Suffolk County Council

ARCHAEOLOGICAL ASSESSMENT, SUMMARY REPORT

SCCAS REPORT No. 2009/136

Abbey Gardens Low Impact Evaluation BSE 332

David Gill

www.suffolkcc.gov.uk/e-and-t/archaeology

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HER Information

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Summary

An archaeological assessment was undertaken within the Abbey Gardens in Bury St Edmunds. The work was concentrated mainly within the flood plain of the River Lark in the ‘events area’ and the playground. The assessment was designed to inform a Garden Management Plan for future applications for Scheduled Ancient Monument Consent work and an Archaeological Conservation Plan. The investigative work included topographic and geophysical surveys, palaeo-environmental assessment and test-pitting.

The survey work confirmed that archaeological deposits lay close to the current surface with layers of rubble encountered at depths of 100-250mm. In the main these were post-dissolution deposits associated with the post-medieval use of the gardens but structural remains of the Abbey including a bonded flint wall and a robbed wall trench (both also identified in the geophysics survey) were also found at this level. The medieval ground level and finds-rich occupation debris deposits were recorded, along with evidence of the former course of the River Linnet which was identified as both a landscape and archaeological feature. The River Linnet once paralleled the River Lark through the Abbey Gardens, it is shown on early maps of the Abbey and is believed to have powered a watermill within the precinct.

The palaeo-environmental assessment identified well preserved pollen and organic deposits within the floodplain. These provided reliable radio-carbon dates from the Neolithic (2700-2900BC), Middle Saxon (C7th-8th) and early medieval periods (C11th-12th). Pollen samples indicate the site was open sedge fen prior to the foundation of the abbey and the distribution of the peat showed a river course that fluctuated within the flood plain. Peat deposits sampled from the former course of the River Linnet close to the site of the putative mill (as shown on A.B Whittingham's conjectural plan of the Abbey) dated to C11th-12th produced abundant cereal pollen demonstrating that crop processing had occurred close by.

1. Introduction

An archaeological assessment was undertaken within the Abbey Gardens which are located within the precinct of the Benedictine Abbey in Bury St Edmunds. The Gardens are within an area designated as a Scheduled Ancient Monument (Suffolk Monument 2) and protected by Statute.

The assessment was based on a specification by RD Carr (Suffolk County Council's Archaeological Service Conservation Team) and commissioned to provide information to guide future applications for Scheduled Ancient Monument Consent. The work was concentrated mainly within the flood plain of the river; the 'events area' where temporary structures are erected during the Bury Arts Festival and other occasions, and where new playground equipment may be located. In addition to this, there is a desire to increase archaeological knowledge of other areas within the precinct in order to inform a future Garden Management Plan and an Archaeological Conservation Plan.

The site was evaluated with a suite of non-destructive techniques which comprised topographic survey and palaeo-environmental assessment. The results were been examined along with a geophysical and GPR survey completed previously by GSB Prospection Ltd (report 2008/64) to target limited test pitting.

The work was undertaken between March and July 2009 by Suffolk County Council's Archaeological Service (SCCAS) and Birmingham Archaeo-Environmental Ltd (BAE), and was funded by St Edmundsbury Borough Council through the Parks and Gardens Department.

2. Site location

The Abbey Gardens lie within the precinct of the medieval Abbey of St Edmund, one of the pre-eminent and largest Benedictine houses in the country. All the major buildings, together with substantial open areas such as the Great Courtyard, were contained within a precinct defined by a substantial boundary wall.

The area of the SAM measures 6.27ha in size. It is located principally on the western side of the River Lark centred at TL8574 6425; the eastern half of which is located within the floodplain of the river. The surface geology comprises gravels over chalky drift and, in the floodplain, river alluvium. It lies between *c.* 31 - 38.00m OD.

3. Archaeological and historical background

The Medieval precinct almost certainly overlies part of the Saxon settlement which developed alongside the river and was the predecessor of the present town. Late Saxon sources refer to it as Bedericsworth, a pre-existing settlement which attracted the attention of one of the Anglian kings, Sigebert, who 'retired' there in 633AD founding a small religious community.

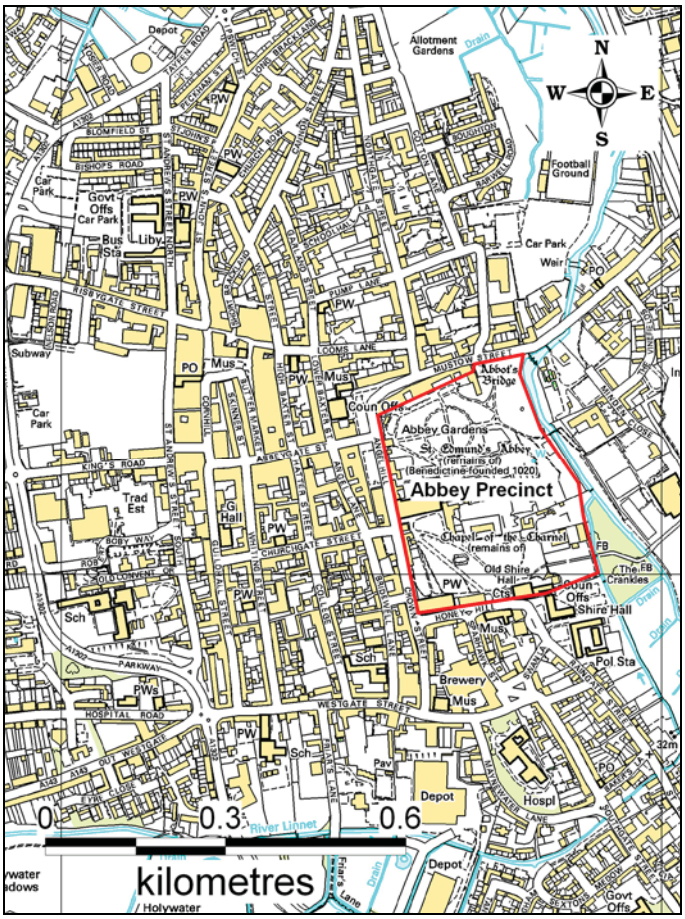


Figure 1. Site location

Abbot Baldwin (1065-97) began the planning and construction of the Abbey and town as we perceive them today. He seems to have been the originator of a strategic plan which re-designed the Abbey church, orientating the claustral ranges and urban gridded street pattern upon a common east-west axis.

A major change took place under Abbot Anselm (1120-48) when the area of the Abbey was extended and formalised with a precinct wall with access to the precinct controlled through gates. The Norman Tower is the sole surviving 12th century gate.

The Abbey as a whole was dissolved by Henry VIII in 1539 although there is good evidence that the church itself survived intact until the 1580's. However, after that date it joined the rest of the claustral buildings, effectively as a stone pit being plundered for building stone and hardcore rubble.

The ruins were acquired in the mid 18th century and became a garden area for Abbey House (on Angel Hill) and by 1806 the entire complex had passed into the hands of the Bristol Estate (Statham 1988). In 1831 the botanical garden was laid out by Mr Hodson in the Great Court of the Abbey, although public access was not gained until the end of the century. The nave of the Abbey Church and associated ruins were probably an established wilderness area and remained so until the 1950's.

4. Summary of results

Topographic survey

A topographic survey, carried out between 17th and 22nd June 2009. A Leica TCR 700 Total Station Theodolite, in conjunction with a GPS (Leica SmartRover RTK, Leica–connected to Leica SmartNet), was used to digitally record the ground level. The survey results were processed using AutoCad and Mapinfo and archived in dxf. file and Mapinfo table formats. The survey area included most of the Abbey precinct; the Abbey gardens, the new rectory yard and the west front, but excluded the areas of the ornamental fishponds, rose garden and Great Graveyard. The provisional results are presented in

the coloured-graded contour plan in Figure 2 which presents the highest values as hot spots in red and lower ones in blue.

The site lies on gently sloping ground that drops from 37.9m OD at the threshold of the Abbey Gate to 30.8m OD alongside the playground, with a marked break of slope at the edge of the floodplain of the River Lark (shown in blue). The eastern extent of the spread of the medieval claustral buildings closely follows the edge of the floodplain with the limit of the buildings apparently lying above 34.2m contour. The only known masonry structures that extend below this are the boundary walls of the Abbot's palace garden and the hexagonal towers at the wall's east terminals (of which only one survives above ground).

The Abbey Church and many of the adjacent claustral buildings were subject to excavation in the early years of the 20th century. This revealed once buried architectural details which identify the former medieval ground surface; namely facing stone of plinths at the base of the walls. These can be seen in several locations, at the Abbey Gate, Norman Tower, Alwyn House, the Abbot's palace buildings and the crossing of the Abbey church to give a good spread of reference points across the gardens. These suggest that over an extensive area of the gardens the ground level has not altered much from the medieval one and archaeological levels are likely to lie close to the surface. The natural slope withstanding, the contour plan shows those areas where the current ground surface is close to or at the medieval ground level as yellow-green.

Over the nave of the Abbey Church, west of the crossing, and the areas immediately north of the cloister the contour data (red shaded areas) would suggest that there is a deeper overburden overlying the medieval levels; this however is likely to be made up of rubble deposits directly associated with the demolition of the Abbey and is itself an archaeological deposit. Most notable is a steep-sided mound to the south of the Abbot's palace (labelled 'D' on Figure 2). The mound is topped by a mature oak tree (*c.*200 years old) and is presumably a spoil heap created from the excavation in antiquity by those scavenging for building stone.

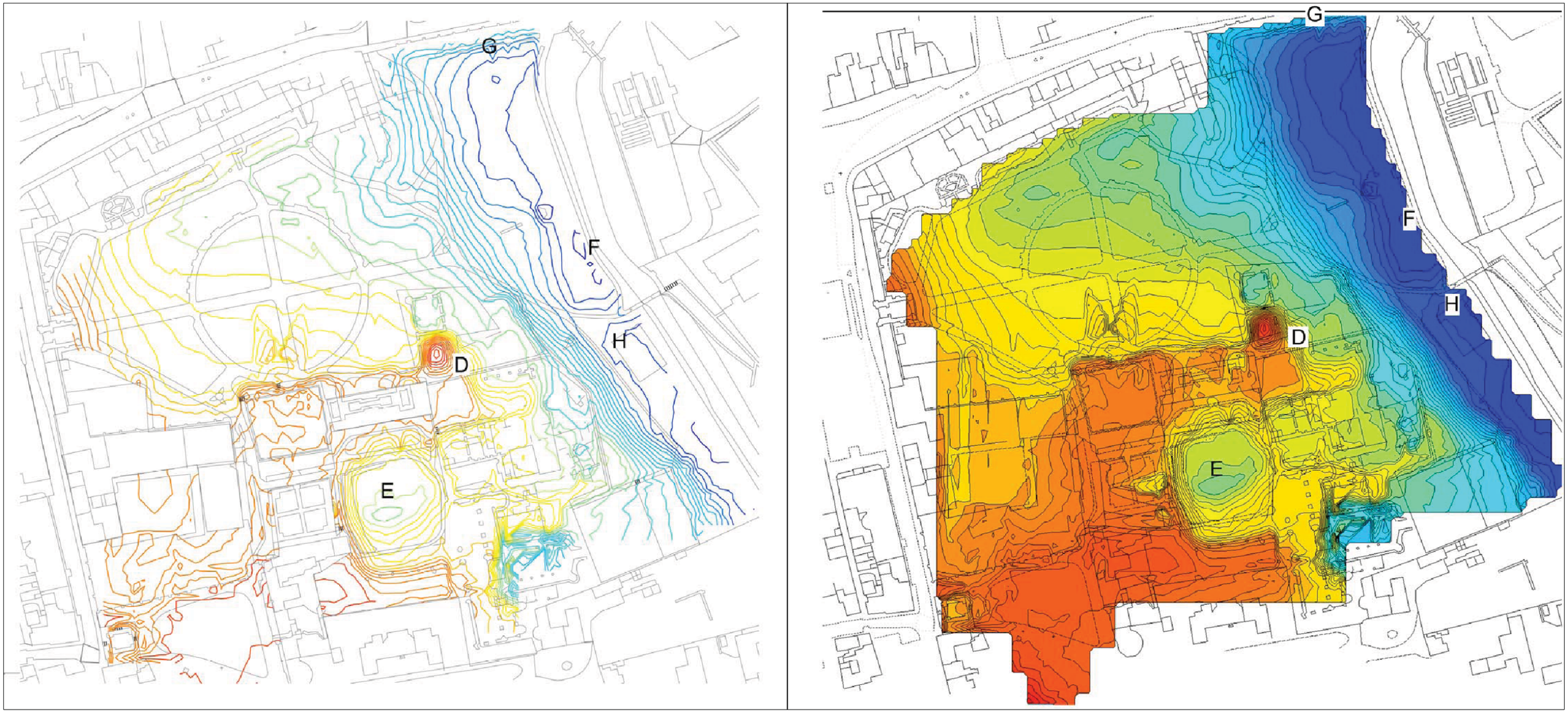


Figure 2. Contour survey: shown at 20cm intervals (above) and as hotspots (right)

The cloister lawn, on the north side of the Abbey church, is interesting as it lies below what is hypothesised to be the medieval ground level. The lawn is stepped along the mid-line and includes an east-west linear hollow (Fig. 2, 'E'), the base of which is 1.8m lower than the medieval floor level at the crossing of the Abbey Church.

The Abbey is sited at a pinch-point in the river floodplain where it is very narrow and this was presumably a determining factor when locating the Abbey here. At a point just north of the tennis courts (which are constructed on an artificial terrace) the floodplain is less than 40m wide. Immediately beyond the precinct, both north and south of the abbey the flood plain is much wider, forming No Mans Meadows and the water meadows north of Cotton Lane.

The only indication of the medieval ground surface within the floodplain floor is the stonework at the base of the hexagonal tower in the centre of the flood plain which lies 350-400mm below the general ground surface in this area at 30.74m OD.

Thomas Warren's map of Bury published in 1747 (F ig. 3) shows the former course of the River Linnet to the west of the River Lark and rectangular fishponds situated within the floodplai n between the two rivers. The River Linnet now joins the Lark just to t he south of the Abbey gardens and the length illustrated on the map and the fis hponds are now infilled but can still be identified as shallow t opographic features. The River Linnet and follows the base of the slope at the edge of the va lley floor and can be seen most clearly running from alongside the play ground area to the remains of the octagonal tower (known as the dovecote) within the events area.

The site of one of the fishponds lies direct ly below that of the area of fenced play equipment with the nor th end of the ponds. It w as initially t hought that these were visible as a rectilinea r low (‘H’ Fig. 2) betw een the playground and the path to the footbri dge but subsequent investigatio n showed t hat this lies on the line of a main sewer (Fig. 8 and 12) and t hat the landscape has been materially altered in this area. The path is on a modern ‘causeway’ to carry it

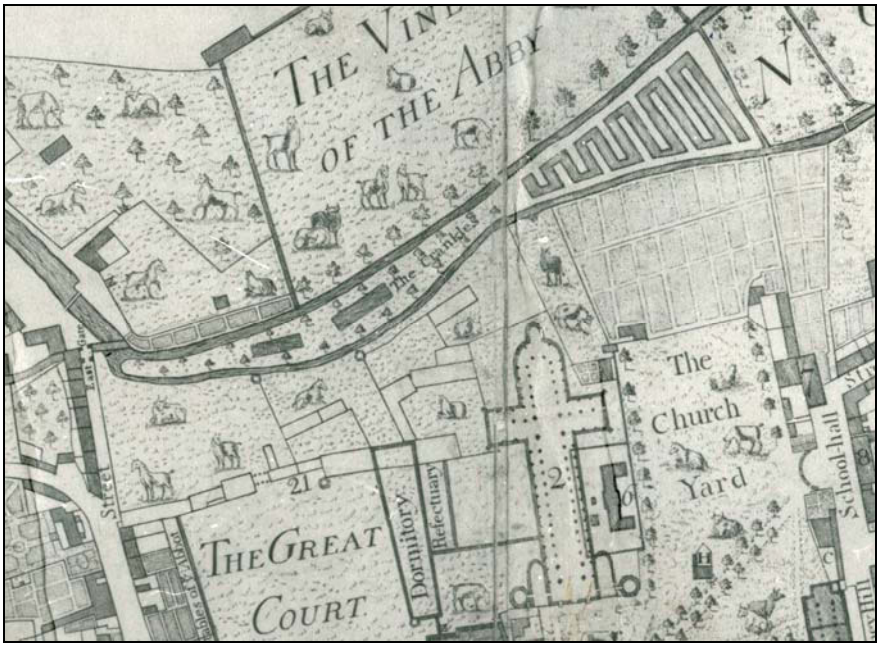
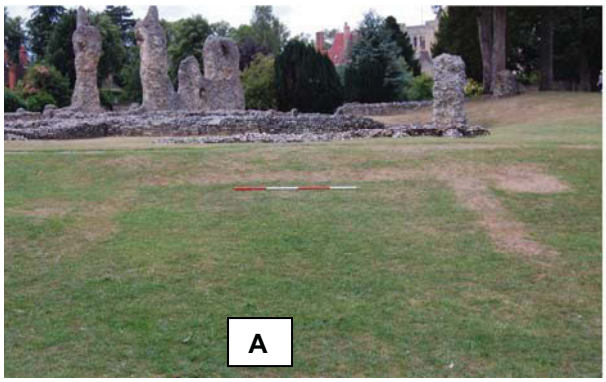


Figure 3. Extract of Thos. Warrens' Map of Bury 1747 north is on the left side of the page

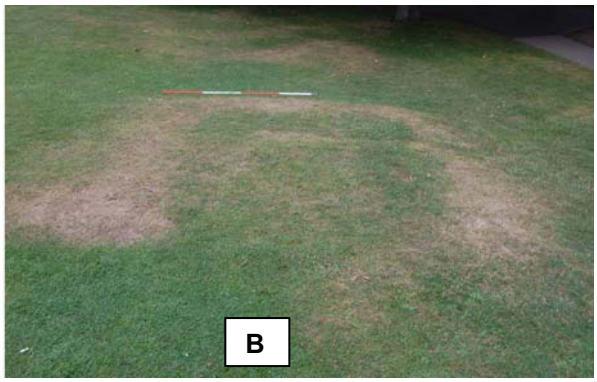
up to the bridge abutment and has distorted the contour readings. The second pond can also be seen as a low to the north of the path ('F' on Fig.2).

At the north end of the site is a flat-topped bank (G Fig. 2 and 5); this is a man-made feature possibly constructed to carry the precinct wall across the floodplain as the top of the wall is level paralleling the line of the bank rather than the sloping contour of the floodplain. The ground level at the top of the bank immediately inside the precinct wall is 0.7m higher than the current Eastgate Street pavement height. There is a blocked low door dating to 16th-17th century, which pierces the wall just to the east of entrance to the gardens. Comparing the relative distance between door head and the ground on both sides of the wall suggests that the base of the wall interior has been partly buried since this date.

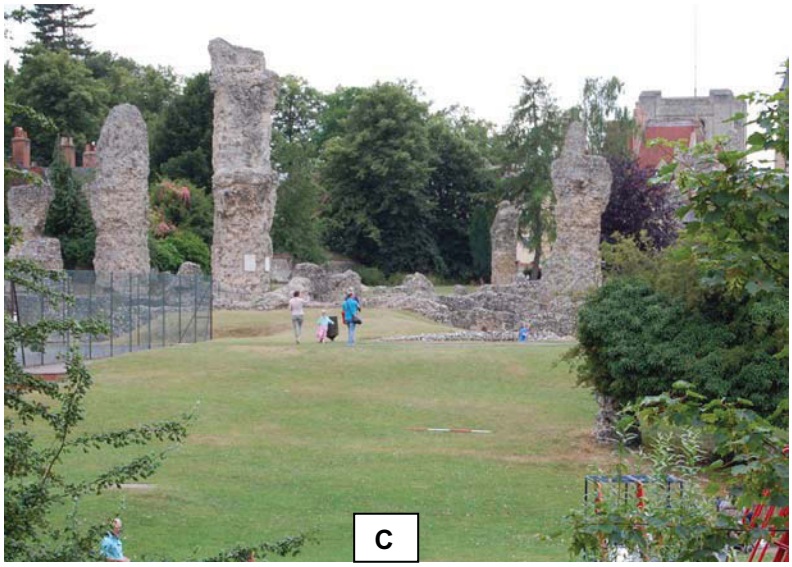
The survey was undertaken during a period of dry weather and parch-marks observed in the grass (Figs. 4 and 8, labelled 'A' 'B' and 'C'). These indicate the presence of wall lines and are further indications of the monument's proximity to the surface.



(A) Part of the Prior's house,



(B) South tower, Abbot's garden wall



(C) Part of the infirmary

Figure 4. Parch marks of Abbey building on the edge of the floodplain.
(Building identification as suggested by Whittingham's conjectural plan of the Abbey)

Figure 5. Bank (G) and boundary wall on the north side of the precinct.
The exterior of the blocked door can be seen to the left of the stone pilaster (left) and as a low blind alcove on the inside of the wall. The wall top of the wall is level, as opposed to following the slope of the ground in the manner of the wall on the south side of the precinct.

Palaeo-environmental survey

The floodplain within the events area was sampled by a total of 23 boreholes taken in four transects; the transects were 25m apart and boreholes at intervals of 5m. The plan of the borehole location is shown in Figure 6 and the full report is included in Appendix 1 and the results summarised below.

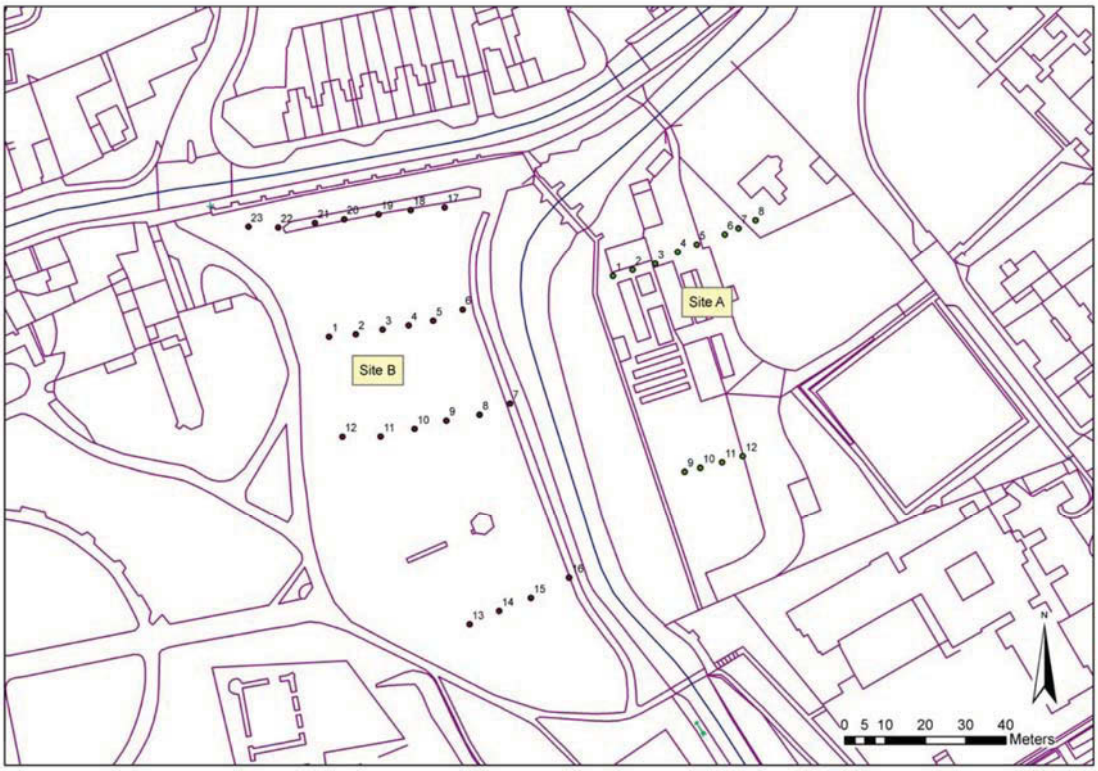


Figure 6. Borehole locations

Summary results

The borehole results show that there are well preserved pollen and organic deposits within the floodplain. These are sealed beneath strata of demolition and medieval occupation up to 1m deep. The organic deposits have provided reliable radio-carbon dates from the Neolithic (2700-2900BC), Middle Saxon (C7th-8th) and early Medieval period (C11th-12th). The deposits are interspersed with silts and clays from flood events and include both natural peat and silt formations. These were the result of fluctuations in the river's course and levels and archaeological deposits; the direct result of human activity. These deposits contain palaeo-environmental information regarding the landscape prior to the foundation of the abbey and pollen analysis indicates the site was once open sedge fen.

The site of one of the former fishponds was identified in the borehole records and along with a deep channel in the area of borehole 1 (*NB* re-drilled as core 28) which dated to the early Medieval period. This has produced abundant cereal pollen and suggests either the cultivation or processing of crops in the immediate area; Borehole 1 lies close to the putative mill shown on Whittingham's conjectural plan of the Abbey.

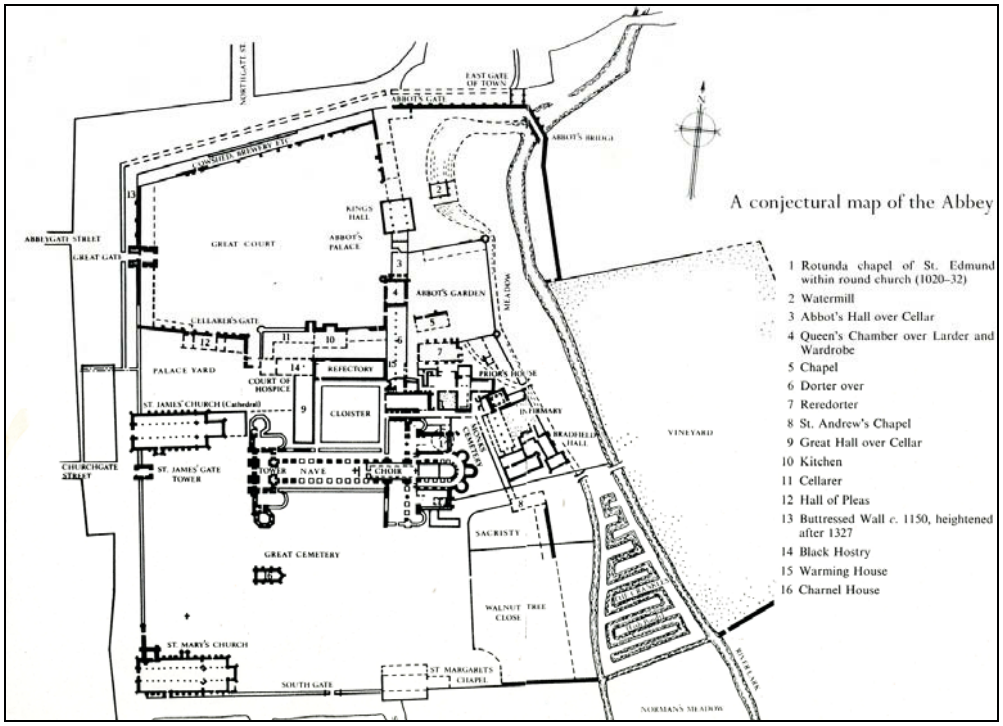


Figure 7. A.B. Whittingham plan of the Abbey, showing site of the Watermill (labelled 2)

Test hole excavations

A series of test holes was excavated by hand across the site. The aims of the excavations were to:

- Identify the date, approximate form and purpose of any archaeological deposits, together with their depth below current ground surface and quality of preservation.
- To scrutinize potential archaeological deposits identified by the geophysical, paleao-environmental and topographical surveys.

Initially a total of 10sqm of test holes was excavated which took the form of 0.5m x 2m trenches which was considered the most appropriate sampling

strategy. Ten locations were identified as of specific interest and are shown on Figure 7. The holes were excavated with the understanding that the disturbance to the archaeological deposits would be kept to the minimum and excavation depths were limited to locating the first identifiable stratified deposit. At the time of writing, excavation of the final test hole (Testhole 7) had been postponed until after the judging of *Bury in Bloom*.

Following the excavation of the original sample three further test holes were excavated in the playground at the request of John Ette (English Heritage) to evaluate the site of proposed new play equipment.

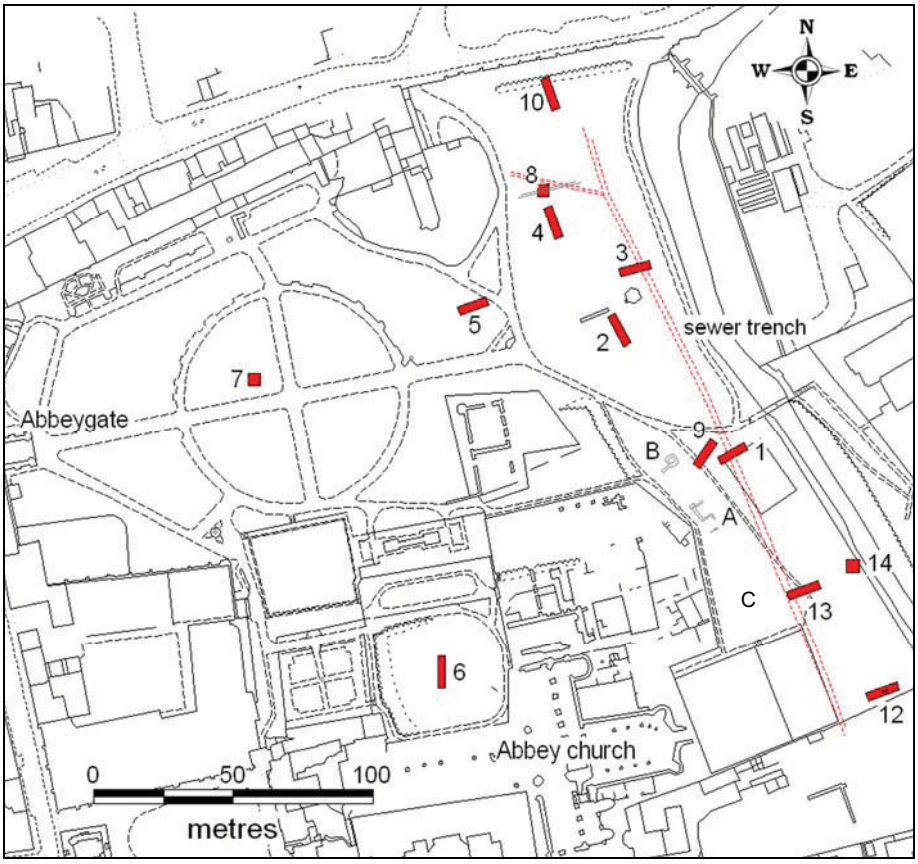


Figure 8. Test hole location plan.
(The trenches are show as larger than actual)

Results

Test Holes 1 and 9 (Figs. 8 and 10)

This was excavated to test the depth of overburden in the playground area and locate the medieval fishponds. A layer of mixed fine rubble within a clay silt matrix, 0018, was encountered beneath 100mm of topsoil. The rubble consisted of tile, brick and flints and included recent material including china, glass and clinker within its make-up. The rubble layer was 200mm thick and sealed a layer of clay silt, the surface of which was encountered at 300mmm

below the current ground surface. This was identified as the backfill of the trench for the main drain and the hole was abandoned. The extent of the drain meant that it was unlikely that it would be possible to the sample the fishponds without excavating within the playground itself.

A second sondage, Test Hole 9, was excavated to test the general ground level within the area. This revealed a similar modern (19th century) overburden (0013) to Test Hole 1 but exposed a dark silt occupation soil, 0016, at a depth of 240mm. The soil contained frequent oyster shell, charcoal and tile fragments, no post-medieval material was observed and the soil horizon is considered to be archaeological. 0016 was cut by a shallow silt filled feature 0014, which was a 'garden' feature and considered not to be archaeological.

Test Hole 2 (Figs. 8, 9 and 10)

Test Hole 2 was located within the Abbot's palace garden to the south of a standing medieval wall. This area was identified as a distinct level platform during the topographic survey and the test hole crossed, at right angles, the line of a narrow linear parch mark.

A worked post-medieval buried topsoil, 0004, containing fragments of post-medieval tile, degraded chalk and charcoal was recorded 240mm below the surface. The top of the soil profile was made up of a chalk-rich deposit, (0002) which contained modern debris and this was bordered by a narrow strip of concrete rubble and plastic (0003) just below the surface which was identified as the cause of the parch mark. The concrete was within a possible trench which was cut from close to the surface and through layer 0004 but this was not clear. At the base of the test hole and sealed by 0004, was a deep deposit of a homogenous brown silt 0005. No limits were found to this material and the test hole was entirely within its extent. 0005 was a secure archaeological soil, either a horizon or a feature fill. It contained occupation debris including pottery, animal bone and oyster shell, the pottery suggested a 15th-16th century date for its deposition.

Test Hole 3 (Figs.8, 9 and 10)

Test Hole 3 was positioned to locate the edge of the medieval channel or 'mill leat' shown on Warren's 1747 map of Bury and to give context to the neighbouring borehole data.

The line of the main sewer trench cut across the eastern half of the test hole. The sewer trench was sealed beneath a layer of fine brick and chalk rubble, 0041. 0041 is either a slump layer over the sewer or it suggests that the sewer trench was cut into a shallow easement, but it is unclear if this was an existing feature or part of the works. The top of the sewer was identified at 400mm below the ground surface from which point the excavation was limited to the western half of the test hole. The section shows a deep strata of medieval building rubble and dumped occupation debris layers, 0042 -0047. These lay in banded horizons, which tipped steeply towards the river and contained no recent material. The pottery dates suggested a deposition date that ranged from the early post medieval period (late 15th-16th century) but it also included residual sherds of earlier medieval wares. The rubble originated from a building dating to 14th-15th century and included high-status glazed floor tiles, probably Flemish imports, as well as roof tiles and fragments of dressed stone. Interleaved with the rubble were domestic rubbish layers which contained high proportion of food waste; animal bones and a variety of seafood shells. The lowest rubble layer, 0045 infilled a pronounced cut, 0046, which was interpreted as the edge of the leat. Unfortunately the leat, in this location, has been severely truncated by the sewer trench and only a limited sample was available. The leat was cut into a clay silt, alluvial deposits which were encountered at the base of the test hole at a depth of 840mm below the current ground surface. The medieval ground level in this area can be determined by the base of the hexagonal tower, which coincides with layer 0043 in the section.

Test Holes 4 and 8 (Figs.8, 9 and 10)

Test Hole 4 was excavated to test the depth of overburden in the festival events area and investigate a possible buried wall implied by a resistance anomaly identified during the geophysical survey. It was also located close to the site of a possible mill as shown on Whittingham's conjectural plan of the

Abbey (Fig 7). The initial test hole failed to locate any evidence of a wall and was extended, Test Hole 8.

The section of Test Hole 4 showed banded layers of a fine early post-medieval rubble at a depth of 200mm below the current ground surface. The rubble was deposited in two events and was separated by dark fine silt deposit 0038 which contained animal bone and oyster shell. The rubble layers, 0037 and 0039 were similar in appearance and included mixed building flint and brick and tile fragments; these had chalk and white lime mortar adhered to them suggesting a 17th-18th century date. A buried topsoil horizon, 0040 indicating the former ground surface occurred at a 500mm depth.

The extended Test Hole 8 uncovered the remains of a bonded flint wall 0051, at 240mm below the current surface. The wall ran east –west, it was insubstantial and built directly off a layer of unbonded crushed tile laid at the level of the former ground surface without, or with very shallow foundations. The excavated length survived up to only two courses and the strength of resistance reading from the geophysics suggests that the preservation of the wall is varied along its length. The wall was bonded with lime mortar consistent with other parts of the monument. Rubble layers 0049 and 0050 from the demolition of the wall, spread across the length of the trench but did not extend as far as the initial Test Hole 4. The rubble overlay a clean loam silt, 0054 and the interface between these two deposits probably represents the former ground level.

Test Hole 5 (Figs. 8, 9 and 10)

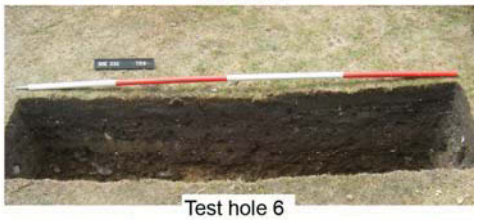
Test Hole 5 was excavated across the west wall line of a range of buildings that made up the Abbot's palace. The remains of the building were still extant when Warren drew his map in the 18th century. The topographical survey also identified the current ground level in this area as being close to the medieval one and predicted very shallow coverage over the monument.

Immediately below the topsoil was a worked dark soil, 0007, which contained

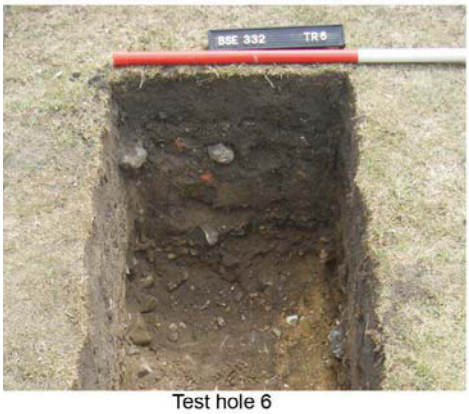
Test hole 2

Test hole 3

Test hole 5



Test hole 6



Test hole 6

Test hole 10

Test hole 8

Wall 0051 in Test hole 8

Test hole 12

Figure 9 Selected test hole photographs

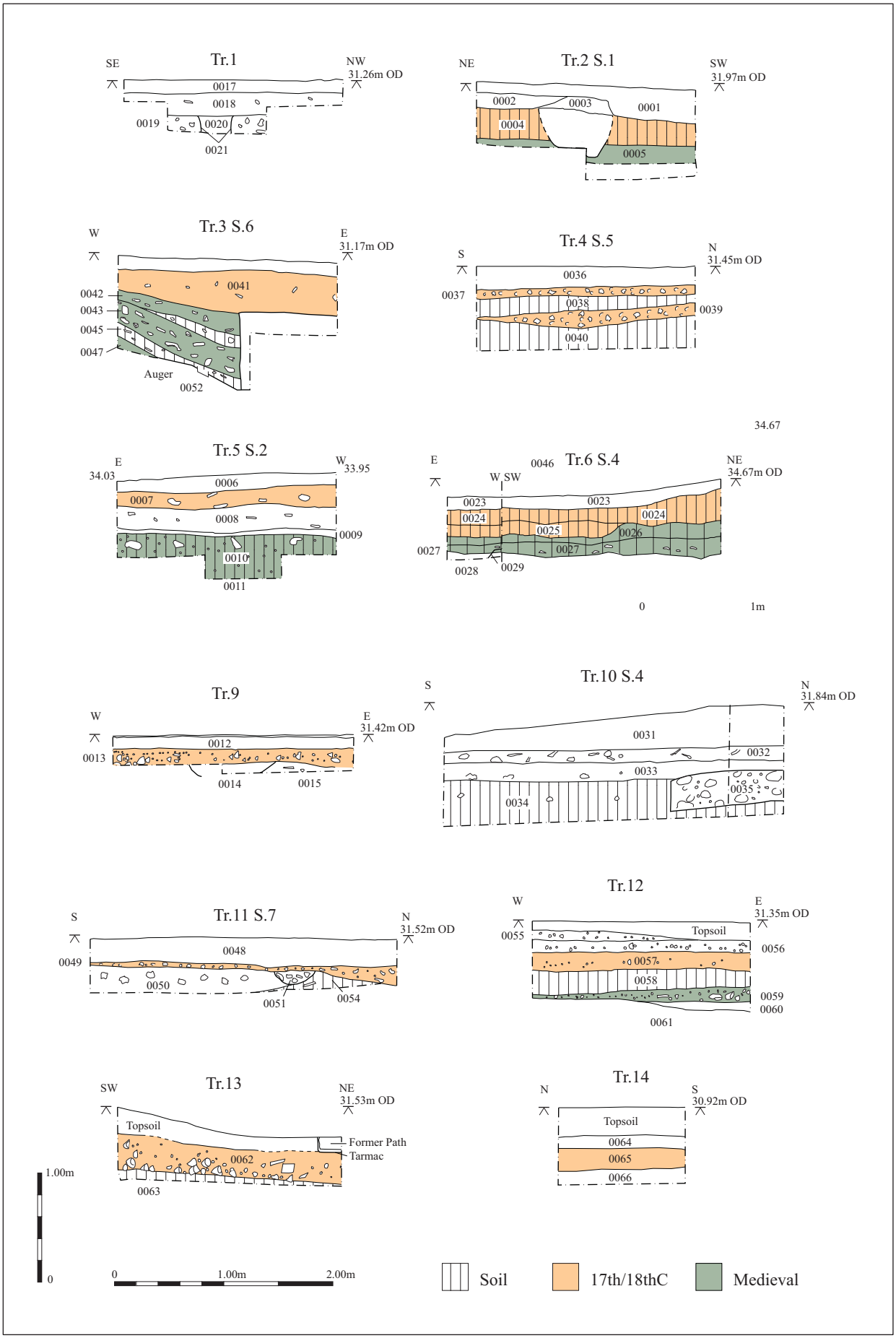


Figure 10. Test hole sections

a fine rubble of post-medieval building material, chalk and clinker fragments as well as fragments of moulded medieval stone. Sealed beneath this was a thick deposit of building flint rubble, 0008, at 300mm depth. The flints were mainly large cobbles within a matrix of coarse sandy lime mortar consistent with the other medieval building on the site. The rubble included tile fragments of peg-tile but there was an absence of brick or general occupation debris. The rubble overlay a worked buried topsoil, 0010 with a discernable turf-line, 0009, at 500mm. 0010 produced two variants of early medieval pottery dating to the 11th-12th century , animal bone and shell but no building rubble suggesting that this was a secure early medieval soil had not been re-worked since the occupation of the Abbey. The depth of soil suggested that 0010 had been augmented and the surface geology, which comprised an outcrop of degraded chalk, was encountered at 950mm.

Test hole 6 (Figs. 8, 9 and 10)

Test hole 6 sampled the cloister lawn to the north of the Abbey Church. It was located to investigate a mysterious ridge contour and deep hollow that ran east west, and a resistance anomaly in the geophysics data.

An occupation debris layer, 0024, was encountered beneath a thin topsoil layer at 100mm below the current ground level. The deposit was made up of a dark-black silt and contained concentration of stoneware and glazed pottery, building rubble and animal bone. The datable finds, including a clay pipe bowl, all fell within a narrow date range suggesting deposition of mid to late 17th century. Whilst the base of the horizon was level the layer became progressively thicker towards the north-east end of the trench and this increase in the depth is largely responsible for the changing ground levels. A buried topsoil horizon, 0025, was recorded sealed below 0024 at the south end of the trench but this appeared to lay with a shallow hollow within a much stonier subsoil, 0026. This horizon had been graded with smaller stones with a fine rubble of crushed tile overlying larger flints within layer 0027. Pottery from 0026 included part of a Stamford ware jug (mid11th-mid 13th) but the building rubble including glazed floor tile suggested an overall date of 13th-15th century. The test hole was excavated to expose the yellow sand of the

surface geology at 500mm below the ground level at the south end of trench; the geological surface was level.

Two cut features 0030 and 0029 were recorded cutting the subsoil at the base of the trench; these were infilled with a stoney, brown silt/sand and were cut from below layer 0026. The features were not sampled as the only a limited area of the feature was exposed and their excavation was deemed to be beyond the project brief. The plan of 0029 was suggestive of a grave but this is unproven, but layer 0025 produced a fragment of disarticulated human jaw. The features are a sealed deposit but otherwise undated.

Test Hole 7

Test hole 7 is planned to determine the depth and character of the 'Great Court' surface as no other indication of medieval surface exists in the immediate area. The excavation of this hole has been postponed until after the *Bury in Bloom* competition.

Test Hole 8

Test hole 8 was re-located to further sample the bonded flint wall found initially in Test Hole 4 - see above.

Test Hole 9

Test Hole 9 was excavated adjacent to Test Hole 1 - see above.

Test Hole 10 (Figs. 8, 9 and 10)

Test Hole 10 sampled the base of the bank that runs east-west across the north end of the events area and abuts the base of the precinct wall. The geophysics recorded a linear anomaly along the base of the bank and the medieval ground level inside the wall is unknown.

The excavation demonstrated that the bank was made up of a re-deposited layer of topsoil, 0031, which changed in depth from 120mm to 400mm across the length of the trench. Beneath the topsoil were two bands of dense early post-medieval building rubble, 0032 and 0033. These lay in level horizons and were made up of brick tile and building flint. Attached to the flints was a fine,

white lime mortar; paler and with less grit than a typical medieval mix. However the layer also produced salt-glazed drainpipe suggesting a deposition date of 19th century or later. The lower rubble layer, 0033, appeared to be a separate deposition event and was distinct from the one above, in that it contained a greater proportion of large building flint and frequent oyster shells.

The demolition layers seal a buried topsoil layer, 0034, which was a relatively clean loam and the top of this horizon represents the former ground surface. Cut into the buried topsoil at the north end of the trench is a square sectioned footing trench of a robbed out wall 0035. It was infilled with flint rubble and was cut from below the rubble deposits 0033. The mortar within the robber trench is a coarse sandy mix, distinct from the overlying rubble layers and believed to be medieval. The presence of peg-tile suggests that the wall was robbed in the early post-medieval period. The robbing trench aligns with an anomaly identified during the geophysical survey. The former ground level represented by the surface of 0034 is at 31.14m OD, 1.66m below the current ground surface inside the wall and 0.98m below the Eastgate Street pavement level without.

Playground Test Holes

Test Hole 12 (Figs. 8 and 10)

Test hole 12 was excavated to the east of the tennis court against the south boundary of the Abbey Gardens, and was situated on the flat floor of the floodplain. The section shows a deep soil profile made up of relatively recent rubble layers, 0056 and 0057, overlying an imported buried topsoil 0057, which the finds suggested was deposited during the 18th century. The imported soil sealed a fine textured silty-clay layer 0058, which had the quality of an alluvial deposit and probably included flooding events. 0058 and the layers above lay in level horizons. At the base of the soil profile was a rubble deposit, 0059 which lay within a depression in the sloping ground. The layer was made up of a coarse rubble of large nodules of building flint (including lumps of bonded core), Tudor bricks and crushed mortar and lime wall plaster within a loam matrix. Beneath this was a layer of sorted crushed mortar and exposed at the base of the test hole was a compacted deposit of abbey

building rubble, 0061. Layers 0059, 0060 and 0061 were primary rubble deposits laid down in the immediate dissolution period and directly related to the robbing of the claustral buildings.

Test Hole 13 (Figs. 8 and 10)
Test Hole 13 was excavated at the base of the slope at the floodplain edge, and located to avoid the line of the 1960's main sewer trench. The topsoil was laid over a compacted rubble layer, 0062, which included domestic rubbish including late 15th-16th Raeren/Aachen stoneware pottery but glass from a late18th century wine bottle glass suggested a later date for its deposition. 0062 overlay a dark silt, loam topsoil 0063 which included a high concentration of building rubble. Despite being close to the current surface neither 0063 or 0062 contained modern material and had not been disturbed in the immediate past.

Test Hole 14 (Figs. 8 and 10)
Test Hole 14 was excavated in the floodplain floor close to the river edge. The soil profile was similar to the upper soil seen in Test Hole 12, with layers 0065 and 0066 being identifiable as continuations of layers 0057 and 0058 respectively. 0065 was a re-worked topsoil that contained occupation debris including pottery and clay pipe dating to the 18th century with a similar date being assigned to the layer below.

5. Discussion

The investigative work has shown that archaeological deposits lie close to the current surface. The test pitting suggests that the former ground surface lies at a depth of between 210-500mm, however in the area around the monument and the formal gardens in the area of the Great Courtyard, there are places where the ground level is unchanged from the medieval levels and the archaeological deposits are extremely vulnerable. This area is shown as shaded in Figure 11.

Where buried, the archaeology is overlain by stratified rubble deposits associated with the destruction of the Abbey buildings. The upper layers

comprise a dark soil, itself containing concentrations of building debris, which has been worked as part of the creation and use of the botanical gardens, and rubble that dates from a second campaign of the destruction of the Abbey ruins which occurred in the early part of the 18th century. Secure medieval occupation deposits and rubble layers that were directly associated with the Dissolution sacking of the claustral buildings were also evident and recorded in Test Holes 2, 5, 10 and 12.

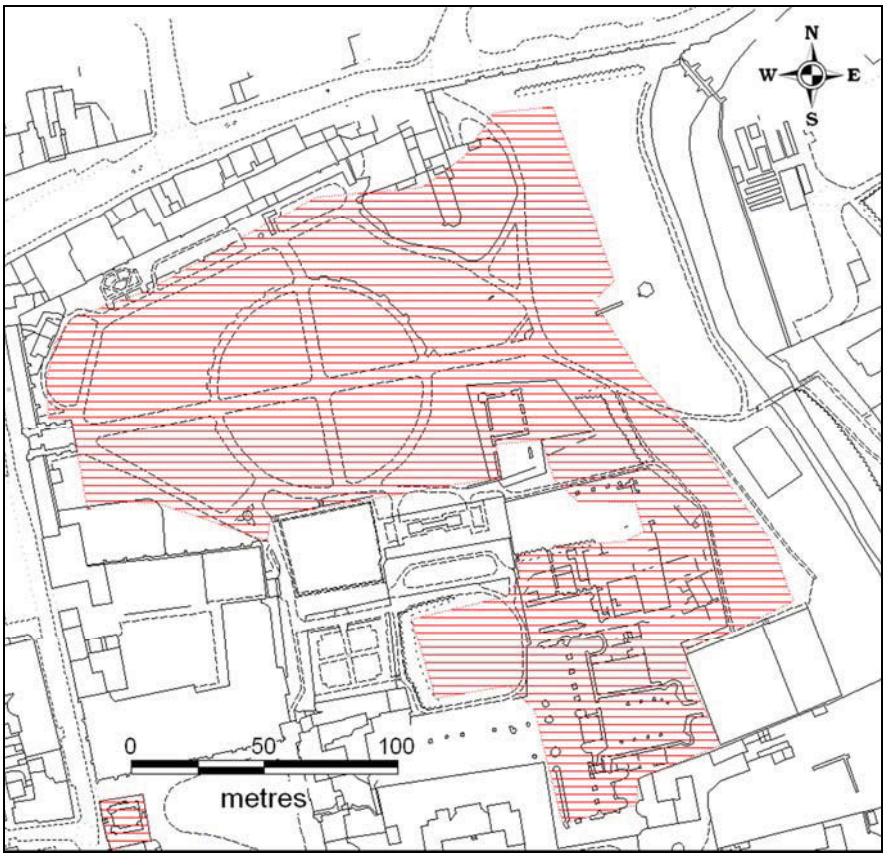


Figure 11. Extent of the area at, or very close to, the medieval ground level

The sections suggest that the biggest overburden occurs at the very floor (the relatively flat section) of the floodplain with the medieval layers occurring at a depth of 500mm; the overburden is not a consistent depth and is shallower towards the north side of the site. The overburden consists of imported and dumped soils which date from the 17th-18th century and are themselves arguably an archaeological layer. The augmenting of the ground level here was probably to alleviate the risk of flooding. A ground-raising campaign took place at a similar date, and for the same reasons, around St James' , the precinct yard and the West Front and the two events may be related. The deep overburden only occurs at the floodplain floor and does not extend up

the sloping ground of the floodplain edge. On the floodplain edge bonded wall structures were seen to exist 300mm below the current surface in the events area and parch marks observed in the grass alongside the playground, which demonstrate that further buried building remains exist close to the surface.

The river has clearly been controlled since at least the 12th century to provide ready fish stocks for the brothers and power for their mill; for which the paleao-environmental assessment has provide further supporting evidence. The current course of the river appears to have been manipulated and runs tightly against the steep, east slope of the valley rather than through a more natural course in the centre of the flood plain. The Linnet similarly appears to have been held against its valley edge along the south side of the town. Documentary sources have identified a predominance of people employed as fullers residing on Westgate Street in the medieval period and the Linnet was probably being controlled to drive their mills.

The shaping of the floodplain to a constricted point is the result of the natural dynamic of the rivers but the apparent extreme narrowness of the floodplain at the south side of the side has probably been accentuated by the construction of the Abbey church. The level reading from the floor level in the nave of the Abbey church seems to suggest that the building sails out over the natural slope of the ground. Examination of the soil profile of the adjacent low ground would suggest that the low ground is closer to the natural profile and the building has been raised. The Abbey’s architects clearly would have had to overcome the valley edge to achieve a level floor over such a long building. An equivalent line taken through the Great Courtyard shows that the ground drops by 3m over the distance of the church, and this drop was probably taken advantage of in the construction of the crypt. The artificial terrace on which the tennis courts are sited have made this important aspect of the Abbey church difficult to read, particularly how the building sits within this landscape and this would benefit from further work.

The tennis courts are one of two major interventions that have impacted on the archaeology, the other being the excavation of the main sewer trench in the 1960's. This may be on the line of a previous drain but it cut a broad

swathe through the floodplain which will have partly truncated the fishponds and part of the medieval mill leat. The depth of the sewer means that the archaeological deposit is completely lost along its line. The line of the drain is shown on figure 7 and a photograph taken during the works can be seen in Figure 12.

Figure 12. Excavations to lay or relay the main sewers in 1961/2

6. Recommendations

Most of the area where the archaeological level lies close to the surface exist within the area of the standing ruins and the formal gardens where the main threat seems to be confined to the activity of horticulture and the insidious damage caused by large tree roots. Those archaeologically sensitive areas most vulnerable to the garden's other activity are the gently sloping ground of the events area and the steeper slope of the ground above the playground area west of the current north-south footpath, although the line of the sewer has created a corridor now devoid of any archaeological deposits. Any intervention at all on the sloping ground in the events area or above the current playground will impact upon the archaeology and would be required to be managed or mitigated for. The overburden in the area of the current playground equipment offers a buffer to the medieval deposits of c. 300mm. However the extent of this is limited and the siting of any proposed fixed play equipment should be done in consultation with the archaeological

conservation officer to minimise impact and the excavation of any associated groundwork done under archaeological supervision.

7. Archive deposition

Paper and photographic archive: SCCAS Bury St Edmunds T:arc\All site\BSE\BSE332 Abbey gardens management plan
Finds and environmental archive: SCCAS Bury St Edmunds.

8. List of contributors and acknowledgements

The excav ation was carried out by a num ber of archaeological staff, (Andy Beverton, Phil Camps, Jonathon Van Jennians, Sim on Picard, John Sim ms David) all f rom Suffolk County Counc il Ar chaeological Servic e, Field Team. The project was directed by Andy Beverton and David Gill

The post-excavation was managed by Richenda Goffin. Finds processing and the production of site plans and sections was carried out by Jonathon Van Jennians, Andy Beverton and Crane Begg. Specialist identification and advice was provided by Richenda Goffin. The excavation was monitored by Dr. Jess Tipper (SCCAS Conservation Team) and John Ette (English Heritage).

The report was checked by Richenda Goffin.

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Appendix 1

BIRMINGHAM ARCHAEO-ENVIRONMENTAL BAE

A Palaeoenvironmental Assessment of Deposits from the Abbey Gardens and Nursery site, Bury St Edmunds

K. Krawiec, E-J.Hopla and Dr.B.R.Gearey MIfA

A Palaeoenvironmental Assessment of Deposits from the Abbey Gardens and Nursery, Bury St Edmunds

By

K. Krawiec, E-J. Hopla and Dr B.R. Gearey MIfA

Summary

In March 2009 a programme of coring was carried out on the floodplain of the River Lark within the grounds of the abbey precinct, Bury St Edmunds, Suffolk. The site was divided into two parts: site A was located on the eastern river bank just outside the main abbey wall; and site B which was located on the western side of the river within the abbey gardens. Using a percussion drilling rig, 5 cores were recovered for analysis out of a total of 40 that were drilled. The results from site A show that the any in situ deposits of palaeoenvironmental value have been removed since the basal gravels were overlain by made ground containing clinker, sand and crushed brick. Site B revealed a more promising range of sediments relating to natural processes of floodplain development as well as human activity at the site. A potential small infilled channel was identified aligned parallel with the river Lark, which contained a highly humified silty peat. Radiocarbon dating indicates sediment accumulation began during the Neolithic, with later deposition during the Anglo-Saxon and Medieval periods, although it is unlikely that sediment accumulation has been continual. To the south of this channel a sequence of silts and peats reflect both in situ organic sedimentation and the later presence of a 'fishpond' at this location. The pollen spectra from the organic deposits indicate that the floodplain environment was dominated by sedge and grass vegetation communities but that cultivation/processing of crops including wheat/oats and rye was taking place during the Anglo-Saxon-Medieval periods. Recommendations for further analyses are made.

KEYWORDS: Abbey gardens, Bury St Edmunds, Suffolk, Pollen, Palaeoenvironments.

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Abbey Gardens and Nursery site, Bury St Edmunds: a palaeoenvironmental assessment

1. INTRODUCTION

In March 2009 Birmingham Archaeo-Environmental were commissioned to undertake a borehole survey of two sites within the abbey precinct, Bury St. Edmunds, Suffolk (TL 858 643). Site A was located at a former nursery site just outside the main abbey wall where the remains of greenhouse structures were still visible. Site B was located on the western bank of the Lark within the lawn area of the abbey gardens. The floodplain slopes gently down towards the river with the remains of an octagonal tower and wall in the centre of the lawn.

The abbey is situated on the western side of the river Lark and has been subject to several large scale archaeological excavations. In order to place the abbey within its environmental context, to determine the potential for the preservation of deposits of palaeoenvironmental significance and to confirm the presence of features noted on the historic mapping, a series of boreholes were drilled using a windowless sampler. This report represents a summary of this fieldwork, assessment of the samples recovered and recommendations for further work.

2. AIMS

The main aims of the projects were

- To record and sample below ground deposits suitable for palaeoenvironmental analysis;
- To analyse organic sediments for appropriate environmental proxies and radiocarbon dating;
- To provide a detailed understanding of the subsurface stratigraphy of any organic-rich deposits and fine grained silts and clays, which might aid in the development of archaeological prospection strategies.

3. METHODS

3.1 Borehole Survey

The borehole survey was undertaken using a windowless sampler drilling rig operated by Global Probing and Sampling. Boreholes were drilled at 5m and 7m intervals perpendicular to the river Lark. Two transects were drilled at site A at 5m intervals. Four transects were drilled at site B approximately 25m apart at 5m intervals, subsequently increased to 7m due to the homogenous nature of the sediments recovered. All boreholes were surveyed using a Trimble differential GPS, which provided OS co-ordinates and Ordnance Datum heights.

3.2 Stratigraphic Analysis

Core tubes were cut open on site and sediment stratigraphy was recorded using the Troels-Smith (1955) system. A summary of the sedimentary and physical properties and the nomenclature used is provided in

Table 1. A full stratigraphic description of the cores is provided in Appendix I.

3.3 Pollen Assessment

A total of 26 subsamples were assessed for pollen from cores 24, 25, 26b, 27 and 28 from Site B. Pollen preparation followed standard techniques including potassium hydroxide (KOH) digestion, hydrofluoric acid (HF) treatment and acetylation (Moore *et al.,* 1991). At least 125 total land pollen grains (TLP) excluding aquatics and spores were counted for each sample. However, pollen concentrations in samples 3.58m, 3.68m and 3.78m from core 25; samples 2.76m and 3.61m from core 26b and 2.56m, 4.72m and 4.84m from core 27 were very low and full counts were not possible for these samples.

3.4 Radiocarbon Dating

A total of 6 sub-samples (see Table 4, Appendix 4) were submitted for radiocarbon dating to SUERC, East Kilbride. These consisted of three samples of wood (*Quercus sp.*), two from Core 28 and one from Core 27. Three bulk sediment samples were submitted, one from Core 27 and two from Core 26b, where it was considered preservation conditions would yield sufficient amounts of organic carbon for dating. Each sample underwent acid/alkali/acid pre-treatment prior to dating.

4. RESULTS

4.1 The borehole survey

The borehole survey at Site A involved the drilling of 12 cores in two transects perpendicular to the river (Fig.2). A 2m stand-off was left between the cores and the abbey wall for safety reasons. The deposits on this site were characterised by a thick layer of made ground containing fragments of brick, coal and gravel within a silty sand clay matrix (Plates 1 and 2). This overlay a deposit of light grey brown silt clay, which may be the partially disturbed remnants of the coarse grained alluvium overlying the natural gravels at this location. No organic sediment was identified on this side of the river. Warren's map of 1747 indicates a vineyard at this location, which suggests it has been well drained since at least the 18th Century (Fig. 3).

The borehole survey at Site B involved drilling 23 cores in four transects perpendicular to the river Lark. The cores at Site B also confirmed the presence of two other features apparent on Warren's map. A possible man-made channel or leat and a fishpond, located to the south of the octagonal tower (Fig. 3). These features were recorded in Cores 6b and 15 respectively. The sediment infilling the channel was a 0.80m thick deposit of well humified silty peat overlying grey coarse river gravels. This was overlain by grey calcareous alluvial silt clays with occasional pale rootlets. This deposit was in turn sealed by a possible archaeological horizon, which consisted of mixed silt sand clay with crushed flint, mortar, shell, bone and tile. In Core 10 the flint and mortar appeared cohesive suggesting the core was excavated through *in situ* wall foundations.

The fishpond feature consisted of a series of silty peats intercalated with coarse grey silts (Plate 3). This is indicative of still water conditions (silty peats) with occasional influxes of moving water (grey silts). During the medieval period fishponds were established to provide fresh fish for the dining table without having to fish the

rivers. The pond may have been fed with fresh water by the channel, which appears to run alongside it (Fig 3). A large piece of cattle bone was recovered from the basal sands along with fragments of wood which were submitted for radiocarbon dating.

The floodplain sediments were characterised by black organic silts overlying gravels (Plate 4). The depth of sediment ranged from fairly thin 0.07m to up to 0.55m thick containing pale rootlets and occasional shell fragments. The thinner deposits tend to be further from the present course of the river. The black silts are overlain by a deposit of grey, gritty silt clay up to 0.80m thick, with frequent shell fragments. The change from organic silts to coarse calcareous silt clay indicates a change in depositional conditions. The organic silts were perhaps deposited in a low energy backwater floodplain environment, punctuated by higher energy flooding events that deposited the coarser sediments.

4.2 Radiocarbon Dating

The radiocarbon dating samples are summarised in Table 5 (Appendix 5). All samples yielded sufficient organic carbon for successful dating and all analyses are reported as having proceeded normally. It can be concluded that that the radiocarbon dating framework has provided a reliable chronology.

4.3 Pollen Assessment

The majority of the pollen samples provided sufficient counts for palaeoenvironmental interpretation. However, pollen concentrations were low in samples from 2.58m, 2.68m and 2.78m in core 25; in samples from 2.76m and 3.61m depths in core 26b; and 2.56m, 4.72m and 4.84m depths in core 27, to permit a reliable palaeoenvironmental assessment. The results from the pollen assessment are summarised in Table 1. The results from core 24 and core 27 are presented in the form of pollen diagrams (Fig.5 and Fig.6), produced using TILIA and TILIA*GRAPH (Grimm 1991). A stratigraphic column and associated radiocarbon dates are also provided to aid interpretation. All percentage figures are of Total Land Pollen (TLP) unless otherwise specified.

Core 24

The base of the pollen diagram is dominated by herbaceous pollen (*c*. 90%). Poaceae (wild grasses) dominates at over 40% with Cereal-type (includes *Avena-Triticum*; oats/wheat) recorded at 20% and *Centaurea cyanus* (cornflower) and Cyperaceae (sedges) over 5%. Other herbs including *Filipendula* (meadowsweet), *Helleborus* (stinking hellebore) and *Secale* (rye) rise from trace values up to values over 5% at 3.56m. Other herbs are scarce but include Apiaceae (carrot family), *Cirsium*-type (thistles), Lactuceae (dandelions), *Plantago lanceolata* (ribwort plantain) and Rosaceae (rose family).

Trees and shrubs are rare and include *Quercus* (oak), *Betula* (birch), *Corylus-avellana*-type (hazel, but may include sweetgale) and a few grains of *Tilia* (lime), *Ulmus* (elm) and *Salix* (willow).

The basal segment of the diagram (between 3.86-3.62m) therefore reflects an open, grassy landscape with little woodland cover locally. It is likely that some of the grasses might be *Phragmites* (common reed) associated with wetter areas on the

floodplain, particularly with the indication of still to moderate flow of water suggested by the presence of *Sparganium* (bur-reed). Tall herbs such as *Filipendula* and Apiaceae are growing locally and are indicative of open fen vegetation, probably on the damp soils around the sampling site.

High values of anthropogenic indicators (*sensu* Behre 1981) are recorded, especially indicators of arable cultivation: Cereal-type, *Secale* and *Centaurea cyanus*; which is a weed of arable fields. Cereal pollen is poorly dispersed and tends to be poorly represented, even in the immediate vicinity of crops (e.g. Brun *et al.* 2007) and the relatively high values must therefore indicate the presence of arable land (wheats/oats and rye), probably immediately adjacent to the sampling site. Alternatively, it is possible that cereal processing was being carried out locally since this activity can enhance pollen dispersal (e.g. Hall 1988).

No samples were taken between 3.62m and 3.00m as the deposits were sands and gravels, which have low preservation potential for pollen. These minerogenic sediments indicate an episode of sediment deposition under relatively high energy fluvial conditions. The pollen diagram recommences at 2.90m with little change in the pollen assemblage. Herbaceous pollen continues to dominate, largely Poaceae and Cereal-type. Trees and shrubs remain scarce with a decline in *Betula, Ulmus* and *Tilia* but an increase in occasional grains of *Pinus sylvestris* (Scots pine), *Alnus* (alder) and *Fraxinus* (ash). The environment in the upper segment of the diagram thus remains similar to that at the base with slight fluctuations in the herb spectra.

Core 25

From the 4 samples submitted for pollen analysis from this core only 1 (2.93m depth) contained a sufficient amount of pollen for a palaeoenvironmental assessment. This sample was dominated by Cyperaceae (sedges) at 54% with Poaceae and Lactuceae reflecting a damp, open, grassy landscape.

Core 26b

From the 5 samples submitted for pollen assessment from the humified peat in this core, 3 from 2.94m, 3.81m and 3.97m depths contained sufficient amounts of pollen for an assessment. The 2 basal samples are dominated by herbaceous pollen largely consisting of Cyperaceae up to 68% and Poaceae up to 22%. Other herbs are rare with grains of Lactuceae, *Filipendula, Galium*-type (bedstraws) and *Plantago lanceolata.* The radiocarbon sample from 3.90m depth produced a date of 2670±40 BP (Beta-258112, 900-790 cal BC) indicative of the later Bronze Age. The local environment was apparently fairly open at this time, probably with sedges growing in and around the channel. Some of the grasses may be associated with wetland vegetation (e.g. *Phragmites*, common reed), but the presence of *Plantago lanceolata* and Lactuceae (dandelions) also indicate open grassy meadow-like areas on the dryland beyond the floodplain.

No samples were taken from the sandy silt deposits between 3.00m and 3.60m. The pollen record recommences at 2.94m, with the spectrum indicating a similar environment to the basal samples, largely dominated by Cyperaceae and Poaceae with few other herbs, trees or shrubs. The top of the humified silty peat at 2.77m is dated to 1350±40 BP (Beta-258111, 640-710 cal. AD to

750-760 cal. AD), the early Anglo-Saxon period. The associated sample from this depth contained a few grains of Cyperaceae and Lactuceae, but the count was too low to permit a reliable environmental assessment.

Core 27 ('Fishpond')

The base of the pollen diagram at 4.92m depth is dated to 4240±40 BP (Beta-258113, 2910-2860 cal. BC, 2800-2750 cal. BC, 2710-2710 cal. BC), the later Neolithic. However the pollen record does not start until 4.28m due to low pollen counts in the basal samples. Herbaceous pollen dominates between 4.28m and 3.70m (c. 90%) mainly consisting of Cyperaceae, Poaceae and Lactuceae. Other herbs are rare, but include occasional grains of *Cirsium*-type (thistles), *Filipendula*, Apiaceae, Cereal-type, *Helleborus* and *Ranunculus*-type (buttercups). The impression is again of an open, pastoral landscape with herb communities typical of meadow vegetation. Increases in arable pollen types including *Secale* and Cereal-type (oats/wheat) are recorded above 3.70m, suggesting arable cultivation and/or cereal processing in the close vicinity of the site.

Other than *Corylus* and *Quercus*, which reach values up to 10%, all other trees and shrubs are scarce. The record is probably heavily dominated by the local pollen signal with sedges and other aquatic vegetation growing close to or on the sampling site. Discerning changes at a greater spatial distance from the current data is difficult, but it seems likely that some oak-hazel scrub/woodland was present in the wider landscape.

No samples were taken between 3.70m and 2.95m as the deposits were gravelly silts with low potential for pollen preservation. When the pollen record recommences at 2.94m the environment is similar to that apparent towards the base and an open landscape with grasses/sedges and evidence for pastoral vegetation as well as arable cultivation is indicated. The top of the diagram at 2.71m is dated to 1250±40 BP (Beta-258114, 670-880 cal. AD), the later Anglo-Saxon period.

Core 28

All three samples taken from the black silt deposits (2.36m, 2.54m and 2.70m) in core 28 provided sufficient counts for palaeoenvironmental assessment. A sample of wood from just below the silts at 2.80m produced a radiocarbon date of 960±40 BP (Beta-258115, 1010-1170 cal. AD), the later Medieval period. The pollen sample from the base of this silt deposit is dominated by Poaceae and Cereal-type pollen. Cereal increases to values up to 45% at 2.54m which is dated to 890±40 BP (Beta-258110, 1030-1230 cal. AD). Other herbs recorded include *Secale, Centaurea cyanus, Rumex, Plantago lanceolata, Helleborus*, Cypercaeae and Apiaceae. The upper sample is dominated by the same herb spectra recorded in the lower samples. Pollen of trees and shrubs are scarce with only occasional grains of *Corylus, Quercus, Salix* and *Pinus* recorded within all three samples.

These pollen spectra are strongly suggestive of an agricultural landscape. The suite of taxa indicates cereal cultivation/processing in the immediate vicinity of the sampling site and the presence of open pastoral vegetation communities. It would appear that there was very little tree or shrub cover present at this time.

4.4 Finds

The boreholes also contained anthropogenic remains in the form of animal bone, tile, metal and pottery which mostly dates from the Medieval period (Table 3, Appendix 3). A discreet archaeological horizon up to 0.40m thick overlay most of the floodplain at Site B, most probably an occupation horizon related to the abbey buildings, which extend across this area.

In addition, animal bone was also recovered from the basal gravels in Cores 25 and 28. This may suggest some re-working by fluvial or human activity. In Core 26 drilling was halted due to the presence of a large fibrous piece of wood at 1.60m, which the rig was unable to penetrate. This may indicate the presence of timber structures associated with the abbey or at the very least a burial environment that is conducive to the preservation of organic archaeological as well as palaeoenvironmental material.

Ten fragments of animal bone were recovered from the cores at site B (see Table 4, Appendix 4). Much of this material is from fowl and game birds with a few fragments of cattle bone. Large *Buccinium undatum* (whelk) shells were also present in Cores 9, 21 and 22.

5. DISCUSSION AND CONCLUSIONS

The eastern floodplain of the River Lark (Site A) preserves no deposits of palaeoenvironmental potential. It seems likely that the effects of drainage and agriculture have destroyed any that may have originally been present. In contrast, it would appear that the western side of the floodplain at the abbey Site B preserves a palimpsest of deposits dating from the Neolithic through to the late Medieval period. These include both natural and archaeological strata. In places (core 26-27) it is clear that *in situ* organic deposits relating to processes of floodplain aggradation during prehistory are present and that these deposits contain palaeoenvironmental information regarding the landscape prior to the foundation of the abbey. These sediments probably accumulated in a floodplain backswamp environment.

The shallower organics of core 27 date to the Anglo-Saxon period, but it is unlikely that the sequence reflects continuous accumulation from the Neolithic. Fluvial activity, the erosion and inwash of material from the dryland and human activity, or a combination of these factors, have probably all affected the continuity of the palaeoenvironmental record.

The pollen from the sub-sampled cores was generally well preserved although some samples produced only low concentrations. It is notable that the spectra are generally very similar and tend to be dominated by herbaceous taxa, notably sedges and grasses. It is probable that the high percentages of Cyperaceae and taxa such as *Sparganium* indicate a highly localised pollen signal, with plants growing on and around the sampling site dominating the record. It would appear that the vegetation at this site was open sedge fen, rather than the dense alder carr attested in other river valley environments in Suffolk during the mid Holocene (e.g. Hopla *et al*. 2008).

However, the high percentages of Cereal-type pollen and *Secale* during the Anglo-Saxon and Medieval periods are notable. Such high values suggest

that cereal cultivation and/or processing must have been taking place in the very close vicinity of the sampling site. The other possibility is that these high percentages of cereal type pollen and other indicators of cultivation were derived from secondary sources, such as the dumping of food waste or crop processing remains. It is clear from the range of archaeological material recovered from the cores that a variety of such taphonomic pathways might be represented in the pollen record.

5. RECOMMENDATIONS FOR FURTHER ANALYSIS

The deposits from Area B thus have considerable potential to shed light on landscape change and human activity at the abbey site. A suite of sediments ranging from the Neolithic to the Medieval period are preserved on the floodplain area. Further more detailed pollen analyses and radiocarbon dating have the potential to produce information regarding the timing and character of activity in the abbey grounds. Analyses should focus on the organic rich deposits in cores 24, 26, 27 and 28.

6. ARCHIVE

The boreholes, sub-samples and finds are currently stored at Birmingham Archaeo-Environmental. These samples will be held until further notice.

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Plate 1: Site A, Core 1

Plate 2: Site A coring rig

Plate 3: Site B core 16

Plate 4: Site B, core 23

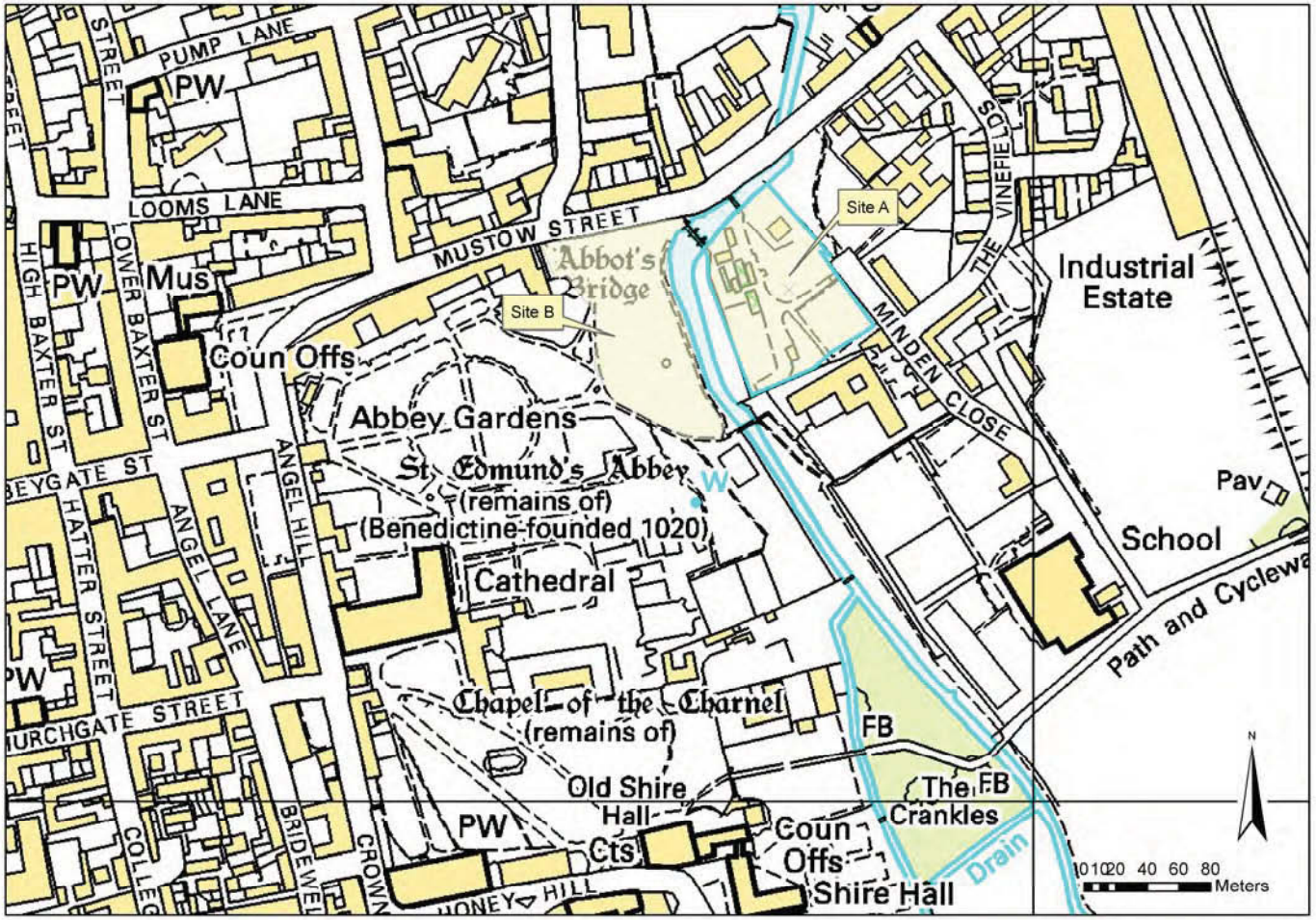

Figure 1: Site location

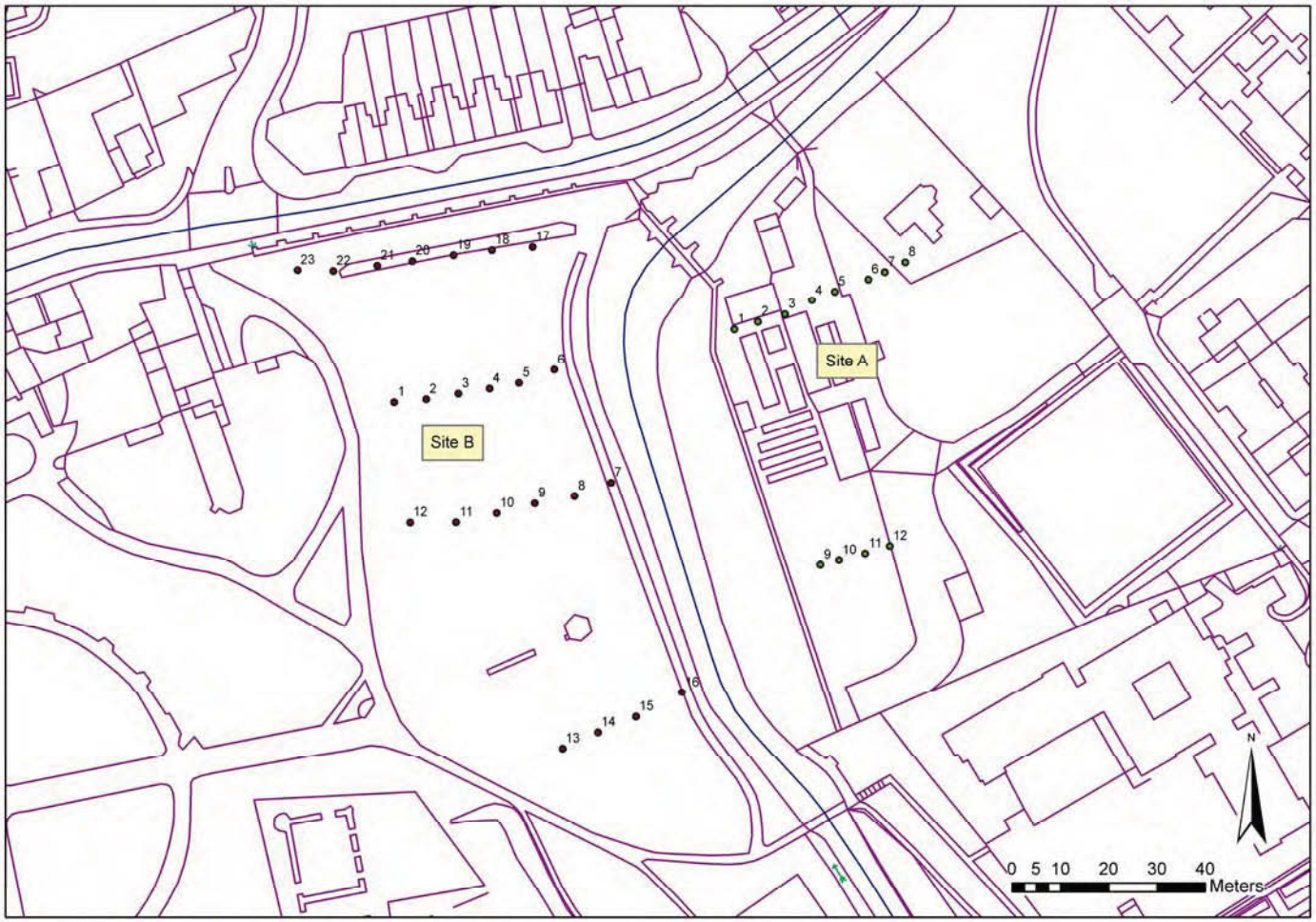

Figure 2: Borehole locations

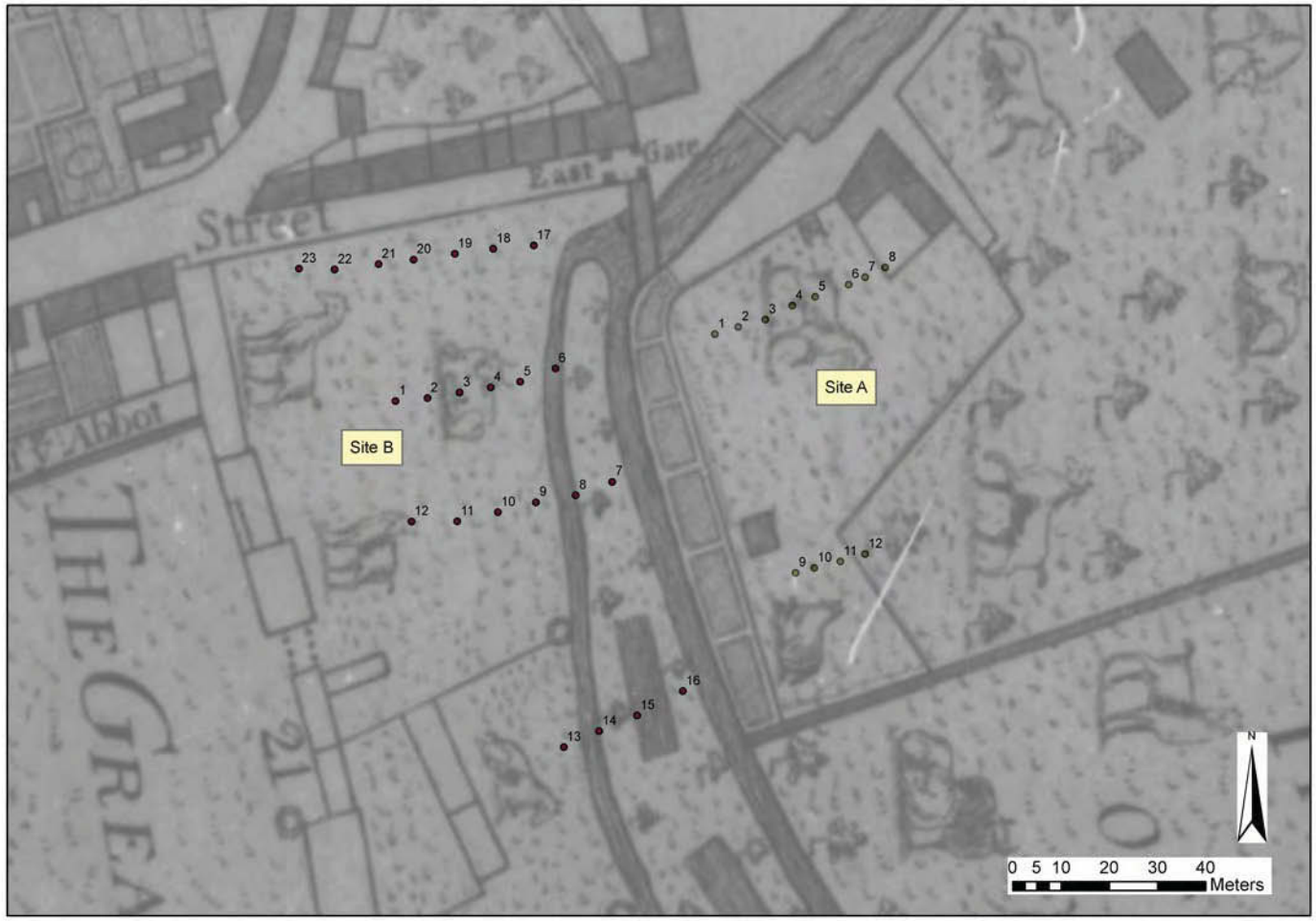

Figure.3: Thomas Warren's Map 1747 (Courtesy of SCC)

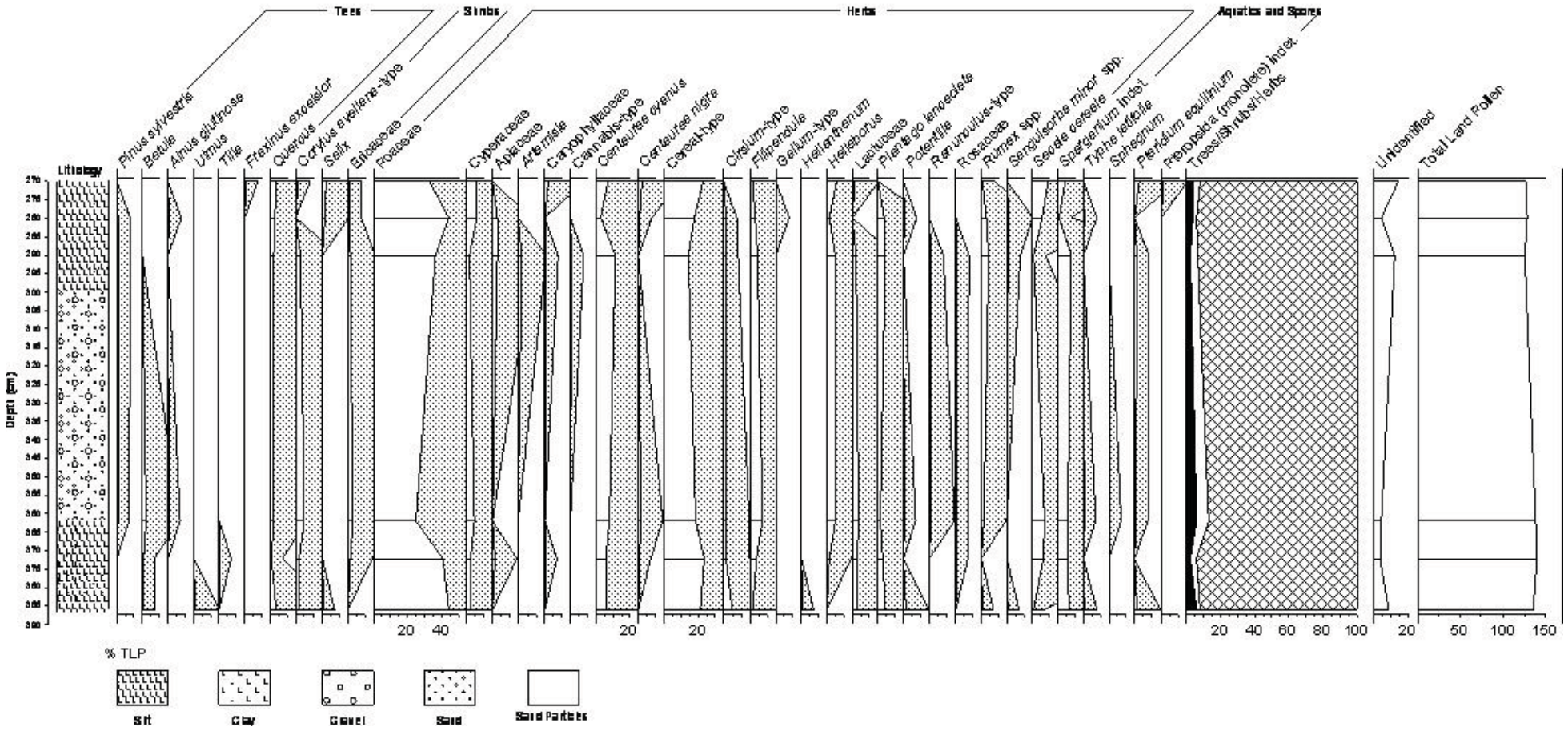

Figure 4: Bury St Edmunds Core 24 Percentage Pollen Diagram. Shading=exaggeration x 10

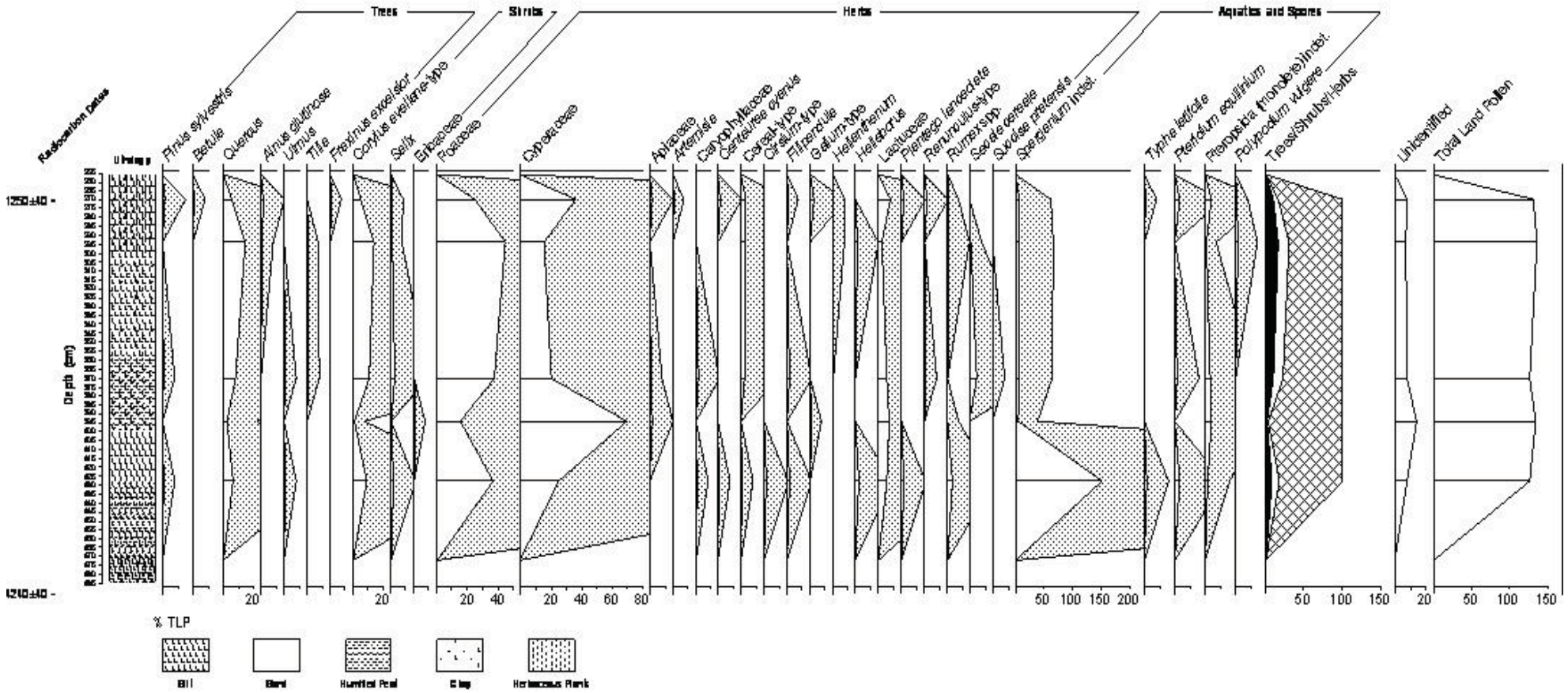

Figure 5: Bury St Edmunds Core 27 Percentage Pollen Diagram. Shading=exaggeration x 10

Core	Depth	Preservation	Concentration	Main species	TLP	Main Anthropogenic indicators	Sediment Description
24	2.70m	Good (4)	Medium (3)	Poaceae (33%) Cereal-type (23%) Secale (9%)	128	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus*	Brown black organic silt
24	2.80m	Good (4)	Medium (3)	Poaceae (44%) Cereal-type (18%)	129	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus, Plantago lanceolata*	Brown black organic silt
24	2.90m	Good (4)	Medium (3)	Poaceae (37%) Cereal-type (14%) *Centaurea cyanus* (11%)	126	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus, Plantago lanceolata*	Brown black organic silt
24	3.62m	Good (4)	Medium-Good (3/4)	Poaceae (25%) Cereal-type (18%) Secale (7%) *Centaurea cyanus* (8%)	139	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus, Plantago lanceolata*	Black organic silt
24	3.72m	Good (4)	Medium-Good (3/4)	Poaceae (41%) Cereal-type (24%)	138	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus, Plantago lanceolata*	Black organic silt
24	3.86m	Good (4)	Medium-Good (3/4)	Poaceae (45%) Cereal-type (21%) *Plantago lanceolata* (4%)	135	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus, Plantago lanceolata*	Black organic silt
25	2.93m	Low (2)	Poor (2)	Cyperaceae (54%) Poaceae (20%) Lactuceae (13%)	128	*Plantago lanceolata*	Highly humified silty peat
25	3.58m	Low (2)	Very Low (1)	A couple of grains of Lactuceae, Cyperaceae, *Corylus*, Poaceae	n/a	-	Highly humified silty peat

25	3.68m	Low (2)	Very Low (1)	A couple of grains of *Alnus, Tilia*, Cyperaceae	n/a	-	Highly humified silty peat
25	3.78m	Low (2)	Very Low (1)	A couple of grains of Pteropsida, Cyperaceae	n/a	-	Highly humified silty peat
26b	2.76m	Low (2)	Very Low (1)	A couple of grains of Cyperaceae, lactuceae	n/a	-	Highly humified silty peat
26b	2.94m	Good (4)	Medium-Good (3/4)	Cyperaceae (65%) Poaceae (24%)	139	*Plantago lanceolata, Rumex*. spp	Highly humified silty peat
26b	3.61m	Low (2)	Very Low (1)	A few grains of Poaceae	n/a	-	Highly humified silty peat
26b	3.81m	Good (4)	Medium (3)	Cyperaceae (68%) Poaceae (17%)	130	*Plantago lanceolata*	Highly humified silty peat
26b	3.97m	Good (4)	Medium (3)	Cyperaceae (54%) Poaceae (22%)	129	*Rumex* spp	Highly humified silty peat
27	2.56m	Absent (0)	Absent (0)	n/a	n/a	-	Organic brown silt
27	2.70m	Good (4)	Low (2)	Cyperaceae (35%) Poaceae (24%) *Quercus* (9%) Lactuceae (7%)	136	*Plantago lanceolata, Rumex*. spp	Organic brown silt
27	2.94m	Good (4)	Medium-Good (3/4)	Poaceae (44%) Cyperaceae (15%) *Corylus* (14%) *Quercus* 14%)	138	*Rumex* spp Cereal-type *Secale*	Organic brown silt
27	3.70m	Good (4)	Medium (3)	Poaceae (37%) Cyperaceae (20%) *Corylus* (10%)	128	Cereal-type *Secale* *Plantago lanceolata*	Black grey brown silty peat
27	3.94m	Good (4)	Medium-Good (3/4)	Cyperaceae (70%) Poaceae (16%) Lactuceae (7%)	134	*Rumex* spp	Black grey brown silty peat
27	4.28m	Good (4)	Low (2)	Poaceae (38%) Cyperaceae (26%) *Corylus* (9%)	125	*Secale cereale* *Rumex* spp. Cereal-type *Centaurea cyanus, Plantago lanceolata*	Highly humified silty peat

27	4.72m	Low (2)	Very Low (1)	Some Cyperaceae, Poaceae, Pteropsida	n/a	-	Organic silty band
27	4.84m	Low (2)	Very Low (1)	Some *Alnus*, Cyperaceae	n/a	-	Organic silty band
28	2.36m	Good (4)	Medium (3)	Poaceae (35%) Cereal-type (25%) Cyperaceae (9%)	131	Cereal-type, *Plantago lanceolata, Rumex* spp, Cannabis-type, *Centaurea cyanus*	Mottled brown black silt
28	2.54m	Good (4)	Medium-Good (3/4)	Cereal-type (45%) Poaceae (41%)	128	Cereal-type, *Secale*, *Centaurea cyanus*	Mottled brown black silt
28	2.70m	Good (4)	Medium-Good (3/4)	Cereal-type (29%) Poaceae (26%)	128	Cereal-type, *Secale*, *Plantago lanceolata*, *Centaurea cyanus*	Mottled brown black silt

Table.1. Pollen from Abbey Gardens and Nursery Site, Bury St Edmunds

Appendix 1

Nursery site (Site A), Bury St Edmunds Core logs

Cores taken at 5m intervals

Transect 1

Core 1
3m from abbey wall TL 85800 64330

0-0.63m made ground brown silts sand with brick fragments
0.63m-1.00m not recovered
1.00m-1.20m light red brown silt occasional natural flint
1.20m-2.00m natural flinty gravels

Core 2
TL 85802 64332

0-0.20m Topsoil, loose gravely silt sand
0.20m-0.60m compact light grey brown sandy silt clay, becoming clayey with depth
0.60m-0.75m flinty gravels

Core 3
TL 85808 64343

0-0.30m Topsoil with brick and sand
0.30m-0.60m silt with sand and gravel becoming clayey with depth
0.60m-0.80m gravels

Core 4
TL 85818 643436 6m interval to avoid service

0-0.27m made ground, sand, gravel and coal throughout
0.27m-0.55m grey brown silt sand becoming clayey with depth, large pebbles at base
0.55m-0.85m sands and gravels

Core 5
TL 85820 64338

0-0.27m made ground
0.27m-1.05m light grey brown silty clay with flint and gravel throughout gritty, charcoal flecks at base
1.05m-1.65m sands and gravels

Core 6
TL 85830 64338 6.50m from last core due to road

0-0.42m made ground, clinker at base
0.42m-1,25m light grey brown, silt sand with charcoal flecks and animal bone at base
1.25m-1.40m gravels

Core 7
TL 85835 654336

0-0.20m sandy topsoil
0.20m-0.82m grey brown silt clay sand charcoal flecks, animal bone at base
0.82m-1.00m sands and gravels

Core 8
TL 85844 64341

0-0.26m topsoil
0.26m-0.85m grey brown silt sand charcoal flecks and coal throughout
0.85m gravel

Transect 2
5m intervals

Core 9
3m from abbey wall

0-0.35m made ground, dark brown silt sand wit gravel, slag and charcoal
0.35m-0.85m silt clay with post-med pot at 0.40m, flinty lens at 0.60m
0.85m-1.85m sands and gravels

Core 10
TL 85825 64314

0-0.40m made ground, gritty silt sand topsoil with coal and charcoal throughout
0.40m-0.80m silty sandy clay with large chunks flint and charcoal flecks, tile at the top
0.80m-1.80m sands and gravels

Core 11
TL 85826 64305

0-0.0.35m made ground, gritty dark brown silt clay with coal and charcoal throughout
0.35m-0.70m grey brown silt sand clay flint throughout
0.70m-1.70m gravels

Core 12
TL 85828 64303

0-0.30m made ground as before
0.30m-0,51m sandy clay, grey brown
0.51m-0.80m gravel

Abbey Gardens (site B), Bury St Edmunds core logs

Transect 1

Core 1
TL 85726 64319 5m intervals

0-0.21 topsoil dark brown sandy clay
0.21m-0.50m mid brown silty clay with animal bone shell, tile and charcoal
0.50m-1.40m not recovered

1.40m-1.83m	**Da**	**St**	**El**	**Dr**	**UB**
	2+	0	1	2	0

Ag2, As2, Ga+, ptm+
grey green calcareous clay, diffuse lower boundary, charcoal flecks

1.83m-2.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2+	1	1	3	1

Ag2, As2, Ga+
blue-grey silty clay charcoal flecks

2.00m-2.26m not recovered

2.26m-2.39m	**Da**	**St**	**El**	**Dr**	**UB**
	2+	0	0	2	1

Ag2, As2, Ga+
Grey brown wet gritty silt clay

2.39m-2.47m

Da	St	El	Dr	UB
2+	0	0	3	1

Ag3, As1, Ga+
Brown smooth silt

2.47m-2.73m

Da	St	El	Dr	UB
4	1	0	3	1

Ag3, As1, Ga+, Th+
Black organic silt, occ black rootlets, laminated bands of lighter silt at 2.50m animal bone at base

2.73m-2.83m

Da	St	El	Dr	UB
4	1	0	3	2

Gg (*min*)2, Gs2, Ga+
black sand

2.83m-3.00m black flinty gravel

Core 2
TL 85724 64334

0-0.50m turf removed
0.50m-0.60m topsoil

0.60m-0.90m

Da	St	El	Dr	UB
2+	0	0	3	1

Ag3, As1, Ga+
mid brown sandy clay, shell animal bone and mortar at 0.75m-0.87m

0.90m-1.51m

Da	St	El	Dr	UB
2	0	0	3	1

Ag+, As2, Ga1, Lc+
gritty yellow brown sandy clay calcareous with depth

1.51m-1.90m

Da	St	El	Dr	UB
2+	0	0	3	2

Ag2, As2, Ga+, Lc+
blue grey silt clay

1.90m-2.10m

Da	St	El	Dr	UB
2+	0	1	3	2

Ag2, Dh2,
Well humified organic silt peat, reeds, wood

2.10m-2.20m

Da	St	El	Dr	UB
2+	0	0	3	1

Ag3, As1, Dh+
smooth brown silt

2.20m-2.42m

Da	St	El	Dr	UB
4	1	0	3	1

Ag3, As1, Ga+, Th+
black organic silts mottled with brown silt at top woody at base

2.42m-2.70m black sands and gravels

Core 3
TL 85740 64329

0-0.55m turf removed
0.55m-0.80m mixed topsoil , flint brick and charcoal

0.80m-1.00m

Da	St	El	Dr	UB
2	0	0	3	1

Ag2, As2, Ga+
light yellow brown gritty clay silt animal bone at base

1.00m-1.40m not recovered
1.40m-1.58m sandy gritty clay with mortar flecks

1.58m-1.90m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag2, As2, Ga+, Dh+				
	brown grey silt clay, occ rootlets and flint organic at base				
1.90m-2.45m	**Da**	**St**	**El**	**Dr**	**UB**
	4	1	0	3	1
	Ag3, As1, Ga+, Th+				
	black silty peat abundant moncot remains and rootlets silty with depth				

2.45m-2.80m black sands and gravels

Core 4
TL 85749 64329

0-0.50m turf removed
0.50m-0.60m topsoil, tile and charcoal

0.60m-0.94m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag2, As2, Ga+				
	mixed brown silt clay with flint, mortar and bone frags				
0.94m-1.40m	**Da**	**St**	**El**	**Dr**	**UB**
	2	1	0	3	1
	Ag2, As2, Ga+, Ptm+				
	yellow brown gritty silt clay becoming clayey and calcareous with depth				
1.40m-1.64m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag3, As1, Ga+, Th+				
	grey silt with occ pale rootlets				
1.64m-1.67m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	4
	Ga3, Gs 1				
	brown sand				
1.67m-1.80m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	4
	Ag3, As1, Ga+, Th+				
	brown organic silts, occ pale rootlets and twigs				
1.80m-1.90m	**Da**	**St**	**El**	**Dr**	**UB**
	4	1	0	3	1
	Ag3, As1, Th+				
	black organic silt				

1.90m-2.00m twiggy rooty black sand
2.00m-2.50m black gravels

Core 5
TL 85756 64335

0-0.50m turf removed
0.50m-0.82m topsoil with oyster shell and mortar

0.82m-1.37m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	1	
	Ag2,As2,Ga+				
	grey gritty silt clay				
1.37m-1.60m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag2,As2,Ga+, Th+				
	brown grey silt clay occ twigs				
1.60m-2.15m	**Da**	**St**	**El**	**Dr**	**UB**
	4	1	0	3	1
	Ag3, As1, Ga+, Th+				

black organic silt occ wood becoming sandy with depth
2.15m-2.30m grey gravel

Core 6
TL 85755 64338

Core had to be redrilled due to hitting possible wall or service

Core 6b

0-0.30m turf removed
0.30m-0.60m topsoil mortar, crushed flint and bone

0.60m-0.84m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As2, Ga+
grey brown gritty silt clay clay pipe at the top

0.84m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As2, Ga+
grey gritty silt clay, large pieces of flint
1.00m-1.50m missing
1.50m-2.00m as above
2.00m-2.50m missing
2.50m-2.80m as above

2.80m-3.00m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	2	1

Ag3, As1, Ga+, Th+
brown silty humified peat monocot remains, pale rootlets, phragmites gritty at base
3.00m-3.50m redrilled sediment
2.50m-3.90m peat as above
3.90m-4.00m gravels
-redrilled as core 26b

Transect 2
Core 7
TL 85773 64301
0-0.50m turf removed
0.50m-0.70m mixed topsoil

0.70-0.90m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1

Ag2, As2, Ga+
mid brown clay silt

0.90m-1.60m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As2, Ga+
yellow gritty brown clay silt

1.60m-1.80m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As2, Ga+, Ltc+
sandy gritty silt, animal bone at 0.70m, mussel and clam shells

1.80m-2.00m	**Da**	**St**	**El**	**Dr**	**UB**
	4	1	0	3	3

Ga3, Gg(*maj*), Ag+
brown sandy gravels with small silty band at top
2.00m-2.30m too wet to recover

2.30m-2.55m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	2	1

Ag2, Dh2, Ga+, Th+
highly hummified silty peat, gritty with large pieces of flint

2.55m-3.00m sands and gravels

Core 8
TL 85776 64312

0-0.50m turf removed

0.50m-1.10m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	0

Ag3, As1, Ga+
grey brown gritty silt large pieces of flint, charcoal flecks silty with depth

1.10m-1.40m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, Ga1,
grey sandy silt with oyster shells large piece of flint with depth
1.60m drilling stopped due to something solid

Core 9
TL 85755 64308 7m interval

0-0.45m turf removed
0.45m-0.75m topsoil
0.75m-0.89m mid brown sandy clay band of mortar, brick and flint at base

0.89m-1.55m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	4

Ag2, As2, Ga+
grey gritty silt clay, large pieces flint becoming shelly at base whole shell at base

1.55m-1.63m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	4	1

Ag2, Ga+, Th2
highly humified silt peat occ pale rootlets, bone at top

1.63m-186m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, As1, Ga+
smooth grey silt clay gritty at top

1.86m-1.90m	**Da**	**St**	**El**	**Dr**	**UB**
	4	1	0	3	1

Ag3, As1, Ga+, Th+
black organic silt, woody, occ rootlets
1.90m-2.40m not recovered some recutting at top of next core

2.40m-2.60m	**Da**	**St**	**El**	**Dr**	**UB**
	3	1	0	3	1

Ag2, As2,
grey brown smooth silt clay

2.60m-2.90m	**Da**	**St**	**El**	**Dr**	**UB**
	4	1	0	3	1

Ag3, As1, Ga+, Th+
black organic silts, occ pale rootlets
2.90m-3.00m gravels

Core 10
TL 85755 64304 7m interval located on slight hummock

0-0.60m not recovered
0.60m-0.90m topsoil

0.90m-2.40m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As2, Ga+
Grey brown gritty silt clay animal bone at top

2.40m-2.78m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As2,
smooth grey blue silt clay

2.78m-2.90m	Da	St	El	Dr	UB
	4	1	0	3	1

Ag3, As1, Th+
black organic silt, occ pale rootlets with silty brown lens 2.82m
2.90m-3.00m black flinty gravels

Core 11
TL85743 64313 7m interval

0-0.45m turf removed
0.45m-0.65m topsoil
0.65m-0.96m possible wall foundations, mortar and flint, brick and chalk

0.96m-1.59m	Da	St	El	Dr	UB
	2	0	0	3	3

Ag2, As2, Ga+
gritty brown silt clay

1.59m-2.75m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As2, Ga+, Ptm+
gritty calcareous grey silt clay becoming siltier with depth, animal bone at 1.87m

2.75m-2.90m	Da	St	El	Dr	UB
	4	1	0	3	3

Ag3, As1, Th+, Ptm+
smooth brown grey silt, shells and pale rootlets

2.90m-2.97m	Da	St	El	Dr	UB
	4	1	0	3	1

Ag3, As1, Ga+, Th+
black organic silt, occ shell and pale rootlets
2.97m-3.00m black gravels

Core 12
TL 85758 64230

0-0.65m turf removed
0.65m-1.00m topsoil with mortar and concrete frags
1.00m-1.60m not recovered
1.60m 1.75m rooty topsoil

1.75m-2.00m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag1, As1, Ga2
Mid brown silty sandy gravel

<u>Transect 3</u>
Core 13

0-0.45m turf removed
0.45m-0.60m rooty topsoil

0.60m-1.00m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag1, As2, Ga1
Brown sandy clay with mortar, sandstone and charcoal flecks

1.00m-1.60m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As2, Ga+
grey silt clay with band of mortar, flint and charcoal1

1.60m-2.00m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag3, As1, Ga+, Th+

yellow calcareous clay silt
2.00m-2.49m not recovered

2.49m-2.74m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag3, As1, Ga+, Th+
grey gritty silt clay

2.74m-2.87m	Da	St	El	Dr	UB
	4	1	0	3	1

Ag3, As1, Ga+, Th+
black organic silt with twig and pale rootlets

2.87m-3.20m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As2, Ga+, Th+
grey gritty silt flint at base

3.20m-3.40m	Da	St	El	Dr	UB
	4	0	0	2	1

Ag3, As1, Ga+, Th+
black organic silt
3.40m-4.00m black gravels

Core 14
TL 85775 64247

0.-0.45m turf removed
0.45m-0.58m topsoil

0.58m-84m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As1, Ga1
mid brown sandy silt clay, with mortar and brick shells at top

0.84m-1.30m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As+, Ga2,
yellow brown sandy silt, coarse gravel throughout

1.30m-1.42m	Da	St	El	Dr	UB
	4	1	0	3	1

Ag3, As1, Ga+, ptm+
black grey sandy silt with gravel, shell, bone frags

1.42m-1.90m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As2, Ga+,
yellow brown gritty silt clay

1.90m-2.50m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag2, As2, Ga+, Th+
grey gritty silt clay pale rootlets, siltier with depth, metal loop at base

2.50m-2.87m	Da	St	El	Dr	UB
	3	0	1	4	1

Ag3, As1, Ga+, Th+
highly humified silt peat calcareous, monocot remains, pale rootlets, compact

2.87m-2.94m	Da	St	El	Dr	UB
	2	0	1	3	1

Ag3, As1, Th+, ptm
light green brown reedy calcareous silt

2.90m-3.80m	Da	St	El	Dr	UB
	3	0	2	3	1

Ag3,Th1
highly humified silt peat reedy with abundant rootlets

3.80m-3.98m	Da	St	El	Dr	UB
	2	0	1	3	1

Ag3, As1, Th+

smooth grey silt with a abundant rootlets and reeds

3.98m-4.00m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	3	1

Ag2, Ga+, Th2
highly humified silty peat monocot remains, rootlets, gritty

4.00m-4.74m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1

Ag+ Ga3, ptm1
shelly wet sand

4.74m- 4.77m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	3	1

Ag3, Ga+, Th1
highly humified silty peat

4.77m-4.80m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1

Ag+, Ga2, ptm2
shelly grey sand

4.80m-4.87m wood

4.87m-4.89m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	3	1

Ag3, Ga+, Th1
highly humified silty peat

4.89m-5.00m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	2	2

Ga3, ptm1
shelly white sand

Core 15
TL 85780 64255

0-0.30m turf removed
0.30m-0.60m topsoil

0.60m-0.90m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	4	1

Ag2, As1, Ga1
grey brown gritty silt clay, gravely at top, window glass at base

0.90m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag2, As1, Ga1, ptm+
grey gritty silt clay, calcareous

1.00m-1.90m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, As1, Ga+, Th+
calcareous grey silt clay, wood at 1.68m becoming rooty at base

1.90m-2.00m gravel

2.00m-2.40m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1

Ag3, Ga1
brown gritty wet silt

2.40m-2.53m silty black gravel

2.53m-2.85m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	3	1

Ag3, Ga+, Th1
highly humified silty peat, pale rootlets, monocot remains, wood at 1.72m

2.85m-2.89m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, As1, Ga+, Th+, ptm+
green grey calcareous silt occ pale rootlets

2.89m-3.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, ptm+, Th1
brown highly humified silty peat, small shells, monocot remains
3.00m-4.30m too wet to recover

4.30m-4.61m	Da	St	El	Dr	UB
	3	0	0	3	1

Ag3, As1, Ga+, Th+
wet gritty dark brown silt

4.61m-4.80m	Da	St	El	Dr	UB
	2	1	0	3	1

Ag3, As1,Th+
diffusely laminated grey silt, pale rootlets monocot remains

4.80m-4.94m	Da	St	El	Dr	UB
	3	1	0	3	1

Ag3,Ga+, Th1
highly humified silt pear pale rootlets, monocot remains woody at base
4.94m-5.00m grey sand
-redrilled as core 27

Core 16
TL 85794 64261

0-0.37m not recovered
0.37m-49m topsoil

0.49m- 0.80m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag+, As3, Ga1
gritty sandy clay crushed sandstone at top tile and flint at 0.68m

0.80m-1.57m	Da	St	El	Dr	UB
	2	0	0	2	1

Ag+, As3, Ga1
yellow brown gritty clay becomes gravely with depth

1.57m-2.55m	Da	St	El	Dr	UB
	3	0	0	3	1

Ag2, As2, Ga+, Th+
blue grey calcareous silt clay occ pale rootlets

2.55m-2.64m	Da	St	El	Dr	UB
	3	1	0	3	3

Ag3, Ga+, Th1, ptm+
brown organic silt abundant pale rootlets, calcareous

2.64m-2.77m	Da	St	El	Dr	UB
	2	0	0	3	3

Ag3, Ga+, Th+, ptm1
smooth grey silt abundant pale rootlets, calcareous

2.77m-2.86m	Da	St	El	Dr	UB
	4	1	0	3	3

Ag3, Ga+, Th1
black calcareous silt, rootlets, small twigs, large piece chalk at base

2.86m-3.00m	Da	St	El	Dr	UB
	3	0	0	3	3

Ag3, Ga+, Th1
brown highly humified silty peat, abundant rootlets and monocots
3.00m-3.60m core recut
3.60m-3.39m humified peat as above

3.39m-3.87m	Da	St	El	Dr	UB
	2	0	0	3	1

Ag3, Ga1, Th+
grey brown organic silt, abundant rootlets an monocots

3.87m-4.00m	Da	St	El	Dr	UB
	3	0	0	3	1

Ag3, Ga+, Th1
humified brown silt peat abundant rootlets and monocot remains gritty at base

4.00m-4.60m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	2

Ag3, Ga+, Th1
organic grey brown silt, abundant rootlets

4.60m-4.74m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1

Ag3, Ga+, Th1
Highly humified silty peat, woody, monocot remains

4.74m-4.80m white grey sand

4.80m-4.85m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1

Ag3, Ga+, Th1
highly humified brown silty peat, abundant rootlets

4.85m-4,90m white grey sand with twigs

Transect 4
Core 17
TL 85757 64357

0-0.50m turf removed
0.50m-0.80m topsoil

0.80m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag+, As2 Ga2,
yellow brown sandy clay charcoal flecks

1.00m-1.68m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, As1,Ga+, ptm+
yellow grey gritty silt clay calcareous

1.68m-2.67m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1

Ag3, As1,Ga+,
grey blue gritty silt clay, gravel at base

2.67m-2.77m flinty black sand

2.77m-3.00m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	1

Ag3, Ga+, Th1
brown highly humified silty peat, abundant monocots and pale rootlets, sandy at base

3.00m-3.60m too wet too recover
3.60m-3.90m brown gravely sandy silt
3.90m-4.00m gravel
-redrilled as core 25

Core 18
TL 85758 64535

0-0.40m turf recovered
0.40m-0.75m topsoil, brick and stones at base

0.75m-0.88m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3,As1, Ga+
grey brown gritty silt clay crushed stone at 0.78m

0.88m-1.25m missing
1.25m-1.50m as above

1.50m-1.73m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1

Ag3, As1,Ga+, Th+
grey gritty silt clay, rooty at base

1.73m-2.78m

Da	St	El	Dr	UB
2	0	0	3	1

Ag1, Ga2,Gg(maj)1
grey brown gravely sand, iron panning at top
2.78m-2.98m grey black silty gravel

Core 19
TL 85757 64372

0-0.30m turf removed
0.30m-0.50m topsoil
0.50m-0.80m

Da	St	El	Dr	UB
2	0	0	3	1

Ag3, Ga1,
mid brown silty sand, brick at top
0.80m-1.50m

Da	St	El	Dr	UB
2	0	0	3	3

Ag3, As1,Ga+
yellow brown gritty silt clay crushed stone at top
1.50m-1.93m

Da	St	El	Dr	UB
2	0	0	3	1

Ag3, As1, Ga+, Th+
grey silt clay occ pale rootlets
1.93m-1.97m

Da	St	El	Dr	UB
4	0	0	2	3

Ag3, Ga+, Th1
black silts, occ rootlets
1.97m-2.00m black gravel

Core 20
TL 85731 64349

0-0.40m turf removed
0.40m-0.60m topsoil
0.60m-0.90m

Da	St	El	Dr	UB
2	0	0	3	1

Ag1,Ga3,
rubbly brown sand, brick frags
0.90m-1.00m

Da	St	El	Dr	UB
2	0	0	3	1

Ag2, Ga2,
mid brown sandy silt
1.00m-1.90m

Da	St	El	Dr	UB
2	0	0	3	1

Ag2,As2 Ga+
yellow brown calcareous gritty silt clay
1.90m-2.00m

Da	St	El	Dr	UB
2	0	0	3	1

Ag3, As1,Ga+, ptm+
grey gritty silt clay calcareous
2.00m-2.70m

Da	St	El	Dr	UB
2	0	0	3	1

Ag3, As1,Ga+
grey silt clay siltier with depth
2.70m-2.90m

Da	St	El	Dr	UB
4	0	0	3	1

Ag3, Ga1, Th+
black silt becoming sandy with depth occ pale rootlets
2.90m-3.00m gravel

Core 21
TL 85727 64349

0-0.30m turf removed
0.30m-0.70m rubbley topsoil

0.70m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag2, As1,Ga1				
	light brown sandy silt clay				
1.00m-1.87m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag3, As1 Ga+,				
	grey green silt clay				
1.87m-2.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag3, As1,Ga+, Th+				
	grey gritty silt clay occ rootlets				
2.00m-2.74m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag3, Ga1, Th+				
	dark grey brown organic silt abundant pale rootlets sandy at base				

2.74m-3.00m sands and gravels

Core 22
TL 85728 64244

0-0.40m turf removed
0.40m-0.64m topsoil

0.64m-1.46m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag2, As1,Ga1				
	light brown sandy silt clay, charcoal fleck, chalk, brick and shell at base				
1.46m-1.79m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag2, Ga2, Th+				
	red brown rooty sandy silt mussel shells and charcoal throughout				
1.79m-1.90m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	2
	Ag1, Ga1, ptm2				
	grey sandy silt mussel shells and charcoal				
1.90m-2.84m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag1, G2, ptm1				
	red brown sandy silt gravel , shells large shell at 2.72m, silty at base				
2.84m-2.95m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	3	1
	Ag3, As1, Th+				
	black smooth silt, occ rootlets upper lens of light brown silt				

2.95m-3.00m black sands and gravels

Core 23
TL 85719 64340

0-0.20m turf removed
0.20m-0.47m topsoil

0.47m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag2, Ag1,Ga1, ptm+				
	light brown sandy silt clay building rubble throughout, oyster shells at top				
1.00m-1.70m	**Da**	**St**	**El**	**Dr**	**UB**

	3	0	0	3	1
	Ag32 Ag1,Ga1,				
	mid brown sandy silt clay charcoal flecks				
1.70m-2.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag2 As1,Ga1, ptm+				
	light grey calcareous brown gritty silt clay tile at 1.79m				
2.00m-2.74m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag3, Ga1, ptm				
	gritty brown calcareous organic silt				
2.74m-3.74m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	3	2
	Ag3, As1, ptm+				
	black smooth organic silt calcareous				

3.74m-4.00m black gravel
-redrilled core 24

Cores recovered

Core 24
x29 pollen
0.-0.26m turf removed
0.26m-0.49m loose topsoil

0.49m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag2, Ag1,Ga1, ptm+				
	mid brown sandy silt clay with mortar and brick frags, shell				

1.00m-1.20m not recovered

1.20m-2.00m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	01	3	0
	Ag2, Ag1,Ga1, ptm+				
	yellow brown gritty silt clay				
2.00m-2.45m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	1	1
	Ag2, Ag1,Ga1				
	wet yellow grey sandy silt, large pebbles at base				
2.45m-2.70m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1
	Ag2, Ag1,Ga1				
	Brown sand silt more organic with depth				
2.70m-3.00m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1
	Ag3, Ga1,				
	Mottled brown black organic silt, occ rootlets, stone at base				
3.00m-3.62m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	G(min)2 G(maj)2				
	brown gravely sand				
3.62m-3.87m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	1
	Ag3, As1				
	Black organic silt, occ rootlets				

3.87m-4.00m gravel

Core 25
x17 pollen
0-0.48m topsoil removed
0.49m-0.69m topsoil

0.69m-1.00m **Da St El Dr UB**
2 0 0 3 0
Ag2, Ag1,Ga1
gritty brown silt clay with shell, mortar frags

1.00m-1.68m **Da St El Dr UB**
1 0 0 3 1
Ag2, Ag1,Ga1, ptm+
yellow brown gritty silt clay, calcareous with depth

1.68m-2.00m **Da St El Dr UB**
2 0 0 2 1
Ag2, Ag1,Ga1
grey brown silt sand, large pieces of flint

2.00m-2.58m **Da St El Dr UB**
1 0 0 2 3
Ag2,Ga1
coarse sand and gravel trending into yellow green silt sand

2.58m-3.78m **Da St El Dr UB**
3 0 0 2 1
Ag3, Ga+, Th1
highly humified silty peat, occ rootlets, monocot remains

3.78m-3.80m **Da St El Dr UB**
2 0 0 2 1
Ag2,Ga2
brown silty sand

3.80m-4.00m grey sands and gravels

Core 26b
x29 pollen
0-0.50m turf removed
0.50m-0.58m topsoil

0.58m-1.00m **Da St El Dr UB**
2 0 0 3 0
Ag2, Ag1,Ga1
grey brown sandy silt clay, brick frags, mortar and shell

1.00m-1.50m recut

1.50m-1.67m **Da St El Dr UB**
1 0 0 3 1
Ag2, Ag1,Ga1,
yellow grey silt clay

1.67m-2.00m **Da St El Dr UB**
2 0 0 3 1
Ag2, Ag1,Ga1
flinty grey silt clay, occ wood fragments

2.00m-2.76m **Da St El Dr UB**
1 0 0 1 1
Ag2, Ga2
grey wet sandy silt

2.76m-3.00m **Da St El Dr UB**
3 0 0 2 1
Ag3, Ga+, Th1
highly humified silty peat, occ rootlets

3.00m-3.60m **Da St El Dr UB**
1 0 0 1 1
Ag2, Ga2
wet sandy silt

3.60m-3.96m **Da St El Dr UB**
3 0 0 2 1
Ag3, Ga+, Th1
highly humified silty peat darker with depth

3.96m-4.00m gravel

Core 27
x58 pollen, wood @4.92m
0-0.30m turf removed

0.30m-0.80m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	0
	Ag2, Ag1,Ga1				
	brown silt sand clay, mortar and charcoal flecks at base				
0.80m-1.40m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	3	4
	Gg (Maj)3,Ga1				
	yellow sandy gravel				
1.40m-1.64m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2
	Ag3, As1,Ga+,				
	grey gritty sandy silt				
1.64m-1.90m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Gg(maj)2,Ga2				
	grey gravel rich sand				
1.90m-3.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	1	2	3
	Ag3, Th1,				
	organic brown silt trending into greener silt at base (2.00-2.55m missing)				
3.00m-3.60m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	Ag3, As1,Ga+,ptm				
	wet gravel rich silt, calcareous with depth				
3.70m-4.00m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	1
	Ag3, Ga+, Th1				
	mixed black grey brown silty highly humified peat				
4.00m-4.28m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	1
	G(min)2 G(maj)2				
	grey sandy silt				
4.28m-4.71m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	1	2	1
	Ag3, Ga+, Th1, ptm+				
	highly humified silty peat, calcareous with depth				

4.71m-4.85m sharply defined organic silty band
4.85m-5.00m woody grey sand

Core 28
x18 pollen, x 2 wood @2.51m & 2.80m
0-0.46m turf removed

0.46m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	0
	Ag2, Ag1,Ga1				
	light brown gritty silt clay, mortar, brick frags and shells				
1.00m-2.36m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	0
	Ag2, Ag1,Ga1, ptm+				
	yellow brown silt clay calcareous becoming gravely with depth				
2.36m-2.70m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	2
	Ag3, As1, Th+				
	mottled brown black silt, occ rootlets, silty lens				

2.70m-3.00m black grey sands and gravel

Appendix 2

Core number	No of tubes	Redrill of core	Samples for pollen analysis	Feature
24	4	23	6	Floodplain
25	4	17	4	Floodplain
26b	4	6b	5	Channel
27	4	15	8	Fishpond
28	3	1	3	Floodplain

Table 2: Redrilled cores

Appendix 3

Core no	**Find type**	**Depth**	**date**
Core 2	1 fragment of floortile, weighing 43g, height 13mm. Medium sandy fabric with sparse flint, reduced core. Light green glaze, poss over degraded white slip.	1.60m	Medieval
Core 4	3 fragments of ?floortile, weighing 21g. 2 joining fragments. Very degraded, thickness >15mm. Coarse sandy fabric,	0.55m	?Medieval.
Core 9	1 small laminated fragment of ceramic building material, weighing 17g, probably rooftile. Fabric fscp (fine sand with clay pellets).	1.55m	Late or post-medieval.
Core 14	1 iron object (18g). Part of a small horseshoe including nails for pony or donkey	2.50m	Medieval to post-medieval.
Core 16	1 fragment of rooftile (15g). Fabric msm (medium sandy with mica).	0.68m	Late/post-medieval.
Core 28	1 fragment of rooftile (15g). Fabric est (estuarine) with reduced core.	2.45m	13th-15th C.

Table 3: Finds

Appendix 4

Core	Depth	Present
3	0.9m	4 unidentified long bone fragments from medium-sized mammal
28	2.8m	Distal domestic fowl tibiotarsus
1	0.4m	2 unidentified fragments
1	2.73m	Proximal galliforme humerus (pheasant size)
28	2.77m	Proximal domestic fowl tarsometatarsus (male – cockspur present)
27	4.94m	Distal cattle humerus fragment

Table 4: Animal bone from Site B cores

Appendix 5

Sample	Lab Code	Age BP	δ13C	Calibrated BC/AD
2.77m-C26b Peat (acid-alkali-acid)	Beta-258111	1350±40	-27.6	640-710 cal. AD, 750-760 cal. AD
3.90m-C26b Peat (acid-alkali-acid)	Beta-258112	2670±40	-27.4	900-790 cal. BC
2.71m-C27 Peat (acid-alkali-acid)	Beta-258114	1250±40	-26.9	670-880 cal. AD
4.92m-C27 Wood (acid-alkali-acid)	Beta-258113	4240±40	-26.7	2910-2860 cal. BC, 2800-2750 cal. BC, 2710-2710 cal. BC
2.51m-C28 Wood (acid-alkali-acid)	Beta-258110	890±40	-26.7	1030-1230 cal. AD
2.80m-C28 Wood (acid-alkali-acid)	Beta-258115	960±40	-25.8	1010-1170 cal. AD

Table 5: Radiocarbon dates from Abbey Gardens and Nursery site, Bury St Edmunds.