscape was open grassland with some pasture. This is suggested by the *Aphodius*, *Geotrupe*, and *Onthophagus* dung beetle recovered from these deposits. Open grassland is also suggested by the presence of *Phyllopertha hortocla* whose larvae are associated with old pasture and meadows. There is little indication of trees in the insect fauna with only isolated fragments of the tree dependent *scoyltid* 'bark beetle' recovered. This suggests that the floodplain was probably open and essentially treeless.

4.6.9 These deposits were overlain by organic silt, deposits (310 and 151), that formed a late Roman ground surface. A series of timber stakes were recovered from this deposit indicating activity within the immediate area. The deposits contained a mixed pottery assemblage of late 3rd-century Roman pottery and one early medieval sherd, so their formation probably commenced in the late Roman period. The plant remains consisted of fragments of matted reeds, molluscs, wood fragments, buds, charcoal and a wide range of fruits and seeds. Aquatics (pondweed), marsh plants (spike rush, sedges), ruderals (nettles, docks), arable weeds (corn cockle, nipplewort) and grassland plants (*Poaceae*) were all represented in the assemblage. The input of ruderal weeds and a few arable weeds may again indicate sewage deposition. The assemblage consisted of wet grass/marsh taxa that indicate that the reclaimed Roman floodplain surface was gradually inundated by rising ground water.

4.6.10 During the same period the Roman rampart identified within Trench 1 and Transect 2, was being constructed directly on to the floodplain deposits. This buried the early Roman floodplain surface and ensured its preservation. Further detailed sediment and chemical assessment of these deposits revealed that the rampart was constructed with a mixture of reworked soils, anthropogenic material and alluvium. It also confirmed that two periods of construction appeared to be indicated by two thin organic deposits potentially representing periods of stabilization (Unit IVd). The preservation of thin wall grass seeds within the assemblage may indicate that turves cut from damp grassland elsewhere were used in the construction of the rampart. The thin sections taken through the deposits revealed dumps of mixed soil horizons from locally derived clay-with-flint soils, with small amounts of anthropogenic inclusions, such as latrine waste, and mixed alluvial silts.

4.6.11 The environmental assemblage of the rampart is difficult to interpret due to complex issues of taphonomy. A narrow range of taxa was identified indicating an assemblage of damp and nutrient-rich wasteground taxa. This included nutrient rich damp taxa of *Hyoscyamus niger* (henbane), *Urtica dioica* (stinging nettles) and *Sambucus nigra* (elderberry), *Carex spp.* (sedges) and *Cnium maculatum* (hemlock). The snail

assemblage from the embankment (150) consisted of several shade-loving species of *Discus rotundatus*, *Carychium minimum* and *Oxyclilus Cellarius* in the assemblage in addition to the open fauna, possibly indicating the presence of nearby hedges or scrub vegetation. It is also possible that this assemblage derives from soils and other deposits from elsewhere that were used in the construction of the rampart.

4.6.12 The immediate post-Roman environment sees a continuation of the conditions and processes of sedimentation that occurred within the late Roman period. Deposits (Unit IVc) represent the transition. A similar range of plant material consists of matted reeds, apple andocarp, ruderals and marsh plant were present within context 309 in Trench 3. No truly aquatic taxa were noted and conditions might have been slightly drier than in the late Roman period.

4.6.13 The insect fauna from these deposits was essentially the same as the early Roman deposits suggesting open ground conditions. Enhanced phosphate and lead levels may indicate possible concentrations of stabling waste within the deposit. Detailed sedimentary examination suggests that the mixed organic waste from the deposit consist of both wood and possible construction debris, along side kitchen waste, dominated by charred and unburnt stabling waste that may have also included pig dung.

4.6.14 The only Saxon/Norman feature identified on the site consisted of a timber lined cesspit (118) within Trench 1. This produced well preserved wood fragments, molluscs, charcoal, insects fish bones and mineralised cess concentrations containing brain, corn cockle impressions and straw. The remains are typical of *in situ* cess deposits, with the straw having been used as toilet paper and/or dumped into the pit to help dampen the smell. The abundance of fly puparia and mineralisation demonstrates that the deposit was nutrient rich, moist to wet, and probably very smelly. The upper fill (120) also produced a wide range of waterlogged edible fruits and seeds like bramble and sloe/plum stones. The seeds of several general ruderal weeds including docks, fumitory and orache, were also present, perhaps indicating that either the pit was more open to the elements or that a wider range of waste was being dumped into the pit.

4.6.15 A second embankment appears to have been constructed on the floodplain during the post-Roman period. This can be seen in section within Transect 1 running from north to south towards the Roman rampart (Fig. 9). It is on the alignment of a projected Roman road that Biddle (1972) believed to run through the site. However it does not appear to have been of Roman construction, consisting of alluvial silt dumps rather than well-constructed road foundations and metalled surfaces. The embankment consisted of deposits of silt (Unit Vb) overlain by organic rubbish dumps (Unit Vc). A stabilisation horizon has been identified on its surface (3005) which developed into a weathered soil horizon during this period with signs of animal trampling. It is possible that the embankment was created as either a flood defence or as access to the ramparts. The date of the construction of the embankment needs to be confirmed

by radiocarbon dating. However it is possible that this may correspond with the reconstruction of the city's defences that occurred in the late 9th century.

4.6.16 The post-Roman silt deposits (Unit Va; and contexts 306, 307, 309 & 318 in Trench 3) consisted of organic silts that overlay the Roman surface deposits. The pottery assemblage indicates accumulation between the 14th to 17th centuries. The diatom preservation is poor and there is silt visible on the slides. There are also some indications that from the diatom composition the assemblage is derived from flooding. The samples from these deposits again have a range of well preserved non-planktonic diatoms, but differ from the assemblage of the underlying late Roman and early post Roman deposits. For example *Achnanthes minutissima* is common in sample 23, *Amphora veneta*, and *Fragilaria vaucheriae* in both samples 23 and 24. A range of *Nitzschia* taxa *(N. amphibia, N. frustulum, N. palea* and undifferentiated *Nitzschia* spp.) also become more common. These *Nitzschia* spp. are often found growing where nutrient levels are moderately high. This is also supported by the consistent occurrences of *Gomphonema* spp. (*G. angustatum* var. *productum, G. clavatum, G. minutum, G. parvulum, G. truncatum*) in Sample 24. These diatoms are often associated with higher nutrient levels that are associated with waste ground environments.

4.6.17 The plant remains from the silts were fairly diverse and frequent, preservation was limited and most flots tended to be small. Most of the taxa appeared to represent disturbed and nutrient-enriched habitats, like fumitory, stinging nettle and henbane. The presence of sedges and thistle could indicate a damp, grazed meadow type of environment. The presence of marsh/damp ground plants such as spike-rush and sedges could represent the habitat in the damper winter months, or the remains of flooding. The presence of slag, fish bone, coal, tile and charcoal fragments also indicated that domestic waste was a notable component of these deposits.

4.6.18 The gravel and mortar deposits (Unit VIa) overlying the silts represents deliberate dumps to reclaim the floodplain in the post-medieval period. The distribution of these deposits might indicate that they were used to infill specific features. The excavation of the crane pit (Teague, 2000) identified a degree of regularity within the distribution of these deposits which may suggest that they were used to infill cut features like medieval fish ponds that might have been located at the site during the monastic period.

4.6.19 The uppermost part of the sequence consists of garden soils that date from the 16th century onwards, following the dissolution of St Swithun's Priory in 1539. These deposits were largely aerobic and therefore did not produce a preserved waterlogged plant remains assemblage.

5 DISCUSSION AND INTERPRETATION

5.1 Discussion

5.1.1 The assessment has been particularly useful in being able to view the previous excavations within the wider context of the floodplain sequence. It has also been able to address specific research questions that still remain over the development of the Roman town and its post-Roman development. More crucially it has been able to map the pre-Roman floodplain sediment sequence and assess its potential, which has not been previously investigated in any detail within the town.

5.2 Early Prehistoric

5.2.1 The site appears to occupy an area of the Itchen floodplain with the higher and dryer ground located towards the east where The Pilgrims' School is presently situated. Previous work in the area of the school has identified limited early prehistoric activity associated with the surface of the gravel. Evidence of prehistoric activity on the floodplain may have previously occurred on higher ground and gravel/tufa islands (Scobie 1995). The higher elevations of the gravel bar represented in Trench 3 may have provided one such location for early prehistoric communities to be able to exploit the rich resources of the floodplain environment.

5.2.2 Previous evidence from the underpinning of the Cathedral and nearby boreholes, have indicated that before the River Itchen was diverted during the Roman period, it flowed in at least two main channels, to the east and west of the tufa island to the north (Qualmann 1993; James 1997, 29-30). The more easterly channel was conjectured to flow through the site of The Pilgrims' School, flowing north to south between the tennis courts and Mill Stream; and the westerly channel, north to south just west of the main school building. The model has confirmed the presence of at least one channel running on the same alignment at the edge of the Stancliffe Building. Based on these assumptions the most likely candidate is that this represents part of the eastern channel sequence. However there are hints within Borehole 8 that another potential channel could be located just to the east of Transect 1 towards the Mill Stream. This still needs to be confirmed through further investigations. The exact arrangement of channels within the floodplain needs to await further confirmation of whether the floodplain extends further west of the main school building.

5.2.3 The pre-Roman floodplain landscape would have consisted of a patchwork of different wetland environments that appears to have ranged from wet grassland to flood meadow with alder carr woodland possible nearby at the floodplain edge. The prehistoric channel would have been slow-flowing and relatively free of vegetation. Spring activity would also have appeared to have been very vigorous during this period depositing thin bands of tufa on the floodplain. The former prehistoric channel of the River Itchen would appear to run north-south through the site represented in Boreholes 1, 2, 3 and 9. This channel appears to have been active from the late

Mesolithic period onwards and was possible rejuvenated in the late prehistoric period, depositing silts within the channel. Throughout the pre-Roman period most of the site would have been too wet for human habitation, but would have likely provided seasonal pasture.

5.2.4 The main floodplain sequence identified underneath the Roman ramparts in Transect 1 formed between the Late Mesolithic to the early Neolithic period. The accumulation of peat and tufa indicate changing conditions within the floodplain. The transitions from the deposition of organic to minerogenic deposits in the sequence are related to significant changes in hydrology and sediment input into the river systems. The causes of these changes could be attributed to both climate change and human activities. The floodplain sequence provides a good opportunity to investigate the relationships between human activity and floodplain sedimentation. Previous research has identified a link between the beginnings of alluviation on floodplains and woodland clearance associated with the intensification of agriculture in low land river systems (Robinson 1992; Brown 1997). The timing of this change obviously varies depending on location and the river system, but most common dates indicate either late Bronze Age or Iron Age. The present sequence may suggest a much earlier date for alluviation in Winchester that was not related to the introduction of agriculture within the area. In fact, sedimentation appears to have decreased within this area of the floodplain between the late prehistoric and late Roman period.

5.2.5 The first evidence of clearance within the sequence occurs within the late Mesolithic period, representing a significant decline in woodland species of lime. A possible phase of secondary woodland regeneration within the early Neolithic period is recorded within the buried soil sealed beneath the Roman rampart. This is consistent with the paucity of Neolithic remains identified within Hampshire in general (Fasham *et al* 1989, 142). The process of sedimentation appears to have been significantly reduced in the late prehistoric and Roman periods.

5.3 Iron Age

5.3.1 During the early Iron Age, more permanent settlement is believed to have been established in the area, concentrated on features and deposits over the east facing side of St Paul's (Qualmann 1993). The floodplain appears to have been cleared by this point and we see the first evidence for widespread occupation of the area. Field systems at Crowder Terrace, possible animal enclosures at Carfax, and settlement features at Staple Gardens, all indicate open settlement related to a wide range of agricultural activities.

5.3.2 By the middle Iron Age the large enclosure of Oram's Arbour was constructed on the western side of the narrowest point of the floodplain. Although the eastern extend of the Iron Age enclosure has not been fully defined it is believed to have been located at the edge of the floodplain. The floodplain would have been wide enough and marshy enough to present a significant barrier to all east-west movement within the

area. The enclosure therefore appears to have been located in order to controlled access to a natural ford over the River Itchen.

5.3.3 The site sequence reveals that the prehistoric Itchen channel was rejuvenated during the late prehistoric period and still active within the Iron Age. The evidence suggests that the floodplain was being extensively used to dump domestic and latrine waste. The environmental indicators suggest that the floodplain would have consisted of flood meadow, possible offering seasonal grazing but was still too wet for permanent habitation.

5.4 Early Roman period (*c* AD 43-199)

5.4.1 Early Roman activity on the site appears to have focussed around the gravel bar identified within Trench 3, indicating that much of the surrounding area was most likely still too wet. This phase of activity has been dated to the 2nd century AD based on pottery recovered from the sandy deposits (323) that overlies the gravel. The former channel of the River Itchen that ran through the site may still have been active into the early Roman period.

5.4.2 The site area appears to have been progressively drained possibly as the settlement expanded eastward during the late 2nd century, as the limits of the *civitas* was established and the river was diverted outside of the eastern boundary. The construction of the defensive embankment *(agger)* deposits occurred shortly after, possibly because prior to this the floodplain marsh may have offered adequate protection.

5.4.3 The Roman rampart was constructed from a mix of reworked soils, anthropogenic sediments and alluvium. Thin section analysis of the deposits indicates that the embankment was being affected by flooding during its construction. The sediment sequence appears to support the idea that the Roman embankment was constructed in two phases, indicating a second phase of either repair or strengthening of the defences at Winchester. Soil micromorphology will help to determine whether the two stabilisation horizons represent dumping of organic rubbish deposits or trampled surfaces.

5.5 Late Roman period (*c* AD 200-410)

5.5.1 The defences of the town appear to have been further reinforced in the late 3rd century by a flint and mortar wall.

5.5.2 Several large deposits of chalk and flint were dumped on to the floodplain in the late 2nd and 3rd century in order help create a dry surface and elevate it above the ground water level. These deposits were compacted in order to create a usable surface for a period of time. These deposits were also used to infill and level off any ground undulations associated with the former palaeochannel of the River Itchen. The presence of wooden stakes that formed undiscernable structures indicate that limited activity was associated with this surface. However the overlying organic silty

alluvium suggests that this activity was relatively short-lived and that wetter conditions returned by the late 3rd century.

5.5.3 This indicates that the Roman town engineers expended considerable effort to create a surface that was suitable for occupation. It does, however, appear that they were not fully successful in this aim, and there is no evidence to indicate that this land was ever suitable for the construction of buildings and roads. The absence of any such evidence for *in situ* building remains or foundations identified within the sequence suggests that the area was used for other activities that may have used more lightweight wooden structures that leave little archaeological trace.

5.5.4 The environmental assemblage from the late Roman surface and overlying silts indicated that the area was still relatively wet, consisting of damp grassland with areas of nearby marsh. Although low level activity can be detected in association with these deposits, the evidence suggests that the area was still too wet for permanent habitation.

5.6 Anglo-Saxon period (*c* AD 410-960)

5.6.1 With the collapse of the Roman administration of the town in Winchester in the early 5th century, urban occupation of the town is believed to have ceased. Defensive ditches and embankments were placed at the former entrances to the town (Biddle 1976, 109-119 and 206).

5.6.2 The post-Roman deposits suggest that conditions remained unchanged from the late Roman period. The environment consisting of damp grassland with areas of marsh and ponds. Evidence of cereal growth and possible seasonal grazing was also occurring within the local area. There is no evidence to suggest that the River Itchen reverted back to its prehistoric path during this period following the collapse of the Roman administration.

5.7 Monastic period (*c* AD 970-1538)

5.7.1 Evidence of late Saxon/Norman activity at the site is notable by its absence from the sequence in general. The only significant feature from the post Roman period is the Saxo-Norman timber-lined cesspit (118) identified within Trench 1. The plant remains indicate that exotic food remains such as fig and walnut and cultivated plums does not appear to have present in the post-Roman deposits, apart from a trace of fig from context (3180). Native hedgerow fruits such as hazelnuts, apples and blackberries were recorded indicating a change to local grown produce. The more extensive network of trade that existed within the Roman period appeared to have declined after the collapse of the Roman administration.

5.7.2 A silty clay deposit (2006 & 3005) within Borehole 2 and 3 within Transect 1 may possibly represent the construction of a medieval embankment that was potentially associated with flood management or access route to the town's defences. The date of its construction needs to be confirmed by radiocarbon dating, however it appears

consistent with the re-organisation of the town in the late 9th century. This may have part of the reconstruction of the town and its defences by King Alfred or his predecessor, intended to provide rapid access to the town walls for defensive purposes. This would help to confirm Biddle's suggestion (1975b, 127) that the new Saxon street pattern completely filled the former Roman town, including the southeast corner.

5.7.3 The Mill Stream is also believed to have been constructed with the re-organisation of the town in the late 9th century and to be contemporary with the laying out of the Brooks water courses north of the present High Street. Certainly the Millstream appears to have been established by the time of the late 10th century monastic reforms. The organic alluvial silts overlying the late Roman deposits within Transect 1 possibly indicates alluviation in the late monastic period as the infrastructure behind the drainage systems struggled to cope.

5.7.4 Assessment of pollen, diatoms and soil micromorphology within these deposits has confirmed that a return to wetter conditions occurred during this period, most likely associated with overbank flooding. It is possible that at certain times of the year the Mill Stream and other managed watercourses within the town could not cope with the flow of water and overbank flooding that occurred fequently over the site between the 14th and 17th centuries.

5.8 Post-medieval period (*c* AD 1538-present)

5.8.1 The post-Roman layers consist of thick deposits of silty clay/building rubble overlying a thin layer of organic silt/silty peat. A thick deposit of compacted poorly sorted well-rounded gravels directly overlay the Roman embankment deposits within Transect 2, and may represent in-filled medieval fishponds or makeup material.

5.8.2 Overlying these deposits are thick accumulations of chalk and flint rubble within a silt clay matrix, consisting of a mixture of dumped post-medieval rubbish and building rubble make-up deposits.

5.8.3 These are overlain by a silty loam that makes up the modern garden soil of the school that has developed over the last 200 years or so.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

6.1.1 The Pilgrims' School assessment has successfully been able to map the main deposits across the site and provide an interpretation of the depositional sequence of the floodplain. The assessment has identified a complex sequence of pre-Roman, Roman and post-Roman deposits that have a high potential for the recovery of both bio-remains and samples suitable for sedimentary analysis. The sequence has

considerable potential to address many of the current research aims that exist concerning the development of Winchester through time (outlined previously in 2.1). The next stage of analysis will attempt to focus on addressing these aims and providing a wider context for the archaeology identified previously at the site.

6.1.2 The following potential has been identified:

- The floodplain of the River Itchen at The Pilgrims' School saw moderate use before the Roman period. Only limited evidence of human activity can be detected within the floodplain sequence and it was probably used for seasonal pasture. Two episodes of woodland clearance have been identified during the Late Mesolithic period and the early Iron Age within the wider landscape.

- The assessment has confirmed that the prehistoric path of the river Itchen did flow through the site at the edge of the Stancliffe Building extension and was later diverted in the late Roman period. The exact route of the two prehistoric channels proposed by Qualmann (1993) still needs to be confirmed, in particular, whether the floodplain does extend west of the main school building.

- The Roman town engineers attempted to drain the site and raise the ground level by dumping and compacting deposits deriving from building demolition (possibly in the immediate vicinity) during the late 2nd and early 3rd centuries. These deposits included chalk, flint, iron nails and ceramic building materials but also occupation waste including coins and pottery. Evidence was recovered for the use of this reclaimed area within the excavations, although this was limited to poorly defined structures consisting of wooden stakes. This period of use appears to have been relatively short lived, as the wet silty peat deposits (Unit IVc) appear to have accumulated above the surface form the late 3rd century onwards. Indeed this evidence calls into question the success of the reclamation in this area, and the suggestion that the town street grid extended into the area (Biddle 1972).

- The post-Roman environment appears to have been a continuation of the late Roman environment consisting of wet grassland and flood meadow with only low level arable and pasture activity occurring within the outskirts of the town.

- There is an indication that the 9th-century street grid may have extended into the site and connected the south of the town with the defences. The deposits relating to Unit VIb indicate a linear embankment running north to south and probably joining up with the rampart within Transect 1. Further detailed investigation of the stabilisation horizon (Unit VIc) on the embankment will help to indicate how extensively it was used and whether it was ever used to drive animals.

- The work has confirmed that the reconstruction of the cathedral and monastic building may have had some impact on the southeast corner of the close or the wall. Although the principle monastic buildings were located further to the north and west, and there is no evidence, architectural and documentary, for buildings on the site. The discovery of possible building remains, a floor surface and timber

water course during the excavation of a sump between the main school and Octagon, indicate that this area was used to a greater extent then previously thought. In addition, the cesspit (118) located within Trench 1 may provide further supporting evidence of a building nearby.

- The deposition of the post-Roman alluvial silts suggests a return to overbank alluviation within the late medieval and early post-medieval periods. These deposits probably post-date the creation of the Mill Stream and the water courses known as the Brooks. It is possible that these deposits were laid down during periods of flooding when the drainage system of the town failed to cope with the amount of input into the river system.

- During the post-medieval period there was an increased effort to reclaim the floodplain and elevate the ground level above the water table. The rubble and mortar deposits may indicate in-filled medieval fishponds and other features.

6.2 Recommended methodology for further analysis

6.2.1 The floodplain sequence revealed at The Pilgrims' School has considerable potential to elucidate the character and development of pre-Roman Winchester.

6.2.2 In order to address these questions a combined bulk, palynological and soil micromorphological analysis is recommended of the sequence from Borehole 3, 13 and the previous OA evaluation trenches.

Pre-Roman floodplain sequence

6.2.3 The lowermost part of BH 13 (1314) has the palynological potential of monitoring the 'pre-clearance' (5,600 bp) environment for the area (3 pollen preps, 4 analyses), a study that would also benefit from bulk study of the sediments, in order to compare changes induced by the putative clearance phase (2 bulk samples).

6.2.4 The floodplain deposits found at -2.43 m and -2.53 m bgl (1311-13) have the potential to elucidate the character and impact of clearance on the catchment and local area, through not only palynology but also through associated bulk and soil micromorphological analyses (3 pollen preps, 4 analyses; 2 bulks; 1 thin section, 2 soil micromorphological analyses). Vegetation (woodland regeneration?) and sediment changes in context 1310 should also be examined (1 pollen prep, 2 analyses; 2 bulks; 1 thin section, analysis) in order to record the changing floodplain environment.

6.2.5 In Borehole BH 3, there appears to be plenty of evidence of pre-Roman impact/activity as found in the late prehistoric channel deposits (3007-3009), which could be better understood after systematic sediment analysis (2 bulk; 3 soil micromorphological analyses).

The Roman rampart and surface- environment and waste deposal

6.2.6 The construction of the Roman rampart and associated pedological and alluvial activity can be investigated by the analysis of thin sections of contexts 1306, 1307 and 1308 (2 thin sections).

6.2.7 Context 319 (samples 7 + 41) and 322 (8 + 42) from the higher area of gravel could provide information relating to the Roman diet. The dried flots could be used in conjunction with the waterlogged flots to provide a rapidly sorted source of rarer, large food remains such as fruit stones and nutshells. In addition the uncharred fruits and seeds could provide some information about the local environment and the deposition of waste, particularly in conjunction with mollusc and pollen data. Preservation bias would need to be taken into account, but the range of taxa is interesting and points to a very nutrient-rich habitat.

6.2.8 The charred cereal remains in the Northgate House site should provide reasonable information concerning the arable component of the Roman diet. Frequent plum/bullace stones from a mineralised cesspit at Northgate house suggest that further dietary information may be present in the residues from this feature. This information can then be compared to the mineralised and waterlogged information from The Pilgrims' School.

Post-Roman environment

6.2.9 The questions about what happened after the Roman period and whether the environment and drainage system reverted back to its previous state, can be further answered by detailed examination and dating of the late- and post-Roman alluvial silts.

6.2.10 The late Roman deposits appear to have a strongly anthropogenic character and probably reflect local 'urban' land use/use of space in this part of Winchester (near the Cathedral). Although constructional debris may be present there appears to be a dearth of domestic, industrial and latrine waste. Instead, waste from animal husbandry appears to dominate (Goldberg and Macphail 2006). Moreover, there appears to be two types of waste present that needs to be investigated; a) charred and mixed material that seems to have come via a dung heap (Bakels 1988; Mücher *et al* 1990) and b) raw stabling waste and possible 'unused' fodder and bedding material (Macphail *et al* 2004). Clearly the following questions can be addressed:

- How was this area of Winchester was used?
- How was animal husbandry waste managed – in contrast to the London Guildhall site, was dung being managed for local manuring; was this an area of dung heaps?
- Can a combined soil micromorphological, chemical and palynological study address the exact components of the animal foddering regimes/grazing practices from the examples of raw stabling waste and possible fodder/bedding?
- Do these deposits act as useful comparisons to contempory domestic and industrial 'floor' deposits at Staple Gardens?

6.2.11 Thin section M310B and further pollen samples should be processed and analysed to attempt to fine tune the suggested hypotheses concerning the understanding of these deposits, supported by an extra soil chemistry bulk study.

6.2.12 The post-Roman silt deposits do not simply appear to just represent overbank alluviation. Their anomalous character includes a rich pollen content including cereal type, but without associated arable weed types, which does not seem consistent with upstream erosion of arable land. Instead, the assessment indicates the deposit appears to be influenced by localised activities, which as yet remain enigmatic, but certainly seem different from those found in the underlying contexts (309-310) within Trench 3. It is therefore suggested that contexts (318) and (308) should be studied in order to understand better what is occurring in this area. This can be achieved through a series of bulk (x4), pollen (x3) and thin section (x2) studies.

Saxon and Norman diet

6.2.13 Frequent mineralised samples from cesspits at Northgate House will provide plenty of dietary information with which to compare cesspit (118) at The Pilgrims' School. Other excavations in Winchester and Southampton have produced charred, waterlogged and mineralised evidence from this period, but much of this is unpublished (Green, unpublished thesis 1979; Monk, unpublished thesis 1977). An attempt will be made to draw this information together to see if luxury foods imported into the town during the Roman period continued to be available. Most of the evidence to date suggests not, but preservation biases need to be taken into account when different types of deposit are compared. The analysis of samples 5 and 6 from cesspit (118) (including mineralised remains sorted from the residues, if available) would be worthwhile.

Saxon/medieval embankment

6.2.14 The suspected period of stabilisation in context (3005) on the medieval bank can be further investigated (1 bulk; 1 soil micromorphological analysis). Lastly, 3004 appears to have similarities to contexts 309-310 found in Trench 3 (2005), which should be identifiable from further study of these possible dumped stabling waste deposits (1 pollen prep, 2 analyses; 1 soil micromorphological analysis).

The medieval diet and disposal of faecal waste

6.2.15 The medieval period has been investigated in many towns across the British Isles, particularly on waterfront sites such as Norwich (Murphy 1983), Bristol (Jones 1987) and Reading Abbey (Carruthers 1997), where waterlogged preservation has provided a wide range of information. Because evidence from The Pilgrims' School represents mixed flood and peat deposits, precise interpretation and dating of the remains may not be straightforward. However, further analysis may provide information that could be compared to the Roman silty-peat deposits, since they have a similar origin. In addition, changes in the environment might be detected if the upper and lower medieval peat layers are examined in more detail. Samples 3 and 4 would provide

information on the environment and the medieval diet. If dated, Samples 2 and 44 could also be included.

7 PUBLICATION AND PRESENTATION

7.1 Publication synopses

7.1.1 OA propose that the publication take the form of a medium sized article in Hampshire Archaeology (Hampshire Field Club) of *c.* 50-70 pages, *c.* 25,000 words in length incorporating figures plans and sections, and plates.

7.1.2 The synopsis below presents a broad outline of the proposed publication. Some elements may be subject to modification as analysis progresses.

Holocene environmental change and Roman floodplain management at The Pilgrims' School, Winchester

by Steve Teague and Carl Champness with contributions by…….

	Author	Words	Figs/tables	Plates
Totals		**27,500**	**24**	**10**
Abstract				
1. Introduction				
1.1 Site location and topography			2	
1.2 Archaeological and historical background			2	
1.3 Archaeological and geoarchaeological methodologies			1	2
	Subtot	**2,500**	**5**	**2**
2. Site Development				
2.1 Pre-Holocene deposits and basement topography			1	
2.2 Holocene sedimentation sequence			1	
2.3 Late Prehistoric			1	
2.4 Roman			4	3
2.5 Medieval			2	2
2.6 Post-medieval			1	1
	Subtot	**10,000**	**10**	**6**
3. Environmental Evidence				
3.1 Insect remans			1	1
3.2 Diatoms			5	1
3.3 Molluscs			1	
3.4 Soil Micromorphology and Palynology			2	1

3.5 Plant remains			2	
	Subtot	**10,000**	**11**	**3**
4. Finds				
4.1 Pottery			2	
4.2 Ceramic and stone building material			2	
4.3 Metalwork			1	1
4.4 Coins			1	
4.5.Worked bone objects			2	
4.6 Waterlogged timbers and wooden small finds			3	
	Subtot	**2,500**	**11**	**1**
5. Discussion				
5.1 The Pre-Roman floodplain			1	
5.2 Roman floodplain management and defences			1	
5.3 The pre-monastic environment			1	
5.4 The monastic period			1	
5.5 Later land use			1	
	Subtot	**2,500**	**5**	**0**

Acknowledgements

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9 APPENDICES

ASSESSMENT OF THE ROMAN POTTERY

Edward Biddulph (OA)

A total of 147 sherds of Roman pottery was recovered from ten contexts. Coarse reduced wares, oxidised wares, fine wares and samian wares were encountered. Reduced wares included ubiquitous grey wares and black-burnished-types wares. The latter were available as cooking jar and dish types; a near-complete BB1-type jar with perforated base from context 319 was of particular interest. Other reduced wares included products of the Alice Holt industry, which supplied the region throughout the Roman period (cf Hawkes 1985, 69), and Hampshire grog-tempered ware, whose flanged dishes were deposited after *c* AD 280 (cf Fulford 1975a, 286-91). Oxidised wares from contexts 322 and 323 were probably of local origin and reached the site as flagons, among other forms. New Forest colour-coated ware was recovered from three contexts (205, 319 and 322). No forms were identified, but sherds were thin-walled and likely to have derived from beakers. These arrived during or after the late 3rd century (Fulford 1975b). Samian was reasonably common, being recovered from six contexts, albeit as residual sherds. Wares from southern central and eastern Gaulish factories appear to have been represented and therefore span the later 1st to mid 3rd centuries AD. Forms included cup forms Drag. 27 and 33, dish form Drag. 31, platter Drag. 15/17 and decorated bowl Drag. 29.

Just three contexts dated to the Roman period. The latest pottery dated contexts 319 and 322 to AD 270 or later; a flagon rim from context 323 joined a handle from 322 and must be of identical date. The remaining pottery, though residual in medieval and post-medieval deposits, included material of 1st to late 3rd/4th -century date, and points to activity occurring in the vicinity throughout the Roman period.

Further work

Although the Roman assemblage was chronologically mixed and largely residual, it contained diagnostic forms and fabrics. Since 'quantitative data represents an essential component of basic data' (Willis 2004, 6), it is recommended that the small assemblage be sorted into fabric groups within context and quantified by weight and sherd count. Forms should be identified and the data presented formally and accompanied by a brief discussion. The near-complete BB1 jar and other vessels from context 319 should be illustrated if warranted.

Recording: 0.5 days
Reporting: 0.5 days
Illustration: 0.5 days

Bibliography

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Appendix: Roman pottery from evaluation Trench 4

John Cotter

Two Roman sherds (total 46g) come from two contexts. A Roman grey sandy ware cooking pot base from context (406) is clearly residual in its context and a single body sherd of Roman grog-tempered ware from context (405) may well be residual also.

ASSESSMENT OF THE POST-ROMAN POTTERY

John Cotter (OA)

Introduction and Methodology

The assemblage comprises a total of 273 sherds of medieval and post-medieval pottery out of a combined Roman and post-Roman total of 420 sherds weighing 8618g.

All the pottery was examined and spot-dated during the present assessment stage. For each context the total pottery sherd count and weight were recorded on an Excel spreadsheet, followed by the context spot-date which is the date-bracket during which the latest pottery types in the context are estimated to have been produced or were in general circulation. Comments on the presence of datable types were also recorded, usually with mention of vessel form (jugs, bowls etc.) and any other attributes worthy of note (eg. decoration, complete profiles etc.). Residual earlier types were also noted when this was considered worthwhile. Potentially drawable items, in particular, were also highlighted in the comments field. The Roman pottery was briefly examined by in-house Roman pottery specialists and their comments and identifications noted.

Date and Nature of the Assemblage

Medieval and post-medieval pottery appears to occur in roughly equal proportions although the post-medieval sherds are generally larger and better preserved. Apart from the Roman pottery the earliest wares present on the site are handmade Late Saxon and early medieval local wares covering the period from the 9C through to the start of the 13C. These include chalk, flint, and sand-tempered wares. Most of these are residual in medieval or later contexts. The medieval pottery (13C to early 16C) comprises local unglazed sandy cooking pot fabrics and wheel-thrown glazed jugs, some with applied strip decoration. These are predominantly south Hampshire redwares together with a late medieval pale buff or pink ware which may be a more local product. A few sherds of possible Laverstock (Wiltshire), Surrey-type and London-type glazed jugs have also been identified. In general the glazed medieval jugs are quite fragmentary. Late medieval imports include one or two salt-glazed Raeren stoneware drinking mugs from the Rhineland - a common import of the period *c*. 1475-1550. Most of the post-medieval pottery occurs in just one or two contexts, probably rubbish dumps, and includes types closely datable to *c*. 1680-1725 or to 1750. The sherds are, in several cases, large and fresh. These include local and regional glazed coarsewares including (?local) glazed red earthenwares, Verwood-type ware (Hampshire/Dorset) and Surrey/Hampshire Border whiteware. Notable pieces include a redware storage jar rim with a trace of a cross-in circle (or square?) stamp on the shoulder. This may be a product of the Graffham kilns in West Sussex. The Border whitewares include a large portion of a chafing dish - a kind of portable stove or plate-warmer. The finewares in the assemblage include tin-glazed earthenwares from Bristol and probably London, among these drug or ointment jars, dishes, chamberpots and a punchbowl. Common German stoneware imports of the period include sherds of brown 'bellarmine' bottles in Frechen stoneware and mugs and jugs in highly decorated Westerwald stoneware. A few sherds of Staffordshire-type white earthenwares (late 18-19C) and English stoneware ink and hot water bottles complete the list of post-medieval wares.

Potential of the Material

The pottery has some potential to inform us about the activities of the occupants of the site during the medieval and post-medieval periods. It also has the obvious potential to provide a chronological framework for the development of the site. The types present however are all fairly well known types typical of Winchester and this part of southern England. The relatively small quantity of pottery recovered together with its fairly poor state of preservation suggests that further more detailed analysis and publication of the assemblage would not produce very meaningful results. More detailed work on the assemblage could be deferred until after the full excavation stage by which time a more significant sample of pottery should have been amassed. Nevertheless a basic catalogue of the post-Roman fabric types (including sherd counts and weights) should be undertaken to accompany the published site report or for incorporation at a later stage with fuller pottery report. A more researched overview or summary of the post-Roman pottery should also undertaken for inclusion in the final publication report. A small number of unidentified fabrics should be checked against the Winchester fabric reference collection and if necessary extracted for addition either to the Winchester or OA fabric reference collections and described in more detail for archival purposes or inclusion in the report.

Illustration of the material is not considered necessary as most of the forms present can be paralleled in existing publications.

Recommendations for further work

Preparation & Analysis

Background research: including familiarisation with Winchester fabric codes, library research and possible consultation of Winchester fabric reference collection:	1 day
Detailed description of new fabrics and addition to reference collection:	0.5 days
Basic pottery catalogue:	1 day
Report writing	1 day
Sundry tasks To include bibliography, checking text, correspondence etc.:	0.5 days
TOTAL:	**4 days**

Appendix: Post-Roman pottery from evaluation Trench 4 and the watching brief

Three sherds of pottery, which are large and fresh (weighing 329 g), are all of post-medieval date - most probably 18th century. These comprise sherds from two storage jars in Verwood-type ware and a third storage jar in a fine local yellow-glazed post-medieval ware.

ASSESSMENT OF THE CERAMIC AND STONE BUILDING MATERIALS

J Tibbles

Introduction and methodology

Examples of brick and tile (414 fragments) were recovered from 25 contexts with a total weight of 45,995 gm. A further 10 fragments of stone weighing 316 gm within the assemblage was also provisionally examined. Assessment of the assemblage was based on a visual scan of all the retained material. Information regarding the dimensions, shape and fabric of the material was recorded and were possible, compared with existing regional brick and tile typologies.

It should be noted that the diversity of size and colour within brick and tile caused during the manufacturing process must be taken into consideration when comparing examples within collected assemblages and local typologies. The varying sizes and colours can be attributed to the variation in the clays used, shrinkage during drying, firing within the kiln or clamp and the location of the brick/tile within the kiln. The dating of ceramic building material can be highly contentious due to its re-usable nature.

Bricks and tiles alone cannot provide a firm date because of their re-usable nature but it is possible to date types of brick and roof tile by their earliest occurrence within dated contexts. The identification of new brick or tile types would supplement the existing regional typology and there is potential for comparison with CBM assemblages from elsewhere in the region. The presence or absence of hip and ridge tile suggests a variety of roof forms.

The assemblage was examined using a x15 magnification lens were applicable to aid dating, though fabric analysis was not undertaken as was considered beyond the scope of this assessment. Information regarding the dimensions, shape and fabric (were applicable) was recorded and catalogued accordingly and a Munsell colour code has been incorporated where appropriate. The presence of the original surfaces was also taken into consideration to aid identification

Of the total assemblage, 50% of the ceramic fragments were of Romano-British forms and/or fabrics. The remainder comprised of ceramic building materials of medieval to modern date.

Assemblage Analysis

Quantification of ceramic and stone building materials

	No of Fragments	Weight (gm)
Brick	55	15,225
Roof tile	132	13,365
Not identified	6	60
Romano-British material	212	14,913
Miscellaneous	9	2,432
Stone	10	316
Total	**424**	**46,311**

The medieval/post-medieval Assemblage

Bricks

Of the fifty-five fragments of brick within the assemblage (recovered from 7 contexts) only one complete example (9 ½" x 4 ½" x 2") was recorded (from dump 103). The remainder of the brick assemblage shows seven part-bricks displaying width and thickness and twenty fragments displaying thickness only (28-65mm). Twenty-three fragments displayed no diagnostic traits and twenty fragments bore evidence of mortar. All the assemblage, with one exception from context (302 -19th century) appeared to be of medieval date of manufacture.

The majority of fragments (71%) were manufactured in fabric F1 the remainder in fabrics F2, F4, F8 and F9.

Flat roof tile

One hundred and nineteen fragments of flat roof tile were identified within the assemblage of which twenty-eight fragments could be classified into three site types (1, 2 & 3). The remaining fragments although diagnostic did not have sufficient diagnostic qualities to be classified other than flat roof tile (FRT). Diagnostic qualities included the varying methods of suspension, length, width and thickness. Six fragments (3 joining) displayed a width and thickness and two displayed suspension holes. The remaining tile thicknesses ranged between 10 mm-22 mm with the majority of the tiles displaying a 15 mm-17 mm range. Ten different fabrics were recorded (F1, F2, F3, F4, F5, F6, F7, F8, F10 & F12) of which F1 dominated the assemblage (46%).

A single fragment from (102) displayed burning and twenty-nine mortar stains/adhesions. Three fragments displayed mortar over surfaces and broken edges suggesting their use as course levelling material.

Site medieval flat roof tile typology

Type 1
Dimensions: L. ?mm x W. 157 mm x Th. 12-22 mm
Suspension: Two circular punched holes 11-18 mm in diameter approximately 40 mm apart.
Manufacture: Moulding sand and moulding lips evident.
Fabrics: F1, 2, 3, 4, 6, & 10

Type 2
Dimensions: L. ?mm x W. 157 mm x Th. 12-22 mm
Suspension: Single finger-pulled nib centrally placed with nail hole to right of nib.
Manufacture: Moulding sand and moulding lips evident.
Fabrics: F2 & 8

Type 3
Dimensions: L. ?mm x W. 158 mm x Th. 12-16 mm
Suspension: Two square punched holes 12-13 mm wide and 40 mm apart.
Manufacture: Moulding sand and moulding lips evident.
Fabrics: F1, 4, & 10

Ridge tiles

Thirteen fragments of ridge tile were provisionally identified within the assemblage from 3 contexts of which none were complete. The general thickness ranged between 18 mm-25 mm with a mean thickness of 22 mm.

Four fragments from contexts (101), (150) and (318) displayed glazes with a colour range of dark olive (5Y/3/2) to a strong brown (5Y/4/4). A further fragment of possible ridge tile displaying a dark yellow brown (10YR/4/6) was recorded within context (318). Evidence of mortar was recorded on seven fragments from context (101). The fragment from context (150) was found to be heavily abraded.

Approximately 62% of the ridge tiles were of F6 fabric the remaining fragments F1, F2, F3 and F7. (See appendix I)

Floor tiles

Two fragments of floor tile were recorded from contexts 101 and 102. The fragment from 101 showed a plain yellowish brown (10YR/5/8) glaze. The fragment from 102 was 25 mm

thick with 60º bevelled edges with residual mortar. Upper surface showed white elliptical pattern sealed by a yellowish red (5YR/4/6) glaze.

Miscellaneous medieval material
From within contexts 101, 102 and 304 four fragments of Welsh roofing slate were recorded varying in thickness between 4 mm-10 mm. The fragment from 304 still retained its suspension hole 12 mm x 10 mm. One fragment displayed residual mortar stains. Although the blue-slate trade of western England and Wales was thriving in the medieval period (Jope & Dunning 1954) the material examined appears to be of a post-medieval character.
A small fragment (15g) of material from context 309 has a pottery appearance but within a ceramic building material fabric (F1) and may represent a fragment of roof finial.
A single non-diagnostic fragment of baked clay displaying a single flat surface was recorded within flood silts (308).
Single fragment of lime mortar (13g) was recovered from flood silts (307). Dark white fabric with frequent black inclusions <1mm. Reactive to diluted hydrochloric acid. Probable medieval in date.
Fragment of sandstone (?) 11mm thick displaying burning. Context (304).
Two fragments of brown/green glazed pottery. Context (322).

Non-identifiable material
Six fragments of unidentifiable ceramic building material were recorded from within context (319). Fabric was F1.

The medieval/post-medieval assemblage discussion
The diversity of brick/tile colour and size caused during manufacture must be allowed for when making comparisons with typologies. The brick assemblage shows typical evidence of hand-made and machine-made brick manufacture utilising alluvial clays. At least four fabrics (F1, F2, F4 & F10) have been provisionally identified in both medieval and Roman material. The majority of the brick assemblage was of a medieval date with two post-medieval/modern exceptions from rubble dump 103 and topsoil 300. The former displaying the residual elements of manufacturer's stamp. The example from topsoil 300 was identified as a machine-made firebrick suggesting a late 19th-20th century date.

Only one complete brick was recorded from context (103) with dimensions of 240mm x 115 mm x 50 mm (9½"x 4 ½"x 2"), its size and general characteristics suggest a date of c. 15th century and would be residual within this context. The part bricks were classified adopting a best-fit policy based on surviving dimensions, fabrics and general characteristics. The remainder of the brick assemblage shows part bricks ranging in width between 102—115 mm (4"-4 ½") and thickness of 50-65mm (2-2 ½"). Based upon the surviving diagnostic traits all appear to be of a medieval date.

Ten fragments of medieval brick were recorded within the RB rubble dump (319) and although all display thickness only and an F1 fabric similar to that of some RB material, they have been provisionally identified as medieval. (medieval roof tile was also recorded within this context)

From within contexts (103), (304) and (319) the upper surfaces of some fragments were found to display a relatively smooth appearance created from their incorporation within an internal floor or threshold. Also from (304) non-diagnostic fragment showed upper surface wear and may represent a quarry tile. Other fragments from contexts (102) and (318) were of abraded appearance.

A possible tilers tally mark (Type 2) consisting of two parallel indentations within the bricks surface was recorded within context (102). Examples of this type are known from 14th-15th century contexts in Yorkshire (Tibbles (a) forthcoming).

The majority of the medieval building material assemblage (70%) is of ceramic roofing tile. The range recorded showed two different types of roof tile: flat and ridge. The flat roof tile could be broken down into three further site types 1, 2 and 3 (See site typology). Peg tiles with one or two suspension holes had become almost universal in the south east of England by the start of the 14th century (Drury 1981). However, Lewis (1987) suggests that nibbed tiles were in use by the 12th century and pegtiles by the mid 13th century. Ridge tiles including glazed ridge tiles have been recorded from late 12th century deposits at Beverley (Tibbles (b) forthcoming) and by the early 13th century in Southampton (Dunning 1975) Fifteen fragments of medieval flat roof tile were provisionally identified and one fragment positively identified of Type 1 medieval flat roof tile, suggesting intrusion or contamination within flood silts (318). A further 15 medieval fragments were also provisionally identified from dump 319.

Provisional identification of the floor tile fragments from layers 101 and 102 would suggest a 14th-15th-century date although a more precise origin and date may be obtained by a more detailed analysis.

The Romano-British Material

An assemblage of two hundred and twelve fragments of Romano-British ceramic building material, with a combined weight of 14913g was recovered from seven contexts. Fabrics varied between soft abraded material to hard fabric and were of a colour range of Reddish Yellow (5YR/6/8) to light brown (7.5YR/6/3).
Four forms were identified, brick, roof tile, hypocaust material and tesserae. Of the assemblage, 25% was not identifiable by form, although the majority of the fragments were of Romano-British fabric.

Brick
An assemblage of thirty-five fragments of bricks, with a total weight of 8143 gm was recovered from four contexts. Two forms were provisionally identified, bessales (27 fragments) and pedales (8 fragments). Thickness ranges of >25 mm to 38 mm and 40 mm to 50 mm respectively were recorded. However, identification is heavily biased towards thickness and must be treated with caution.
Within the assemblage one fragment of bessalis/pedalis from context 310 and five fragments from dump 319 were heavily abraded, possibly water action. Also three fragments from context 310 and seven from context 319 displayed mortar adhesions.

Roof Tile
A total of sixty-eight fragments, with a combined weight of 4781 gm were recovered from five contexts. Three types were identified, tegulae, imbrices and ridge. However, the similarities between imbrix and ridge thickness on small fragments may affect identification and therefore quantities must be treat with caution.

Tegulae
Thirty-five fragments from 5 contexts were identified within the assemblage, of which seven were diagnostic. This material displayed means of suspensions in the form of finger smoothed or knife-trimmed flanges, upper and/or lower cut-aways.
Six part flanges were identified, maximum flange height 33 mm. Only one fragment bore a knife-trimmed lower cut-away which was unidentifiable by form due to breakage in antiquity.

Six fragments were found to be underfired and a further three fragments heavily abraded. A single fragment from 31) displayed a smooth worn upper surface suggesting it had been re-used as part of a floor or yard surface. Thickness ranged between 15 mm - 26 mm.

Imbrices
Twenty-one fragments of imbrices were identified from 5 contexts within the assemblage. This material had a combined weight of 1005 gm and was recovered from five contexts. The tiles had a thickness range of >12 mm to 20 mm.

Box-Flue Tiles (Tubulus)
Seventeen fragments of box-flue tiles, with a combined weight of 980 gm, were recovered from five contexts. A thickness range of 12 mm to 25 mm was recorded. Heat discoloration was noted on some internal surfaces, probably from original use. One fragment from context 310 was abraded.
Of the assemblage, ten fragments displayed diagnostic features in the form of characteristic combing/scoring, the keying element for the adhesion of plaster or mortar. Where possible the number of tines per comb recorded ranged from 4 to 6.

Unidentifiable by form
Five contexts produced an assemblage of fifty-six fragments of ceramic building material, unidentifiable by form. This material had a total weight of 2528 gm.

Although forty-two fragments were non-diagnostic, where complete dimensions allowed, a thickness range of 14 mm to 42 mm was recorded, indicating the identification of some fragments as tiles and bricks respectively. The assemblage included abraded material and underfired examples.

The Romano-British material discussion

The majority of the assemblage consisted of the range of Romano-British forms that would have been used in the various aspects of building construction, including hypocaust materials. Although possible underfired material and seconds were noted within the assemblage, overall the material appeared to represent quality materials.

Secondary use was also evident in the form of smooth original and broken surfaces. This material may have been possibly used within floors, hard standing or metalled surfaces.
The similarities in the material from the medieval wall (102), organic silts (309), (310) and the earlier Roman deposits tend to suggest dumping of the material from the same site. Alternately the Roman material may have been re-used and incorporated with medieval structures or deposits prior to final deposition.

The diverse range of forms suggests a 'high status' building(s) with at least one hypocaust in operation within the vicinity of the evaluation. The presence of decorated wall plaster and tesserae add to this premise. It is likely that the assemblage represents residual elements of this/these building(s).

Romano-British Individual Finds of Intrinsic Interest

Context 319	Roman rubble dump	10 g
	Fragment of wall plaster Red (7.5R/5/8) render/paint	
Context 319	Roman rubble dump	40 g
	Fragment of tile disc 15 mm thick. Fabric F16	

The objects/artefacts
Two limestone? tesserae were noted from the Roman rubble dump (319) and a further tesserae from the sand bar (323). Thicknesses were 22 mm and 15 mm respectively.
A further thirty-four tesserae were recorded from four contexts (309, 310, 319, 322) manufactured from tile. Remnants of white mortar were recorded on the lower 'bed' surface and edges either from original use or within floor. The tesserae had originated from within a floor; the upper surface and edges were smooth and rounded, footworn.

Recommendations
These recommendations are based upon the completion of contextual and site interpretation and dating of contexts.

- The potential of the assemblage is limited at the present level of assessment, however, after the refinement of dating and interpretation of contexts further analysis of the fabrics (provisionally by visual examination) to identify types should be undertaken to try to ascertain source. This will aid as reference for comparative purposes with ceramic building material assemblages recovered from previous and future archaeological investigations within Winchester. Refined identification of forms should also undertaken. Comparative fabric analysis with the medieval fabrics within the assemblage may also be of benefit.
- The medieval and Romano-British assemblages should be recorded fully, including illustrations of diagnostic material including flange types, and the individual finds of intrinsic interest.
- A synopsis of the complete assemblage, including individual finds of intrinsic interest, should be brought up to publication in a suitable regional journal.
- The assemblage needs to be in a suitable condition for deposition within the relevant museum accordance with museum guidelines for the deposition of archaeological material. After fabric samples have been retained, a selective discarded policy should be implemented.

Appendix: The building materials from evaluation Trench 4 and the watching brief

John Cotter

The assemblage comprises 11 pieces from four contexts weighing 2185 g. Four of these are of stone or slate and the remainder are ceramic building materials (CBM). The latest pieces in the assemblage are a couple of flat roof tile (peg tile) fragments in a late-looking fine red sandy fabric probably of 18th- or early 19th-century date. There is a single piece of probable medieval roofing tile in a coarser fabric and a fairly large fresh fragment from a crested ridge tile which is probably of 13th- or 14th-century date, but residual in its context (406). Besides this there are two other residual ceramic pieces including a very worn 15th- or 16th-century Flemish-type floor or quarry tile, and a very worn fragment of decorated medieval floor tile. The latter belongs to the 'stabbed Wessex' floor tile tradition (*c* 1280-1330) and is decorated with a fleur de lys design in inlaid white slip. Given the proximity of the cathedral the discovery of medieval floor tile fragments is hardly surprising.

The stone building materials include three small pieces of grey slate (context 405), which may well be medieval rather than later. There is also a small broken rectangular slab-like object (context 404) of fine oolitic limestone which has been adzed on one face and cut completely flat on the other face. It could be something like a paving slab - although it only exhibits wear on its edges - or perhaps a stone veneer? The date is either medieval or post-medieval.

ASSESSMENT OF THE ARCHITECTURAL STONE

by Julian Munby (OA)

Four architectural stone items were recovered. They all came from context 209, a 0.53 m thick rubble make-up/dump layer that also contained 17th-18th-century pottery and glass. All pieces are of fine limestone, with well-finished faces showing tool marks; all are likely to be medieval.

Architectural stone

Small Find Number	Context No.	Description
1	209	Rim of part-octagon with external moulding and internal curve. Probably part of font or similar stone basin. Date 14th/15th-century.
2	209	Block of ashlar with chamfered edge and rebate. Possibly window mullion or door/cupboard jamb.
3	209	Block of ashlar with chamfered edge. Door jamb or possibly corbel table.
4	209	Block of ashlar with chamfered edge. Door jamb or possibly corbel table.

The objects are not especially worth drawing or further study except for Item 1, which should be shown to a specialist, drawn and photographed.

ASSESSMENT OF THE METALWORK

Leigh Allen and Paul Booth (OA)

A total of 159 metal objects were recovered from the excavation at the site of The Pilgrims' School, Winchester. The assemblage comprises 7 copper alloy objects (including 4 coins) and 152 iron objects (including 107 nails and 39 hobnails). The metal work assemblage is in reasonable condition although many of the iron objects are covered with corrosion products. Material recovered from waterlogged contexts (319) and (322) is much better preserved and easily identifiable. The assemblage has not been x-rayed at this stage, but it is recommended that this be carried out before the full report stage in order to check the preliminary identifications made in this assessment report and for archive purposes. The majority of the assemblage comprises nails recovered from rubble dumps and make up layers of both Roman and post-Roman date. Other identifiable objects include 4 Roman coins, a horseshoe arm and two structural iron objects; a hasp and a wall hook.

Metal objects

Context	SF No	Object	Material	Pottery spot date	Description
100	-	Nail	Iron	1680-1725	
103	-	Nail	Iron	1775-1875/19	
103	-	Horseshoe	Iron	1775-1875/19	Curved fragment from the arm of a horseshoe
103	-	Wall hook	Iron	1775-1875/19	
120	-	Nails (x2)	Iron	11-12C	
205	-	Bolt	Iron	19-20C	Large bolt with a hexagonal head and a thick circular section shank
206	-	Nails (x2)	Iron	-	
207	-	Nail	Iron	1680-1725	
208	-	Nails (x3)	Iron	1675-1725	
209	-	Nails (x3)	Iron	1675-1750	
301	-	Fitting	Iron	1680-1725/50	
304	-	Nails (x2)	Iron	1690-1730	
306	-	Nail (x4)	Iron	16-17C	
306	-	Hasp	Iron	16-17C	An incomplete figure of eight-shaped hasp
307	-	Nails (x6)	Iron	13-14C	
308	-	Nails (x4)	Iron	14-15C	
318	-	Nails (x3)	Iron	-	
318	-	Object	Iron	-	Very corroded object requires x-ray for identification
319	-	Nail (x7)	Iron	RB	
319	-	Hobnails (x21)	Iron	RB	15 small dome-headed hobnails with rectangular section shanks
319	-	Nail shanks (x17)	Iron	RB	

Context	SF No	Object	Material	Pottery spot date	Description
319	-	Nail (x5)	Iron	RB	
319	-	Hobnail	Iron	RB	Dome-headed hobnail
319	-	Sheet	Copper alloy	RB	An irregularly shaped fragment of sheet
319	-	Strip	Copper alloy	RB	A thin strip of copper alloy (looks like an off-cut)
319	19	Nail	Iron	RB	
319	16	Nail	Iron	RB	
319	9	Nail	Iron	RB	
319	-	Nails (x17)	Iron	RB	
319	10	Coin	Copper alloy	RB	
319	12	Coin	Copper alloy	RB	
319	15	Coin	Copper alloy	RB	
319	20	Coin	Copper alloy	RB	
322	-	Nail (x3)	Iron	RB	
322	-	Nail shanks (x10)	Iron	RB	
322	-	Hobnails (x17)	Iron	RB	17 small dome-headed hobnails with rectangular section shanks
322	-	Nails (x13)	Iron	RB	
322	-	Misc	Copper alloy	RB	A solid amorphous lump of melted copper

Copper alloy objects

Four coins were recovered in the evaluation, all from context 319. All are of late 3rd century-date and in moderate to good condition.

SF 10. IMP C TETRICUS P F AUG. Rev, PA[X AUG, Pax left. Irregular. AD 270-273 or later.

SF 12.] TETRICUS [. Rev, standing figure. Irregular. AD 270-273 or later.

SF 15. IMP C CARAUSIUS AUG. Rev, MO]NET AUG, Moneta left. AD 286-293.

SF 20.] C CLAUDIUS [. Rev, ?MARTI [, Mars left. AD 268-270.

The issues of Claudius II and Carausius appear to be regular, though on the latter coin the dies are quite imperfectly located on the large flan. The two certainly irregular coins could date as late as *c* AD 295.

The remaining 3 copper alloy objects all recovered from Roman contexts comprise a miscellaneous fragment of sheet, a thin strip that could have been cut/trimmed from a larger sheet and an amorphous lump of melted copper, possibly waste from copper working.

Iron objects

A total of 106 nails were recovered from the excavation; 75 of these were from Roman waterlogged contexts 319 and 322. Complete examples conform to Manning Type 1B, with a square-sectioned tapering shank and a circular head (Manning 1985, 132-137, fig 32, No.1b) and is the most common form of Roman nail. A total of 39 hobnails were also recovered from Roman contexts; they have domed heads and square sectioned tapering shanks they range in length from 10-12 mm. The post Roman objects comprise 32 nails, less well preserved than the Roman examples but many with rectangular/square slightly domed head, and in general more robust than the earlier type. The wall hook from context 103 has a rectangular section tang for inserting into timber or masonry and a hook that separates from the shank before the end, a type that does not occur before the 13th century (Goodall 1990, 328). The horseshoe arm from the same context has a slender web, plain outline, but no holes are visible through the corrosion. A fragment from a figure-of-eight shaped hasp was recovered from context 306.

Statement of potential

The majority of the metalwork recovered from the excavations comprises structural iron objects of Roman and post-Roman date from rubble dumps and make up layers. The evidence indicates that the material originated from buildings but not necessarily from the site. The assemblage should be x-rayed for archive purposes to check identifications but no further work is recommended.

ASSESSMENT OF THE SLAG

Lynne Keys

Slag quantification

context	slag	wt. (g)	len. (mm)	br. (mm)	dep. (mm)	comment
116	smithing hearth bottom	392	110	70	40	
205	glass-making slag?	6				
305	run slag	26				magnetic
305	undiagnostic	214				
318	smithing hearth bottom	204	104	70	50	
318	undiagnostic	90				
319	undiagnostic	230				
207	run slag	30				
207	undiagnostic	70				

The only diagnostic slag were the two smithing hearth bottoms. The run slag could be produced by either smithing or smelting. The undiagnostic iron slag also could not be assigned to smelting or smithing. The slag described as possibly from glass-making was a deep black glass-like run of a type frequently encountered in glass-making (rather than glass-working) assemblages; it could however have been produced by some activity using silica, very high temperatures, and possibly a fuel like coal.

ASSESSMENT OF THE CLAY TOBACCO PIPES

John Cotter (OA)

The excavation produced a total of 98 fragments of clay pipe weighing 459g. These have been spot-dated and a given a basic catalogue. The catalogue records, per context, the quantity of stem, bowl and mouth fragments, the overall sherd count, weight, and comments on condition and any makers' marks or decoration present. The collection is not particularly large or impressive but it does include a small number of interesting stamped pipes.

The largest number of fragments came from context 207 (63 fragments), which produced the widest range of datable pipes including all three stamped examples. Pipe bowls from this context range in date from *c*. 1600-40 to *c*. 1690-1730. Context 207 has a concentration of 4 pipe bowls of the late 17th to early 18th centuries. There are no pipe bowls from the site which are later than this and all the stem fragments from the site have wide bores suggestive of 17th to early 18th century dates.

The three stamped pipes from context 207 are all 17th century types, which must be residual to varying degrees in this context. Nevertheless the stamps or makers' marks are of considerable interest and should be published. One of the stamps has general parallels in Oswald 1975 (see below), the other two are unidentified. The stamps occur on the broad oval heels of the pipes and are briefly described as follows:

1. Bowl type *c*. 1600-1640. Mailed gauntlet stamps parallel to stem. This is paralleled by a slightly different stamp on a pipe from Salisbury dated *c*. 1650-60 (Oswald 1975, fig. 8.3) and also (with initials) on a pipe from Worcestershire (*ibid*., pl.III.7). Gauntlet stamps are found in London, Wiltshire and Somerset (*ibid*., 63) and another example has recently been identified from Oxford (OXCLA 05 (6)).

2. Bowl type *c*. 1660-80. Heart-shaped stamp enclosing initials TR with a pellet above each initial.

3. Bowl type *c*. 1660. Heart-shaped stamp with uncertain figurative/heraldic details. Divided by a horizontal line with two opposing spirals above line (one in each lobe). Details below line unclear - possibly a bird, or a plant.

One other pipe bowl of *c*. 1690-1730 from context 304 has traces of Dutch-style milled decoration on the stem. Apart from these examples all the remaining pipe bowls and stems are plain.

Bibliography

Oswald, A, 1975 *Clay Pipes for the Archaeologist*, BAR **14**

Recommendations

Apart from the stamped pipes it is probably not worth reporting on this assemblage in any detail. A summary report should be sufficient. The three stamped pipes, however, are worthy of publication in their own right. These should be illustrated and a brief search of more up-to-date publications made in order to identify the makers, if possible, or to find published parallels. It is recommended that this work should be carried out by Dr. David Higgins, a leading authority on clay pipes in Britain.

Illustration:	1 day
Background research:	0.5 days
Report writing:	0.5 days
TOTAL:	**2 days**

ASSESSMENT OF THE GLASS

Dr Hugh Willmott

Introduction

A small assemblage of glass from The Pilgrims' School, consisting of 66 fragments from a number of vessels or windows, was submitted for assessment (summarised below). All is post-medieval in date and relatively stable, requiring no further specialist conservation or treatment.

The assemblage

With the exception of three, possibly intrusive, fragments from contexts 205 and 206, the assemblage dates entirely to the late 17th or early 18th centuries. These later fragments are from two press-moulded bottles and a single window. The earlier glass consists almost entirely of early wine bottles, and although these have not been accurately quantified, there are reasonable numbers of early onion and mallet types present. The remaining glass comes either from windows and there is a single fragment of early mirror or plate glass from context 306.

Table 1: Summary of the glass

Context	No Frags	Description	Date
105	1	Wine bottle	Late 17th-early 18th century
109	1	Wine bottle	Late 17th-early 18th century
205	1	Press-moulded bottle	Late 19th-early 20th century
206	4 1 1	Wine bottle Press-moulded bottle Window	Late 17th-early 18th century Late 19th-early 20th century Late 19th-early 20th century
207	41	Wine bottles	Late 17th-early 18th century
208	10	Wine bottles	Late 17th-early 18th century
209	1	Wine bottle	Late 17th-early 18th century
301	2	Wine bottles	Late 17th-early 18th century
306	1	Window	Late 17th-early 18th century
306	1	Mirror/plate glass	Late 17th-early 18th century
319	1	Wine bottle	Late 17th-early 18th century

Recommendations and resource requirements

Although the assemblage is small, it is potentially interesting, especially as it dates mainly to a single period. Furthermore it contains a good sequence of early wine bottle forms that merit further study and quantification. Therefore it is recommended that the glass is written up to full publication level and a couple of illustrations of the most diagnostic bottles made.

Appendix: Glass from evaluation Trench 4

John Cotter

A single piece of green bottle glass weighing 342 g was recovered from context 404. This is from the thick prunted base of small onion-type wine bottle of 17th- to early 18th-century date.

ASSESSMENT OF THE WATERLOGGED TIMBERS AND WOODEN SMALL FINDS

Steven J Allen

Introduction

Thirty pieces of waterlogged wood were delivered to the Wet Wood Laboratory on 20th September 2005 for assessment. The assemblage includes some very interesting pieces of timber and two 'small finds'.

Aims and Objectives

This report aims to meet the requirements of MAP2, Phase 3, Assessment of Potential for Analysis, (English Heritage, 1991). The work carried out has been the cleaning and examination of the objects submitted and an assessment of their condition. An evaluation of the potential for further investigation is included, with recommendations and costs for long term stabilisation.

Condition

Each piece of wood has been preserved through burial in a waterlogged anoxic environment and it appears that these conditions were maintained in all contexts in which the material survived up to the time of excavation. Minimal recent surface damage was present suggesting what damage is present was the result of actions before or during burial. Several of the larger boards had fragmented as in their current condition they are unable to support their own weight. Some timbers had suffered slightly from being at the very margin of the local water table where those parts at or above the water table had been eroded and rotted. None the less, overall the wood was exceptionally well preserved with many pieces retaining crisp tool signature marks.

Listing

All species identifications follow Schweingruber (1982)

Wooden structural timbers

ID	Comment (dimensions in mm)	Species identification
122 (I)	Radially faced board. Edges hewn to create slightly concave plan. Remains of one through hole in face at each corner. Some minor surface damage. 317 l, 125 w, 10 th.	*Quercus spp.*
122 (ii)	Radially faced board. One complete and one partial though hole at the two surviving original corners. Badly fragmented and incomplete -in eight refitting fragments. 220 l, 121 w, 10 th.	*Quercus spp.*
122 (iii)	Section of boxed heart stake point. Four hewn facets with good axe signatures cut to create sub rectangular cross section tip. End of tip missing. Some longitudinal shrinkage cracks. 281 l, 72 w, 54 th.	*Alnus viridis DC*
122 (iv)	Offcut from radially faced heartwood. Abraded surfaces. 348 l, 51 w, 26 th.	*Quercus spp.*
122 (v)	Offcut from radially faced heartwood. Abraded surfaces. 298 l, 47 w, 35 th.	*Quercus spp.*
122 (vi)	Offcut from radially faced heartwood. Abraded surfaces. 218 l, 54 w, 25 th.	*Quercus spp.*

ID	Comment (dimensions in mm)	Species identification
122 (vii)	Offcut from radially faced heartwood. Abraded surfaces. 154 l, 33 w, 30 th.	*Quercus spp.*
124	Radially faced board. Both edges hewn to create point at one end. Other end eroded. Faces hewn with good axe signature (>120mm w) preservation. Sapwood present on one edge. One detached and refitting fragment near knot on other edge. 877 l, 299 w, 14 th.	*Quercus spp.*
125	Tangentially faced board. One end and both faces hewn, with good axe signature preservation. Other end eroded. Badly fragmented and incomplete –In eight refitting fragments. 832 l, 407 w, 12 th.	*Quercus spp.*
126	Radially faced board. One end hewn roughly square, other end eroded. Axe hewing marks on face. Single through nail hole towards one edge. In three refitting sections. 837 l, 258 w, 16 th. Hole 08 dia.	*Quercus spp.*
130	Radially faced board. One end hewn roughly square, other end eroded. Good axe signature (*c* 140w) preservation. Badly fragmented and incomplete -in five refitting sections. 686 l, 224 w, 14 th.	*Quercus spp.*
131	Radially faced board. One end bevelled with good axe signature preservation. Other end broken. Single through hole in face towards bevelled end. 306 l, 109 w, 14 th.	*Quercus spp.*
132	Radially faced board. Faces hewn with good axe signature (>180 w) preservation. One end hewn roughly square, other end eroded. Sapwood on one edge. In two refitting sections. 826 l, 276 w, 20 th.	*Quercus spp.*
133	Radially faced board. Both edges hewn to create tip at one end. Other end slightly eroded. Hewing marks on faces with good axe signature (>115 w) preservation. Badly fragmented –in eight refitting fragments. 947 l, 295 w, 15 th.	*Quercus spp.*
134	Radially faced board. One end hewn roughly square, other end eroded. Hewing marks on faces with good axe signature preservation. Sapwood on one edge. Sapwood on one edge. Very fragmented and incomplete –in six refitting fragments. 734 l, 274 w, 15 th.	*Quercus spp.*
135	Radially faced board. Both edges hewn to create point at one end. Faces hewn with good axe signature (c. 238 w) preservation. Other end eroded. Sapwood on one edge. Partially fragmented -in five refitting sections. 809 l, 299 w, 16 th.	*Quercus spp.*
146	Radially faced stave. Both edges hewn to create sub rectangular cross section tip. Sapwood on one edge. Surfaces abraded, slight excavation damage to surface. Tip in two refitting sections, some parts missing. 647 l, 106 w, 25 th.	*Quercus spp.*

ID	Comment (dimensions in mm)	Species identification
150 (I)	Radially faced stake point cut entirely from sapwood. One edge and both faces hewn to create sub rectangular cross section tip. Abraded surfaces, some ancient woodworm damage. In three refitting sections. 168 l, 31 w, 25 th.	*Quercus spp.*
150 (ii)	Offcut from radially faced board. Abraded surfaces, no working marks. 44 l, 61 w, 19 th.	*Quercus spp.*
150 (iii)	Offcut from radially faced timber. Sub rectangular cross section, no working marks. 163 l, 82 w, 40 th.	*Quercus spp.*
311	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. In three refitting sections, end of tip missing. 264 l, 24 dia.	*Corylus avellana L.* 5 annual rings, Summer cut.
312	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. In two refitting sections. 292 l, 26 dia.	*Corylus avellana L.* 5 annual rings, Spring cut.
313	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. In three refitting sections. 227 l, 21 dia.	*Corylus avellana L.* 8 annual rings, Winter cut.
314	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. 184 l, 25 dia.	*Corylus avellana L.* 7 annual rings, Winter cut.
315	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. 321 l, 23 dia.	*Corylus avellana L.* 8 annual rings, Winter cut.
316	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. 139 l, 16 dia.	*Corylus avellana L.* 5 annual rings, Winter cut.
317	Roundwood stake point, bark present. Single hewn facet cut to create chisel tip. In three refitting sections. 362 l, 20 dia.	*Corylus avellana L.* 5 annual rings, early Spring cut.
320	Boxed heart post section. Faint hewing marks on faces and edges. Some damage to lower end. Upper end eroded with very sharp division between eroded and uneroded wood. Abraded surfaces. 637 l, 120 w, 85 th.	*Quercus spp.*
321	Boxed heart post section. Both faces and both edges hewn to create taper towards lower end which terminates in a blunt sub rectangular cross section tip. Sapwood present on one face. Abraded surfaces. 551 l, 140 w, 95 th.	*Quercus spp.*
326	Roundwood stake point, bark present. Five hewn facets cut to create sub hexagonal cross section tip with axe signatures present. Tip detached but refitting. 224 l, 38 dia.	*Corylus avellana L.* 11 annual rings, Spring cut

Wooden small finds

ID	Comment	Species identification
319, SF 23	Radially faced staff terminal. One end broken and missing, other end shaped o a regular cone with prominent shoulder. Much surface damage. 97 l, 29 dia.	*Acer campestre L.*
319, SF 24	Box quartered peg. Sub rectangular cross section with even taper on all four faces/edges towards tip. Tip finished with single hewn facet cut at steep angle. 86 l, 15 w, 12 th.	*Quercus spp.*

Acer campestre L. Field Maple
Alnus viridis DC.- Green Alder.
Corylus avellana L. Hazel
Quercus spp.- Oak. Sub species not determinable

Discussion
What at a first reading appeared to be a fairly unremarkable assemblage of timbers has proved to be of very great interest once cleaned and examined. The preservation of the worked surfaces of the medieval planks, such as those on timbers (133) and (135), is exceptional. The crispness of the tool signatures and the lack of any woodworm damage to the sapwood edges indicates that these timbers were placed in their burial context immediately after being worked and have not subsequently been moved until the date of the excavation. With good tool signature preservation it ought to be possible to compare signatures on different boards and work out whether they were cut with the same tool, or whether several tools were used in their fabrication.

These same boards also have good dendrochronological potential. They are wide, radially faced, with sapwood on one edge and consequently ought to be able to provide an estimated felling date for the tree(s) they were cut from. The condition of the boards indicates they were placed in the ground very shortly after felling and have not been reused. Thus the date of the boards should approximate the date of the feature of which they formed a part. One further possibility is that, given the straightness of their grain and their width, these boards may not be English in origin.

The condition of the wood provides an indication of the long-term height of the local water table, which may be of interest for studies of the local topography and drainage patterns. Finally the two small finds are worth retaining especially if, as appears from the notes supplied, they are from a Roman context. The shaft terminal is an example of the wood surviving without the metal to which it was joined. Usually the metal component is recovered and the wood survives only as mineral preserved organic. The peg may well be another example of a type used in roofing, to fasten slates or tiles in place, rather than deriving from a joint.

Recommendations and Further Work:

- Most of the assemblage may now be discarded unless required for further work or analysis. However the 10 boards (124-146) should be sampled for dendrochronological studies and the two small finds, as portable artefacts, ought to be drawn and conserved.

- It is recommended that before any sampling is carried out a record of the tool signatures be made. This would involve the production of silicone rubber moulds of the relevant surfaces of the boards, which may then be used for comparative studies.

- A scale drawing of each board should also be prepared as part of the archive and for any future publication.

- Normally, such boards would not be recommended for conservation. However this may be reconsidered given the quality of their preservation. A decision to conserve any or all of the boards need not preclude their sampling for dendrochronology as, provided the dendro samples are returned and placed through the same conservation regime as the parent timbers, it is quite possible to rejoin the components once stabilisation has been completed.

ASSESSMENT OF THE LEATHER

Quita Mould

Methodology

The leather was wet and washed when examined and recorded. It is currently packed in double self-sealing polythene bags in an air-tight plastic storer OA 1026. A basic record of the leather for archive is provided in appendix 1 and a summary is provided below.
Leather species were identified by hair follicle pattern using low powered magnification. Where the grain surface of the leather was heavily worn identification was not always possible. Shoe soles and repair pieces are presumed to be of cattle hide unless stated otherwise. The distinction between immature (calfskin) and mature cattle hides is not always easy to determine and the term bovine leather has been used when in doubt.

Summary

Leather was recovered from three contexts (309, 319, 322) in Trench 3. At least two shoe of nailed construction and a shoe of one-piece construction along with a very small amount of waste leather were recovered from Roman deposits (319, 322). Shoe parts of medieval date were found in a deposit of organic silts (309) tentatively dated to the 14th-early 16th century.

Roman c. AD 270+

A piece of secondary waste cattle hide (SF21) and part of the bottom unit of a shoe of nailed construction (SF22) were found in organic silts (322) along with coarse pottery and Samian datable to AD150-200. The nailed shoe (SF22), of adult size, had nailing of van Driel-Murray type 3A (2001, fig. 21) and type 2 constructional thonging. Highly fragmentary remains of a shoe of one-piece construction (SF11 part, SF 00 part), the bottom unit of a shoe of nailed construction (SF 13) and primary waste leather were found in a layer of flint and chalk rubble (319) lying directly above organic silts (322). The primary waste included three hide edges of bovine leather.

Medieval

A fragment of seam from a turnshoe sole, a large clump repair piece and a length of rand were found in the upper layer of peat along with a fragment of baluster jug. These shoe parts are of medieval date supporting the ceramic evidence.

Further work

A basic record of the leather is provided in the appendix below. No further work is required.

Basic record of leather recovered

Context (309) Medieval turnshoe parts
SF 7
large clump repair piece, worn away down the right side, with tunnel stitching on flesh side along the surviving left edge. Adult size. Length 120, width 79 mm.
Curving piece with edge/flesh seam, stitch length 6mm, broken from the seat of a turnshoe sole. Length 68, width 17 mm
SF 8
length of rand with edge/flesh seam, stitch length 6-7 mm. Length 140, width 8 mm

Context (319) Roman shoe parts and waste leather
SF 11
Compacted fragment with all edges torn, no grain pattern visible 68x55x1 mm

Delaminated and compacted fragment with a grain/flesh seam, stitch length 5 mm along one edge, other edges torn
Folded fragment with a cut sides, torn into two pieces 62x15(folded)x1 mm bovine leather
SF 13
Lower tread and waist area from a bottom unit of shoe of nailed construction comprising an insole and middle lamina joined with constructional thonging type 2. Fragment of constructional thong is present 5mm wide. Holes from widely-spaced nailing present, no hobnails present. Length 95 mm, width 63 mm. Insole worn calfskin. Also small fragments broken from the bottom unit components
In separate bag
Fragment with grain/flesh seam and small area of second seam at right angles. The fragment is curved and likely to be the seat area of a one-piece shoe. The grain/flesh shoe is similar to that in SF11. Height 58 mm, width 46 mm. Leather delaminated 1 mm thick.
Fragment of compacted leather with an awl made hole present. 54x47x1.5 mm
Hide edge cattle hide 72x60x4.5 mm
Hide edge bovine 87x40x1 mm
Hide edge bovine 141x35x2 mm
Six fragments with cut and torn edges
Nine fragments with all edges torn including one with a folded edge as seen in SF11

Context (322) Roman shoe parts and waste leather
SF 21
elliptical piece of secondary waste with all edges cut 136x27x5 mm cattle hide
SF 22
Waist and lower tread area of bottom unit of shoe of nailed construction comprising an insole and middle joined by constructional thonging. A fragment of thong is present 5 mm wide. No hobnails present but holes from a single line on one side and a double row along the other with infilling at the waist, van Driel-Murray type 3A. Impression from upper lasting margin overlaps the sides of the middle layer. Insole cattle hide 3.5 mm thick. Length 102 mm, width 76 mm

ASSESSMENT OF THE WORKED BONE

Rose Grant (OA)

Two worked bone objects were recovered from excavations at The Pilgrims' School.

Worked bone

Context No	SF No	Length (mm)	Description	Parallel
310		164	Cattle Metacarpal. At one end there is a highly polished cutaway. The other end has a similar cutaway. At this end the knuckles has been broken off through wear. The object is possibly a handle of some type.	
319	17	30	Bone pin. Point end of pin missing. The pin has a conical head with 3 transverse groves below. The shaft is cylindrical.	Crummy, 1983,p21 fig 18 no159.

Further work

Catalogue entries for publication
Preparation of drawing briefs.

ASSESSMENT OF THE ANIMAL BONES

Lena Strid (OA)

Quantity of material and recording methodology

The animal bone assemblage consisted of 1605 fragments. The assessment consisted of an overview of the material on a context by context basis recorded in a *Microsoft Access* database. Context wide data such as number of fragments and overall weight of bone fragments, bone condition, fragment size, species present were described. More specific information such as butchering marks and pathologies were recorded as present or absent. The number of bones and mandibles that were possible to age, sex and/or measure were recorded. A record of the assemblage can be found with the site archive.

Recovery

The animal bone was recovered through hand collection during excavation and from wet sieved bulk samples (processed using 500 μm residue mesh and 250 μm flot mesh). 51% of the assessed bones derive from hand-retrieved contexts, and 49% from sieved contexts. Most of the bones from the sieved contexts were rather small (5.4% of the total weight) and mainly unidentifiable to species. They were, however, a good source for fish bones.

Table 1: Number of hand retrieved and sieved animal bones

	Hand retrieved bones	**Sieved bones**	**Total**
Roman	393	420	813
Medieval	235	365	600
Post-medieval	187		187
Modern	5		5
Identifiable to species	318	86	404
Total fragment count	**820**	**785**	**1605**
Total weight (g)	*17518*	*1004*	*18522*

Methodology

The bones were identified to species using a comparative reference collection, as well as osteological books and articles. Sheep and goat were not identified to species at this stage, but rather classified as 'sheep/goat'. Ribs and vertebrae, with the exception for atlas and axis, were classified by size: 'large mammal' representing cattle, horse and deer, 'medium mammal' representing sheep/goat, pig and large dog, and 'small mammal' representing small dog, cat and hare.

The condition of the bone was graded using criteria stipulated by Lyman (1996); grade 0 being very well preserved bone and grade 5 indicating that the bone had suffered such structural and attritional damage as to make it unrecognisable.

For ageing, mandibles with two or more recordable teeth (Grant 1982), cattle horncores (Armitage (1982) and fused and unfused epiphyses (Habermehl 1975) were noted. Sex estimation was carried out on cattle metapodials and pelves, sheep pelves, and pig canine teeth, using data from Boessneck et al (1964), McCormick and Murphy (1997), Prummel and Frisch (1986), Schmid (1972) and Vretemark (1997). Measurable bones were noted according to von den Driesch (1976).

Preservation

The preservation level for the assemblage was quite good in most phases.

Table 2: Preservation level of animal bone assemblage.

	N	0	1	2	3	4	5
Roman	4			100.0%			
Medieval	11			66.7%	33.3%		
Post-medieval	7			85.7%	14.3%		
Modern	2				100.0%		

Species
The assessed assemblage consisted of 820 fragments, of which 318 (38.8%) could be determined to species (see Table 3). The species present included cattle, sheep/goat, pig, horse, deer, roe deer, dog, cat, hare, fowl, goose, duck, partridge and human. Some indeterminable bird and fish bones were also found.
The four phases are dominated by the cattle, sheep/goat and pig. The small number of horse, dog, cat and wild mammals are to be considered normal. Of the birds, fowl dominate the assemblage, followed by goose and duck. The presence of a few human bones is not unusual.

Table 3: Identified animal bone species for all phases
x = present

Species	**Roman**	**Medieval**	**Post-medieval**	**Modern**
Cattle	x	x	x	
Sheep/goat	x	x	x	x
Pig	x	x	x	
Horse	x			
Deer		x		
Roe deer	x		x	
Dog	x	x		
Cat	x			
Hare		x		
Rodents	x	x		
Fowl	x	x	x	
Goose		x	x	
Duck		x	x	
Indet. bird	x	x	x	
Fish	x	x		
Amphibians		x		
Human		x	x	
Medium mammal	x	x	x	
Large mammal	x	x	x	
Identifiable to species	150	106	60	2
Total fragment count	**813**	**600**	**187**	**5**
Total weight (g)	*11360*	*4206*	*2902*	*54*

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Ageing, sexing and measuring data
Several bones provided useful information on ageing, sexing and biometrical data. These figures would not only give information on the age and sex profile of the herds, but also add to the subsequent discussion on animal husbandry strategies, trade, breeding, nutrition etc from the Roman period and onwards.

Table 4: Mandibles and bones providing data for ageing, sexing and measuring data

	Roman	**Medieval**	**Post-medieval**	**Modern**
Ageable mandibles	3	2		
Ageable bones	52	54	38	2
Sexable bones		6	3	
Measureable bones	46	55	24	2

Butchering marks
Bones with butchering marks were found in two Roman, five medieval and four post-medieval contexts. The long continuity of the site would make it possible to study any changes in butchering practices. Such changes have been suggested for Roman Portchester versus Saxon Hamvic (Bourdillon and Coy 1980:97) as well as between early medieval and high medieval Lincoln (O'Connor 1982:16).

Pathology
Pathological conditions were present in three medieval contexts. Despite the small frequency, an analysis of pathological conditions present in the assemblage will add to the general discussion on animal husbandry and utilisation of animals.

Potential And recommendations
Although the assemblage as a whole is not particularly large it is recommended that further work be done on the bone. While the main focus of the work will need to be aimed at the Roman period, from which the majority of the bone was recovered, I recommend that the stratified contexts in the Roman, medieval and post-medieval phases are fully analysed. Further quantification and identification of the animal bone, such as the identified number of fragment per species (NISP) and minimum number of individuals (MNI) should be carried out which will help determine the importance of individual species at the site. Bird bones should be identified to species/family where possible. Fish and human bones would be transferred to specialists in the respective fields. Further analysis of tooth eruption and tooth wear stages, horncore structure and epiphysial fusion data will determine age at death patterns, and alongside sexing data and the incidences of butchery marks and pathologies may determine animal husbandry regimes as well as the utilisation of various species.
All this information would be part of a larger animal husbandry discussion regarding the town of Winchester and its surroundings from the Roman period up to the post-medieval one. This would include inter-site comparisons with sites such as Fishbourne (Cunliffe 1996), Southampton (Bourdillon and Coy 1980) and Eynsham Abbey (Ayres et al 2003), as well as with other sites within Winchester.

While the modern contexts contain no useful data for the archaeological context, I recommend that they are sorted through in order to discover any human or worked bones.

Time estimation

Task	**Time (days)**
Bone identification	3.5
Identification of bird bones (including travel to reference collections at museums)	0.5
Identification of sieved bones	0.5
Analysis of data	2
Library research time	1
Writing report	3
Final editing	1
TOTAL	**11.5**

ASSESSMENT OF THE OYSTER SHELL

Rose Grant (OA)

A total of 67 fragments of oyster shell were recovered for the site. The table below gives the quantification for each context.

Summary of the shell

Context Number	Fragment Count	Weight (g)
116	1	1
150	2	70
205	1	13
206	15	142
207	34	425
208	5	52
209	3	44
319	1	2
322	5	128

ASSESSMENT OF THE PLANT REMAINS

Wendy Carruthers

Introduction

A second batch of samples was assessed in October 2006. These samples came from two of the sixteen boreholes sunk in a Transect across the site in June 2006, in order to locate the former channel of the River Itching (OA assessment notes, Carl Champness, *pers. comm*.). Eight contexts were identified, as described below. The results from this second assessment have been added to the original assessment report, written in October 2005.

Methods

Environmental samples were taken by OA staff from a number of features dating from the Roman to medieval periods. The range of deposits sampled included flood silts, peat deposits, a Roman rubble dump, Roman ramparts and a Saxon-Norman cess pit (118). The samples were processed by OA staff using standard methods of floatation and wet-sieving (using a wash-over technique). In some cases, where it was uncertain whether deposits were waterlogged or not, soil samples were both floated and wet sieved. Where they were available, both dry flots and waterlogged wash-overs were assessed for this report. This has proved to be useful in some cases, as discussed below.

The borehole samples were wet-sieved at OA and the flots were sent to the author for assessment.

Results

Seventeen samples were submitted for assessment from Trenches 1 and 3, as listed in Table 1. Eight additional samples were recovered from the boreholes, and the results were added to Table 1.

The results of the assessment are presented in the table, together with indications of the potential for further analysis. The codes used in the 'potential' column should be interpreted as follows;

Potential for further analysis key:

A = plant remains are sufficiently frequent, well-preserved or of an interesting character to be worthy of analysis in their own right.
B = reasonable quantity or quality of material, particularly if examined alongside other samples from the period. Worthy of full analysis.
C = some remains present but possibly poorly preserved or few in number. These samples are of little value on their own but they could be selected for analysis if they form part of a group or if the context is of particular importance. C category samples are usually omitted from the analysis unless the Project Manager or other specialists advise otherwise.
D = no remains, or the few remains present have already been identified and counted.

C and D assessment data may be included in the full report, if it proves to be useful, but no further analysis is usually required on these samples.

Discussion

State of preservation – The state of preservation of the wet (wash-over) flots was variable, ranging from poor (e.g. sample 39, context 323) to good (eg. sample 8, context 322). Poorly preserved samples that have remained partially waterlogged often produce predominantly woody, thick walled fruits and seeds, such as elderberry seeds, bramble seeds and sloe stones. The flots often contain frequent charcoal and decaying wood fibres. Plant macrofossil

evidence from these types of contexts will be biased towards woody-seeded taxa, so it is not a reliable source of environmental information. However, the presence and decay of organic remains in these deposits can be beneficial in firstly protecting charred plant remains from crushing and weathering, and then concentrating it into a more manageable soil sample size. Only a few charred plant remains were recovered from The Pilgrims' School samples, but the concentrating effect of carrying out flotation on a deposit that had probably been partially waterlogged, e.g. the Roman Rampart layer 150 (sample 53), may prove to be useful for some of the waterlogged assemblages (see discussion below), providing that the effects of differential preservation are borne in mind.

The borehole samples were poorly preserved and there was some evidence to suggest that organic material had been subjected to differential preservation through drying out of the deposits. The peaty samples showed signs of oxidation, and very few, mainly woody organic remains were present. The fluvial silts were also fairly unproductive, with woody taxa such as alder (seeds and catkins) often being the only remains to survive. Small fragments of charcoal were present in some of the samples but no identifiable charred plant remains were found.

I . PHASE 1 EVALUATION, 2005

Trench 1

Two sondages were excavated down to the peat (151) in this Trench. One sample in the northern sondage was assessed for this report :

Sample 53, context150. - This homogeneous, moderately compact grey-brown clay silt was thought to have possibly formed the Roman rampart (OA Evaluation report). Wooden stakes driven into the peat were recovered, demonstrating that organic survival was reasonable at least in the lower levels.

Both wet and dry flots were assessed by the author. They contained frequent molluscs, some charcoal and bone, peaty fragments and large fragments of wood. A narrow range of plant taxa was observed in the 3 boxes of waterlogged flot, but the drying out of the floated sample concentrated the seeds into a more easily scanned assemblage of damp and nutrient-rich wasteground taxa. Henbane (*Hyoscyamus niger*) seeds were particularly frequent. This is an indicator of nitrogen-rich habitats such as farmyards and middens. Other taxa of nutrient-rich soils included stinging nettle (*Urtica dioica*) and elderberry (*Sambucus nigra*). Sedges (*Carex* sp(p).) and hemlock (*Conium maculatum*) reflected the damp nature of the local environment. These taxa are commonly recovered from damp ditches and wasteground. Hemlock seeds are sometimes abundant in Roman and medieval deposits alongside faecal waste (e.g. the Saxo-Norman defensive ditch at Aldgate, London; Carruthers 2001), and there is the possibility in some cases that they had been used for medicinal purposes (Moffat, 1987). There is some potential for more detailed information to be recovered from this deposit, as additional taxa would be identified if detailed analysis was undertaken. In addition, the recovery of food plants and quantification might help to determine whether any of the plants had been exploited.for their medicinal properties or whether they were simply growing locally as weeds. If the latter interpretation is accepted, this vegetation is more likely to represent an abandonment phase, since tall plants such as hemlock would not be left to obstruct an actively used defensive ditch.

In the southern sondage a sample was examined from above the peat:

Sample 52, layer 154 - This consisted of thin spreads of decayed ?turf, possibly representing stacked sods from the Roman rampart. Abundant molluscs, frequent worm cocoons, chalky fragments, peat lumps and occasional small charcoal were present in the dried flot. No

waterlogged flot was available, but the presence of a few uncharred seeds and wood fragments in sample 52 indicated that the deposit had been fairly anaerobic for most of its history. Only a few 'damp to wet ground' plant remains were observed in the dry flot, consisting of sedge nutlets and aquatic buttercups (*Ranunculus* subg. *Batrachium*). Since thin-walled grass seeds do not preserve well even in fully anaerobic conditions, these few seeds probably represent turves cut from damp to wet grassland, such as probably existed along the Itchen valley.

Two fills from a small Saxon-Norman timber-lined pit 118 from Trench 1 were also assessed;
Sample 6, context 122 – primary fill, a thick, soft anaerobic dark brown cessy deposit (OA Evaluation report). 9th-12th century spot date.
Waterlogged flots comprised well-preserved layers of matted straw interleaved with frequent fly puparia. Mineralised (Green, 1979) concretions consisting of cereal bran, straw and fly puparia were recovered from the dried samples and a damson-type (*Prunus* sp.) stone was present. These remains are typical of concentrated, *in situ* cess deposits, with the straw probably having been used as toilet paper and/or dumped in the pit to help dampen odours. The abundant fly puparia and mineralisation demonstrate that the deposit was nutrient-rich, moist to wet, and probably very smelly.

Sample 5, context 120 – above 122, more compact, dark brown cessy fill, spot dates C11th-C12th (OA Evaluation report). Wet and dry flots produced wood fragments, molluscs, charcoal, insect pupae, fish bones and mineralised cess concretions containing bran, corn cockle impressions (see Carruthers, 2005) and straw. A wider range of waterlogged fruits and seeds was present in the wet flots from sample 5 than in context 122, including some edible taxa such as bramble and sloe/plum stones. The seeds of several general ruderal weeds (e.g. docks, fumitory, orache) were also common. Perhaps the pit was more open to the elements at this later date, or a wider range of waste was being dumped in the pit. Full analysis of both of these deposits is recommended, since more direct evidence of diet will undoubtedly be obtained, including information that could be compared to Middle Saxon Hamwic and to 9th-12th century cess pits at Northgate House, Winchester (OA, ongoing). Changes in the environment and waste disposal may be investigated, particularly if insect remains are also analysed.

Trench 3
A sondage in this Trench was excavated down to the 'natural' river gravel (324). The sequence of overlying deposits assessed for this report is described below using stratigraphic information from the OA Evaluation report (September 2005);

Sample 39, context 323 – overlying the 'natural' river gravel, consisting of a loose layer of sand and grit that probably formed a sand bar. Spot date c. 150-200AD.
A wet flot and some hand-picked dry items (bark, charcoal, sloe stone, hazelnut shell) were assessed. Although frequent wood fragments were present, the range of plant taxa was narrow and mainly tough-coated seeds were present, suggesting there may have been some drying out of the deposit from time to time. Terrestrial buttercups (*Ranunculus repens/acris/bulbosus*), docks (*Rumex* sp.) and fumitory (*Fumaria* sp.) were observed, and these are the type of plants that were probably growing in disturbed grassland areas along the river. The presence of hazelnut shell and a possible bullace (*Prunus* sp.) stone suggest that human waste may also have been deposited nearby, although the presence of sewage was not confirmed. Better-preserved samples higher up the profile from later Roman activity do appear to have contained faecal waste, so this type of material was probably being discharged into the river during the Roman period. It should be remembered that any of the water-lain deposits contain a mixed assemblage that may include plant remains washed in from some distance away from the sampling point.

Samples 8 and 42, context 322 – a firm mid-green/grey peaty silt/sand above 323. Spot date c. 270+. Contained flint nodules and RB pot.
The wet flot contained frequent wood fragments, several small charcoal fragments, occasional bone and leather fragments. The dried flot also contained a charred spelt wheat glume base (chaff fragment, *Triticum spelta*), molluscs and chalky lumps, and insects were more visible than in the large, organic wet flots. The waterlogged plant assemblage included a few seeds of aquatic and waterside plants (e.g. pondweed (*Potamogeton* sp.; gipsywort (*Lycopus europaeus*)) either representing plants that were growing in and around local pools or seeds that had been washed into the area during flooding episodes. A few ruderal weeds indicated that disturbed habitats occurred locally (e,g, docks, nettles). The presence of several food remains, including imported luxury fruits and nuts such as fig (*Ficus carica*) and walnut (*Juglans regia*), indicated that faecal material was present. The origin of this may have been sewage discharged into the river that had been washed into the deposit during episodes of flooding, or more locally deposited waste. Further analysis of these samples would provide information about foods being consumed during this period, and more detailed information about the local habitat.

Samples 7 and 41, context 319 – a compact layer of flint and chalk rubble above 322. Spot date c. 270+. Contained RB pot, building material and coins. Appears to represent deliberate dumping to make a useable surface. Timber posts cut into this layer.
Frequent large charcoal fragments, bone, molluscs, wood and moss were present in the dry and wet flots. A similar range to context 322 of aquatic/semi-aquatic plants (including aquatic buttercups (*Ranunculus* subg. *Batrachium*), ruderal weeds (e.g. stinging nettle, persicaria) and food plants (fig, walnut, apple, cf. damson)) was observed in the flots, probably deriving from the same types of flooding episodes. As with 322, a more detailed examination might show whether or not any changes to the diet, waste deposition or the environment had taken place over time

Samples 4 and 50, context 310 – lower peat, above 319. Spot date ?14th-15th centuries. Firm, mid reddish brown with lenses of green-brown fine silt. Contained sherds of late Roman pot and a ?14th -15th century sherd. Timber stakes were contained within the lower peat, perhaps representing a fish trap.
The wet plant remains consisted of fragments of matted ?reeds, molluscs, wood fragments, buds, charcoal and a wide range of fruits and seeds. Aquatics (pondweed), marsh plants (spike-rush, sedges), ruderals (nettles, docks), arable weeds (corn cockle, nipplewort) and grassland plants (Poaceae) were all represented in the assemblage. The presence of tree buds and wood in addition to marsh plants suggests that a fen-type of vegetation may have existed locally, but this suggestion needs to be confirmed by full analysis of different types of environmental evidence, particularly pollen. The input of ruderal weeds and a few arable weeds may again be due to sewage deposition. Further analysis is required to determine how intensive this was, and to provide evidence of food plants during this period.

One tentative observation concerning the Trench 3 samples is that the exotic food remains such as fig and walnut and cultivated plums (including bullace and damson-type Prunus sp.) do not appear to have been present in the post-Roman deposits, apart from a trace of fig in context 318. More detailed work is obviously required to confirm this suggestion. Native hedgerow fruits such as hazelnuts, apples and blackberries were recorded, however, along with other indicators of sewage such as small fragments of corn cockle seed coat, so faecal waste was obviously still being deposited, but the diet of the local population appears to have become more limited. It will be useful to compare these tentative observations with results from Northgate House.

Sample 3, context 309 – upper peat, above 310. Spot date 14th-16th centuries. Darker in colour, firm, homogenous. Contained ?15th century pot and leather fragments.
A similar range of plant remains was present in the wet-sieved sample to the lower peat sample, including matted ?reeds, apple endocarp ('scales' from the core), ruderals and marsh plants. No true aquatics were noted this time, so perhaps fewer wet pools existed. However, this may simply be due to the chance positioning of the sample. Pollen analysis would help to determine if conditions had become drier. Identification of the frequent moss fragments interleaved with ?reeds may also assist in characterising the habitat. The matted material should be identified, if possible, during full analysis.

Samples 2 and 44, context 318 – fine silt, possibly of alluvial origin - ?flood silt, above the peat, context 309. Mid green-brown silt containing slate fragments.
Once again, matted ?reeds were present and sedge nutlets were quite frequent. Rushes were also present, as were wood and twigs. The range of other plant remains in this silt, however, was not as great as in the peat samples, perhaps because of poorer conditions of preservation or perhaps because of the dilution effect of the silts being washed into the deposit. As before, sewage and/or domestic waste was still a component of the assemblage, with occasional charred cereals, a few fig seeds and apple endocarp comprising the evidence for this suggestion.

Samples 1 and 46, context 308 – mottled grey silt with 10% chalk fragments and 1% tile, slate and mortar patches suggesting episodes of dumping. Above 318. Spot date 14th-15th centuries.
Only dried flots were available from this deposit, although the presence of uncharred fruits and seeds indicated that it had once been waterlogged. The plant remains were fairly frequent and diverse, but the flots were small so a limited amount of information was recovered. Most of the taxa present represent disturbed and often nutrient-enriched habitats, e.g. fumitory, stinging nettle and henbane. The presence of sedges and thistles could indicate a damp, grazed meadow-type of environment, since thistles often become abundant where livestock grazes. No further work is recommended for these samples.

Sample 48, context 307 – a clean light grey silt. ?flood silt above 308. 13th-14th centuries.
As with context 308, only a dry flot was assessed from this deposit. Although some organic remains had survived, these silts had probably dried out to some extent from time to time, perhaps in the summer months when the area could have been dry enough to provide lush floodmeadow grazing. The presence of remains from marsh/damp ground plants such as spike-rush and sedges could represent the habitat in the damper winter months, or the remains may have been washed into the silts during seasonal flooding episodes. A raspberry seed (*Rubus idaeus*) is slight evidence that human sewage may still have been washed into the area, or perhaps that 'night soil' had been deposited to fertilise the fields. The presence of slag, fish bone, bone, coal and large charcoal fragments in the sample demonstrates that domestic waste was a notable component of the deposit. No further work is recommended for this deposit.

Conclusions and recommendations for further analysis
Although a reasonable amount of information can be obtained from a rapid assessment scan of the wet and dry flots, changes between the periods are difficult to detect without detailed analysis and quantification of the remains, since they often consist of subtle changes in a number of different taxa. In addition, comparisons between sites cannot be undertaken unless quantified, detailed species lists are available. Therefore, further analysis is required for at least some of the more accurately dated and productive deposits.

This report has indicated which deposits could provide more detailed information (see Table 1). It is suggested that, in view of the range of deposits and types of preservation available amongst the samples from Northgate House, the following topics would be worth following up in the samples from The Pilgrims' School:

1. Diet and the deposition of faecal waste in the Roman period.
Charred cereal remains in the Northgate House samples should provide reasonable information concerning the arable component of the Roman diet. Frequent plum/bullace stones from a mineralised cesspit at Northgate house suggest that further dietary information will be present in the residues from this feature. This information can then be compared to the mineralised and waterlogged information from The Pilgrims' School.
Further work - Providing that the dating information is considered adequate, samples 7 + 41 and 8 + 42 could provide this data. The dried flots would be used in conjunction with the waterlogged flots to provide a rapidly sorted source of rarer, large food remains such as fruit stones and nutshells.

2. The Roman Rampart – environment and waste disposal.
Although only dried flots are available, the uncharred fruits and seeds could provide some information about the local environment and the deposition of waste, particularly in conjunction with mollusc (and pollen?) data. The dry flot would be quick to sort, so further analysis would not be expensive. Preservation bias would need to be taken into account, but the range of taxa is interesting and points to a very nutrient-rich habitat.
Further work - Analysis of flot 53.

3. The Saxon-Norman diet
Frequent mineralised samples from cesspits at Northgate House will provide plenty of dietary information with which to compare cesspit 118 at The Pilgrims' School. Other excavations in Winchester and Southampton have produced charred, waterlogged and mineralised evidence from this period, but much of this is unpublished (Green, unpublished thesis 1979; Monk, unpublished thesis 1977). An attempt will be made to draw this information together to see whether or not luxury foods imported into towns during the Roman period continued to be available. Most of the evidence to date suggests not, but preservation biases need to be taken into account when different types of deposit are compared.
Further work – The analysis of samples 5 and 6 from cesspit 118 (including mineralised remains sorted from the residues, if available) would be worthwhile.

3. The medieval diet and disposal of faecal waste
As above, this period has been investigated in many towns across the British Isles, particularly on waterfront sites such as Norwich (Murphy 1983), Bristol (Jones 1987) and Reading Abbey (Carruthers 1997), where waterlogged preservation has provided a wide range of information. Since the Pilgrims' School remains represent mixed flood and peat deposits, precise interpretation and dating of the remains may not be straightforward. However, further analysis may provide information that could be compared to the Roman silty-peat deposits, since they have a similar origin. In addition, changes in the environment might be detected if the upper and lower medieval peat layers are examined in more detail.
Further work – Samples 3 and 4 would provide information on the environment and the medieval diet. If dated, samples 2 + 44 could also be included.

Resource Requirements
The analysis of 5 waterlogged, 4 dry and 2 wet/mineralised samples would take the author 13 days.

II. PHASE 2 EVALUATION: The Borehole Samples, 2006
Samples (0.7 to 1 litre volume, see Table 1) were examined from Borehole 2 (3-4 m) and Borehole 14 (2-3 m). None of the samples contained well-preserved organic remains although wood fragments, molluscs and a few insect fragments were observed as indicated in the table. It is likely that in most cases the deposits dried out periodically, since brown lumps of what appeared to be oxidised peat were often present. Small fragments of charcoal but no identifiable charred remains were found. The main conclusions were as follows;

BH2 – Contexts 2009, 2010 and 2011. Below possible medieval bank material, 2006.
Context 2009, *fluvial deposit* - This large flot appeared to contain decaying organic peaty material containing several twigs and wood fragments. The only identifiable plant macrofossils were alder (*Alnus glutinosa*) seeds and catkins, which were fairly frequent. Because these plant propagules are designed to float in order to disperse seeds more widely they are often abundant in river sediments where alder is growing along the banks. As a result of their buoyancy, they can be carried some distance, so alder trees may not necessarily been growing on the site.

Context 2010, fluvial silt – the small flot contained chalk and shell fragments. Small charcoal fragments were frequent and a few wood and insect remains were present. The small number of seeds present was limited in range to a few tough-coated taxa, including sedges (*Carex* sp.), stinging nettle (*Urtica dioica*), elderberry (*Sambucus nigra*) and alder seeds. A fairly disturbed, nutrient-enriched, damp bankside vegetation-type is indicated, i.e. waste disposal was probably occurring nearby.

Context 2011, lower peat – This was the only sample to produce a reasonable diversity of taxa, as well as wood fragments, and several mollusc and insect fragments. Small charcoal was present. As with the sample above, alder and stinging nettle were represented, but a few other wet ground/bankside taxa and disturbed ground taxa were observed. These included (wetground plants) crowfoot buttercups (*Ranunculus* subg. *Batrachium*), water cress (*Rorippa nasturtium-aquaticum*) and (disturbed ground) chickweed (*Stellaria media*) and docks (*Rumex* sp.). Further analysis of this sample could provide a more detailed picture of the local environment, perhaps with some evidence for waste disposal if economic plants are found.

BH14 – Contexts 14004, 14005, 14006, 14007, 14008. Below Roman embankment deposits – natural alluvial sequence of peats and silts.
Context 14004, peat – oxidised lumps of peaty material, frequent tufa fragments, wood fragments, occasional insect fragments and small bone. No identifiable plant remains in small flot.

Context 14005, calcareous silt – Oxidised peaty lumps and tufa as above. Several molluscs, occasional small charcoal. Mint (*Mentha* sp.) and rushes (*Juncus* sp.) were the only identifiable seeds in this small flot. Evidence of wet, marshy conditions.

Context 14006, silty peat – as 14004. No plant remains.

Context 14007, calcareous silt – oxidised peaty lumps, occasional small charcoal, molluscs and insect fragments. Occasional decaying buttercup (*Ranunculus* sp.), stinging nettle and

mint seeds. Suggests wet grassland with some nutrient enrichment of the soil due to disturbance by humans or livestock.

Context 14008, peat – Reasonably large flot but no plant remains recovered. Oxidised, peaty lumps and tufa, occasional small bone and wood fragments.

The lack of identifiable plant remains from these borehole samples suggests that the deposits had dried out at some point in the past, perhaps through drainage during the Roman period. Some pre-Roman disturbance of the area is indicated in context 14007, but the plant remains can provide no further details of this.

Conclusions and Recommendations for Further Work
From the small quantities of fruits and seeds observed in the borehole samples, evidence for alder carr was recovered from the three contexts from BH2, with signs of disturbance and wetland plants in the lower two levels. No alder was found in the BH14 samples and they showed more signs of drying out. However, disturbed ground weeds and wetland/grassland plants were present in the middle of the sequence. Either human dumping of waste or animal disturbance and nutrient-enrichment was occurring in both areas, as indicated by the presence of stinging nettles, docks and chickweed. It would be useful to compare this information with that recovered from mollusc and insect analysis.

Unfortunately no additional soil samples exist for BH 2 (Carl Champness, *pers. comm*), and this produced the only sample of interest, context 2011. Nevertheless, full analysis of this sample would provide a little information about the local environment and extent of human or livestock disturbance in the area. Radiocarbon dating (perhaps on fragments of wood?) would need to be carried out in order to put this information into context.

Although additional soil exists for BH 14, further processing is unlikely to produce useful plant assemblages since organic decay appears to have taken place. However, additional soil from contexts 1406 and 1407 could be processed for insects if required, as the small number of fragments in these samples may not provide sufficient information on their own. Insects from BH2 2011 could also be examined, after the plant macrofossils have been removed from the flot. They were not very frequent but, in conjunction with the seeds, they may provide additional habitat information.

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Table 1: CPR Assessment

Bulk sample	Context No	Trench	Type	Description	Spot Date	sample size (litres) W-wet sieved; F - floated	other samples taken	Flot description	Plant Remains	potential
5	120	1	Fill	Fill of Pit 118	11-12C	W1 F40		W - 1 lge box wl wood, mostly Qu, 1 full box flot, ironimpreg wood frags, freq charcoal, sev insect pupae, fish bone. Freq & varied plant taxa but possibly some decay as mostly woody seeds & wood frags. F - 2 small dry bags = mineralised concretion with corn cockle, bran & straw & nodules.	Rubus++, Rumex+, Atriplex p/p, Raphanus raph+, Aethusa+, Fumaria+, Prunus sloe/damson+	B - some environmental information & dumping of waste info. Wood ID? SORT RESIDUES
6	122	1	Fill	Fill of Pit (cess?) 118	9-12C	W2 F20		W - 2 lge tub flot, freq puparia, bran, sev woody/straw frags, occ sm char, abundant insects, matted straw & fly puparia, some whole ear frags; F - 1 bag with 2 lge char frags - 1 Qu + 1 non-Qu; 1 bag with mineralised concretions of bran, straw + fly puparia; 1 bag with 2 lge molluscs; 1 bag with damson-type stone (12mmx8.5mm).	abundant bran, Agrostemma frags = waterlogged cess	A - good info on diet. Good insect info > environmental conditions. SORT RESIDUES
53	150	1	Layer	Roman ?Rampart		W1 F39		W - 3 quarter-filled boxes of flot plus 1 quarter bag dried flot. Occ lge char, ?tufa, some lge molluscs, peaty frags & wood frags, bone frags. Freq molluscs in one box, lge wood frags in another	Frequent henbane+++, Urtica dioica, Conium maculatum, Sambucus+, Carex+	B - dried flot providing more concentrated seed evidence of environment. Check wet flots for delicate remains. Mollusc & wood ID?

Bulk sample	Context No	Trench	Type	Description	Spot Date	sample size (litres) W-wet sieved; F - floated	other samples taken	Flot description	Plant Remains	potential
52	154	1	Layer	Roman ?Rampart (?turf)		F40		F -1 6" bag dried flot - ?tufa frags & peaty lumps, mostly molluscs, occ sm char, freq worm cocoons. Once partly waterlogged?	occ small wood frags, occ sedge seed (Carex) & aquatic buttercup (Ranunculus sg.Batrachium)	C - little further potential. Mollusc ID.
48	307	3	Layer	Flood Silt?	13-14C+?	F40		F - Quarter 6" bag of dried flot - slag, coal, bone, fish bone, freq molluscs, freq lge char (15ml)	occ seeds, prob some organic decay: cf. raspberry+; spike-rush (Eleocharis)+, sedge (Carex)	C - little further potental, infrequent seeds
1	308	3	Layer	Flood Silt?	14-15C?	F40	C,D,I,A	F - half 3" bag dried flot, once waterlogged, small ?tufa frags, molluscs, 25ml lge char, variety of spp.	several & diverse taxa - Carex++, Urtica dioica, Viola, Fumaria, Sambucus, Carduus/Cirsium, Henbane, Aethusa	C - possibly some decay, small flot
46	308	3	Layer	Flood Silt?	14-15C?	F10	C,D,I,A	F -third 3" bag dried flot, as above, fish bone	as above, also Rubus sp., Ran Batrachium	C, some fragmented
3	309	3	Layer	Upper peat	14-E16C?	W1	C,D,I,A	W -half sm box + 1 med box wet flot + 1 med box matted ?reeds. Small box - ?tufa frags, silty lumps, occ organic only, oyster, fish bone, wood frag. Med box - freq organic, molluscs, lge pupae	Med box - polyg aviculare++, Agrostemma+, apple endocarp, sedge, Prunella, cereal, Juncus, Poaceae. Mosses	B - some info on environment & dumping. Moss ID may help.
4	310	3	Layer	Lower peat	14-15C?	F40	C,D,I,A	F? - 2 med boxes, one with matted ?reeds, molluscs, woody frags, sev charcoal, buds, freq seeds	freq & diverse - Potamogeton, Eleocharis, Lapsana, Agrostemma, Poaceae, Prunella, Carex, Sambucus, Rumex Urtica	B - good range of environmental & waste disposal info
50	310	3	Layer	Lower peat	14-15C?	W1	C,D,I,A	W -2 half boxes silty lumps & ?tufa lumps, occ sm char, little organic, occ sm woody frag, sm molluscs.	nil	D
2	318	3	Layer	Flood Silt?		W1	C,D,I,A	W -3 half boxes, 1 residue with freq oyster, stones, fish bone; 1 matted ?reeds with wood & twigs; 1 sev seeds, narrow range, lge pupae	sev Cyperaceae, Atriplex, Ranunc r/a/b, Juncus, cf. apple endocarp, Anthemis cotula	B/C some info about environment

Bulk sample	Context No	Trench	Type	Description	Spot Date	sample size (litres) W-wet sieved; F - floated	other samples taken	Flot description	Plant Remains	potential
44	318	3	Layer	Flood Silt?		F10	C,D,I,A	F - half 6" bag dried flot, woody frags, fish bones, ?tufa lumps, once waterlogged, 15ml lge char	occ charred cereals, wl fig, sedge, potamogeton, ranunculus r/a/b, crucifer	B - reasonable info about environment & sewage
7	319	3	Layer	Roman rubble dump	c270+	W1 F30	C,D,I,A	F -whole 6" bag, once waterlogged, woody frags, moss, woody fibres, molluscs, freq med char; W -3 tubs wl material = flot, residue & wood chips; bag with 23 HNS + 2 sloe stones. 1 bag with lge charcoal (Qu, Pom, Corylus-t, 10ml), wood, pot.	freq & varied seeds, sloe, HNS, sambucus, ranunculus Batrachium, ranunculus r/a/b, walnut shell, apple, rubus, cf. damson	B - environmental and sewage info
41	319	3	Layer	Roman rubble dump	c270+	F10	C,D,I,A	F? -quarter med tub flot, pale rootlets, wood frags, freq char; 1 bag charcoal (15ml) + HNS (removed), bone, wood.	sev ranunculus r/a/b, sambucus, persicaria, carex, fig, urtica dioica	B - reasonable range of environmental & dumped/sewage taxa
8	322	3	Layer	Silty ?peat	c270+	F40	C,D,I,A	F? -2 med tubs flot, freq woody frags, sev sm char, wood & leather in 2nd tub, occ bone	potamogeton, fallopia, urtica urens, carex, HNS, walnut shell, ranunculus r/a/b, Lycopus europaeus, fig, onopordum, plum/damson	A - good range of environmental & dietary info
42	322	3	Layer	Silty ?peat	c270+	F10	C,D,I,A	F -half 6" bag dried flot, once waterlogged, twigs, ?tufa lumps, molluscs, lge charcoal (25ml), sev insects; 1 med tub lge wood frags (cf. Prunus branch)	charred spelt gl base, wl sambucus, HNS, polygonum, barbarea, rumex, stellaria, polygonum hydropiper, fig	B - environmental and sewage info; wood ID
39	323	3	Layer	Sand bar	c150-200	F20	C,D,I,A	F? -half med tub flot, freq wood frags, lge char, twigs, 1 bag of dry bark frags; 1 bag charcoal (40ml), range of spp.; 1 bag with sloe stone + 2 HNS frag	sev ranunculus r/a/b, HNS, persicaria, fumaria, rumex, cf. bullace	B/C poss some decay as mostly woody

Bulk sample	Context No	Trench	Type	Description	Spot Date	sample size (litres) W-wet sieved; F - floated	other samples taken	Flot description	Plant Remains	potential
BH2	2009			fluvial deposit		W1		W - 3/4 lge box flot, twigs, wood frags, freq brown ?peat lumps	freq alder seeds & catkins	C - low diversity
BH2	2010			fluvial silt		W ?		W - 1/4 lge box flot, shell frags, tufa frags, freq sm char, occ wood frags, occ insects	sev seeds, elder, alder, Urtia dioica, Carex	C - low d iversity, poss differential decay
BH2	2011			Lower peat		W0.7		W - 1/3 lge box, freq wood frags, sev sm char frags, sev molluscs	sev to freq seeds, alder, Urtica dioica, Rumex, Stellaria, Berula erecta, Ranunculus Batrachium, Rorippa n-a, Juncus	B - reasonable diversity
BH14	1404			possible stabilisation deposit		W1		W - 1/4 lge box flot, occ sm bone	nil	D
BH14	1405			calcareous silt		W1		W - 1/2 small box, freq tufa, sev moluscs, brown ?peat lumps, occ sm char frag	occ Mentha sp.; freq yellow Juncus sp.	C - low diversity
BH14	1406			silty peat		W1		W - 1/3 lge box, fre tufa, ?peat lumps, some molluscs, occ insect, occ sm wood frags	nil	D
BH14	1407			calcareous silt		W1		W - freq ?peat lumps, occ sm char, occ mollusc & insect frag	occ decayed Ranunculus r/a/b; occ Mentha, occ Urtica dioica	C - low diversity
BH14	1408			pre-Roman peat		W0.75		W - 1/3 lge box, ?peat lumps, tufa, molluscs, occsm bone, occ sm wood	nil	D

ASSESSMENT OF DIATOMS

Nigel G. Cameron

Introduction

A diatom assessment was carried out on ten slides prepared from sediment samples taken from the site at Pilgrims' School Winchester (Wincmay 234). These slides were selected by Gem Swindle (Royal Holloway, University of London) from a larger group of twenty-six slides prepared from the site for diatom evaluation. The aims of this assessment are to determine if diatoms are present and the potential for percentage analysis of the diatom assemblages. Comments are made about a number of sample characteristics including: diatom valve concentrations, the quality of diatom preservation, the diversity of taxa, the types of diatom assemblage and the environmental preferences of those diatoms present.

Methods

Sediment sampling, diatom sample and slide preparation was carried out by Gem Swindle, Department of Geography, Royal Holloway, University of London. Diatom preparation involved the following procedures:

Treatment of the sub-sample (0.2 g) with Hydrogen peroxide (30%) to remove organic material and Hydrochloric acid (50%) to remove remaining carbonates
Centrifuging the sub-sample at 1200 for 5 minutes and washing with distilled water (4 washes)
Removal of clay from the sub-samples in the last wash by adding a few drops of Ammonia (1%)
Two slides prepared, each of a different concentration of the cleaned solution, were fixed in mounting medium of suitable refractive index for diatoms (Naphrax)

Slides were scanned at magnifications of x400 and x1000 under phase contrast illumination. Diatom floras used to assist with diatom identification include Krammer & Lange-Bertalot (1986-1991) and Hartley *et al.* (1996). A semi-quantitative assessment of species abundance was made by making a skeleton count of diatom valves for each sample.

Results & Discussion

Table 1: Diatom species counts

Diatom Species/Sample Number	11	12	13	14	17	18	19	20	23	24
Achnanthes exilis	2									
Achnanthes hungarica						9	4	1	2	
Achnanthes lanceolata		4	2	4		2			1	2
Achnanthes lanceolata var. elliptica	7									
Achnanthes lanceolata var. rostrata	2		4							
Achnanthes lauenbergiana			1	10						
Achnanthes minutissima		6	3	1	2	3	1		14	
Achnanthes sp.						2				
Amphora libyca					1	2	1	1		1
Amphora pediculus	6	2	17	20		2	5	3		
Amphora veneta					1	1	1	3	5	10
Caloneis silicula					1	1				

Diatom Species/Sample Number	**11**	**12**	**13**	**14**	**17**	**18**	**19**	**20**	**23**	**24**
Cocconeis disculus		1	1	1				1		
Cocconeis pediculus	2						3		1	
Cocconeis placentula & var. euglypta	4	3	7		32	11	23	2	1	1
Cyclotella meneghiniana							1			
Cyclotella sp.		1								
Cymatopleura solea										1
Cymbella sinuata			5	12						
Cymbella affinis			2	1			2			
Cymbella amphicephala			1	1						
Cymbella minuta						3		1		1
Cymbella sp.	1									
Diatoma vulgare				2						
Diploneis ovalis								1		
Fragilaria brevistriata	4	19	2	1						
Fragilaria capucina var. mesolepta					10	2		1	7	1
Fragilaria cf. oldenbergiana										
Fragilaria construens					1			2		
Fragilaria construens var. venter	6	2	2	2		2				
Fragilaria lapponica	2	2		1		1				
Fragilaria pinnata	6	11	3	3		1				
Fragilaria sp.	1	9								
Fragilaria vaucheriae	1							1	8	2
Gomphonema acuminatum					1					
Gomphonema angustatum var. productum								2		1
Gomphonema clavatum										1
Gomphonema minutum			2							2
Gomphonema parvulum										1
Gomphonema sp.	1	1	1		1					
Gomphonema truncatum						2				1
Gyrosigma acuminatum	1				1					
Gyrosigma sp.		1								
Hantzschia amphioxys	1								1	3
Melosira varians		1			10	3	4	1	1	6
Meridion circulare	2	2			1			1		
Navicula capitata						2	1	1		
Navicula cari			1	2						
Navicula cryptocephala						4	1	1		
Navicula cincta	1	1	1	3	1					
Navicula minima		1				3		1	2	
Navicula pupula						1		1		
Navicula seminulum				1						
Navicula sp.	2			1	1	1		1		
Navicula tripunctata		2								
Nitzschia amphibia									4	

Diatom Species/Sample Number	**11**	**12**	**13**	**14**	**17**	**18**	**19**	**20**	**23**	**24**
Nitzschia dubia		1								
Nitzschia frustulum									1	1
Nitzschia palea									2	
Nitzschia sp.		2	2					3	3	2
Pinnularia gibba								1		
Rhoicosphaenia curvata							1			
Stephanodiscus sp.						1		1		
Surirella sp.		1								
Synedra capitata					1					
Synedra ulna	1	1	1		3	2	1	1		1

The semi-quantitative assessment of relative diatom abundance within each sample is presented in Table 1 (Excel file) which show diatom species counts. These data are presented as raw counts rather than as percentages because the total count for each sample is low. A summary of the assessment results is presented in Table 2.

Table 2: Summary of diatom assessment

Sample Number	Context	Description	Diatom valve concentration	Quality of preservation	Diversity	Comments on Assemblage Type	Potential for percentage counting
11	319	Roman rubble dump	high	good to moderate	moderately high	non-plankton, attached & benthic	good
12	319	" "	high	good to moderate	moderately high	non-plankton, attached & benthic	good
13	319	" "	high	good to moderate	moderately high	non-plankton, attached, benthic less *Fragilaria* sp.	good
14	319	" "	high	good to moderate	moderately high	non-plankton, attached, benthic less *Fragilaria* sp.	good
17	310	Lower peat	high	good to poor	moderately high	higher proportion of epiphytes rheophilous species	good
18	310	Lower peat	high	good to poor	moderately high	higher proportion of epiphytes rheophilous species	good
19	309	Upper peat	moderate	good to poor	moderately high	non-plankton, attached & benthic	good
20	309	Upper peat	moderate	good to poor	moderately high	non-plankton, attached & benthic	good
23	318	Flood silt?	moderate	moderate to poor	moderate	higher proportions of *Nitzschia* spp.	good
24	308	Flood silt?	moderate	moderate to poor	moderate	higher proportions of *Gomphonema* spp.	good

In addition a rapid scan (phase contrast x400 magnification) was made of the 16 remaining samples prepared from the site. These samples and their context numbers are listed in Table 3.

Table 3: Samples for which a rapid scan for diatoms was made

Sample Number	Context Number
9	323
10	323
15	319
16	300
21	318/309
22	318
25	308
26	308
27	308
28	308
29	308
30	306
31	306
32	306
33	306
34	306

In most of these samples diatoms are present in relatively low concentrations, in some diatoms were very sparse, and species diversity is low (sample numbers 9, 10, 16, 21; 25-34 inclusive). There are moderate numbers of diatoms in sample numbers 15 and 22. However, in the latter species diversity is low. In addition in several of these rapidly scanned samples the most common diatom component is of aerophilous, semi-terrestrial diatoms that are common in soils and damp aerial habitats as opposed to true aquatic environments. These types of diatoms can also be present in the atmosphere. Such diatoms are therefore almost ubiquitous and can be found in many terrestrial environmental samples (although they can in some contexts be useful indicators of eroded or in-washed sediment in aquatic sediments). True aquatic diatom species are rare in this group of samples and were in low concentrations.

The ten samples for which a full diatom evaluation was carried out (Table 1 and Table 2) have high or moderately high concentrations of diatom valves. The quality of valve preservation is generally good or moderately good, but a varying number of poorly preserved valves are also present. In particular in the postulated 'flood silt' samples (23 and 24) there are a greater number of poorly preserved diatoms that show evidence of valve breakage and silica dissolution. Species diversity is moderately high, but again in sample numbers 23 and 24 the diversity is slightly reduced compared with other samples. All ten samples have very good potential for percentage diatom counting and more detailed environmental reconstruction (e.g. the use of a diatom-water chemistry transfer function) to be carried out. From the results of the skeleton counts carried out for sample numbers 11-14, 17-20, 23 and 24 some general comments on the environments represented can be made.

All ten samples are dominated by non-planktonic diatoms with a mixture of attached (e.g. epiphytic and epilithic) and benthic (e.g. epipelic, mud-surface) species. Planktonic (open water) diatoms are rare with only occasional occurrences of planktonic diatoms such as *Cyclotella meneghiniana* and poorly preserved valves of *Stephanodiscus* sp. However, species such as *Melosira varians* and some *Fragilaria* spp. are tychoplanktonic and may have a stage of their life cycle in open water. The habitats represented are therefore of

shallow water where these non-planktonic diatoms are able to remain attached to or move on surfaces within the photic zone.

There is a component of diatoms specifically associated with flowing water (rheophilous diatoms) represented by *Melosira varians* (common in several samples) and *Meridion circulare*. Whilst the component of aerophilous diatoms (a diatom community described above for the rapidly scanned samples) is very small. Therefore diatoms derived from terrestrial habitats are rare but there are occasional occurrences of aerophiles such *as Hantzschia amphioxys*.

Samples numbers 11 to 14 are derived from context 319 (age AD270+ and interpreted from other evidence as Roman rubble dump deposits). These samples have in common a range of non-planktonic aquatic species. The species include the consistent presence of a number of *Fragilaria* taxa (*F. brevistriata, F.construens* var. *venter, F. lapponica, F. pinnata*) which are early colonisers of new and ephemeral aquatic habitats. However, there is a diverse range of other diatom types in this group of samples and the assemblage does not show evidence for mixing of diatoms from disparate sources. Other common species include *Achnanthes minutissima, Amphora pediculus* and *Cocconeis placentula* and its varieties. *Amphora pediculus* is particularly common in samples 13 and 14 along with *Cymbella sinuata* in sample 14. These and other common taxa may grow both as epiphytes or as benthic species. However, the presence of relatively high numbers of *Achnanthes* species (*A. lanceolata* and its varieties, *A. minutissima, A. lauenburgiana*) probably reflects the presence of a large aquatic macrophyte habitat. Further, from the skeleton counts of common taxa there appear to be changes in the relative numbers of these species.

Diatom assemblages derived from peat are often poorly preserved. However, the quality of diatom preservation is excellent in the samples from contexts associated with peat formation (numbers 17, 18, 19, and 20). The presence of rheophilous diatoms in some samples has been noted, e.g. *Melosira varians* is particularly common in sample 17. Maxima of *Cocconeis placentula* occur in this group of samples. This species is commonly epiphytic. Also of note is the common occurrence of *Achnanthes hungarica* (samples 18 and 19). This diatom is particularly associated with the water plant *Lemna* and moderately high levels of nutrients.

The samples from the probable flood deposits (number 23 and 24) again have a range of non-planktonic diatoms. The quality of preservation in these samples is poorer and there is more silt visible on the diatom slides. There are also some indications from the diatom composition that the assemblages are derived from flooding. The dominant components of the assemblage have changed compared with the underlying levels. For example *Achnanthes minutissima* is common in sample 23, *Amphora veneta*, and *Fragilaria vaucheriae* in both 23 and 24. A range of *Nitzschia* taxa *(N. amphibia, N. frustulum, N. palea* and undifferentiated *Nitzschia* spp.) also become more common. These *Nitzschia* spp. are often found growing where nutrient levels are moderately high. This is also supported by the consistent occurrences of *Gomphonema* spp. (*G. angustatum* var. *productum, G. clavatum, G. minutum, G. parvulum, G. truncatum*) in sample 24. These attached diatoms are often associated with higher nutrient levels.

Conclusions

Diatoms are present in all ten samples evaluated. They occur in moderately high concentrations, are generally well preserved and species diversity is moderately high. The concentrations of valves, their quality of preservation and species diversity is somewhat reduced in the probable flood deposits (sample numbers 23 and 24). All ten samples have very good potential to make percentage diatom counts. The remaining sixteen samples

prepared for diatom analysis, with few exceptions, have poorer diatom assemblages and where diatoms are present they are often from the ubiquitous aerophilous diatom community. Skeleton counts of ten selected samples show consistent diatom assemblages within the contexts examined with no clear evidence for mixing of disparate community types (as might be anticipated in dump deposits for example). More subtle changes in composition within the context types are also indicated from the skeleton counts. All the diatom assemblages are dominated by non-planktonic diatoms with only rare occurrences of planktonic diatoms. This reflects the shallow water origins of the diatoms. Benthic (mud) and attached (e.g. epiphytic) diatom communities are represented in the diatom assemblages along with some occurrences of species associated with flowing water. Percentage diatom counts to further investigate the species composition and possible environmental reconstruction using a transfer function (e.g. Birks *et. al.* 1995) may be of relevance here.

Acknowledgements
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2006 Floodplain Assessment

Introduction and background

In 2005 a diatom assessment was carried out for Oxford Archaeology and Archaeoscape (Royal Holloway, University of London) for the site at The Pilgrims' School, Winchester. Relatively well preserved diatoms were found in ten samples taken from a number of contexts (Cameron 2005). Oxford Archaeology returned to the site for a second phase of archaeological assessment in 2006. As part of this work, a borehole survey was undertaken which has been able to place the previous Trenches within a wider context of the floodplain sequence (Carl Champness pers.comm.). A former channel of the River Itchen has been revealed by this new work and the aim of the present diatom evaluation is therefore to supplement the previous assessment of the site. The aim here is then to assess the potential of new samples for diatom analysis, and to revise previous recommendations for further diatom analysis as appropriate.

The two selected boreholes were sub-sampled by Richard Macphail at UCL for pollen and soil micromorphology. Richard Macphail also took sub-samples for diatom evaluation from the same levels that were sampled for pollen analysis. A total of eight new samples were selected for diatom assessment. Included is a sample from BH3 at 3.55 m in the upper part of context 3010. This context has not previously been subsampled for pollen or diatoms, but is believed to represent a palaeochannel of the River Itchen (Carl Champness & Richard Macphail pers.comm.).

Methods

Diatom preparation followed standard techniques: the oxidation of organic sediment, removal of carbonate and clay, concentration of diatom valves and washing with distilled water. Two coverslips, each of a different concentration of the cleaned solution, were prepared from each sample and fixed in Naphrax, a mounting medium with a suitable refractive index for diatom microscopy. Slides were scanned at magnifications of X200, x400 and x1000 under phase contrast illumination. Diatom floras and taxonomic publications consulted to assist with diatom identification include Hartley et al. (1996) and Krammer & Lange-Bertalot (1986-1991).

Results

The results of the diatom evaluation are summarised in Table 1 and a qualitative assessment of the main species found in the samples is presented in Table 2.

Diatom assemblages of high quality are present in the four uppermost samples from BH3. Diatoms are absent from the remaining four samples, these are the basal sample from BH3 and all three samples from BH13. The absence of diatoms may reflect unfavourable conditions for diatom silica preservation such as repeated wetting and drying of sediment or extremes of pH either in the water or in the sediment (Flower 1993, Ryves *et al.* 2001).

Table 1: Summary of diatom assessment of samples from two boreholes BH3 and BH13

Sample Depth (m)	Diatoms presence	Diatom valve Concentration	Quality of preservation	Diversity	Assemblage type	Potential for percentage counting
BH3 1.89	+	Moderately High	Good to Poor	Moderately High	Epiphyte Benthic Plankton	Good

Sample Depth (m)	Diatoms presence	Diatom valve Concentration	Quality of preservation	Diversity	Assemblage type	Potential for percentage counting
BH3 2.38	+	High	Good	High	Epiphyte Benthic Plankton	Very Good
BH3 2.76	+	High	Good	High	Epiphyte Benthic Plankton	Very Good
BH3 3.55	+	High	Good	High	Epiphyte Benthic Plankton	Very Good
BH3 3.85	-	-	-	-	-	None
BH13 2.435	-	-	-	-	-	None
BH13 2.47	-	-	-	-	-	None
BH13 2.87	-	-	-	-	-	None

Table 2: Diatom species in samples from BH3 1.89 m, 2.38 m, 2.76 m and 3.55 m depth.

+ species present; ++ common: +++ abundant

Diatom Species/Sample Number	***BH3 1.89m***	***BH3 2.38m***	***BH3 2.76m***	***BH3 3.55m***
Achnanthes clevei				+
Achnanthes kolbei	+			
Achnanthes lanceolata	++	++	++	+
Achnanthes minutissima		+	+	
Achnanthes sp.	+			
Amphora normanii	+			
Amphora ovalis		+	+	
Amphora pediculus		++	++	+
Caloneis bacillum		+		
Campylodiscus hibernicus				+
Chrysophyte cysts	+			
Cocconeis pediculus		+		+
Cocconeis placentula & var. *euglypta*	+	++	+++	+++
Cyclotella kuetzingiana	+		+	+
Cyclotella radiosa	+			
Cymatopleura solea				+
Cymbella aspera		+	+	+
Cymbella cistula				+
Cymbella minuta		+	+	+
Cymbella sinuata			+	
Denticula tenuis		+	+	+
Diatoma vulgare			+	+
Didymosphaenia geminata				+
Diploneis oblongella	++			
Diploneis ovalis	+		+	
Ellerbeckia arenaria			+	+
Eunotia curvata		+		
Eunotia pectinalis *var*. minor				+
Fragilaria brevistriata	++	++	+	+
Fragilaria construens var. *binodis*		+		
Fragilaria construens var. *venter*	+	++	+++	+
Fragilaria leptostauron	+	+		+
Fragilaria pinnata	+	+++	+++	+++
Fragilaria sp.	+			

Diatom Species/Sample Number	***BH3 1.89m***	***BH3 2.38m***	***BH3 2.76m***	***BH3 3.55m***
Fragilaria vaucheriae		+	+	
Fragilaria virescens	++			
Gomphonema truncatum	+	+	+	+
Gyrosigma attenuatum		++	++	+
Hantzschia amphioxys	+			
Indeterminate pinnate	+			
Melosira varians	+			+
Meridion circulare		+	+	+
Navicula bacillum			+	
Navicula capitata				+
Navicula cf. *cryptocephala*		+		
Navicula cincta	++	+		+
Navicula pseudotuscula			+	
Navicula pupula	+			
Navicula radiosa				+
Navicula sp.		+		
Navicula tripunctata			+	+
Nitzschia amphibia	+		+	
Nitzschia sinuata	+			
Nitzschia sp.	+		+	
Pinnularia microstauron *var.* brebissonii	+			
Pinnularia sp.	+		+	+
Rhopalodia gibberula				+
Stauroneis anceps	+			
Stauroneis smithii				+
Stephanodiscus sp.		+		
Synedra parasitica		+		
Synedra ulna	+	+	+	+
Unknown naviculaceae	+			

Discussion

The diatom assemblages from the four diatomaceous samples from BH3 are composed mainly of benthic and epiphytic (or other attached) non-planktonic diatoms. These non-planktonic diatoms are restricted to the photic zone in shallow-water. However, three samples have a small component of open water, planktonic diatoms e.g. *Cyclotella kuetzinghiana, Cyclotella radiosa, Melosira varians* (the latter species appears from the scan of the slide to be absent in any numbers in BH3 at 2.38 m).

The dominant diatoms in all four samples are epiphytic or are from other non-plankton habitats (epilithic, epipsammic). Common epiphytes include *Cocconeis placentula, Achnanthes lanceolata, Fragilaria brevistriata, Fragilaria pinnata* and *Fragilaria construens* var. *venter.* In addition the benthic, mud surface habitat is represented by species such as the large diatom *Gyrosigma attenuatum*.

Aerophilous, desiccation tolerant, diatoms associated with semi-terrestrial habitats (damp soil) or sediments subject to cycles of wetting and drying, or from the inwash of eroded bank or terrestrial sediments form a small component of the diatom assemblages in BH3. The exception is in the top sample where the aerophile *Navicula cincta* is common along with the presence of other aerophilous taxa such as *Pinnularia microstauron* var. *brebissonii*, *Hantzschia amphioxys* and chrysophyte stomatocysts. However, a number of true aquatic, non-planktonic diatoms such as *Achnanthes lanceolata, Diploneis oblongella*, *Fragilaria virescens* and *Fragilaria brevistriata* are also common in this sample.

A rare occurrence of a few valves of *Didymosphenia geminata* (found on both coverslips prepared from the sample) is restricted to the sample from 3.55 m in BH3. This species is generally found in low numbers in the north of the UK in circumneutral (c. 10 mg calcium per litre) oligotrophic (low nutrient levels c. 20 µg per litre) rivers in cooler temperatures (it is also found in Scandinavia and Poland (Kaweka & Sanecki 2003)). Unfortunately *Didymosphenia geminata* has been introduced to New Zealand, Canada and the United States

where since the late 1980s as an invasive species it can form large dense algal mats in rivers resulting in deoxygenation and the death of fish. In its native habitats in Northern Europe the species is not problematic. The record in Winchester seems to be a southerly record for the species in the UK, where *Didymosphenia* is typically a small component of the diatom assemblage of streams in northern Britain. The species is usually found in clean, unpolluted water, in cool and unshaded conditions. *Didymosphenia geminata* is found where there are low rates of water flow and stable habitats where there is a low level of scour and with low levels of suspended solids. The presence of the rheophilous diatoms *Meridion circulare* and *Melosira varians* in samples from BH3 also indicate the presence of flowing water. The nutrient levels indicated by the diatom assemblages in BH3 are likely to be moderate or low. Diatoms associated with organic pollution and eutrophic, nutrient enriched, conditions are not very common here. However, this idea could be tested using a diatom-phosphorus nutrient transfer function so that phosphorus levels and any quantitative changes between samples could be established (Bennion *et al.* 1996).

Conclusions

In conclusion the evaluation of a number of the diatom assemblages in BH3 indicates that where diatoms are present there is shallow, flowing water. Nutrient levels are only moderately high and the component of aerophilous diatoms is generally small, with the highest numbers of aerophiles in the top sample of BH3. The environment could be further investigated by carrying out percentage diatom counting for BH3 and applying a diatom-phosphorus transfer function to examine variation in nutrient levels between samples. The present evaluation therefore reinforces the conclusions made in the previous diatom assessment made for the site (Cameron 2005). Diatom-based nutrient reconstruction might also complement the work on soil micromorphology in relation to the presence of possible dung deposits in the sequence (Macphail 2006). Diatoms are absent from the samples assessed from BH13.

Acknowledgements

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ASSESSMENT OF INSECTS

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Introduction

The insect remains discussed are primarily from a series of samples recovered in 2005 from palaeochannel deposits in Trench 3 at The Pilgrims' School, Winchester during the initial evaluation. This sequence of deposits dated from between *c.* 2nd century AD to the 15th century. They are from the flood plain of the River Itchen and are initially associated with the Roman Town. It is thought that in during the medieval period this area of Winchester was open (probably gardens). The nature of the material sampled is quite variable ranging from sandy silts to organic 'peat'.

Subsequently in 2006 three samples from two boreholes from transects across the site were submitted for analysis. These were context 2011 from Borehole 2 and context 1407 and 1406 from Borehole 14. The material consisted of the plant macro flots from these deposits and a number of insect specimens picked out from the waterlogged plant remain flots by Wendy Carruthers.

This assessment was carried out in order to establish the following:

- Are insect remains present? And if so, are the faunas of interpretative value?
- Do the insect remains from these samples contain information on the nature of the environment in the area at the time of the deposits formation?
- What were the water conditions in the palaeochannel?
- Is there any evidence for the dumping of domestic and settlement material in the area?

Methods

The samples from 2005 were processed using the standard method of paraffin flotation as outlined by Kenward *et al* (1980). The weights and volumes of the individual samples are included in Table 1. Insect remains were then sorted from the flot and examined under a low-power binocular microscope. The system for 'scanning' faunas as outlined by Kenward *et al*. (1985) was followed in this assessment.

The material from 2006 was examined separately. Given the essential similarity in terms of location and deposit it was felt that an examination of the recovered insect fragments and a fast scan of several Petri dishes of material from the plant macrofossil flots would confirm preservation and presence at minimal cost.

When discussing the faunas recovered, two considerations should be taken into account:

1) The identifications of the insects present are provisional. In addition, many of the taxa present could be identified to species level during a full analysis, producing more detailed information. As a result, these faunas should be regarded as incomplete and possibly biased.

2) The various proportions of insects suggested are very notional and subjective.

Results

The insect taxa recovered from the 2005 excavations are listed in Table 1. The taxonomy used for the Coleoptera (beetles) follows that of Lucht (1987). Trichopteran (caddis fly) remains were also found.

The numbers of individuals present is estimated using the following scale: * = 1-2 individuals ** = 2-5 individuals *** = 5-10 individuals **** = 10+ individuals.

Discussion

Are insects present and are the faunas interpretable?
Moderately sized but diverse faunas of beetles were recovered from samples 39 and 43. These are from the peat and silts dated to the 2nd and 3rd century AD. Samples 40 and 45 from the overlying roman flood silts produced very small insect faunas and are not interpretable. Samples 51 and 49 from the 14th-15th-century peat produced reasonably large and diverse insect faunas. No insects were recovered from sample 47 at the top of sequence. Where insect faunas were recovered these are interpretable.

What is the environmental setting and land use during deposit formation?
The insect remains from samples 39 and 43 from the Roman peat suggest that the local landscape was open grassland with some pasture. This is suggested by the *Aphodius, Geotrupes* and *Onthophagus* dung beetles recovered. Open grassland is also suggested by the presence of *Phyllopertha horticola* whose larvae is associated with old pasture and meadows where they feed on the roots of grass (Jessop 1996). The *Apion, Sitona* and *Ceutorhynchus* species of weevil usually feed on a range of grassland and waste ground vegetation. There is little indication for trees in the insect fauna with only isolated fragments of the tree dependant scolytid 'bark beetles' recovered. This suggests that the landscape was probably open and essentially treeless by this time.

The medieval samples 51 and 49 produced an essentially similar fauna again suggesting the presence of open ground. However, These faunas are much smaller than those in Roman period and the evidence is less equivocal.

What were the water conditions within the palaeochannel?
The water beetles (the aquatic hydrophilids and the hydreanids) recovered from the samples from both the Roman and medieval periods are all associated with vegetated, stagnant, slow moving or standing waters (Hansen 1987; Nilsson and Holman 1995). The exception to this is the relatively small numbers of elmid 'riffle beetles' recovered in the samples from the Roman peat. . Elmids are normally associated with faster flowing waters. This might suggest that there were either areas of fast flowing water locally or that this material might represent a flood deposit with an origin in the main channel of the Itchen. In the Mediveal period the weevil *Tanysphyrus lemnae* is present in some numbers. This species feeds exclusively upon duckweed (*Lemna* spp.) (Koch 1992), which is a classic indicator plant for very slow water conditions. There is however, little evidence from the insect remains from both periods for the presence of waterside vegetation, suggesting that the channel probably remained relatively clear of dense stands of reed bed.

Is there any evidence for the dumping of domestic and settlement material in the area?
Both the Roman and medieval deposits from this section contain a number of insects that indicate that domestic material was dumped into this area or that settlement was nearby.

Perhaps the clearest indication for this is from the Roman sample 39 which contained the remains of the 'granary weevil' *Sitophilus granarius* and the 'saw toothed grain beetle' *Oryzaephilus surinamensis*. Both of these species are only associated with grain and granary waste and are not found in the natural environment. Similarly deposits from both periods do contain species such as *Lathridius minutus, Cryptophagus spp., Mycetea hirta,* and *Typhaea stercorea* that are common in settlement deposits and waste in the archaeological record

(Hall and Kenward 1990; Kenward and Hall 1995). Equally the 'woodworm' *Anobium punctatum* is usually associated with settlement timbers.

2006 FLOODPLAIN SEQUENCE

Introduction

The insects sorted by Wendy Carruthers from samples 2011 and 1407 were not identifiable since they consisted of small fragments or undiagnostic elements. However, it is clear that preservation is quite good. Equally, a quick scan of the plant macro fossil flots showed that well-preserved insects fragments were present. If larger volumes of this material were paraffin-floated reasonably large and interpretable insect faunas should result.

Conclusions

This assessment of the insect remains from The Pilgrims' School, Winchester suggests that these deposits do contain reasonably large and interpretable faunas. However, the faunas are comparatively small and probably function best as an additional line of evidence to any pollen and plant macrofossil studies from these deposits. They clearly suggest that during the Roman period the area was open and probably periodically flooded. It also appears to have had settlement waste dumped onto it.

A similar pattern is also suggested for the medieval deposits, though there is clearer evidence for a body of very slow-moving or still water.

Recommendations

A fuller analysis of the insect faunas from these samples would result in an improved understanding of the environments surrounding these channels and the depositional regime present. This would be particularly true if larger faunas were available for study. It is suggested that the material presently reserved from these samples should be processed and analysed at the same time as the existing faunas. At present I know of no other archaeological insect faunas from Winchester, or the area surrounding the town, except for the single brief report on the contents of a medieval latrine (Jones *et al.* 1991).

It is recommended that the insect faunas from samples 39, 43, 51 and 49 from 2005 are fully analysed. It is also recommended that any unprocessed material from these contexts is also processed and the insect faunas analysed. Equally, the three samples of material from the 2006 boreholes also need to be examined. In this case any remaining unprocessed material form these contexts and the existing plant macro fossil flots will need to be processed and paraffin floated.

Time to complete this work:

3.5 days processing and sorting
2.5 days laying out of insect fauna
2 days identification
1 day table preparation and statistics
1 day report writing

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Table 1: The Insect Remains from The Pilgrims' School, Winchester

Sample No.	**39**	**43**	**40**	**45**	**51**	**49**	**47**
Processed Weight (kg.)	7	6.5	9	5.5	6	7.5	6.5
Processed Volume (L.)	5	5	6	5	5	6	5
COLEOPTERA							
Carabidae							
Nebria salina Fairm. Lab.	+	-	-	-	+	-	-
Dyschirius globosus (Hbst.)	-	+	-	-	-	-	-
Trechus spp.	+	-	-	-	-	-	-
Bembidion spp.	+	-	-	-	+	-	-
Agonum spp.	-	+	-	-	-	-	-
Amara spp.	+	+	-	-	-	-	-
Calathus spp.	+	-	-	-	-	-	-
Hydraenidae							
Hydraena spp.	-	-	-	-	+	-	-
Octhebius minimus (F.)	-	-	-	-	+	-	-
Octhebius spp.	-	-	-	-	+	-	-
Helophorus spp.	+	-	-	-	+	-	-
Limnebius spp.	-	+	-	-	-	-	-
Hydrophilidae							
Coelostoma orbiculare (F.)	+	-	-	-	+	-	-
Cercyon spp.	-	-	-	-	-	+++	-
Cercyon spp. (Aquatic)	+	-	-	+	-	-	-
Laccobius spp.	+	-	-	++	-	-	-
Cymbiodyta marginella (F.)	++	-	-	-	-	-	-
Orthoperidae							
Coryopholous cassidoides (Marsh.)	-	-	-	-	-	+	-
Staphylinidae							
Omalium spp.	-	-	-	-	-	+	-
Lesteva spp.	-	+	-	-	+	-	-
Trogophloeus spp.	-	+	-	-	-	-	-
Oxytelus spp.	+	++	-	-	+	++	-
Platystethus arenarius (Fourc.)	+	-	-	-	-	-	-
Stenus spp.	++	-	-	-	-	+	-
Xantholinus spp.	-	-	-	-	-	++	-
Lathrobium spp.	-	-	-	-	+	+	-
Tachyporus spp.	-	-	-	-	+	+	-
Helodidae							
Helodidae gen & spp. indet	-	-	-	-	+	-	-
Dryopidae							
Dryops spp.	-	+	-	-	-	-	-
Elmis aenea (Müll)	+	++	-	-	+	-	-
Oulimnius spp.	-	++	-	-	+	-	-
Nitidulidae							
Brachypterus spp.	+	-	-	-	-	-	-
Cucujidae							

Sample No.	**39**	**43**	**40**	**45**	**51**	**49**	**47**
Oryzaephilus surinamensis (L.)	+	-	-	-	-	-	-
Cryptophagidae							
Cryptophagus spp.	-	-	-	-	-	+	-
Lathridiidae							
Enicmus minutus (Group)	-	++	-	-	-	-	-
Corticaria spp.	-	-	-	-	-	+	-
Mycetophagidae.							
Typhaea stercorea (L.)	-	-	-	-	-	+	-
Endomychidae							
Mycetaea hirta (Marsh.)	-	-	-	-	-	+	-
Anobiidae							
Anobium punctatum (Geer.)	+	+	-	-	+	+	-
Ptinidae							
Ptinus spp..	+	-	-	-	-	-	-
Anthicidae							
Anthicus spp.	-	-	-	-	-	+	-
Scarabaeidae							
Trox scaber (L.)	+	-	-	-	-	-	-
Geotrupes spp.	+	+	-	-	-	-	-
Onthophagus spp.	+	-	-	-	-	-	-
Oxyomus silvestris (Scop.)	+	+	-	-	-	-	-
Aphodius spp.	++	+	-	-	+	-	-
Phyllopertha horticola (L.)	+	-	-	-	+	-	-
Chrysomelidae							
Chaetocnema spp.	-	-	+	-	-	-	-
Scolytidae							
Scolytus spp.	+	-	-	-	-	-	-
Leperisinus varius (F.)	+	-	-	-	-	-	-
Curculionidae							
Apion spp.	+	-	-	-	++	-	-
Sitona spp.	++	-	-	-	-	+	-
Tanysphyrus lemnae (Payk.)	-	-	-	-	+++	++	-
Bagous spp.	++	+	-	-	-	-	-
Sitophilus granarius (L)	+						
Ceutorhynchus spp.	++	-	-	-	+	-	-
Tricoptera	++	++	++	++	++	-	-

ASSESMENT OF THE MOLLUSCS

Carl Champness (OA)

Introduction

A total of 9 samples were assessed from an evaluation and borehole survey from The Pilgrims' School, Hampshire (AY234). The samples derive from a range of different deposits and cover the early prehistoric to the Romano-British periods. The purpose of the work was to ascertain if the molluscan assemblages retrieved could provide data on the local site environment for the various phases of activity represented.

Site location and Geology

The site lies within the south east corner of Winchester Cathedral Close, a Scheduled Ancient Monument (Hants 585) and part of the Roman town. National Grid Reference (SU 4829 2905). The site is situated on the valley floor to the west of the River Itchen that flows from north to south.

The geology comprises Upper Chalk of the Cretaceous Epoch overlain by floodplain gravels dating from the late Quaternary period (BGS sheet 299D) which are in turn overlain by peat and floodplain silts.

Aims

At the most basic level the assessment aimed to:

- Determine the presence/absence of molluscan remains
- Give preliminary data on taxonomic content
- Indicate the potential for further work

Specific research aims:

- Help identify the changing environment of the floodplain
- Indicate the affects of Roman drainage practices on the floodplain

Method

Assessment was carried out on a mixed sampling assemblage of small 2 litre samples, specifically collected for the retrieval of waterlogged plant remains, and bulk samples that were taken for the retrieval of charred plant remains, but were also found to contain molluscs. The sediment was floated in water onto 0.5 mm mesh and the flots retained wet. The residues were also sieved to 0.5mm and examined. Both the flots and residues were then scanned under a binocular microscope at magnifications of x10 and x20 and the abundance of taxa recorded. Flotation was generally found to have given poor shell recovery as many of the molluscs were incrusted with tufa and were found not to float.

The abundance of taxa was recorded on a sliding scale of + (present, 1-5 individuals), ++ (some 6-10), +++ (many 11-25), and ++++ (26-51) +++++(abundant 51+). An estimate was also made of the total number of individuals in each flot excluding *Cecilioides acicula*. This species was excluded because it burrows deeply and provides no useful information on conditions as a sediment or soil formed. *C. acicula* can be extremely numerous and its inclusion in the total tends to obscure the results from the other species. The results are presented in Tables 1. For the purposes of assessment the species are grouped at a very basic level by ecological preferences following Boycott (1936), Ellis (1926), and Evans (1972),. Nomenclature follows Kerney (1999).

Results (see Table 1)
Preservation and abundance of molluscan remains were highly variable in the assemblage, ranging from low to poor from the samples examined from the palaeochannel sequence in Borehole 2 and moderate to good from the floodplain sequence in Borehole 14. The samples from the floodplain sequence, contexts 1404, 1405, 1406, 1407 and 1408 produced well preserved and rich assemblages, some of which would be suitable for further analysis. Also one sample <53>, context 150, part of the possible Roman rampart deposit, produced a rich assemblage of well preserved shells. The abundance and diversity of species through the assemblage may be a reflection of the nature and diversity of the prevailing local habitat, i.e. woodland, arable, pasture and/or the mode and energy of deposition.

The results of the assessment indicate certain changes in the local environment can be detected through time, although there appears to be a low diversity and a high degree of consistency within the whole assemblage. Floodplain taphonomies can be difficult to interpret as the molluscan assemblages can be very mixed and receive inputs from several sources. A pragmatic approach has been adopted here, in that the samples are taken to represent the wider floodplain environment and due consideration has been given to the fact that they are likely to have undergone a degree of reworking. For convenience, the samples are discussed in chronological order to develop a picture of the changing floodplain environment.

On the whole the early pre-Roman floodplain assemblage (context 1405-1408) consisted of totally open country/wetland grassland fauna up until the early Roman period. They include, *Vallonia pulchella, Succinea or Oxyloma, Cochlicopa lubericella, Trichia hispida and Cepaea sp.* A small range of freshwater species of *Valvata cristata*, *Valvata piscinalis, Bithynia sp*. *and Lymnaea truncatula* were also present. The presence of both a typical damp grassland fauna with a amphibious element have been previously thought to indicate floodmeadow (Robinson 1992). The absence of certain slum species like *Anisus leucostoma* would indicate that this environment would not have seasonal inundated and would most likely have been lightly grazed.

The samples from the palaeochannel 2009 2010 and 2011 from Borehole 2, produced a very poor assemblage of flowing water species. Only a few of these were readily identifiable and preservation is limited to the more robust shells. The assemblage consisted of *Bathyomphalus contortus* and *Planorbis spirorbis* with frequent well-broken up shell fragments. This is consistent with a slow flowing channel of the River Itchen that was believed to cross the site before it was diverted in the Roman period (Biddle 1983).

The Roman assemblage (context 1404) shows a continuation of damp grassland conditions and a gradual reduction in aquatic species. The reduction of fresh water species within the sample corresponds with the reclamation of the floodplain in the 2nd century AD. This surface would likely have become much drier as indicated by the increase of terrestrial/marsh species compared to that of aquatics. The area may still have been prone to waterlogging and occasional flooding as indicated by the presence of *Valvata cristata* and *Valvata piscinalis* within the assemblage.

By the time of the construction of the Roman embankment of the town (context 150), the site appears to have become much drier and more suitable for settlement. Shade loving species of *Discus rotundatus*, *Carychium minimum* and *Oxychilus cellarius* appear in the assemblage, possibly indicating the presence of nearby hedges or scrub vegetation. The continued dominance of open wet grassland fauna within the assemblage may indicate that a much more diverse range of habitats existed in this area at this time. The presence of shade loving species may indicate that this area was not being so heavily grazed as before and shrub

vegetation was able to become more established. One note of caution is that this mixed assemblage could also be the result of reworking caused by the practice of rubbish dumping.

Recommendation for further analysis
In general the majority of samples have limited potential for further work considering the poor preservation throughout the sequence. Only contexts 150 from Trench 1, and context 1404 and 1405 from Borehole 14, have sufficient numbers for full analysis. It therefore recommended that a complete sorting of all flots from Borehole 14 be undertaken to provide a full count of snails from the early floodplain sequence. These samples should also include context 150, from Trench 1 that represents the Roman rampart that is not present within the Borehole 14 samples. The confirmation of the snail identifications and full analysis of the flots will help to provide greater detail about the environmental changes that occurred during the Roman drainage of the floodplain and after.

Time for further analysis:

Tasks	**Days**
Sorting and counting	3
Preparation of text	1

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Table 1: Molluscs assessment

+ (present, 1-5 individuals), ++ (some 6-10), +++ (many 11-25), and ++++ (26-51) +++++(abundant 51+)

Feature type		Channel sequence (BH2)			Floodplain sequence (BH14)					Roman Rampart (TR1)
Context		2009	2010	2011	1404	1405	1406	1407	1408	150
Depth (m)		2.64-2.96	2.96-3.64	3.64-3.80	2.24-2.42	2.42-2.61	2.61-2.75	2.75-2.89	2.89-3.04	1.70-2.00
Volume processed (litres)		2	2	2	2	2	2	2	2	2
Total no. shells		1	0	4	87	90	49	10	16	215
Taxa	**Habitat**									
Valvata cristata (Müller)	D				+	+++	+		+	+++
Valvata piscinalis (Müller)	F				+	++	+++	+	++	+++
Bithynia spp. (Linnaeus)	F				+					+
Carychium minimum (Müller)	T(m)s									++
Lymnaea truncatula (Müller)	S M				+	+				
Ancylus fluviatilis (Müller)	F								+	
Succinea/Oxyloma sp.	Tmo				+	+++	+	+		+++
Cochlicopa sp.	T(m)				+					++
Vertigo pygmaea (Draparnaud)	T(m)o				+	+				+
Pupilla muscorum (Linnaeus)	To				+	+	+		+	++
Vallonia costata (Müller)	To									+
Vallonia excentrica (Sterki)	To				+					+
Vallonia pulchella (Müller)	T(m)o				++	+	+			+++
Vallonia sp.	T(m)o				++	+	+	+	+	+++
Nesovitrea hammonis	Tc				+	+				+
Oxychilus c.f. *cellarius*(Müller)	Ts									++
Discus rotundatus (Müller)	Ts							+		+++
Trichia hispida (Linnaeus)	Tc(m)o			+	++++	+++	+++	+		+++++
Cepaea/Arianta sp.	Tc(m)									++
Psidium sp.	Tm Sl D C			+		+	+	+		+

Feature type		Channel sequence (BH2)			Floodplain sequence (BH14)					Roman Rampart (TR1)
Context		2009	2010	2011	1404	1405	1406	1407	1408	150
	F									
Bathyomphalus contortus (Linnaeus)	F	+		+						+
Planorbis spirorbis (Linnaeus)	F	+								+

F = Flowing water species require a clean stream with a current.
S= Slum species are those able to live in water subject to stagnation, drying up and large temperature variations.
D= Ditch species require clean slowly moving water often with abundant aquatic plants.
C = Catholic species that tolerate a wide range of conditions except the most extreme of environments
T = Terrestrial
m = Obligate marsh species
o = Open country
s = Shaded environments
c = Catholic (species that tolerate a wide range of conditions except the most extreme of environments)
(m) = Terrestrial species that can live in wet conditions

ASSESSMENT OF MICROSTRATIGRAPHY

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Introduction

The sediments and archaeological sequence at The Pilgrims' School was investigated by Oxford Archaeology (Project Manager, Ben Ford) in the summer of 2005, and this included Trenching and coring of samples through the Roman to medieval deposits. A number of cores/monoliths were received for the assessment of their microstratigraphy from Seren Griffiths (Oxford Archaeology), namely monolith samples 36, 37, 38 and core BH1. At The Pilgrims' School, microstratigraphic assessment entailed soil micromorphology and complementary chemistry, magnetic susceptibility and pollen investigations (Table 1, below).

Samples and methods

Parts of the monoliths were selected for thin section/bulk chemistry and microfossil/pollen sampling (in all 11 bulk and 36 pollen samples). Depths of these samples were measured and contexts identified (Table 1), according to information received from Oxford Archaeology (Seren Griffiths and Steve Teague). In all, 5 thin section, 2 bulk chemistry and 8 palynological (pollen) samples were selected for assessment.

Chemistry and magnetic susceptibility

Analysis was undertaken on the fine earth fraction (i.e. <2 mm) of the samples. Phosphate-Pi (inorganic phosphate) and phosphate-Po (organic phosphate) were determined using a two-stage adaptation of the procedure developed by Dick and Tabatabai (Dick and Tabatabai, 1977) in which the phosphate concentration of a sample is measured first without oxidation of organic matter (Pi); and then on the residue following alkaline oxidation with sodium hypobromite (Po).
In addition to χ (low frequency mass-specific magnetic susceptibility), determinations were made of χmax (maximum potential magnetic susceptibility) by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. χconv (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, viz: (χ/χmax) x 100.0 (Scollar *et al.* 1990; Tite 1972). In many respects this is a better indicator of magnetic susceptibility enhancement than raw χ data, particularly in cases where soils have widely differing χmax values (Crowther 2003; Crowther and Barker 1995). A Bartington MS1 meter was used for magnetic susceptibility measurements. χmax was achieved by heating samples at 650°C in reducing, followed by oxidising conditions. The method used broadly follows that of Tite and Mullins ((Tite and Mullins 1971), except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment (after Graham and Scollar 1976; Crowther and Barker 1995). LOI (loss-on-ignition) was determined by ignition at 375oC for 16 hours (Ball 1964) – previous experimental studies having shown that there is no significant breakdown of carbonate at this temperature. Pb, Zn and Cu were determined by atomic absorption spectrophotometry following extraction with 1N hydrochloric acid.

Palynology

Eight pollen samples (Table 2) were sent to the University of Wales, Lampeter, for pollen preparation where the chemical preparation methods and methods for determining pollen

concentrations were carried out and described according the literature (Moore *et al*. 1991; Stockmarr 1971). The prepared pollen slides were scanned, the observed pollen types were noted and a qualitative appraisal of the frequency of taxa was made. Additional notes were also made on pollen concentrations and pollen preservation.

Soil Micromorphology

After the monoliths had been subsampled for bulk and pollen analyses monolith 36 and layer 323 from monolith 37 were impregnated with a crystic resin mixture, cured and prepared for selective thin section manufacture (Goldberg and Macphail, 2006). Impregnated blocks were selectively cut up into five 75 x 50 mm size blocks (Table 20; Figs 1 and 2)(Goldberg and Macphail 2006). These blocks were sent to Quality Thin Sections, Tucson, Arizona for thin section manufacture (Murphy 1986). Remaining impregnated material was retained for further work and/or archiving. Thin sections were analysed under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were briefly described and their geoarchaeological character assessed (Bullock et al. 1985; Courty *et al*. 1989; Goldberg and Macphail 2006; Stoops 2003). Overall, the microstratigraphy was assessed in the light of a 2005 assessment of Staples Gardens, Winchester (Macphail *et al*. 2005) and results from small English settlements and towns, including Roman and medieval London, for example (Atkinson and Preston 1998; Macphail 2001, 2002; Macphail *et al.* 2004, In press).

Results

Chemistry and magnetic susceptibility

The analytical data are presented in Table 1. In the absence of control samples, the results have been characterised on the basis of criteria used in the interpretation of previous analytical data from the nearby Staple Gardens excavation, Winchester (Crowther, 2005). According to these criteria, neither of the present samples shows clear signs of phosphate-P enrichment – though this characterisation will need to be re-assessed if further samples are analysed from The Pilgrims' School site. It should also be noted that the χ max values recorded are both very low. This is indicative of a low Fe content, which could be attributable to Fe loss through gleying. The notable features of the two samples are as follows:

Sample 309

- organic rich
- likely Pb enrichment

Sample 310

- very strong magnetic susceptibility enhancement – though this may need to be interpreted with caution if the context has been subject to post-depositional gleying

Palynology

Pollen concentrations in Monolith 36 are very variable, from rich (parts of 309 and 318) to sparse (310 and also within 309). Preservation is also equally variable. Pollen scanning found overwhelming grassland pollen types, and few trees. Even though cereals can be abundant, there are few 'supporting' arable weeds present. There are therefore indications of 'grazing' with inputs from stabling materials. Some samples have a very high potential,

others have a good potential, whereas some can be counted with difficulty if important questions need answering. Sample BH1 (33 cm) is uncountable.

Soil micromorphology

Findings from the four thin sections are given in Table 4, and illustrated in Figures 1-11. Although mixed, M323 appears to shows inputs of constructional, latrine, cooking and animal management waste (Figs 4-7). Mixed layers also appear in thin section samples M310A, 309B and M309A, with characteristics of constructional debris (Figs 8-9), and animal husbandry waste (Figs 2-3, 10-11), but there is very little evidence of domestic or industrial waste being deposited. Importantly, the good preservation shows possibly clearly distinctive inputs of stabling waste that probably underwent weathering (on the manure heap?) and some charring/burning, whilst other microstratigraphic units (e.g., within 309B) appear to be layers of a) raw stabling crust (Figs 10-11) and b) possible 'unused' fodder/bedding.

Discussion and suggested further study

Roman (AD 150-200 + earlier):

Context (323) from monolith 37 was chosen for assessment because of its humic content. There is concordance between the palynology and soil micromorphology assessments; materials of mixed provenance are present. It is suggested that a full pollen species list is produced alongside full soil micromorphological analysis, in order to characterise this example of Roman rubbish disposal, in terms of both domestic, latrine and animal husbandry waste. It certainly has a stronger domestic component than the post-Roman deposits assessed so far, and will act as a useful comparison. The deposits can be compared to those analysed from Anderida Fort (Pevensey), Heybridge small town, Essex and No 1 Poultry, urban London, for example, where roadside and other urban middening was characterised by major inputs of stabling waste ((Hill and Rowsome In prep; Macphail *et al*. 2004; Macphail and Linderholm In press; Rowsome 2000).

Post-Roman 'peat' (Contexts 310-309):

It is clear from the chemistry (evidence of burning, moderately high phosphate and Pb enrichment in places) and soil micromorphology that the organic deposits are not peat-like. Equally, there are some anomalous pollen characteristics (e.g., lack of dominant wetland plants) also arguing against the deposits being peat. In fact, the 'peats' appear to have a strongly anthropogenic character and probably reflect local 'urban' land use/use of space in this part of Winchester (near the Cathedral). Although constructional debris may be present (cf. outside space in front of medieval Magdeburg Cathedral; (Goldberg and Macphail, 2006), there appears to be a dearth of domestic, industrial and latrine waste here (cf. Early Medieval London Guildhall; (Macphail *et al.* In press). Instead, waste from animal husbandry appears to dominate (Goldberg and Macphail 2006). Moreover, there appears to be two types of waste present that needs to be investigated; a) charred and mixed material that seems to have come via the dung heap (not common at the London Guildhall (Bakels 1988; Mücher *et al.* 1990) and b) raw stabling waste and possible 'unused' fodder and bedding material (Macphail *et al*. 2004). Clearly the following questions can be addressed:

How was this area of Winchester used?

- How was animal husbandry waste managed – in contrast to the London Guildhall site was dung being managed for local manuring; was this an area of dung heaps?
- In the examples of raw stabling waste and possible fodder/bedding, the exact components of the animal foddering regimes/grazing practices may be addressed from a combined soil micromorphological, chemical and palynological study.

- According to the dating, these deposits may act as useful comparisons to the assessed domestic and industrial 'floor' deposits at Staple Gardens.

Thin section M310B and further pollen samples should be processed and analysed to attempt to fine tune the suggested hypotheses concerning the understanding these deposits, supported by an extra bulk study.

Medieval silts (Context 318):

These deposits, as shown by their limited soil micromorphological study (top of M309A; Figs 1-2) and pollen assessment, do not simply appear to be overbank flood silts. Their anomalous character includes a rich pollen content including cereal type, but without associated arable weeds types, which does not seem consistent with upstream erosion of arable land. Instead, the assessment indicates the deposit appears to be influenced by localised activities, which as yet remain enigmatic, but certainly seem different from those found in the underlying contexts (309-310). It is therefore suggested that contexts 318 and 308 should be studied in order to understand better exactly what is going on in this area. This can be achieved through a series of bulk (x4), pollen (x3) and thin section (x2) studies.

Table 2: Microstratigraphy: Bulk analytical data

Sample	LOI (%)	Phosphate-P_i (mg g^{-1})	Phosphate-P_o (mg g^{-1})	Phosphate-P[$] (mg g^{-1})	Phosphate-P_i:P (%)	Phosphate-P_o:P (%)	□ (~10^{-8} SI)	□$_{max}$ (10^{-8} SI)	□$_{conv}$[¶] (%)	Pb[†] (□g g^{-1})	Zn[†] (□g g^{-1})	Cu[†] (□g g^{-1})
309	**34.4**	3.372	0.545	3.92	86.1	13.9	10.5	254	4.13	**736***	84.5	47.4
310	8.69	2.889	0.330	3.22	89.7	10.3	36.8	129	**28.5*****	371	55.9	27.9

Notes – Provisional interpretation based on previous samples analysed from Staple Gardens Excavation:

§ **LOI:** Sample 309 (highlighted) is organic-rich

$ **Phosphate-P:** Moderately high values, but may not be indicative of enrichment (critical threshold = 5.00 mg g^{-1})

¶ **□:** Figures highlighted in bold show signs of magnetic susceptibility enhancement: * = enhanced (□$_{conv}$ = 5.00-9.99%), ** = strongly enhanced (□$_{conv}$ = 10.0-19.9%), *** = very strongly enhanced (□$_{conv}$ ≥20.0%)

† **Pb, Zn and Cu:** Figure highlighted in bold and asterisked for Pb would appear to show signs of enrichment

Table 3: Pollen assessment
(Nomenclature follows Moore *et al*.,1991; Stace, 1991, Bennet *et al*., 1994)

SAMPLE	234/36	36	36	36	36	36	BH1	37
Height(m aOD)/depth on core	31.12	31.20	31.22	31.30	31.34	31.45	33cm	44cm
Context	***310***	***310***	***310***	***309***	***309***	***318***	***?***	***323***
TALL WOODY TAXA								
Acer		*						
Betula								*
Corylus t.		*	*		*			
Lonicera (?)					*	*		
Quercus	*	*			*			
Salix		*						
Sambucus								*
HERBACEOUS TAXA AND DWARF SHRUBS								
Cereal t.			**	***		***		*
Achillea t.	*			*	*	*		*
Calluna					**	*		
Caryophyllaceae		*						
Centaurea nigra t.				*				*
Chenopodiaceae					*			*
Galium t.			*		*	*	*	
Lactuceae	*	*	*	*	**	**		*
Lotus t.		*						
Plantago lanceolata	*			*			*	*
Plantago maj/media				*				*
Poaceae	***	**	***	***	**	***	*	**
Polygonum t.						*	*	
Rumex acetosa t.	*			*				*
Rumex oxyria t.			*	*	*		*	*
Sinapis t.	*	*						
Solidago virgaurea t.						*		
Stachys sylvatica t.	*							
Trifolium t.	*							*
Umbelliferae				*				
Urtica t.								*
Veronica t.			*				*	
Vicia t.				*				
MOIST SOIL & AQUATIC TAXA								
Caltha t.					*	*		
Cyperaceae		*	*					
Equisetum			*					

SAMPLE	234/36	36	36	36	36	36	BH1	37
Filipendula	*		*	*				
Ranunculus t.	**		**	*		*		*
Myriophyllum	**							
SPORES								
POLYPODIACEAE					*			
NOT IDENTIFIED						*	*	
UNIDENTIFIABLE	*		*	*	**	*	*	*
POLLEN CONCENTRATIONS	++	+	+	+++	+	+++	-/+	+
POLLEN PRESERVATION								
Normal	**	**	***	***	**	***	**	**
Crumpled	*	*	*	*	*	*		
Corroded	*	*				*	*	*
Degraded	*	*	**	**	**	**	*	*
Split	*	*	**	*	*	*	*	*

Key 1. Frequency of pollen types and pollen preservation categories

*** Abundant
** Frequent
* Present

Key 2. Pollen concentrations

++++ Very rich (eg. stabling/floor crust, rich peat/lake sediments)
+++ Rich
++ Countable
+ Countable with difficulty
- Not countable

Table 4: Microstratigraphy assessment

Thin section sample (Core sample)	**Chief characteristics: soil micromorphology (SM), bulk data (BD) and palynology.**	**Preliminary Interpretation**
(36)	Palynology @ 31.45 m aOD (Lower 318): rich pollen concentrations of moderately well preserved pollen, predominantly cereal type and *Poaceae* (and *Calluna* present); some things in common 31.30 m(??).	Medieval (Lower 318) Chalky silts (from core description) (Rich countable pollen)
M309A (36)	31.41-31.335 m aOD (0.50-0.57.5 m) SM: Lowermost (318): moderately well sorted chalky silts with few fine plant fragments; minor phosphatisation of chalk clasts and matrix, including both amorphous Fe/Ca/P (?) and vivianite; minor burrowing and sedimentary (muddy?) alluvial fine laminae. Junction between (309) and (318) marked by concentration of coarse woody debris and large chalk fragments, wood charcoal and large piece of burned bone and ubiquitous burned eggshell. Upper 309: very poorly sorted mixture of large chalk, slate(?), wood fragments, with coarse sand-size chalk, amorphous organic matter fragments, rare examples of strongly burned bone, partially charred amorphous organic coprolite set in ash and fine charcoal; calcitic and phosphate-stained ashey fine fabric in addition to fine biologically mixed chalky mineral and finely fragmented amorphous and charred organic matter.	Junction of Post-Roman peat (309 upper) and lowermost medieval (318) Unlikely to be simple chalky silt alluviation/overbank (Sedimentation containing organic fragments – deposits affected by nearby/later cess disposal, but overall landuse unclear.) Over – Wood and chalk building debris (also including included burned food waste)? Mixed organic dumps containing both wood and constructional(?) debris, alongside minor kitchen waste, in a sediment dominated by charred and unburned stabling waste that may also include pig dung(?). (Backyard animal husbandry?)
M309B (36)	31.35-31.26 m aOD (0.57.5-0.65 m) SM: Layered organic 'peaty' and minerogenic 'peats', BD (x309lower): 34.4% LOI, 3.92 mg g^{-1} phosphate-P, 10.5 x 10^{-8} SI χ, 4.13% χ_{conv}, 736 µg g^{-1} Pb, 84.5 µg g^{-1} Zn, 47.4 µg g^{-1} Cu	Post-Roman peat (309 lower) (Overall very organic {LOI], moderately phosphate-rich. Origins of strong Pb signal is unclear – possibly from concentrated stabling waste)??

Thin section sample (Core sample)	Chief characteristics: soil micromorphology (SM), bulk data (BD) and palynology.	Preliminary Interpretation
	("Stony peat") Coarse chalk, wood charcoal, flint, pottery, brickearth, slate? and mortar-rich layer with burned eggshell, biogenic calcite (earthworm granules), plant fragments, fine amorphous and charred organic matter (in patches), with ashes, fungal material and occasionally articulated phytoliths. Palynology @ 31.34 m aOD: sparse pollen and relatively poor preservation, yet containing interesting presence of woody taxa pollen types and *Calluna*, in addition to grassland pollen types.	Mixed constructional and burned organic debris (animal husbandry?)? (Interesting and countable pollen)
	Layered horizontally oriented blackened long lengths of Poaceae plant fragments, often intercalated with fine mineral material; with few pot, chalk and flint stones.	Dominantly dumped raw stabling waste?
	Two layers, a basal layer of Layered horizontally oriented blackened long lengths of Poaceae plant fragments, often intercalated with fine mineral material; overlain by layered Poaceae, but containing plant cells and organ fragments. Palynology @ 31.30 m aOD: rich pollen concentrations; very abundant grasses and cereal types, and herbaceous taxa; probable mixed pollen preservation.	Dumps of unused bedding and fodder(?) and raw stabling waste? (Good countable pollen)
M310A (36)	31.26-31.185 m aOD (0.65-72.5cm) SM: Base of (309): similar to (310), biologically worked but more humic, more fine burned material – mineral and charcoal; Palynology @ 31.22 m aOD (309): sparse, countable with difficulty; mixed pollen preservation (very good to very poor); mainly grasses and	Post-Roman peat (junction of 309-310) 309: similar to below, but with higher organic content. 310: Deposition/dumping of burned (% χ_{conv}) poorly ferruginous (calcareous) residues of organic waste (LOI) – possibly mainly of stabling waste origin (dominance of fine charcoal, amorphous organic matter; presence of fungal material, phytoliths, ash (Pb?);

Thin section sample (Core sample)	Chief characteristics: soil micromorphology (SM), bulk data (BD) and palynology.	Preliminary Interpretation
	cereal type. 310: moderately heterogeneous poorly sorted mixture of frequent stone size flint and chalk, with very few coarse charcoal and wood fragments; occasional land snail shell, biogenic earthworm granules and slug plates present; many fine charcoal and wood fragments, and inclusions of 'humic' soil; example of burned eggshell – all set within a calcitic (includes some ash crystals and some secondary calcite formation) fine fabric containing mainly finely charred organic matter; many amorphous (dung?, including possible pig as well as herbivores) fragments, fungal bodies, phytoliths, diatoms present; after thin burrowing by mesofauna there was secondary calcite, possible patches of secondary amorphous P formation. BD (x310): 8.69% LOI, 3.22 mg g^{-1} phosphate-P, 36.8 x 10^{-8} SI χ, 28.5% χ_{conv}, 371 µg g^{-1} Pb, 55.9 µg g^{-1} Zn, 27.9 µg g^{-1} Cu Palynology @ 31.20 m aOD (310): sparse (countable with difficulty), moderately well preserved pollen; with frequent Poaceae, but also with several tree pollen types present.	dung heap (phosphate-P) worked by mesofauna, earthworms and slugs, burned and dumped into site (?) – small number of diatoms reflecting its wet character. (Countable and useful pollen potential)
(36)	Palynology @ 31.12 m OD (Lower 310): countable, reasonably well-preserved pollen – predominantly grassland types.	(310): Post- Roman peat (Countable and useful pollen potential)
M323 (37)	0.38.5-0.46.0 mm SM: heterogeneous mixture of poorly sorted silt to small stone-size chalk, weathered chalk, flint, mortar, pot, bone, charcoal, wood/bark, shell (landsnail), coprolites including coarse fragments; with a calcitic fine fabric characterised by very abundant amorphous and fine charred organic matter; many and diverse diatoms are present; rare fungae; possible fragments of amorphous organic matter/stabling waste present with	AD150-200 + earlier Moderately biologically worked mixed mainly minerogenic building and occupation debris and waste (e.g., latrine and kitchen), with organic content possibly indicating inputs of charred stabling waste into a 'very wet' (given the variety and numbers of diatoms present) environment. (Pollen countable with difficulty but should prove informative)

Thin section sample (Core sample)	**Chief characteristics: soil micromorphology (SM), bulk data (BD) and palynology.**	**Preliminary Interpretation**
	phytoliths; abundant thin and medium size burrowing and biological mixing. Palynology @ 44.00 cm: pollen concentrations are low, although a wide variety of reasonably well preserved pollen types were noted; mainly grassland types, but also cereal type.	
BH1 (BH1)	Palynology @ 33 cm: Very low pollen concentrations, on which it would be difficult to carry out a full count; few pollen present are of grassland type.	Unclear context – compacted core sample of silty clay. (Further analysis probably not warranted)

Costs
5 bulk samples @ £55.00 + VAT (LOI, magnetic susceptibility with χ_{max}, fractionated P and heavy metals - £275.00 (+£48.12 VAT)
8 further pollen preparations @ £20.00 +VAT - £160.00
Assessment of 8 further pollen samples – 1 day @ £200.00 - £200.00
8 full pollen counts (tables and diagrams) of selected samples (after assessments and including Roman context 323) – 5 days @ £200.00 - £1,000.00
3 further thin sections from impregnated blocks @ £50.00 each - £150.00
Soil micromorphology of 7 thin sections (description, counting, microprobe where appropriate and digital recording/archive) @ 0.5 days per thin section @ £250.00 per day - £875.00
Integrated reporting 4 days @ £250.00 per day - £1,000.00
Total – £3,660.00
UCL's 10% overhead - £366.00
Total - £4,026.00

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2006 Floodplain sequence

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Introduction
Test pit and trial Trench excavations at The Pilgrims' School, Winchester in 2005 (by Oxford Archaeology, project manager Ben Ford), and the assessment of the microstratigraphy (Macphail et al., 2006) were followed up by a borehole study involving two lines of boreholes (eg BH13), one series (eg BH3) close to the line of the Roman wall (Carl Champness, pers. comm.). Two borehole samples were focused upon, namely borehole samples BH3 (1-2 m, 2-3 m, 3-4 m) and BH13 (1-2 m, 2-3 m).

Methods
Subsampling
Pollen, diatom and bulk samples were collected from Cores BH3 and BH13, prior to the removal of undisturbed sediment to be impregnated with resin and used for soil micromorphological analysis (Table 5).

Bulk analyses
Analysis was undertaken on the fine earth fraction (i.e. <2 mm) of the samples. LOI (loss-on-ignition) was determined by ignition at 375^{o}C for 16 hours (Ball, 1964) – previous experimental studies having shown that there is no significant breakdown of carbonate at this temperature. Phosphate-P_i (inorganic phosphate) and phosphate-P_o (organic phosphate) were determined using a two-stage adaptation of the procedure developed by Dick and Tabatabai (1977) in which the phosphate concentration of a sample is measured first without oxidation of organic matter (P_i), using 1N HCl as the extractant; and then on the residue following alkaline oxidation with sodium hypobromite (P_o), using 1N H_2SO_4 as the extractant. Pb, Zn and Cu were determined by atomic absorption spectrophotometry following extraction with 1N hydrochloric acid. pH (1:2.5, water) was determined using a combination electrode and the carbonate

concentration was estimated by observing the reaction when 10% HCl was added to the sample (Hodgson 1974).

In addition to χ (low frequency mass-specific magnetic susceptibility), determinations were made of χ_{max} (maximum potential magnetic susceptibility) by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. χ_{conv} (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, viz: (χ / χ_{max}) x 100.0 (Tite 1972; Scollar *et al.* 1990). In many respects this is a better indicator of magnetic susceptibility enhancement than raw χ data, particularly in cases where soils have widely differing χ_{max} values (Crowther and Barker 1995; Crowther 2003). A Bartington MS2 meter was used for magnetic susceptibility measurements. χ_{max} was achieved by heating samples at 650°C in reducing, followed by oxidizing conditions. The method used broadly follows that of Tite and Mullins (1971), except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment (after Graham and Scollar 1976; Crowther and Barker 1995).

Palynology

Eight pollen samples (Tables 3-4) were sent to the University of Wales, Lampeter, for pollen preparation where the chemical preparation methods and methods for determining pollen concentrations were carried out and described according the literature (Moore *et al*. 1991; Stockmarr 1971). The prepared pollen slides were scanned, the observed pollen types were noted and a qualitative appraisal of the frequency of taxa was made. Additional notes were also made on pollen concentrations and pollen preservation.

Soil micromorphology

The undisturbed samples collected during subsampling (see above) were impregnated with a polyester resin-acetone mixture, and topped up with resin ahead of curing and manufacture into a single thin section by Quality Thin Sections, Tucson, Arizona, USA (Murphy 1986).

Thin sections were analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were briefly described according to established methods, and assessed according to the literature and previous investigations at The Pilgrims' School, Winchester. (Bullock *et al*. 1985; Courty 2001; Courty *et al*. 1989; Goldberg and Macphail 2006; Macphail and Cruise 2001; Macphail *et al*. 2006; Stoops 2003).

Results

Bulk analyses

The analytical data are presented in Table 1 and 2. Here, a broad overview of the analytical data is presented. Key features relating to individual samples are highlighted in Table 1. None of the samples have a particularly low LOI (minimum, 8.69% in sample 310), and several of the samples (highlighted in Table 1) are clearly very humic and/or comprise mixed peat and minerogenic material, and one sample (1314) is of peat. It should be noted that the LOI value recorded for sample 3008 (10.9%) is not consistent with it being a 'peat' (as described on data sheets supplied). Apart from peat sample 1314, the samples from boreholes 3 and 13 are all alkaline and quite calcareous, with an estimated carbonate content of at least 10%. The samples display very marked variability in phosphate-P, though none of the values are exceptionally high (range, 0.195-3.92 mg g^{-1}). These figures compare, for example, with a range of 6.11-12.3 mg g^{-1} recorded in nearby Staples Gardens, Winchester (Crowther, 2005). However, on the basis of the range of values observed it is reasonable to assume that samples with concentrations of $\geq$2.00 mg g^{-1} show some degree of enrichment. The exceptionally low phosphate-P concentration (0.195 mg g^{-1}) in peat sample 1314 reflects the very limited mineralization of organic material within the peat, either during its development or as a result of post-depositional processes. Apart from in peat sample 1314, the majority of the phosphate is present in inorganic forms. On the whole, however, the P_o:P ratio is somewhat higher than is often found in archaeological contexts.

With the exception of sample 1308, the χ_{max} values are very low (<400 x 10^{-8} SI). This is indicative of a low Fe content, which seems likely to be attributable to Fe loss through gleying associated with wet or waterlogged conditions – a factor that would also explain the apparent accumulation of organic residues within the contexts sampled and also the quite high P_o:P ratios recorded in some of the samples. Two of the samples seem to show strong or very strong signs of enhancement which is likely associated with burning (sample 1308: χ_{conv}, 15.0%; and sample 310: χ_{conv}, 28.5%), though in view of the possibility of post-depositional gleying effects, the magnetic susceptibility data do need to be interpreted with some degree of caution.

Unfortunately, heavy metal determinations were only made on two of the samples. In comparison with previous data from the Staples Garden site (Crowther 2005), only sample 309 appears to show any sign of enrichment, with a Pb concentration of 736 μg g^{-1}.

Conclusions and recommendations
Despite the limitations of the sample set noted above, some of the samples appear to show clear signs of chemical enrichment and/or susceptibility enhancement associated with human activity. These results are encouraging and suggest that analysis of a wider range of contexts, including samples of natural soils, would significantly enhance our understanding of the various soils and deposits present at the site. It is recommended that analyses of bulk samples are undertaken to complement any further thin sections investigated from the site.

Palynology
Assessment counts are presented in Tables 3 and 4.

Differences between the core BH3 and BH13.
a) Core 13.
Preservation is very variable with both excellently preserved grains and very degraded grains on the same slide, particularly in the upper samples (243.5 cm, 247 cm). Overall preservation is much better in the lower samples. Pollen concentration data show that none of the samples are very rich, but three of the samples are thought to be rich-enough for counting, albeit two would be countable with some difficulty and would probably only produce counts of 100 each. Only one of the samples (287), is thought to be uncountable; this is probably because of the presence of wood peat at this depth. All but one of the samples (247 cm), have high frequencies of arboreal and tall shrubby taxa.
b) Core 3
Pollen preservation is much better than in core BH13, but concentrations are much lower. Only one of the samples (237.5 cm) contains enough pollen for counting. In contrast to core BH13, there are few arboreal taxa, and in contrasts (especially in sample 237.5 cm) there is quite a rich herb assemblage.

Interpretation
BH13: In core BH13, abundant *Alnus* and *Corylus t*. pollen, likely shows that these trees were present in the flood-plain. Particularly interesting is the presence of *Tilia* and *Ulmus*, neither of which were observed in any of the samples from core BH3. In 243.5 cm, most *Tilia* grains appear to be well-preserved so they are unlikely to have been derived from older re-worked deposits. In contrast, many *Alnus* and *Corylus t*. are poorly preserved and may be derived from re-worked material. In the basal sample (297 cm), however, overall preservation of most pollen types is good and again suggests a lack of re-working. The presence of *Tilia* in particular, in three of the samples, is interesting as it may be consistent with peat formation of some antiquity. Greig (Greig 1996) citing Waton (Waton 1982) notes a major woodland clearance that caused a sharp reduction in trees like Tilia at 5,600 years bp in this part of southern England (sites of near Winchester). If indeed the lowermost deposits are this old, then it seems that there could have been an ancient clearance phase as represented by sample 247 cm in BH13. With regard to possible radio-carbon dating, it is suggested that dating may most usefully be carried out on the basal deposits as the upper deposits are likely to be comprised of mixed materials.

Core BH3: The rich herb community (sample 237.5 cm) found in this core, which includes pollen types typical of moist soils, is consistent with a much later date than core BH13, and is probably indicative of use of the flood-plain during a later period; Greig (1996) again citing Waton (1982) notes another woodland clearance phase at 900 bp. The possibility that pollen in the upper parts of BH3 may be of more direct anthropogenic origin also has to be considered, in the light of the earlier assessment of contexts 309 and 310 in Trench 3 excavated in 2005 (Macphail *et al* 2006), which found likely stabling waste dumps.

Soil micromorphology

Brief soil micromorphological descriptions are presented in Table 5 and Figs 1-8.

Discussion and recommendations

Combined bulk, palynological and soil micromorphological data are given in Table 5, which also outlines suggested interpretations of the selected units from each borehole core. Clearly, the lowermost part of BH13 (13014;) have the palynological potential of monitoring the 'pre-clearance' (5,600 bp??) environment for the area (3 pollen preps, 4 analyses), a study that would also benefit from bulk study of the sediments, in order to compare changes induced by the putative clearance phase (see below)(2 bulk). The deposits found in 13011-13 (Figs 1-2), e.g., at 2.43-2.53 m have the potential to elucidate the character and impact of clearance on the catchment and local area, through not only palynology but also through associated bulk and soil micromorphological analyses (3 pollen preps, 4 analyses; 2 bulks; 1 thin section, 2 soil micromorphological analyses). Vegetation (woodland regeneration?) and sediment changes in context 13010 should also be monitored (1 pollen prep, 2 analyses; 2 bulks; 1 thin section, analysis).

Attempts to build embankments and associated pedological and alluvial activity can be investigated by the analysis of thin sections of contexts 13006, 13007 and 13008 (Figs 3-4)(2 thin analyses). In borehole BH3, there appears to be plenty of evidence of pre-Roman impact/activity as found in 3007-3009 (Figs 5-6), which should be better understood after systematic analysis (2 bulk; 3 soil micromorphological analyses).Similarly a suspected period of stabilisation in 3005 can be further investigated (Figs 7-8) (1 bulk; 1 soil micromorphological analysis). Lastly, 3004 appears to have similarities to contexts 309-310 found in Trench 3 (2005), which should be identifiable from further study of these possible dumped stabling waste deposits (1 pollen prep, 2 analyses; 1 soil micromorphological analysis).

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Table 1: Chemical (excluding phosphate fractionation) and magnetic susceptibility data

Sample	Depth (m)	Description	LOI[§] (%)	pH (1:2.5, water)	CO_3^{2-} (est, %)	Phosphate-P[$] (mg g^{-1})	□ (□ 10^{-8} SI)	$□_{max}$ (10^{-8} SI)	$□_{conv}$[¶] (%)	Pb[†] (□g g^{-1})	Zn[†] (□g g^{-1})	Cu[†] (□g g^{-1})
Monolith 36 (analysed November 2005)												
309	?	Stony peat	**34.4***	n.d.	n.d.	**3.92***	10.5	254	4.13	**736***	84.5	47.4
310	?		8.69	n.d.	n.d.	**3.22***	36.8	129	**28.5*****	371	55.9	27.9
Borehole 3												
3004	1.87-1.97	Humic organic silts	**27.3***	7.9	10	**2.25***	13.1	383	3.42	n.d.	n.d.	n.d.
3007	2.38-2.46	Humic silt with peat	9.14	8.0	10	1.74	5.1	140	3.64	n.d.	n.d.	n.d.
3008	2.46-2.79	Peat	10.9	8.0	10	0.752	2.8	73.5	3.81	n.d.	n.d.	n.d.
Borehole 13												
13008	2.00-2.08	Fine sands with gravel	10.3	8.0	10	1.41	126	841	**15.0****	n.d.	n.d.	n.d.
13014	2.73-3.00	Peat	**83.6****	6.8	0	0.195	0.6	n.d.	n.d.	n.d.	n.d.	n.d.

§ **LOI:** Samples highlighted in bold are organic-rich: * = very humic or mixed peat/minerogenic material, ** = peat

$ **Phosphate-P:** Figures highlighted in bold show likely phosphate enrichment: * = enriched (none of samples are strongly or very strongly enriched)

¶ **□:** Figures highlighted in bold show signs of magnetic susceptibility enhancement: * = enhanced ($□_{conv}$ = 5.00-9.99%), ** = strongly enhanced ($□_{conv}$ = 10.0-19.9%), *** = very strongly enhanced ($□_{conv}$ ≥20.0%)

† **Pb, Zn and Cu:** Figure highlighted in bold and asterisked for Pb would appear to show signs of enrichment

Table 2: Phosphate fractionation data

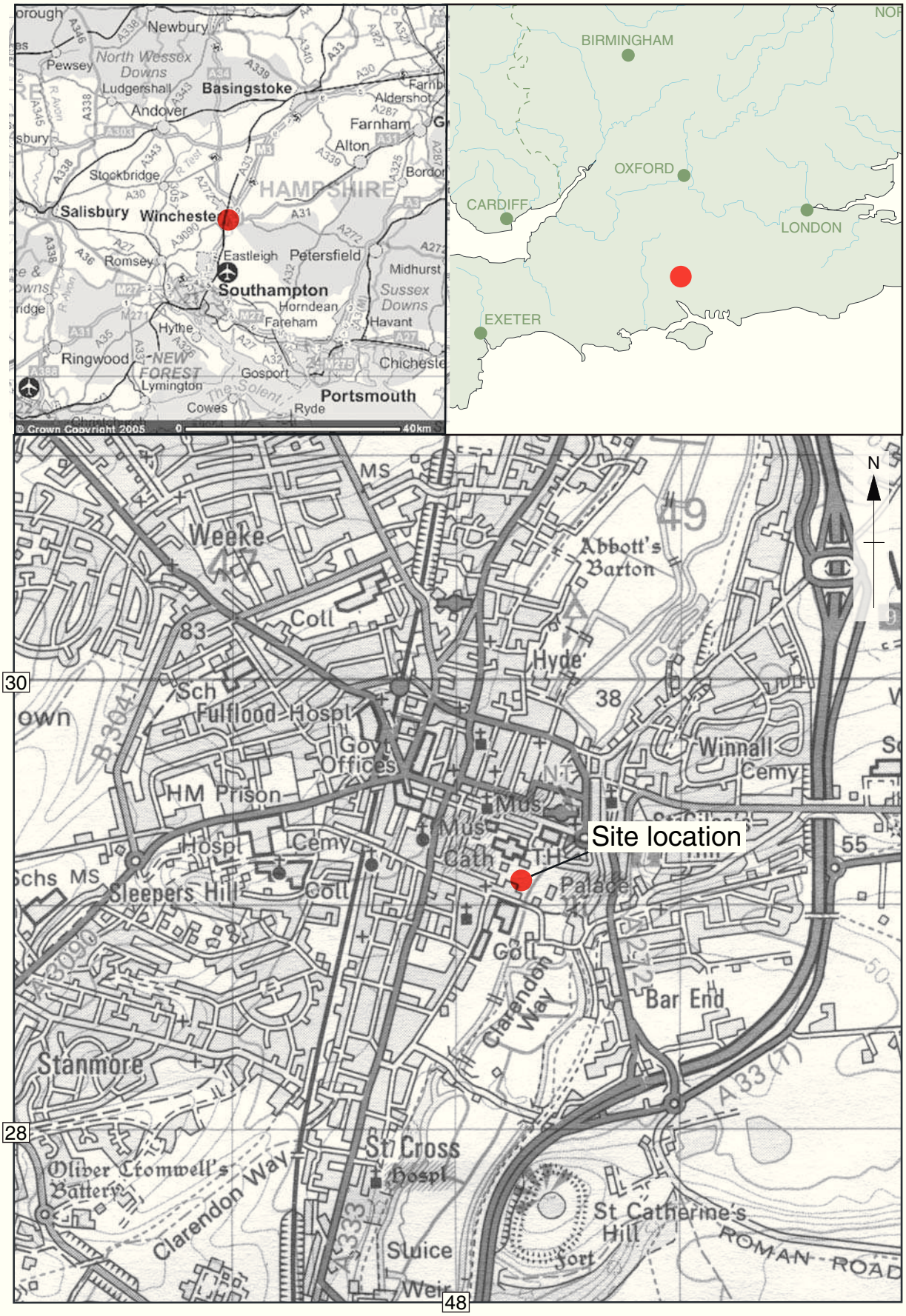
Sample	Depth (m)	Description	Phosphate-P_i (mg g^{-1})	Phosphate-P_o (mg g^{-1})	Phosphate-$P^{\$}$ (mg g^{-1})	Phosphate-P_i:P (%)	Phosphate-P_o:P (%)
Monolith 36 (analysed February 2006)							
309		Stony peat	3.372	0.545	3.92	86.1	13.9
310			2.889	0.330	3.22	89.7	10.3
Borehole 3							
3004	1.87-1.97	Humic organic silts	1.895	0.359	2.25	84.1	15.9
3007	2.38-2.46	Humic silt with peat	1.524	0.214	1.74	87.7	12.3
3008	2.46-2.79	Peat	0.590	0.162	0.752	78.5	21.5
Borehole 13							
13008	2.00-2.08	Fine sands with gravel	1.132	0.274	1.41	80.5	19.5
13014	2.73-3.00	Peat	0.098	0.097	0.195	50.3	49.7

Table 5: The Pilgrims' School, Winchester microstratigraphy assessment

Thin section sample (Core sample)	**Chief characteristics: soil micromorphology (SM), bulk data (BD) and palynology.**	**Preliminary Interpretation**
Borehole 3	***Borehole 3***	***Borehole 3***
3004 (BH3)	Palynology @ 1.89 m: non-countable herbaceous pollen suite, with probable background valley woodland. BD (1.87-1.97 m): Very humic and phosphate-enriched SM 3F (1.87-1.97 m): generally well-sorted humic to very humic calcitic silts, with silt-size rounded humic detrital clasts dominant (humified organic matter and humified tissue and organ fragments); woody fragments, stone size, mortar, Greensand and earthworm granules also present.	Alluvium of locally fluvially-worked possible humified dung residues, with woody fragments (anthropogenic origin of herb-dominated pollen suite?); included constructional and 'terrestrial' debris; high humic and phosphate-enriched bulk data is consistent with this. (Possible similarities to the dung-dominated deposits in 309-310, 2005 Trench 3) *Medieval deposits as in Trench 3*
3005 (BH3)	SM 3G (2.11-2.21 m): Very poorly sorted and heterogeneous deposit with very broad (35 mm) burrows, composed of stone size flint, 'brick', 'tile', burned shell, mortar and chalk, with charcoal, bone and possible coprolite fragments; earthworm granules throughout; upper part of slide shows biological (terrestrial) soil formation/homogenisation; lower half of slide is more alluvial (calcareous and humic silts) in character. **(Figs 7-8)**	'Terrestrial' weathered (earthworm and small mammal burrowed) soil formed in dumps and calcareous humic alluvial silts. This appears to record a period of stasis. *Clear stabilisation horizon here.*
3007 (BH3)	Palynology @ 2.33 m: non-countable herbaceous pollen suite, with probable background valley woodland. Palynology @ 237.5 m: countable herbaceous rich pollen suite with numerous woodland species. BD (2.38-2.46 m): moderately humic (in terms of peat), with moderate phosphate present. SM 3D upper (2.40-2.46 m): Part-burrowed broadly layered very organic and moderately organic very well sorted calcitic silts and calcitic silts containing humified and charred organic fragments and *in situ* plant roots; occasional fine charcoal.	Accumulation of fine silty calcareous and moderately humic 'alluvium' – with countable pollen, formed under probable open herb-dominated conditions (tall woody taxa pollen from included wood fragments) – or material of organic anthropogenic origin (reworked dung residues? possibly consistent with phosphate) – as in 3004. (Pollen analysis has the potential here to help resolve this) *Humic alluvium with palynological potential to be able to clearly interpret the local environment.*

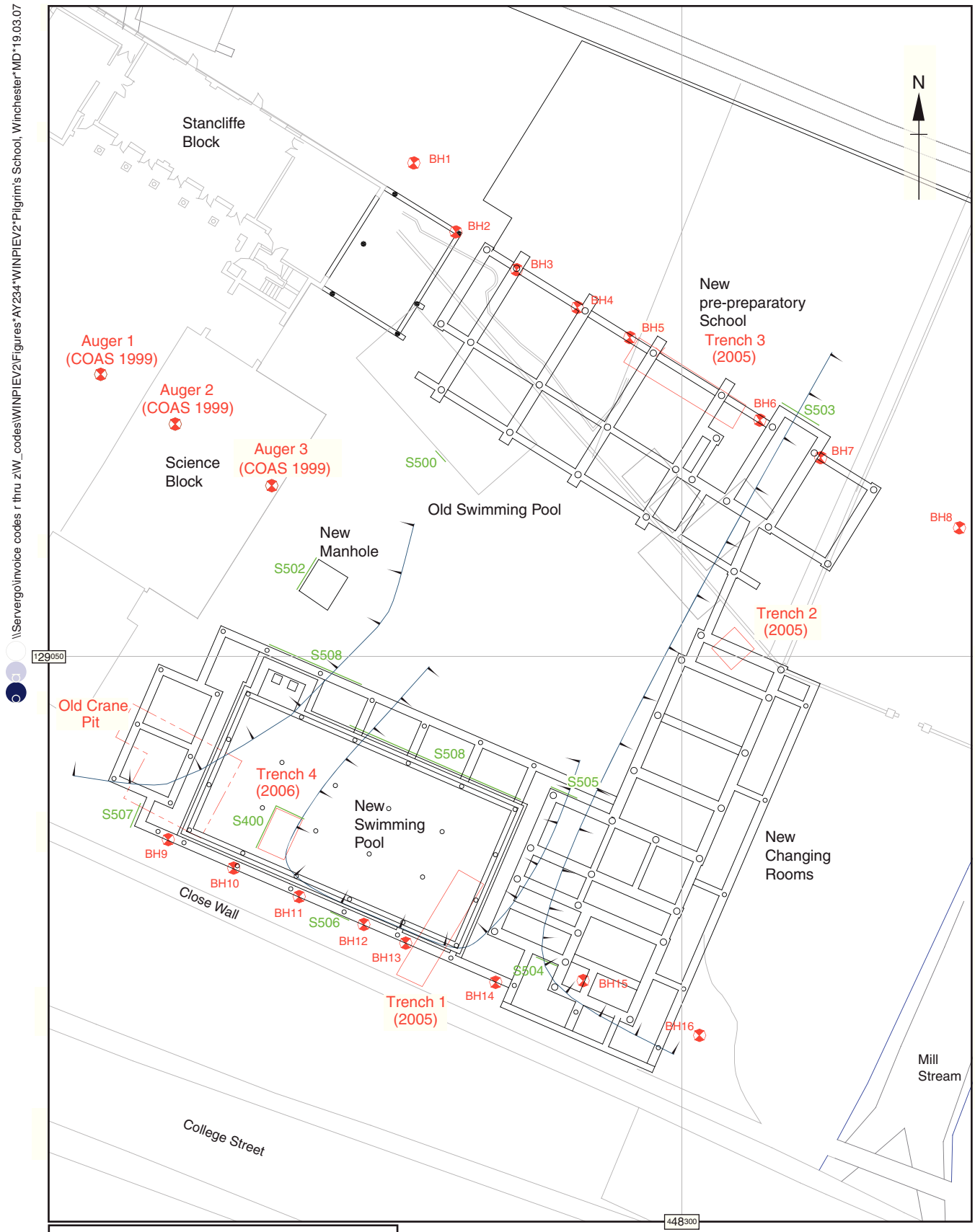
3008 (BH3)	BD (2.46-2.79 m): moderately humic (in terms of peat), with both very low phosphate content and negligible magnetic susceptibility SM 3D lower (Upper 3008; 2.46-2.50 m): Very poorly sorted, silts to gravel size quartz, flint, chalk, fossil and tufa fragments, in calcitic/tufaceous matrix that includes many charcoal and woody fragments. **(Figs 5-6)** SM 3E (Lower 3008): poorly sorted silt to small stone size quartz, chalk, 'tufa', flint and mollusc fragments; with fine and very coarse charcoal and wood fragments; possible woody roots(?); partially cemented by micritic matrix associated with *in situ* tufa formation.	Poorly humic calcareous gravels that also contain locally dumped? woody debris and charcoal; partially cemented by tufa formation; an apparent anthropogenic background signal here too. *Possible apparent signal of anthropogenic activity.* Alluvial tufa formation in poorly sorted alluvial and anthropogenic deposits, containing reworked tufa and background silts. *Possible apparent signal of anthropogenic activity.*
3009 (BH3)	SM 3E: Moderately well sorted mineral component of silt and very fine sand-size quartz and micritic material ('tufa'), partially cemented by micrite/tufa; aquatic(?) molluscs and shell fragments and *in situ* 'fleshy' roots; very abundant coarse charcoal, wood fragments and highly humified organic materials – possible fragments of stabling waste.	*In situ* calcareous fine alluvial sedimentation with mollusc fauna; weak tufa formation and vegetated surface; all contemporary with 'local' dumping of organic waste – charcoal, wood fragments and possible stabling waste. *Apparent continuing background anthropogenic activity.*
3011 (BH3)	Palynology @ 3.85m: uncountable pollen with both tall woody taxa and herbs present.	Uncountable pollen. (Palynology possibly reflects natural open conditions after 2nd clearance phase around 900 bp??) *Unfortunately insufficient pollen to analyse this pre-Roman deposit – better potential in BH13.*
Borehole 13	***Borehole 13***	***Borehole 13***
13006 (BH13)	SM 13A (upper) top c. 1.76 m: heterogeneous minerogenic silt-rich deposits; a compact mixture of clay-rich ('Bt') and clay-poor ('Eb') soil, with chalky soil, mollusc fragments, earthworm granules and rare included latrine-waste, all partially biologically worked and homogenised with calcareous silty alluvium that shows relict bedding.	Dump of mixed soil horizons from local Clay-with-Flint soils (high loess content), with small amounts of included anthropogenic inclusions, such as latrine waste, all mixed with silty calcareous alluvium. Partial biological mixing ensued. *Roman embankment constructional material dump, with both weak pedological working and possibly also affected by continuing alluviation*

13007 (BH13)	SM 13A (lower) base c. 1.90 m: very heterogeneous minerogenic silt-rich deposits; a compact mixture of clay-rich ('Bt'), clay-poor ('Eb') and humic ('Ah') soil, with chalky soil, chalk, stone-size flints, mollusc fragments, earthworm granules and many charcoal; calcareous silty and 'peaty' alluvial fragments also present.	Partially biologically worked mixture of dumped soils and anthropogenic materials, and alluvium; perhaps all locally fluvially reworked? *Again, embankment material was being affected by 'river' flow when being constructed?*
13008 (BH13)	BD (2.00-2.08 m): moderately humic (in terms of peat), moderate phosphate content, but strongly enhanced magnetic susceptibility. SM 13C 2.00-208 m: very heterogeneous mixture of soil fragments (see 1307), but with abundant coarse charcoal, flint, mortar and peats and humic (alluvial?) silts; calcite root pseudomorphs. **(Figs 3-4)**	Highly mixed dump of constructional (and industrial – inferred from strongly enhanced magnetic susceptibility) material, with both soil and 'peat' and silty alluvium also present. *Both soil and occupation (constructional and other debris) materials employed – a little evidence of weathering.*
13010 (BH13)	Palynology @ 2.435 m: countable pollen; dominant arboreal and tall woody taxa including elm and lime.	Pollen preservation suggests local growth of elm and lime, with alder and hazel pollen possibly being reworked? *Good potential for understanding 'post first clearance' environment*
13011-1312-13013 (BH13)	SM 13B (2.43-2.53 m): partially turbated but still recognisable laminated calcareous silts, and peat (both amorphous and plant-tissue-rich material; common patches of tufa and occasional (aquatic?) molluscs present. (**Figs 1-2)** Palynology @ 2.47 m: pollen countable with difficulty; tall woody taxa and herbs.	Despite some tufa formation and minor disruption well laminated humic silts and peat are present, of good integrity, consistent with the palynology. Pollen suite suggests a possible clearance phase here, that needs dating in order to compare this with the major clearance phase in the local area (i.e., 5,600 bp?). *Opportunity to elucidate woodland clearance and effects on alluvial sedimentation.*
13014 (BH13)	BD: Peat (83.6% LOI) with extremely low phosphate and no magnetic susceptibility. Palynology @ 2.87 m: not countable (wood peat layer); dominant tall woody and arboreal taxa, including lime. Palynology @ 2.97 m: pollen countable with difficulty; dominantly tall woody and arboreal taxa including elm and lime.	Pollen data indicates a pre-clearance (i.e., pre-5,600 bp?) woodland- dominated environment. *Excellent (eg 2.97 m) potential for monitoring early mid-Holocene environment.*



Scale 1:25,000

Figure 1: Site location



Foundation plan based on Drawing BTA31 by Rusby Brewster Associates

Figure 2:Site Plan

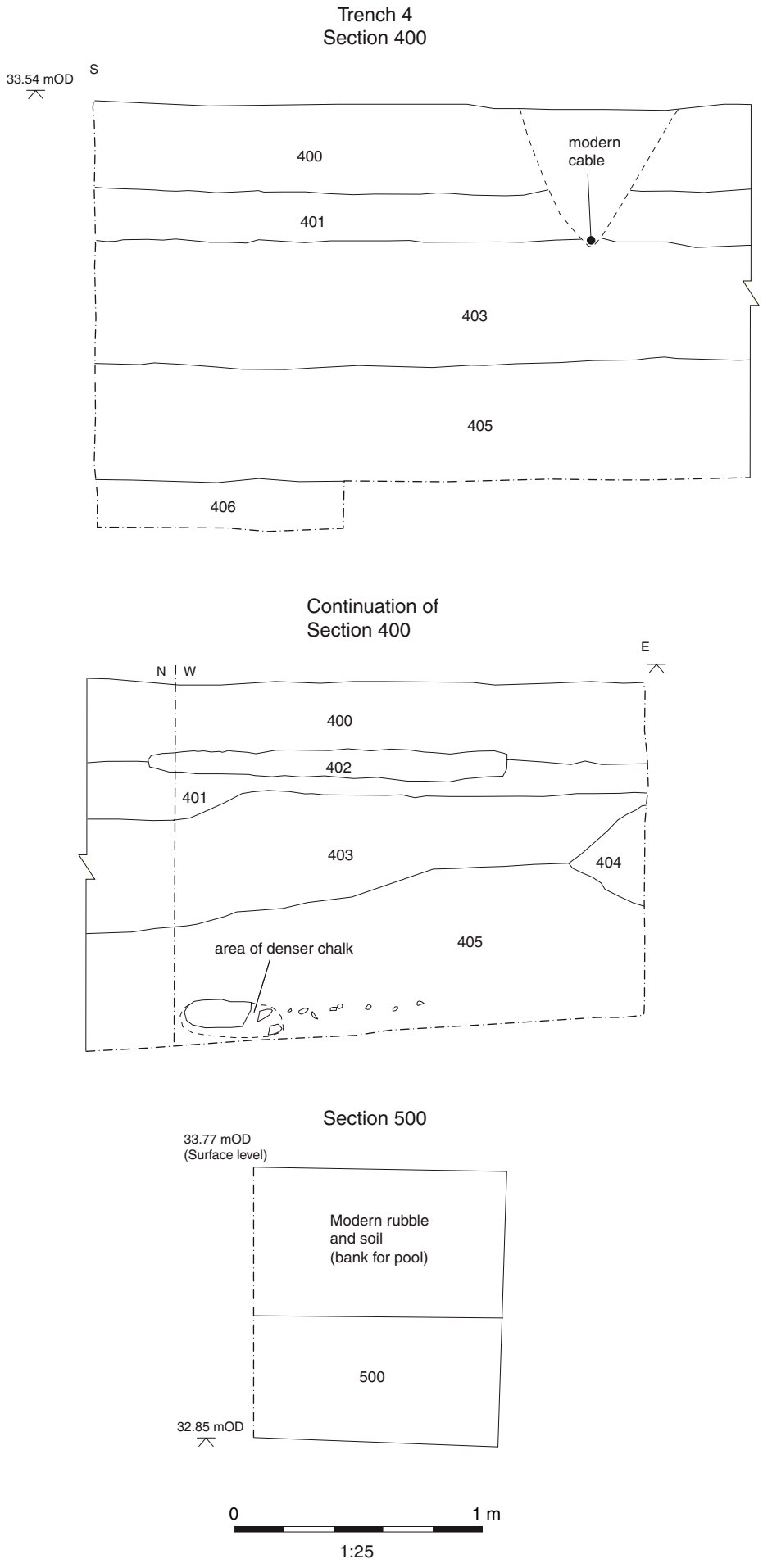


Figure 3: Trench 4, Section 400 and Section 500

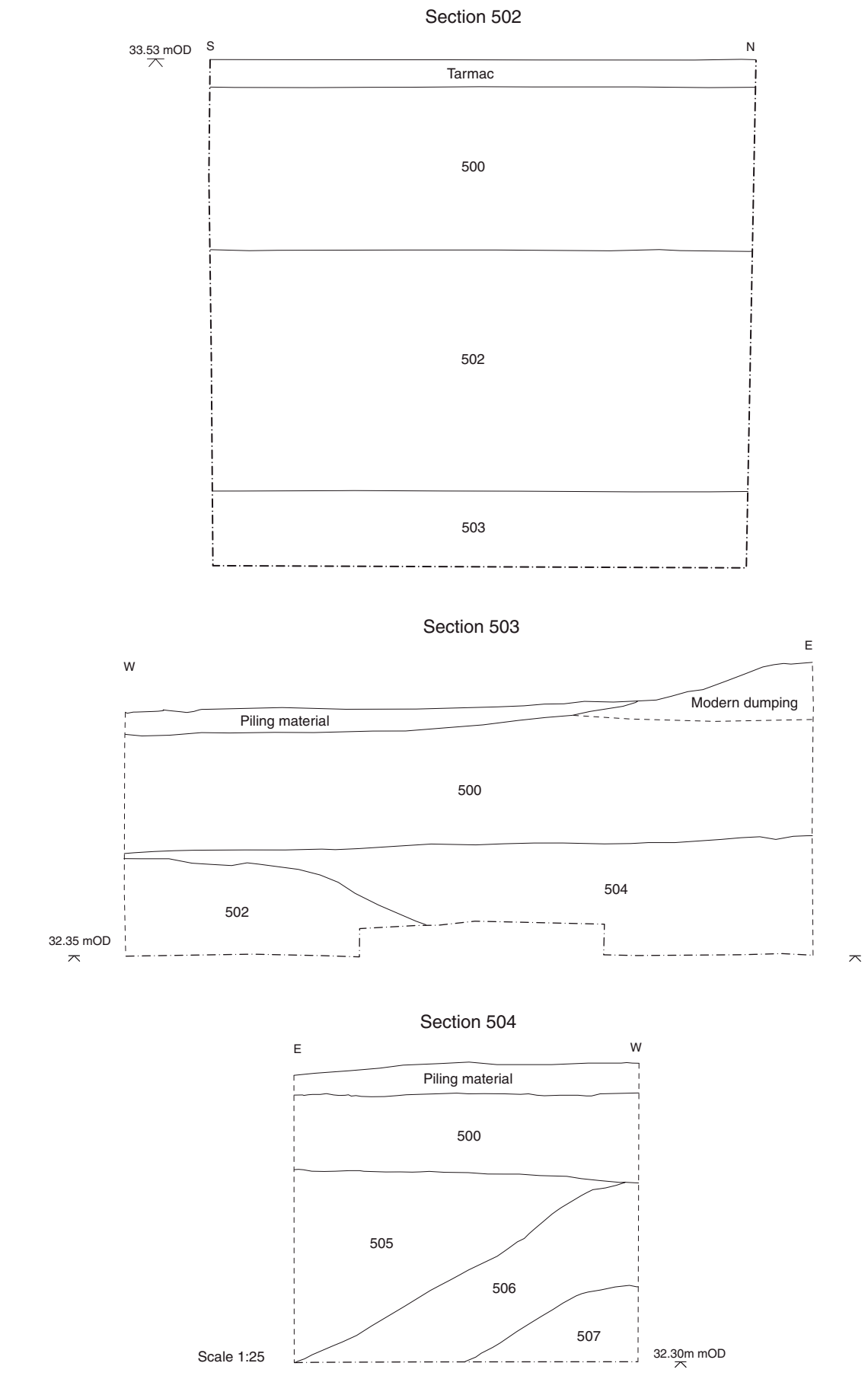


Figure 4: Sections 502, 503 and 504

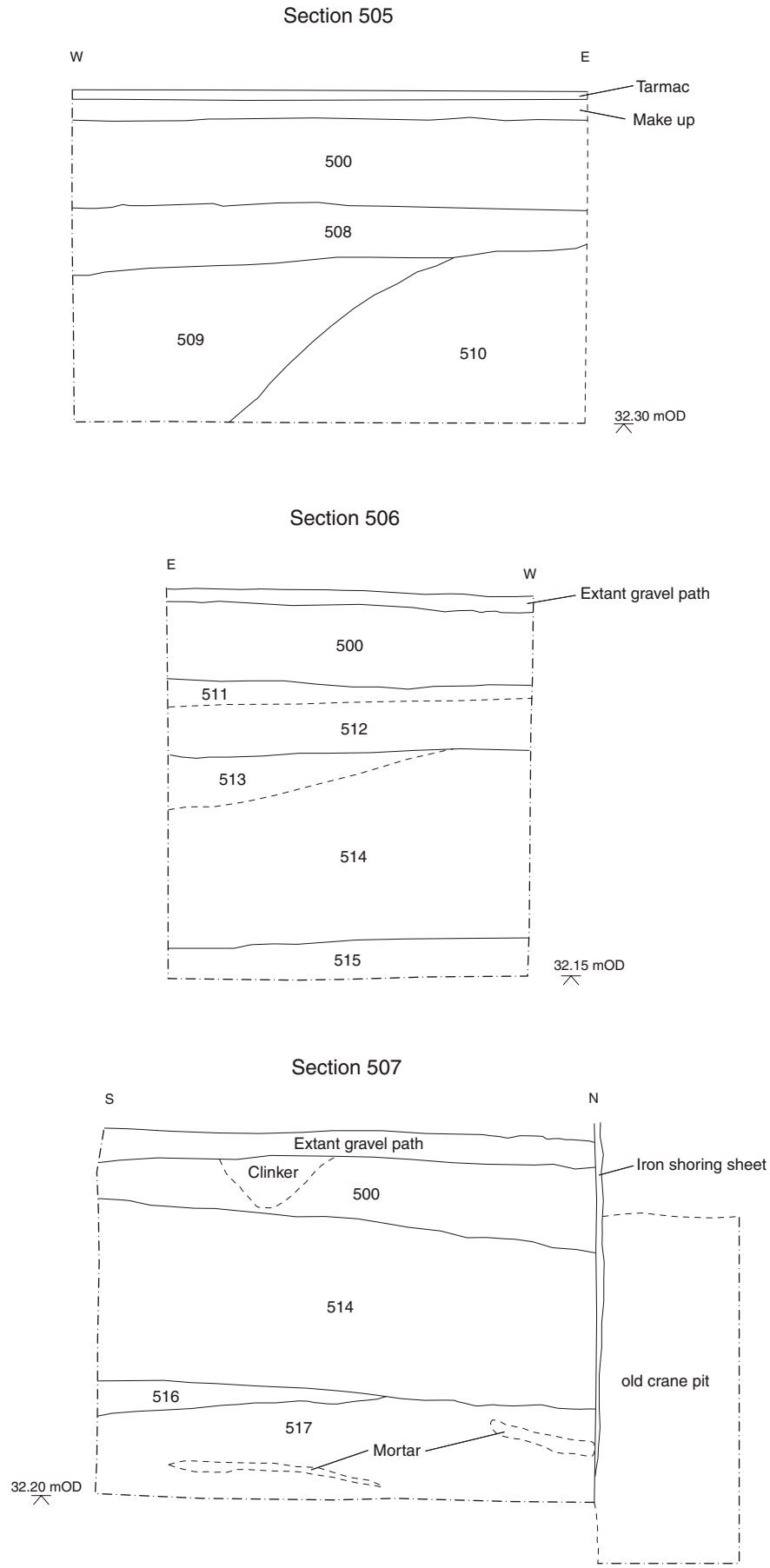


Figure 5: Sections 505, 506 and 507

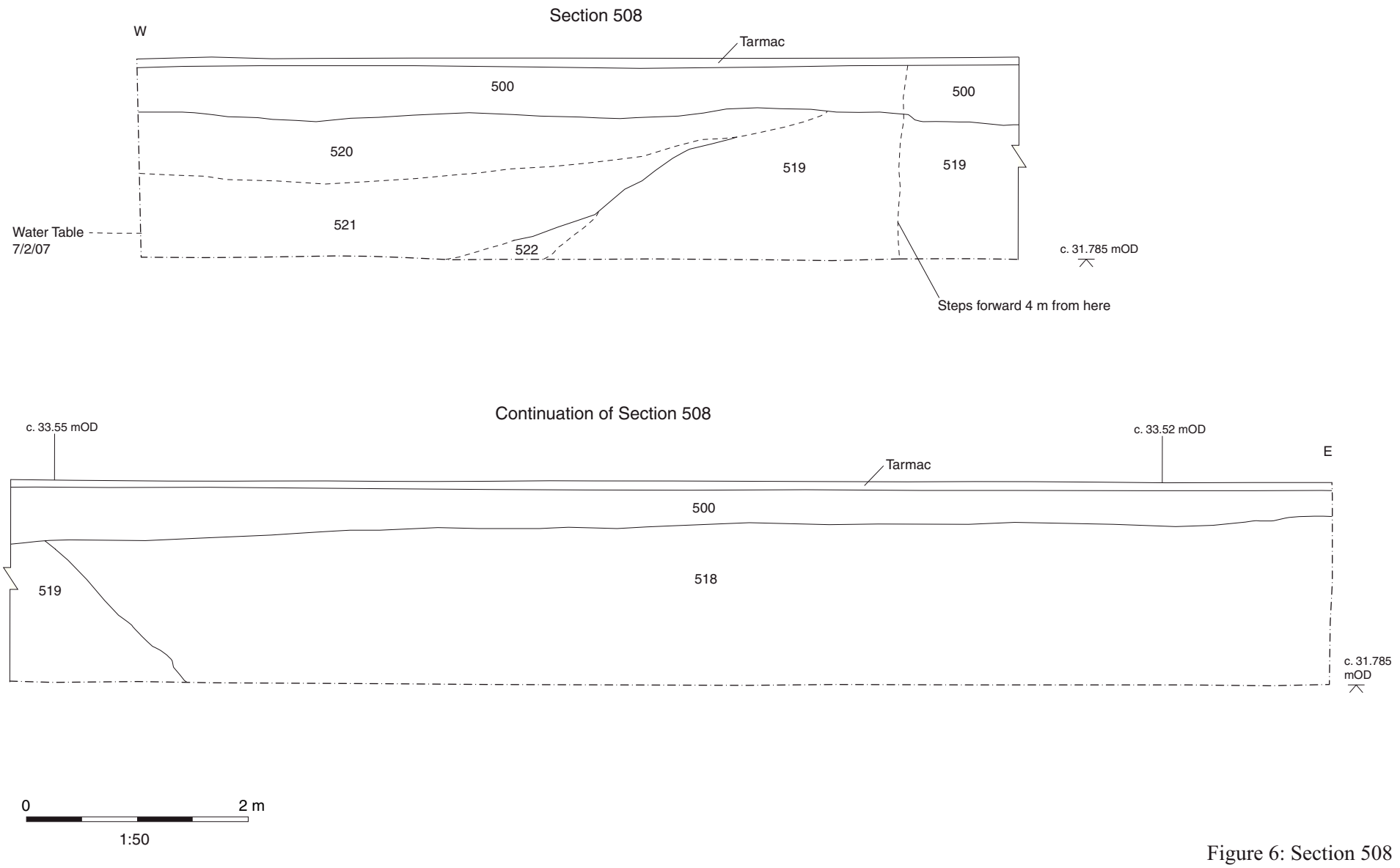


Figure 6: Section 508

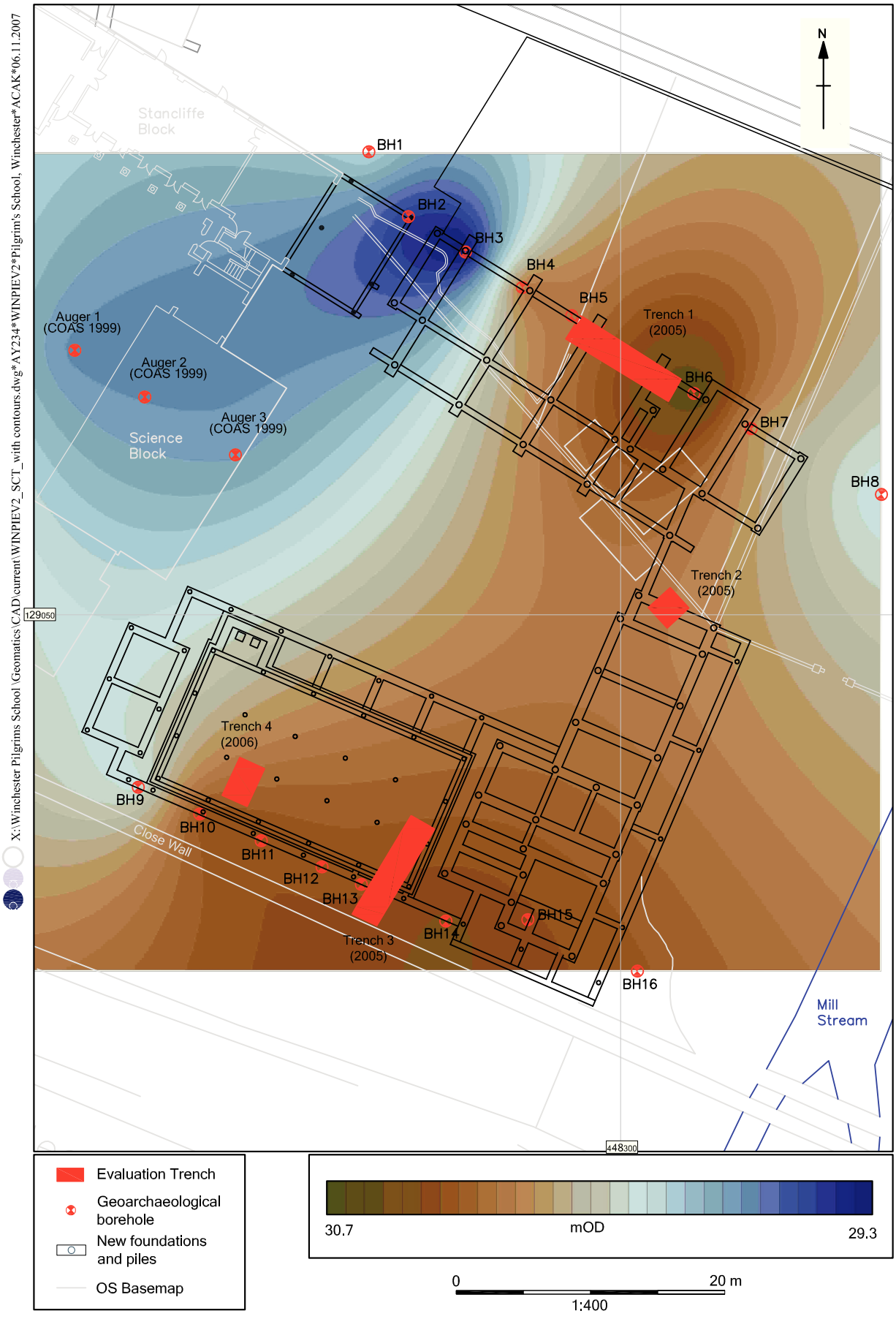


Figure 7: Gravel elevation (mOD)

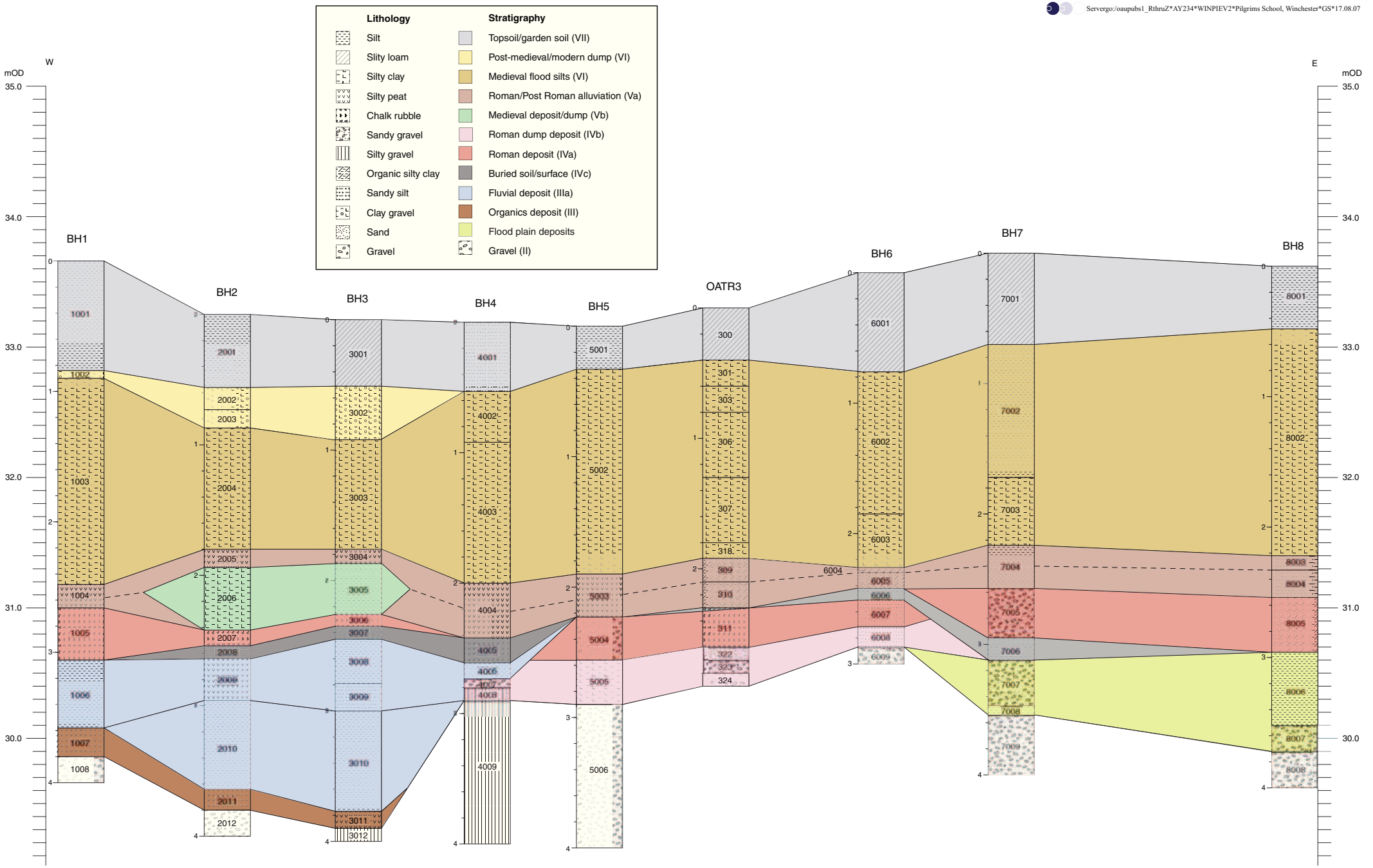


Figure 8: East-west cross section: Transect 1

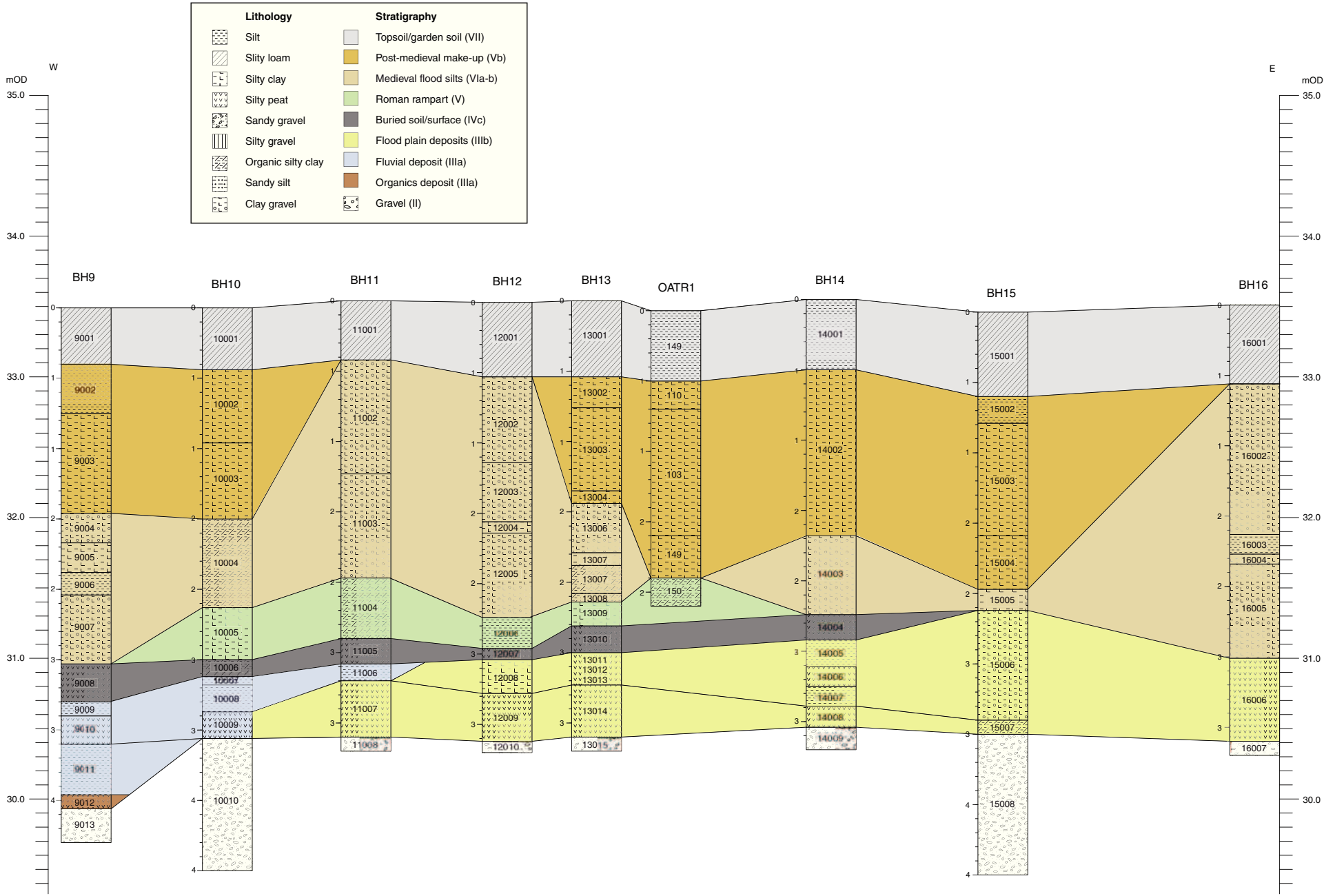


Figure 9: East-west cross section: Transect 2