De-silting of the moat at Haughley Castle, Haughley
HGH 046

Archaeological Monitoring Report

SCCAS Report No. 2012/127

Client: Plashwood Estates

Author: David Gill

August/2012

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Summary

Scheduled Ancient Monument consent was given to excavate excess silts from the moat of Haughley Castle and to remove trees and vegetation from its motte and banks as part of a scheme to bring the monument back into positive management. The castle had become overgrown with scrub and self-seeded deciduous trees which were causing damage to the earthworks and obscuring the monument. The intention of the project was to remove only the latest deposits and avoid disturbing those which were potentially related to the early medieval construction and occupation of the castle.

The survey results show that the moat ditch was generally about 5m deep from the current ground surface but was greater on the western side; the absolute level at the base of the moat varies from 51.40mOD on the west side to 53.17mOD at the east. The fills comprise organic layers made up mainly of leaf mould and organic matter from the overhanging trees. C14 dating of the base of this deposit showed that it had been laid down within the last 150 years. At the bottom of the ditch was a primary infill of grey fine clay silts 0.75m deep which contained no organic material suggesting that the silts had eroded off the castle motte before it became enveloped in vegetation. Barnack stone, from the fabric remains of the castle keep, was found in the moat at the top of the primary silt but only within a small area on the north side of the motte, suggesting that the keep itself had been dismantled in a controlled manner.

The platform at top of the castle mound is flat has a diameter of 27m and is 555 sqm in area. It is *c.*9.20m above the surrounding fields and *c.*14.5m higher than the bottom of the ditch. The remains of the keep's outer wall was exposed in locations on the south and west sides and consisted of low stubs of bonded flint-work, up to 2m thick, which were truncated flush with the current ground level. The bonded material was situated on the very edge of the platform suggesting that the keep enclosed the entire area of the motte top. If joined, these fragments described a circle 27m in diameter and with a circumference of 85m. A total length of 11.5m of bonded fabric was visible forming *c.* 13.5% of the potential wall circuit.

1. Introduction

Haughley Castle is amongst the best preserved medieval earthworks in Suffolk and has statutory protection as a Schedule Monument (SF 29). It consists of a motte and a bailey which has internal banks on its south-west and east sides. Linked moats encircle the entire monument including an enclosure to the west of the castle and further earthworks include a linear fishpond to the north. The motte is recorded at over 9m (29ft) high and is one of the tallest in the county. Ancient fields boundaries complete with veteran trees, thought to be the remnants of a deer park, extend to the north of the site and together these form one of the most astonishingly well preserved groups of medieval features in the county.

Scheduled Ancient Monument consent (consent ref. S0005311) was given to excavate excess silts from the moat and remove trees and vegetation from the motte and bailey banks as part of a scheme to bring the monument back into positive management. The castle had become overgrown with scrub and self-seeded deciduous trees which were causing damage to the earthworks; in particular where fallen trees had become uprooted. The dense folia coverage also obscured the monument making it difficult to comprehend the extents of the castle from the public footpath which passes close by. The moat had become choked with silts derived from the constant leaf litter from the overhanging trees and its complete silting up in some parts, together with the tree cover, had enabled unauthorised access to castle motte leading to erosion of the earthworks and fly-tipping in the moat (Pls.1 and 2).

The consent for the refurbishment of the monument was conditional on a programme of archaeological investigation and monitoring being implemented. A brief and specification was prepared by Edward Martin, Suffolk County Council Archaeological Service Conservation Team in conjunction with guidance from English Heritage. The archaeological work was staged and included assessment and evaluation of the moat deposits before the project start. This was to identify any significant archaeological levels in order to inform the project planning and the de-silting strategy.

The fieldwork was completed over two seasons (October 2010- March 2011) and February-April 2012). The palaeo-environmental assessment was undertaken by specialists from Birmingham Archaeo-Environmental whilst all other survey work and

monitoring was completed by Suffolk County Council Archaeological Service Field Team. The archaeological work was commissioned and the project, as a whole, managed by Tony Hargreaves from Brown & Co. agents acting on behalf of the landowner Plashwood Estates.

The main contractors for the de-silting were Miles Waterscapes Ltd, a company experienced in this type of work.

Project aims

The immediate project aims were to:

- characterise the moat ditch, establish the ditch profile, create a model of the infilling and the date of these deposits.
- provide data to inform the moat cleaning process, to ensure that the shape of the moat was not compromised and to remove only those deposits considered to be without archaeological value.
- record any archaeological deposits disturbed during the project.
- produce a permanent record, which will be deposited with Suffolk HER.

The academic aims centred on recording the extents of the castle complex by establishing the nature and date of the putative medieval moat circuit to the west of the motte and bailey. The study of early castles by recoding any evidence of building remains on the top of the motte and possible related structures within the moat silts (eg. fish traps). The dating of the castle's occupation and abandonment by the study of occupation detritus within the moat silts.

2. Site geology and topography

The castle lies at TM 0255 6224 on the edge of a high plateau between the 55 and 60m contour. It stands over looking the River Gipping valley at the junction of three of the river's tributaries and would have commanded panoramic views over the surrounding countryside. The surface geology is the grey and yellow clays with chalk, the glacial till of the Lowestoft Formation.

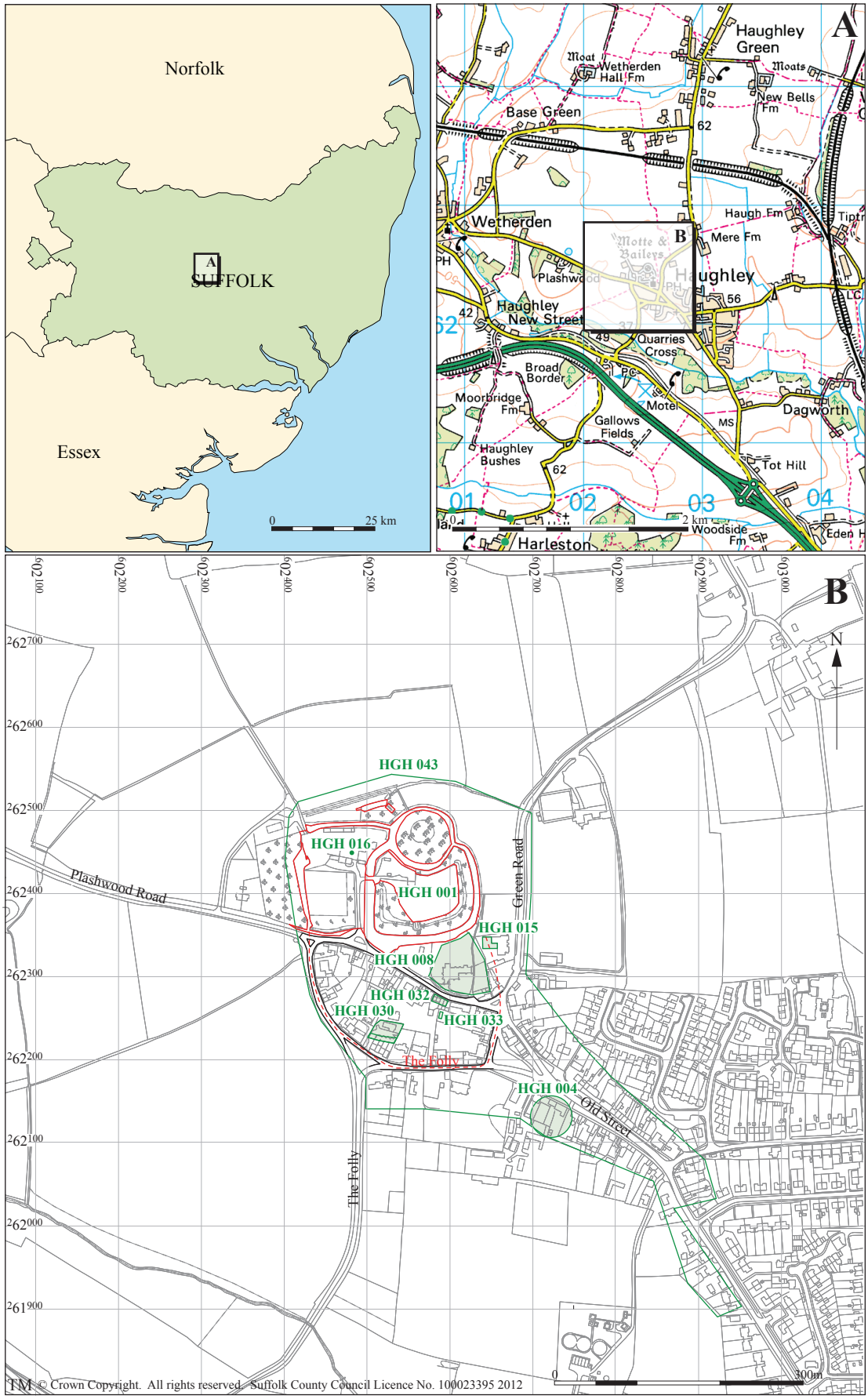

Figure 1. Location of Haughley Castle (red) and sites listed on the HER record

3. Archaeology and historical background

Haughley Castle was built c.1100 and is attributed to Hugh de Montfort, constable of the army of William the Conqueror. It dates to the first period of castle building in Suffolk and together with similar structures at Clare and Eye was constructed in the years immediately following the Conquest by their new respective Norman lords as places from which to govern their recently acquired estates.

In 1173 as part of a rebellion against King Henry II by Norman nobles who had been dispossessed of some of their lands, the castle was captured and destroyed by the Earl of Leicester and Earl Bigod, following a siege and heroic defence by Robert de Brock, who remained loyal to the King, together with thirty men. Edward II stayed at the castle during Christmas 1326 but by the late medieval period it had fallen into disuse. The ruins of the castle keep were still in existence in the 18th century when the remains were finally levelled by Richard Ray.

The plan of the current village stretches to the south and south-east of the castle around the long triangular, market place which dates to the later medieval period and is now known as The Green. However a relic of what is possibly the previous settlement pattern is preserved in the looping road (The Folly) to the south of the castle's moated bailey (Figs.1 and 2). The shape enclosed by the road must represent either an additional outer bailey or market. Raised earthworks which parallel the arc of the road have been recorded in several of the gardens suggesting the line of a bank and elsewhere on the circuit a linear depression evokes a ditch to support this (West 1977).

Excavations at the rear of the school (HGH015) recorded a part of giant ditch (over 7m wide and reportedly more than 4m deep) which is likely to have been part of these outer bailey defences. The infilling of the ditch was well under way by the 12th-13th century and completed by the end of the medieval period. A second substantial ditch believed to be part of an earlier defensive work dating to the Late Saxon period produced a sizable assemblage of Ipswich, Thetford and St Neots-ware pottery commensurate with Middle and Late Anglo-Saxon settlement (Meredith 2000).

The suggested extent of the outer bailey encompasses the site of the church (HGH008), which dates to the 14th century but is said to retain the remains of a Norman predecessor within its fabric.

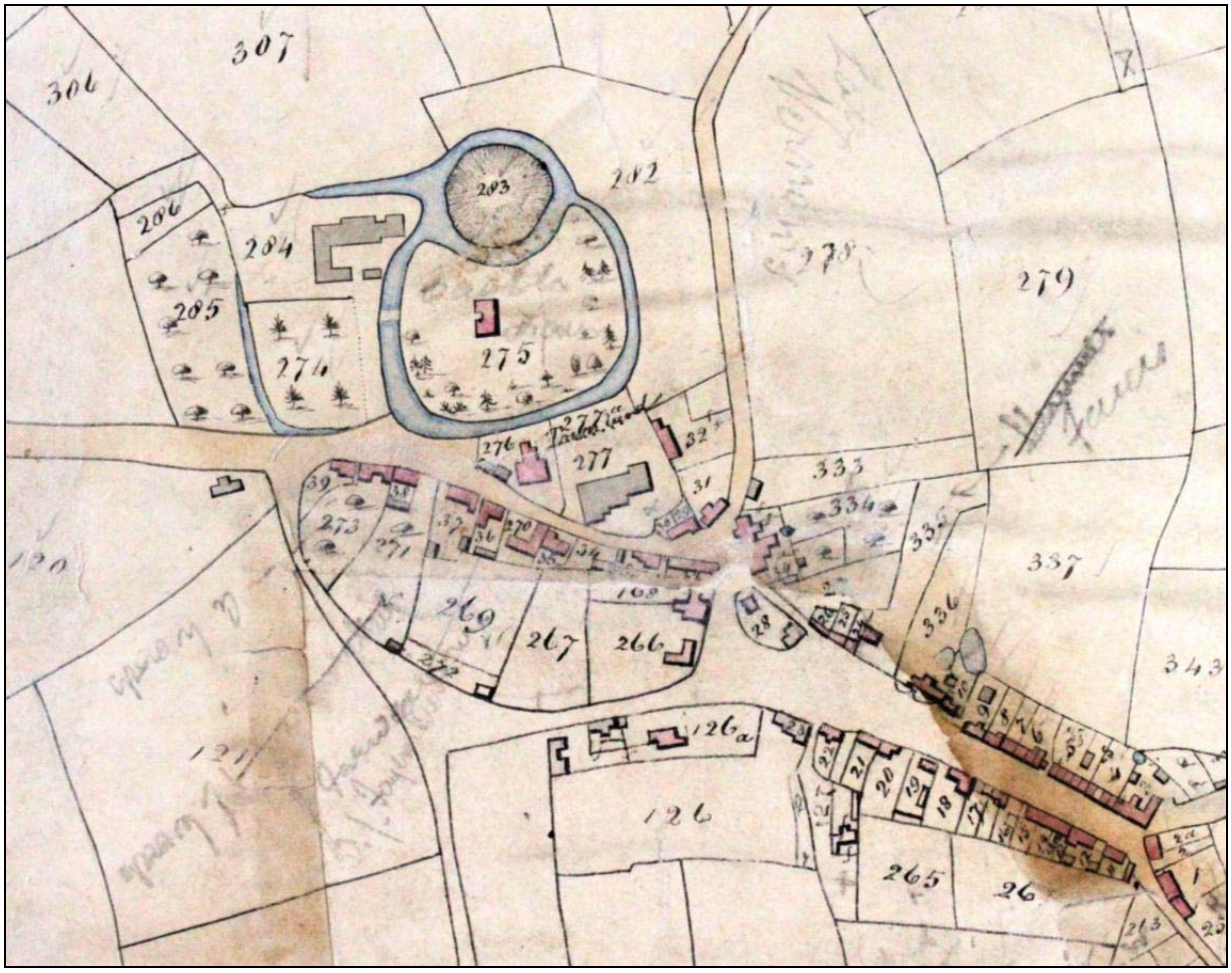

Figure 2. Haughley village as depicted on the parish tithe map of 1845 (SROI). The loop to the south of the present moated motte and bailey must represent either an additional outer bailey or market infill.

4. Methodology

The following three-staged archaeological programme of work was undertaken:

- Palaeo-environmental survey
- Trenched evaluation
- Monitoring of the moat de-silting and the reduction of vegetation on the motte

The work was sequenced with the first two stages taking place in advance of the de-silting to establish if any archaeologically sensitive deposits existed within the moat and at what depth.

The palaeo-enviromental survey consisted of a series of hand cores within what were the dry sections of the moat. The results of the auger survey were used to model the build-up of silts and identify potentially medieval deposits by radio-carbon dating.

During the evaluation stage trenches, excavated by a long-reach tracked machine fitted with a wide toothless bucket, were cut across the moat fill in order to accurately record the profile of the moat ditch and infilling layers and to validate the silt-depth data gathered by the borehole sampling. The trenches were excavated where possible after the moat had been (partially) drained. The trench sides were recorded by a combination of electronic survey and hand drawing to create scale sections across the moat; at the south end of the castle the moat was not drained and profiles only, were recorded through the water.

The excavation of the moat silts were monitored by an experienced field archaeologist from SCCAS Field Team. The machine worked under the direct supervision of the monitoring archaeologist to ensure that no archaeological deposits were removed. The depth of excavation followed English Heritage advice which stated that a maximum of 1.5m of silt could be removed from the centre of the moat and c.1m from elsewhere. The stripping did not go back to the original profiles to avoid damaging the ditch shape. Excavated silts were stockpiled in a settling lagoon and spread on the adjacent fields once they had dried out and the area 'field-walked' after each season of work. The surface of the motte was walked and bonded castle fabric and spreads of building flint were recorded together with post-medieval interventions.

Site records were made on SCCAS *pro forma* context sheets under a continuous and unique numbering system and conventions compatible with the county HER were used throughout. A Total Station Theodolite set up on stations located with a RSK GPS was used to record the extent and depths of silts removed related to the OS grid and datum. Sections were drawn at 1:20 or 1:50, as appropriate, on plastic drawing film. A photographic record of the site and any archaeological features was made using digital camera.

An OASIS form has been completed for the project (reference no. suffolkc1-113993) and a digital copy of the report has been submitted for inclusion on the Archaeology Data Service database (http://ads.ahds.ac.uk/catalogue/library/greylit).

The site archive is kept in the main store of Suffolk County Council Archaeological Service at Bury St Edmunds under the site code HGH 046 and HGH 054.

5. Results

Summary of palaeo-enviromental survey

The palaeo-environmental borehole survey was undertaken in October 2010; transects each consisting of up to five individual cores were sampled at locations on the north and east sides of the moat in the two places that were not beneath water at the time (Fig. 2). The moat silts varied in depth from 1m - 2.6m and were made up of poorly humified leaf litter over a gritty brown grey silt clay. The upper deposits were a coarse sandy silt material interleaved with organic silt deposits suggesting that periods of erosion had led to the deposition of this coarser material. In Transects 8 and 9 the cores were obstructed at about 0.60-0.90m below ground level where the coring equipment struck an impenetrable layer, later discovered to be stone from the fabric of the castle keep itself.

Radiocarbon dating of two samples indicated that the silt had accumulated in the recent past and none of the deposits dated to before 18th century. The full report on the palaeo-environmental of the survey is included in Appendix 2.

Evaluation

Wide trenches were excavated on the north and east side of the motte moat after the water was drained: Section 1 at the approximate mid-point of the circular moat and Section 2 on the east side of the bailey moat (Fig. 3). The trenches were excavated wholly by machine and recorded using surveying equipment; no hand-digging took place and the trenches were not entered by the archaeologists on grounds of safety.

Moat section drawings were generated from the survey data and annotated sketch sections to produce the drawings in figures 4, 5 and 6 together with profiles recorded during the monitoring phase. The simplified drawings are shown at the same scale for comparison, annotated with OS level data.

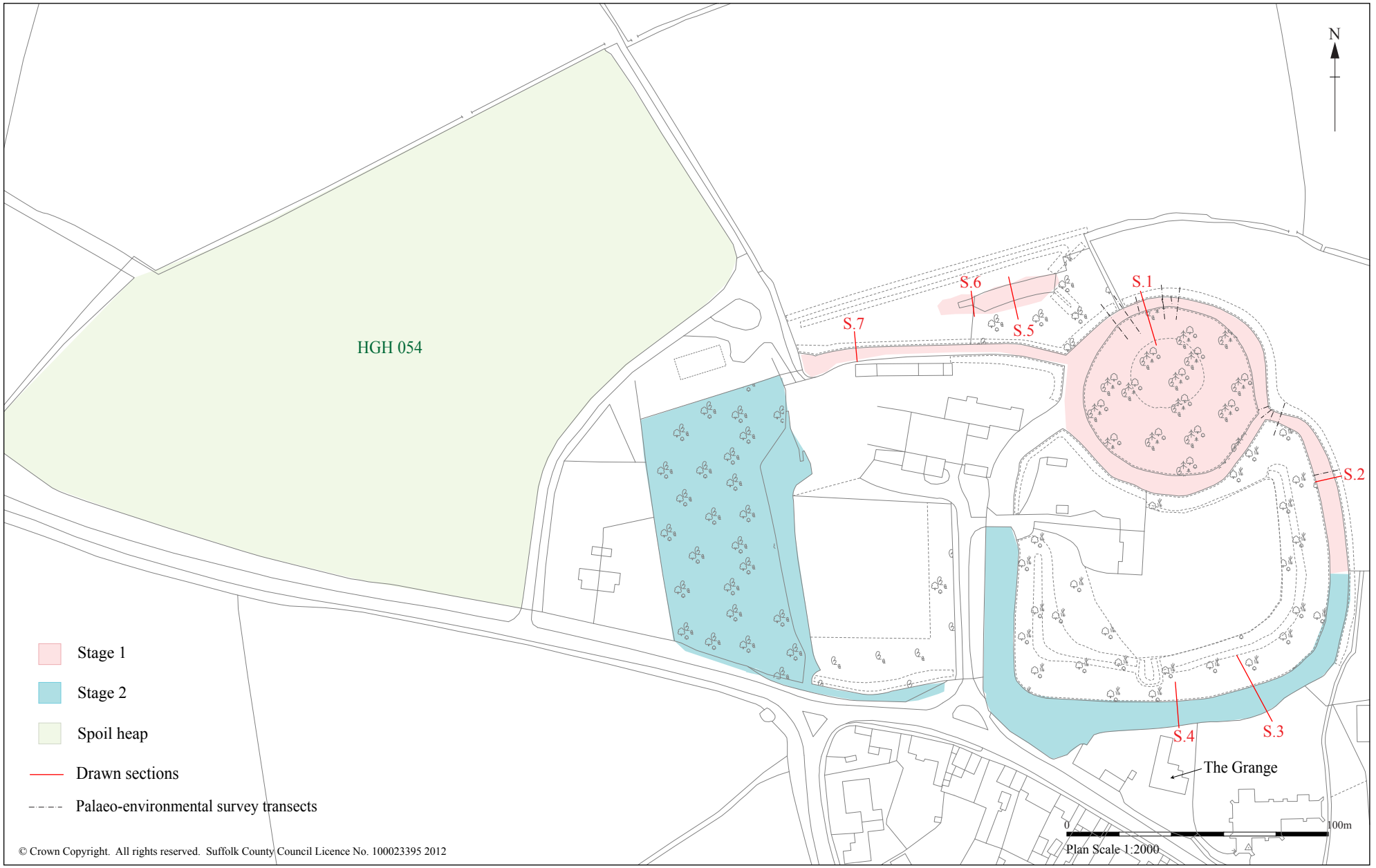

Figure 3. Phases of work and locations of drawn sections

Section 1

At Section 1 the moat ditch was 15.78m wide and 5.25m deep, as measured from the ground surface of the surrounding field. The shape of the moat ditch across the base was broad and gently rounded before rising steeply on the north (outer) side. On the south (inner) side the machine could not follow the profile of the original ditch shape (due to limited reach) and the excavation cut as recorded (S1 Fig. 5) is inside the true moat edge.

The section shows the moat to be filled in two distinct phases, the upper fills made up of accumulated organic material and the lower a dense clay-silt which was devoid of organic matter (Pls.3 and 4). Separating the two was a layer of stone and flint, building material that had tumbled in a scree from the top of the motte. The upper silts survived in different states of decay, the lower silts being made up of a dense mat of coarse twiggy roundwood and leaf-mould that had been laid down in water and sealed quickly by later deposits to create anaerobic condition in which the organic material did not breakdown. In contrast to this the uppermost silts although originally composed from the same of material had be subject to a changeable wet-dry environment and had decayed to a fine, uniform mud.

Immediately beneath the organic silts was a layer of building rubble made up blocks of cut limestone and flint nodules. Due to their substantial mass, the fall of the cut stones had taken them further out into the middle of the moat; they lay together at the head of a ‘moraine’ of smaller sized flints and were deeply impressed into the soft clays of the layer beneath. Eight stones were collected from the section and are catalogued in the finds section (chapter 6). Subsequent monitoring of the de-silting showed that the stones lay only in a very narrow band in the immediate proximity of Section 1.

The stone was a Barnack-type limestone derived from the quarries of south Lincolnshire; they were all a similar size (*c.*300mm^3) and weighed a handable 30-35kg. Most of the stones were cut into plain cubes and exhibited tooling marks on their flat faces with mortar attached to the jointing ones. The faces of the stones were fresh but the corners were chipped and damaged. The corner of one stone included part of an engaged column which would have once framed an opening. The flints were large ‘field-flints’ which had been selected for size; all were fist-sized or larger and some had lime mortar attached.

Beneath the building rubble the bottom of the moat ditch was filled with a uniform layer of clean, fine-textured, pale grey clay silt; material which had eroded off the motte itself. The top of this deposit seems to have been relatively soft, when the building rubble cascaded down from the top of the motte, and the larger stone sunk into it, but by the time of the excavation it had settled and compressed into a dense clay. The clay silts eroding off the motte had effectively changed the slope of the ditch's inner side and by the time the rubble was deposited, it was in effect, a continuous gradient from the top of the mound to the base of the ditch. Originally, the ditch side would have been steeper and there would have been a discernable break of slope between the ditch cut and motte gradient. Unfortunately the machine was unable to excavate back to the original cut of the ditch to demonstrate this during the evaluation.

Section 2

Section 2 was excavated on the east side of the moat side of the moat. The waterlogged fills here were unstable and were reduced to a running slurry in which it was impossible to maintain a section long enough to record (Pl. 5). Observations however confirmed that the pattern of moat fill was similar to Section 1 and consistent with the boreholes results. A profile of the excavated ditch was later surveyed of the east side of the bailey ditch and reproduced as S2, Fig. 4. The ditch was 11.9m wide and 5.13m deep and the ditch profile was more v-shaped than exhibited in the other recorded sections. The bailey bank at this point was 4.1m above the level of the surrounding field and 9.23m above the bottom of the ditch.

Monitoring stage 1 de-silting

Motte moat

The first stage of de-silting was completed by a long-reach machine working from the bank and removed moat silts from the north and east side of the motte and the east side of the bailey, the north side of the western enclosure ditch and the fishpond (Fig 3.) The machine working under the guidance of the monitoring archaeologist removed only the recently accumulated upper organic silt layers as established by the evaluation. The base of this deposit was left in, as a protective buffer to the underlying clay silts, and a leeway given the sides of the ditch to ensure they were not damaged (Pl.8). The fill of the moat was consistent with those layers seen in the sections for the complete circuit between S1 and S2. The material removed was all relatively recent and therefore no

archaeological deposits were encountered. The layer of castles building rubble seen in the area of Section 1 was not seen elsewhere in the moat circuit.

The moat to the south of the motte was de-silted from a floating barge. One to 0ne and a half metres of soft silt were removed, leaving the lower silts in to ensure no ancient deposits were disturbed. The extracted silts were examined for finds, which generally consisted of 19th-20th detritus, however some artefactual material including bricks and china, some which were dated to as early as the 17th century. Flint together with early post-medieval brick was recorded on the ditch's internal edge whilst the water-levels were reduced and left in place (Pl.12). A block of dressed Barnack stone and a small section of bonded flint-work from the castle were recorded when the silt was spread on the adjacent field which was believed to have come from the south west-side of the moat.

On the west side of the motte between the junctions of the western enclosure ditch and the bailey moat, the motte moat was extremely deep. Its depth was tested by 'dipping' the machine arm and was found to be in excess of 4m from the water's surface.

Fishpond

The long rectilinear fishpond at the north of the monument was cleared of layers of black silts and a thick accumulation of leaf-mould (Pl. 7). The fishpond had been used as a rubbish tip in the relatively recent past (since WWII) and the upper silts were packed with bottles, enamelled tin ware, china, tins and bits of bicycles and other rubbish to a depth of c.0.7m. Up to 1.1m depth of material was removed and recorded in Sections 5 and 6 (Figs. 3 and 6). At the east end this exposed an underlying layer of brown clay, a (?)primary silting layer built up during the life of the pond. This material appeared archaeologically sterile and could not be dated, but was thought to be 'old '. It was left in place and the full depth of the fishpond at the east end was not exposed.

The fishpond was 48.75m long and up to 9.4m wide. The west end formed a shallow gentle incline, in contrast to the steeper east end, suggesting that it may have been re-profiled to create an entry point. The incline had a flat base and was lined with brick and tile rubble to create a metalled track 2m wide. The incline was cut into natural boulder clay into which the brick and tile of the track surface were compressed, suggesting that this end was an addition to, and a lengthening of, an existing feature, sometime after

the 19th or 20th century (the brick and tile date to the 19th century). The incline may have been to allow cattle to drink although the narrow entry at the end, rather than down the long sides of the pond, would imply that this was a cart entry; perhaps for the loading of vehicles during an earlier campaign of de-silting.

The ground level at the sections was *c*.57.50m; natural was found at 56.01m at the west end whilst at the east, excavations were halted, at the top of the undated silting infill, at 55.11m.

Western enclosure ditch

The exploratory section across the north arm of the western enclosure ditch, Section 7 (Figs. 3 and 6 and Pl.6), showed that the ditch had been cleaned out in the relatively recent past. Milk bottles, pan-tiles and bricks, which matched those used on the adjacent (refurbished) barn, were found close to the bottom and the existing ditch shape reflected the arc of the machine ‘pull’, suggesting that the previous dredging was also mechanical. The exposed natural – which was not seen in the other excavations - was blue boulder clay. The ground level was 56.85m and the bottom of the ditch 52.99m. Because of its recent history the ditch was re-cleaned to natural from Section 7 eastward to the motte’s moat edge.

The remainder of the enclosure ditch circuit was monitored as part of the phase II season of work and de-silted after the west field was cleared of scrub and the dense cover of small trees. The ditch alongside Plashwood Road/Duke Street was also cleaned out and the hedge re-laid; it was clear that the road ditch had been regularly maintained and contained no ancient deposits.

The field was generally flat but in the north-east corner it dropped in a wide basin to provide a shallow approach to the enclosure ditch to create an access to its waters and a pond for watering cattle. The ditch is large, much larger than would be expected for a field ditch, and greater than the simple field boundary ditch which parallels it to the west. The tree stumps from the recently felled trees were left in place along the enclosure ditches edges to avoid damaging the banks and the de-silting along its length was limited to the upper organic silts. At the junction with the Duke Street ditch the width of the enclosure ditch was pinched and kinked in its alignment suggesting that the ditch here had been altered by being infilled on its inside corner. The dense tree stumps in

this area meant that the banks remained untouched by the present work and this feature could not be investigated.

Motte walkover

The castle mound was scanned after the removal of trees and scrub. The tree stumps were left in place and the ground disturbance kept to a minimum. The platform at the top of the mound is flat, measures 26m in diameter and is *c.*555sqm in area. It is *c.*9.20m above the surrounding fields and *c.*14.5m higher than the true bottom of the ditch, as determined by excavation. The remains of the keep's outer wall was exposed in locations on the south and west sides (Fig. 4 A, B, C and D). The wall consisted of low stubs of bonded flint-work, up to 2m thick, truncated flush with the current ground level (Pls.13, 14). The bonded material was situated on the very edge of the platform suggesting that the keep enclosed the entire area. Fragments A, B and C all lay on a circle 27m in diameter and with a circumference of 85m, whilst fragment D lay outside this circle suggesting that the piece was either not *in-situ* or the keep did not have a perfectly round ground plan. A total length of 11.5m of bonded fabric was visible which would have formed *c.*13.5% of the potential wall circuit. Probing the ground around the exposed areas was inconclusive but suggested there was not a continuous surviving wall. No dressed stone, to indicate openings, was seen and the surviving wall fragments were too small to be interpreted or to increase an understanding of castle's form. Dense scatters of loose building flints were recorded on the slopes of the west and south sides and were seen at the water's edge on the inside foreshore of the moat (Pl.12). The flints were up to fist-sized and although all of the mortar was weathered off they were probably building material; mixed with the flint at the motte base was occasional slate and early post-medieval brick. Generally less flint was observed on the east and north slopes but a single, disengaged small block of bonded wall was recorded on the east slope at mid height (Fig. 4).

A linear depression extended from the top of the motte at the south cardinal point, this lay on the line of the likely keep's entrance and opposes a break in the south bailey bank.

Other earthwork features on the motte included evidence of the post-medieval spiral path which was still just visit as a shallow lip on the east and west sides, but the route has all but vanished on the north and south sides (Fig. 4).

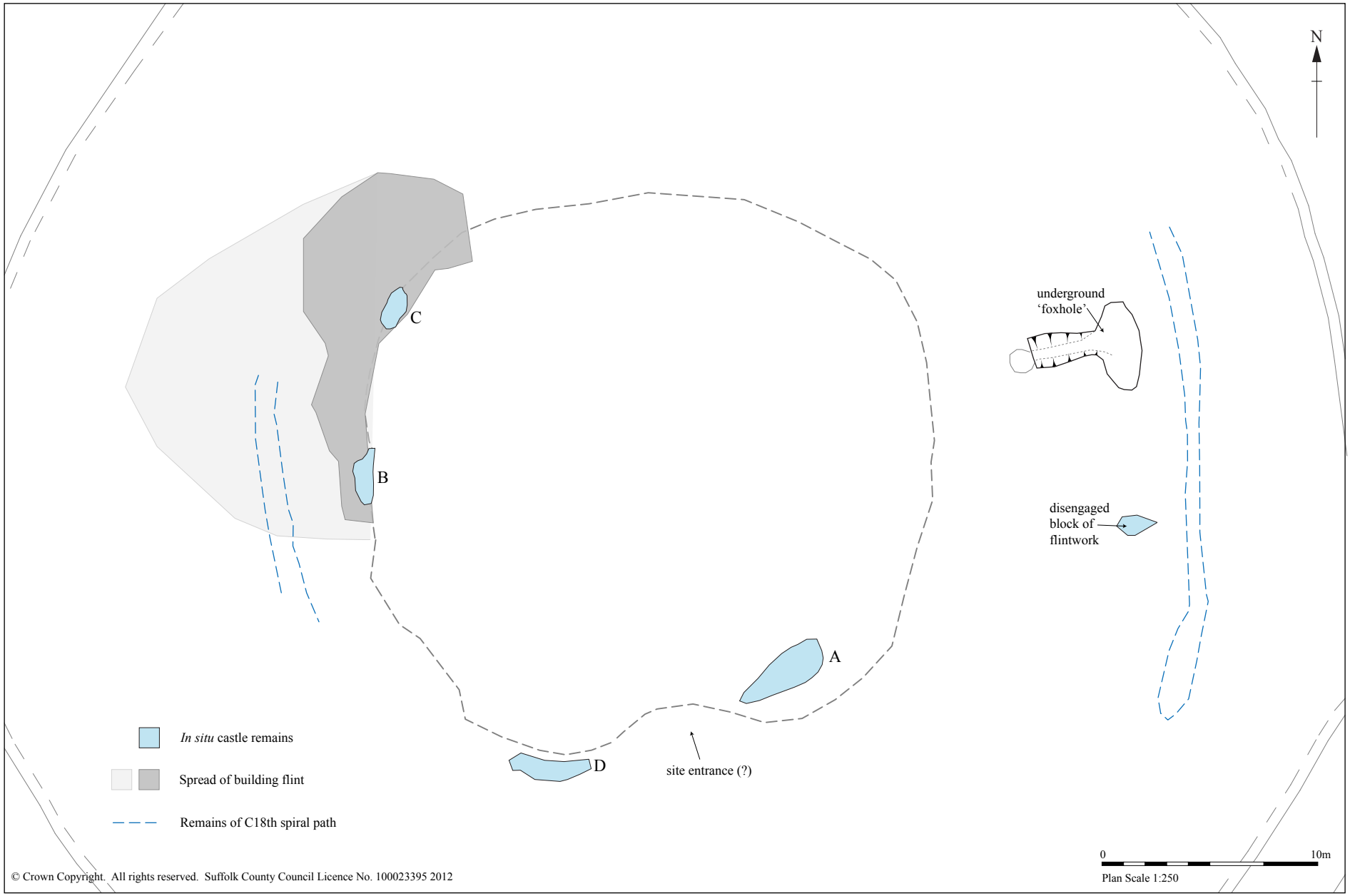

Figure 4. Plan of the Motte platform showing *in-situ* bonded flint remains of the stone keep and post medieval & modern earth works.

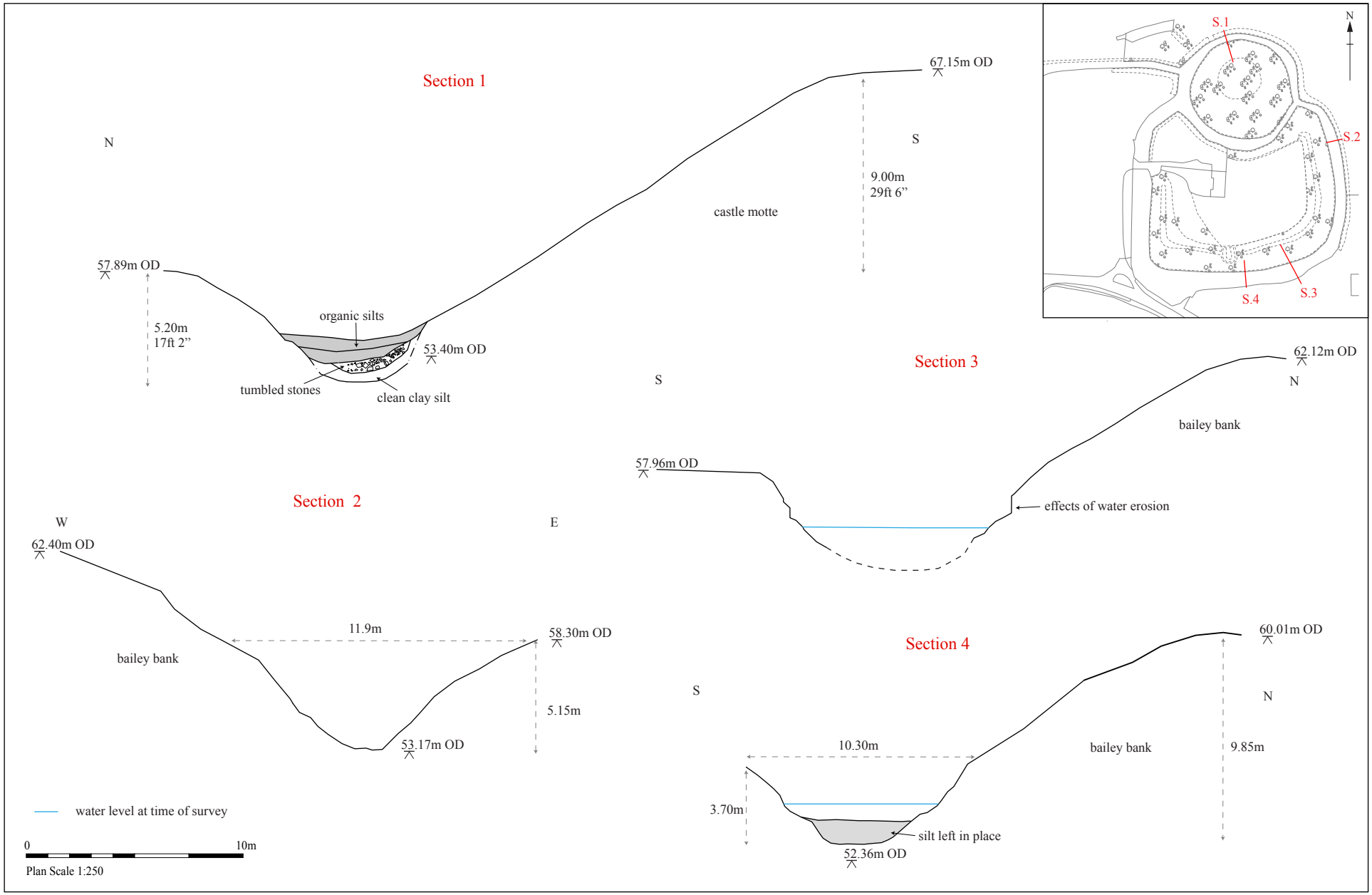

Figure 5. Surveyed moat profiles

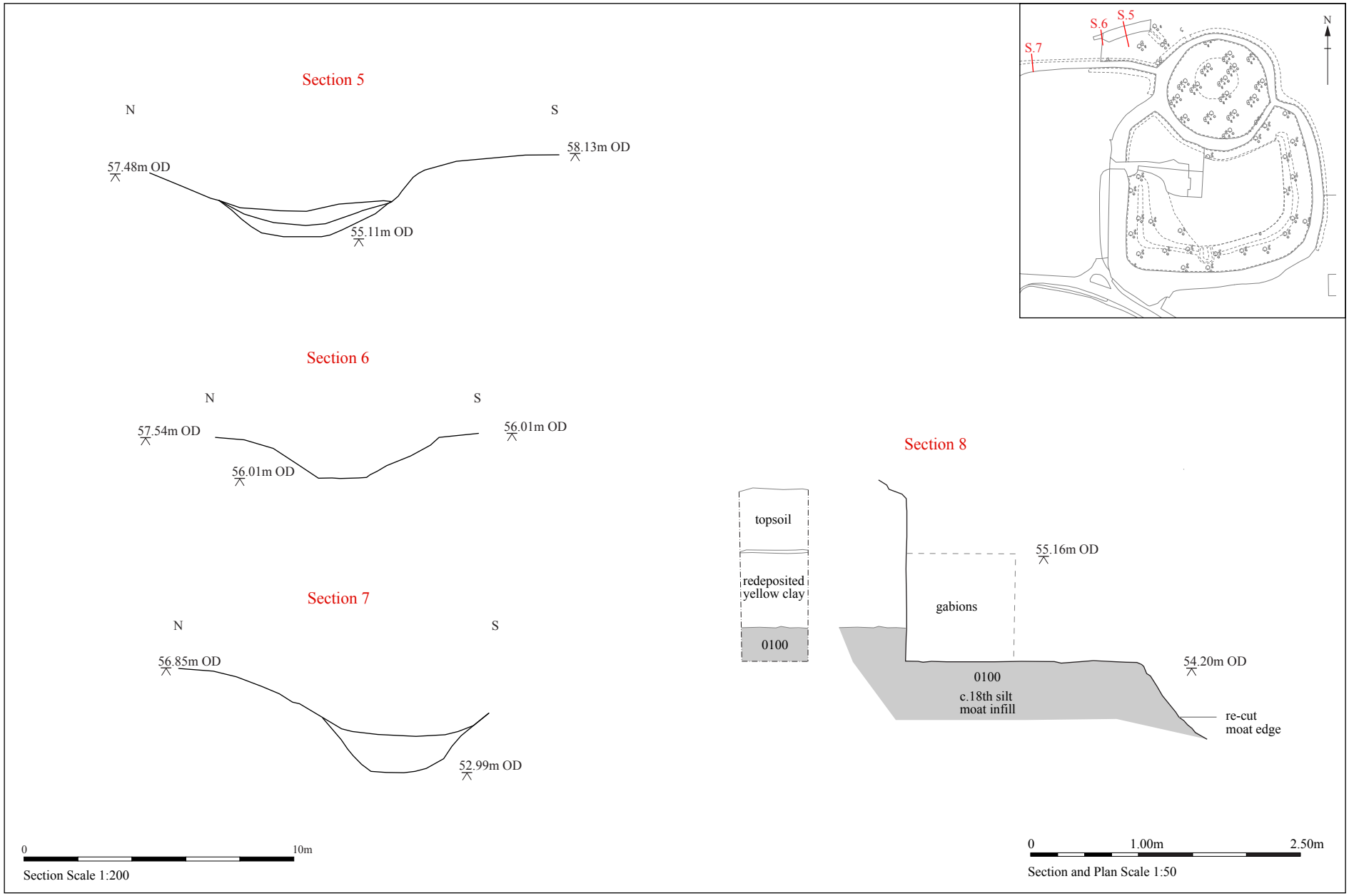

Figure 6. Profiles of fishpond and western enclosure ditch and section of gabion setting

A large ‘foxhole’, a below ground chamber with an entrance 1.5m high, has been excavated into the east side of the motte about half way up. It is thought to be the work of local teenagers, who have burrowed 2m into the core of the mound; it contained modern rubbish and the remains of a fire. The excavations show the composition of the upper layers of the mound which is made up of topsoil over brown clay over chalky blue boulder clay (Pl 15); a sequence that was the same natural geological stratigraphy.

Monitoring Stage 2 de-silting 2012 monitoring season

Introduction

The second season of moat dredging cleared the south side of the outer bailey moat and the ‘duck-pond’. The water within the moat was lowered, but not drained and the de-silting was completed by a machine located on a floating barge. The floating machine was assisted by a second machine working on the moat side, the excavated silts being loaded on to a skip which was towed to the bank. The extracted silts were unloaded and stockpiled in a temporary slurry lagoon to dry out before being spread on the adjacent field. Because of this working method the observation in this area was limited to the examination of excavated silt and the exposed moat edges.

In addition to the bailey moat the west enclosure was cleared of scrub and trees and the enclosures ditches that were not dredged during Phase I were cleaned. The work took place between January and April 2012.

Bailey ditch

The entry point for the operations was the south-west corner of the duck pond where a temporary ramp, made of crushed concrete/brick rubble, was created and it was from here that the skips were unloaded and material carted away. Before de-silting large fallen trees were removed from the moat waters (Pl. 20).

The machines worked in an anti-clockwise direction starting at the current bailey entrance on the west side of the moat. Silt depths here were reported to be over 4m deep of which the machines removed 2m; the silts were black, organic and liquid. No lower silts were disturbed and no archaeological deposits or artefacts were encountered.

The depth of water in the duck pond was relatively shallow at *c*.400mm. The base of the pond was compacted with a surface of gravelly stones over clay and across its southern half it was level before shelving down steeply to a depth of 3.5m+ along the line of the moat ditch. Where it crossed the duck pond the moat could be excavated by the larger 'earth-bound' machine and the tide-marks on the machine arms indicate an excavation depth of 3.1m below the water surface, whilst still leaving in more than 1m depth of silt on the bottom.

To the east of the duck pond, where the excavation could be done only by the smaller barge mounted machine, the moat depth was found to be shallower and considerably less silt was removed. From the barge it was possible to plot the ditch profile and silt depths to create Sections 3 and 4 (Fig. 5) and these showed the ditch was 3.7m deep from the ground surface and 10.30m wide; 1.2m of silt was left in the base of the ditch and the bailey bank rose 9.85m above the ditch bottom.

The removed silts from this section were a black, rotted silt/sludge with tree branches and trunks. Finds were collected from the removed silts along the south edge of the moat in this section and the spread of finds related directly to the extent of the plot of 'The Grange' (Fig. 3) which bordered the moat. The finds consisted of decorated, glazed pottery and building materials, all of which dated to the 18th century or later. The Grange (the former Rectory which faced the church) is a timber-framed hall running N-S with a parlour cross-wing at its south end. The listing (LBN 280551) assigns it to the early 17th century and reports that the main N-S range (which extends to within 3m of the current moat edge) was truncated and rebuilt as a service wing in 18th century.

Significant undercutting at the base of the bailey bank by natural water action along the inside edge of the moat was seen all along the south side and part-way up the east. It was recorded in profile in Section 3 (Fig. 5) and by photograph (Pl. 10, 11). The erosion appears as a deep horizontal gouge at what was the water level prior to pumping out. Lowering the water exposed the erosion which had cut back to the underlying yellow boulder clay, with a beach of pebbles on the slope below. This effect occurred most dramatically on the south and east sides of the bailey ditch; those areas where the moat had been constantly full of water.

The garden of ‘The Grange’ encroached on the moat’s south edge and was supported by a collapsing revetment made of concrete and timber. As part of the scheduled work the revetment was removed and replaced with stone-filled gabions which ran the whole length of the property from the east end of the fishpond to the east edge of The Grange’s plot. The machine cut a vertical step into the bank excavating down 1.5m from garden level along the line of the boundary fence to form a horizontal shelf on which the gabions were set (S8, Fig. 6). The vertical cut was 2.20m back from the water’s edge, the point at which the cut of the moat ditch dropped steeply way. To create the ledge the machines cut through made-up ground comprising redeposited pale-brown boulder clay which sealed a black mud deposits (layer 0100). The mud layer produced a large assemblage of domestic waste (mainly decorated china, clay pipes, animal bone and oyster-shell), and building material (bricks, tile, building timber, and a thatching spar); amongst the finds was a gravestone dated 1737. The top 300mm of this deposit was removed but a considerable depth was left intact and this layer was seen along the complete length of the excavations. The presence of this infill demonstrates that the ground levels here are built on moat infill (deposited since 1737) and suggests that the original edge of the moat was further to the south. The current ditch profile (prior to this *tranche* of work) cuts through the infills and is therefore a re-cut and demonstrates that the moat has been cleaned out before.

Built into the redeposited soil was a short flight of brick and concrete–built steps leading down to the water. The steps (although not old) and the alignment of the rear range of ‘The Grange’ opposes the original entrance into the bailey, as demonstrated by the ‘saddle’ cut into the bailey bank, and are an echo of a former approach to the castle.

Walk-over of silts dumps

After drying out in the temporary lagoons dredged silts from the work were spread over a field to the west of the moat site. A new HER code (HGH 054) was issued for the field and the area covered shown in Figure 2. The field was systematically walked to scan the dumped deposits for finds. A low density of large building flints including a short length of bonded flint work and a single block of limestone were noted across the field. The limestone was the same stone type as the ones retrieved form the north side of the moat in the 2011 season and may have been from this assemblage.

A substantial quantity of timber was retrieved from the moat but this was almost entirely unworked round wood and tree branches. A fragmentary length of oak with a square mortise and part of a medieval or early post-medieval oak joist, with plain chamfer and simple stop were recorded. The joist had been re-used and cut to a short length, removing the tenon, with a saw and was clearly not in its original context in the moat. Low numbers of early post-medieval brick (16th-17th century) and 19th century pantile were recorded but all building materials lay within a background of 19th and 20th century household rubbish.

Notable amongst the finds were relatively large quantities of sheep bones including a great many skulls. A sample of the bones including eight skulls was collected for specialist assessment; the sheep were large animals, lacking horns, and considered to be from quite modern breeds. The bones exhibited no evidence of disease.

6. Finds and environmental evidence

Andy Fawcett

6.1 Introduction

A small quantity of finds was recovered from the moat at Haughley Castle. A basic catalogue of the finds retrieved from the moat silt (0100) can be seen in Table 1. Context 0101 consists of several fragments of dressed stone from the disintegration of the castle walls. This material has been catalogued separately alongside a brief commentary.

Context/find type	No	Wgt/g	Comments
0100			
Pottery	6	72	1 x London stoneware (M17th-E20th C), 3 x Creamware (1730-60), 2 x Transfer printed ware (18th-20th C)
Ceramic building material	1	59	Post-medieval roof tile fragment with mortar trace on old break indicating its reuse
Clay tobacco pipe	2	9	Stem fragments only
Stone	1	5060	Tombstone fragment (sandstone) with inscription R P 1733
Glass	1	1	Clear late post-medieval/modern window glass
Coal	1	10	
Wood	2	57	1 x modern stake fragment, 1 x thatching spar
Shell	2	26	1 x oyster half, 1 x cockle half
Total	**16**	**5294**	

Table 1. Finds quantities

6.2 Constructional stone

A total of eight fragments (listed A-H) of dressed Barnack stone associated with the construction of the castle walls, was recorded as context 0101. The stone consists of

shelly and oolitic limestone, however it is shell that dominates their matrix. All of the fragments exhibit tooling marks and have at least three faces in tact. Of note is Stone A. This has the remains of an engaged column as well as a mason's mark (Pl. 22).

A) Three faces intact with one partial engaged column and mason's mark. Length 290mm, width 210mm and depth 170mm.
B) Three faces intact. Length 225mm, width 190mm and depth 170mm.
C) Four faces intact. ?Length 220mm, ?width 190mm and ?depth 190mm.
D) Five faces intact. Length 300mm, width 215mm and depth 195mm. Some mortar on one face.
E) Four and a half faces intact. Length *c*.300mm, width 220mm and depth 190mm.
F) Three faces intact. Length *c*.330mm, width *c.*240mm and depth *c.*200mm. Worn and with mortar on two sides.
G) Three faces intact. Length *c*.300mm, width 230mm and depth 210mm. Worn and with mortar on one side.
H) Too worn for measurement.

7. Discussion

The intention of the project was to remove only the latest deposits and avoid disturbing those which were potentially related to the early medieval construction and the occupation of the castle. This was achieved but as a result the archaeological information gathered by the monitoring was limited.

The deposit model for the moat fills shows a primary infill of grey fine clay silt, to a depth of 0.75m, material presumably washed off the sides of the mound. The clay silts contained no organic material suggesting that they eroded off the castle before it became enveloped in vegetation and which therefore built–up quite early on in the castle's life. The silts produced no material evidence relating to the castle's original occupation although this must be qualified by the size of the sample which was very limited and over most of the moat's length the silt was left in place. Overlying the primary clay silts were organic layers, laid down in the relatively recent past, and made up mainly of leaf-mould and organic matter from the overhanging trees. The oldest trees were no more than 2-300 years old and the radiocarbon dating of the organic silts were consistent with this time frame. On the south side of the bailey moat, where it passed alongside 'The Grange', evidence suggested that this part of the moat had been re-cut

sometime after mid-18th century and, together with the apparent absence of early organic deposits from the moat generally, strongly suggests that the moat had been cleaned out (to at least about half depth) in the relatively recent past.

The survey results show that the bailey and motte ditches were generally about 5m deep from the current ground surface but the ditch depth was greater on the western side and was particularly deep near the western entrance; the absolute level at the base of the moat varies from 51.40mOD on the west side to 53.17mOD at the east. The bottom of the western enclosure ditch was a comparable depth at 52.98mOD. There are springs that rise to the north of the castle and Haughley Mere within 400m to the west and field drains feed into the moat network in two places, however the moat ditches are so deep they are simply filled by ground water.

There appears to be a stepped change in the moat depth at the south cardinal point, where the original entrance was located (as suggested by a saddle in the bailey bank and motte top) and this anomaly in the moat bottom profile may reflect this position but no structures relating to a crossing were found.

Remains of the castle keep's stone fabric was found in the moat at the top of the silt but only in a small area on the north side of the motte, suggesting that the keep itself had been dismantled in a controlled manner and the materials carted away as a valuable resource. The negligible amount of keep's building fabric seen in the upcast silts spread on the neighbouring fields supports the apparent absence of material in the moat and suggests that it is unlikely to occur in those parts where the moat bottom remained submerged. The deposition rubble, as an event, could not be dated; it lay directly on top of the primary silts but was sealed only by relatively recent organic silts. It could be argued that the stratigraphic position of the rubble means it was deposited in the early medieval period (possibly in the 1173 engagement) but equally they could have been deposited after a period of moat cleaning and the result of the demolition of the last of the upstanding remains of the ruins the 18th century; the weathering to the stones would suggest the latter. Bonded masonry remains, giving an impression of its circular keep, are still extant on the motte top. The absence of any visible dressed stone indicates that the remains are probably below the ground footings but the potential still exists to create a plan of the keep.

A limited view of the mound's construction was provided by the unauthorised digging into its side, by youths (Pls. 15, 16). This suggested that the surface of the mound was composed of brown clay silt over a core of grey clay with a high chalk content. This replicated the composition of the natural geological stratigraphy and would suggest that the mound was raised with clay derived from the deeper ditch-digging and covered with clay collected from the nearer the surface, which presumably had been stockpiled. The interface between the two types of clay is a sharp divide and it appears the deposition of the two layers were distinct and separate events. This layered construction may be intentional, to do with creating a stable structure, or simply be a coincidence and reflect the interval between the construction of the initial timber keep to the more permanent stone one.

8. Conclusions

The monitoring facilitated the collection of digital survey data for the dimension of the motte and, where accessible, part of the moat ditch and fishponds. The work demonstrated that the moat had been cleaned out before and only post-medieval silts were removed. The primary silts are still in place and the potential here still remains. Bonded masonry remains of the castle still exist at the top of the motte and the potential to gain further information of castle by excavation is very high.

The ditch that surrounds the western enclosure is larger than the adjacent field boundary ditches but the work was unable to prove positively that this was part of the original castle complex, its alignment with the street pattern to the south however is compelling and it seems likely that it was; excavation within the enclosure itself may better answer this question.

The removal of the tree cover and the project as a whole has made the monument more visible within the landscape making the understanding of its form more accessible.

9. Archive deposition

Paper and photographic archive: SCCAS archive store, Bury St Edmunds
Digital archive: SCCAS R:\Environmental Protection\Conservation\Archaeology\Archive\Haughley\HGH046
Digital photographic archive: SCCAS R:\Environmental Protection\Conservation\Archaeology\Catalogues\Photos\

10. Acknowledgements

The fieldwork was carried out by Robert Brooks, David Gill and Jonathon van Jennians. The project was monitored by John Ette for English Heritage and Edward Martin for Suffolk County Council.

Post-excavation management was provided by Richenda Goffin. The specialists finds report was produced by Andy Fawcett.

The report illustrations were created by Gemma Adams and the report was edited by Richenda Goffin.

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West, S.E., 1977 *Haughley Castle.* PSIA volume XXXVI pt.1

Plates

Plate 1. Bailey moat, choked and overgrown, on the east side of the castle facing north prior to the start of work

Plate 2. Infilled moat on the east side of the motte facing south

Plate 3. Evaluation trench1 on the north side of the motte, showing depth of modern organic silts forming the upper deposits of the moat infill. The survey staff rests on the top of the primary silt made up of pale grey clay which can be seen on the sides of the cut and at water level

Plate 4. Evaluation trench 1 on the north side of the motte showing grey clay primary silt removed from the centre of the moat and the base of the ditch cut. A single block of Barnack building stone from the castle keep remains in the section and the position of further stones, which fell out before the photograph could be taken, can be seen as the indented area between the black and grey silts. The section depth is 2.6m

Plate 5. Attempted section through moat on the east side of the bailey. The water-logged silts were unable to hold a section and bailey ditch was recorded in profile once emptied and by snapshot. The moat was machined to brown primary silts which can be seen on the far side of the ditch.

Plate 6. Evaluation Trench across the north arm of the western enclosure ditch (section 7), which had been cleaned out in the recent past and black silts and modern deposits were seen at the section base. Total depth 1.45m

Plate 7. Excavation of the east end of the fishpond (Section 5) during the removal of C20th deposits; brown clay primary silt at the base of the pond has been left in place.

Plate 8. Motte ditch on the north-east side looking south-east after the removal of the later silts. The limit of the excavations were inside the original cut of the moat ditch in order to preserve evidence of its shape

Plate 9. Linear fishpond to the north of the castle after cleaning out, looking west

Plate 10. SE corner of the bailey bank and moat facing west. Note how the water action has eroded a channel at the base if the bank which was exposed when the water level was reduced

Plate 11. Detail of the depth of erosion at the base of the bailey bank, south side. This level is below the pre-castle ground level ground and the yellow clay silts of surface geological formation are exposed

Plate 12. Scree of loose flints from the former castle keep at the motte base, south side (left) facing SE

Plate 13. Bonded flint (Area B) *in-situ* remains of the keep foundations on the edge of the motte platform, facing east.

Plate 14. *in-situ* remains of the keep foundations on the edge of the motte platform (Area A0 facing N.

Plate 15. Modern, man-made, 'foxhole' burrowed into the east side of the motte at mid-height. The hole is accessed by a cutting excavated into the side of the mound and the hole extends 1-1.5m into its core

Plate 16. Section of the approach to the ‘foxhole’ showing soil profile and make up of the mound. The core of the mound is grey clay, similar to the underlying geological formation and excavated from the bottom of the ditches whilst the surface is composed of brown clay similar to that found nearer the surface. There is a sharp cut off between these layers suggesting the deposition of these clays were separate events

Plate 17. NE side of the motte after tree removal. The man-made foxhole can be seen at mid-height, centre.

Plate 18. ‘Saddle’ in the bailey bank at the south cardinal point, facing N, the castle’s probable former entrance

Plate 19. Building of the gabion wall on the south side of the bailey moat, facing west. The ledge is cut into moat infill deposited in the 18th century

Plate 20. Black infill silts dating to the C18th below redeposited yellow clay on the south side of the bailey moat, facing south. The Norman cut of the moat ditch is further back, behind the make-shift fence

Plate 21. Land-based and barge-mounted excavators clearing the bailey ditch and duck pond viewed from the south

Plate 22. Dressed Barnack stone associated with the construction of the castle keep's walls. Showing masons marks (top) and section of engaged column (?)part of a decorated opening (middle and bottom)

Appendix 1

BIRMINGHAM ARCHAEO-ENVIRONMENTAL BAE

Haughley Moat: an auger survey

K.Krawiec and E.Hopla

SCCAS- BA2131-2010

Haughley Moat: an auger survey

by

Kristina Krawic and Emma Hopla
09/10

Summary

In October 2010 BA-E were commissioned to undertake an auger survey and radiocarbon dating program in advance of remedial restorations work on a motte and bailey castle site, Haughley, Suffolk. The proposed works involved the removal of vegetation and the deepening of the moat profile which may disturb in situ medieval deposits. The auger survey characterised the general sequence of deposition to be represented by a poorly humified leaf litter sealed by material that had eroded out of the motte and the moat ditch sides. The leaf litter indicates that the moat contains material that probably dates from the abandonment of the site rather than from the working life of a castle. Documentary sources indicate this site was relatively short-lived being destroyed during Prince Henry's rebellion in 1173 so occupation deposits were not expected. There was, however, evidence for something that obstructed the auger in the base of the moat which may relate to the destruction of the stone foundations of the keep. Radiocarbon dating confirmed that even at a depth of 2.50m the material that infills the moat is fairly recent and therefore can be removed to reinstate the moat.

KEYWORDS: Haughley, Suffolk, organics, Radiocarbon dating

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Haughley Moat: an auger survey

1. INTRODUCTION

In October 2010 BA-E were commissioned by Suffolk County Council Archaeological Service to undertake an auger survey at the motte and bailey castle at Haughley, Suffolk in order to recover material suitable for radiocarbon dating (Fig.1). The proposed remedial conservation works include removal of vegetation and a desilting of the moat in order to allow it to reflood. This is to prevent access to the monument which is suffering from erosion and vandalism.

The castle is thought to have been constructed sometime in the 1100's in the reign of King Stephen by Hugh de Montfort. It is one of the largest motte and bailey castles still extant but probably one of the most short-lived, being destroyed in 1173. The revolt of Prince Henry against his father King Henry II led to its destruction by the Earl of Leicester and his Flemish army.

The auger survey was designed to characterise the deposits infilling the moat and identify any intact medieval deposits through radiocarbon dating. The locations of the auger transects were restricted due to parts of the moat being too soft underfoot or too wet to access. The main areas that were accessible were on the east side, at the junction between the motte ditch and the bailey ditch, and the northern arm of the motte ditch.

2. METHODS

2.1 Auger Survey

The auger survey was undertaken using an Eikjelcamp gouge corer. The stratigraphy of the deposits was logged in the field using the Troels Smith (1955) method and the locations of the cores were recorded using a dGPS.

2.2 Radiocarbon Dating

Two samples of roundwood were submitted for radiocarbon dating to Beta Analytic Inc., Florida, to establish the chronology of sediment accumulation. The sample underwent acid/alkali/acid treatment prior to AMS dating.

3. PRELIMINARY RESULTS OF FIELDWORK

The transects (1, 2, 10, 11 and 12) located at the motte and bailey ditch junction characterised the deposits as follows (Fig.2). Full core logs can be found in Appendix I.

Motte and Bailey Junction
The basal deposit of the moat was a black poorly humified leaf litter. This overlay the natural chalky grey clay which the moat is cut through. The leaf litter was overlain for the most part by a grey brown silt clay which contained coarse flint and sand particles. The upper deposits recorded in Cores 8 and 9 in Transect 3 have successive layers of coarser material overlying the basal deposits (Figs.3 and 4). In this area the

motte is particularly damaged and shows sign of erosion. The layers of flint rich silty sand most likely relate to erosion episodes of the motte material.

Motte ditch
The northern arm of the motte ditch was characterised in Transects 3-9. The deepest part of the ditch was located in Transects 6 and 7 being up to 2.60m deep. The ditch became shallower to the east, in Transects 3-5, being 1.10-1.75m deep (Fig). This may correspond to a widening of the ditch to the west.

The basal deposit in this section of the ditch conforms to the poorly humified leaf litter seen in the motte and bailey junction. In places this overlay a gritty brown grey silt clay, although this was an intermittent deposit and not seen in all the cores. For the most part this leaf litter was overlain by a coarse brown silt clay although the sequence in Core 9, Transect 3 was more varied. The upper deposits were a coarse sandy silt material interbedded with organic silt deposits suggesting that periods of erosion have led to the deposition of this coarser material

The cores in Transects 8 and 9 were obstructed at about 0.60-0.90m below ground level. The auger was unable to penetrate beyond this depth and was clearly striking something extensive and tough, like stone.

Dating
A sample of wood was recovered from Core 10 at 0.79m below ground level for radiocarbon dating (Table 1). The results show a modern age, i.e. the dated fraction incorporates material living within the last 50 years. This may indicate that this horizon is not secure and has become contaminated from overlying deposits.

A second piece of wood was selected from lower down the profile from Core 21, Transect 6 at 2.50m below ground level. This was to ensure minimal contamination from modern deposits. However, this deposit also proved to be modern suggesting that no intact sediments from the life of the castle survive in these locations.

4. CONCLUSIONS

The motte and bailey castle at Haughley was a fairly short lived structure and was not rebuilt after it fell in 1173. The brief occupation and use of the site contributed to the lack of material infilling the moat. The basal deposits very much resembled the upper deposits and consist primarily of poorly humified leaf litter. This suggests that the deposits in the base of the ditch are representative of a heavily vegetated and therefore abandoned site and are not indicative of occupation.

The radiocarbon dating has shown that the basal leaf litter material to be recent, being subject to active biological processes. It seems clear that the moat has not been subject to the build up of material that is usually expected. The deposits within it do not date from the life of the castle and therefore will not contribute to the understanding of the castle within its landscape

The current state of the motte is poor with several trees uprooted and clearly subject to damage from unauthorised public access. The upper deposits in the northern arm of the moat show the effects of this damage with layers of erosion material which in all likelihood derive from the motte. The presence of an obstruction between Transects 8 and 9 may be large pieces of stone. The keep would have been built out of

wood but the castle foundations are listed as being made of stone. It is possible that once the keep was destroyed only the stone foundations remained and through neglect and vandalism may have fallen into the base of the moat.

5. RECOMMENDATIONS FOR FURTHER ANALYSIS

The radiocarbon dating has shown the moat to be infilled with recent deposits derived from the vegetation growing at the site. This material may therefore be removed under archaeological supervision to reinstate the moat.

6. ARCHIVE

The remaining radiocarbon samples are currently stored at BAE and will be held for a maximum of one year.

ACKNOWLEDGEMENTS

Thanks are due to David Gill and the Suffolk team for their help in the field.

REFERENCES

Troels-Smith, J. (1955). Karakterisering af lose jordater (characterisation of unconsolidated sediments). *Denmarks Geologiske Undersogelse*, Series IV/3, 10, 73.

Figures

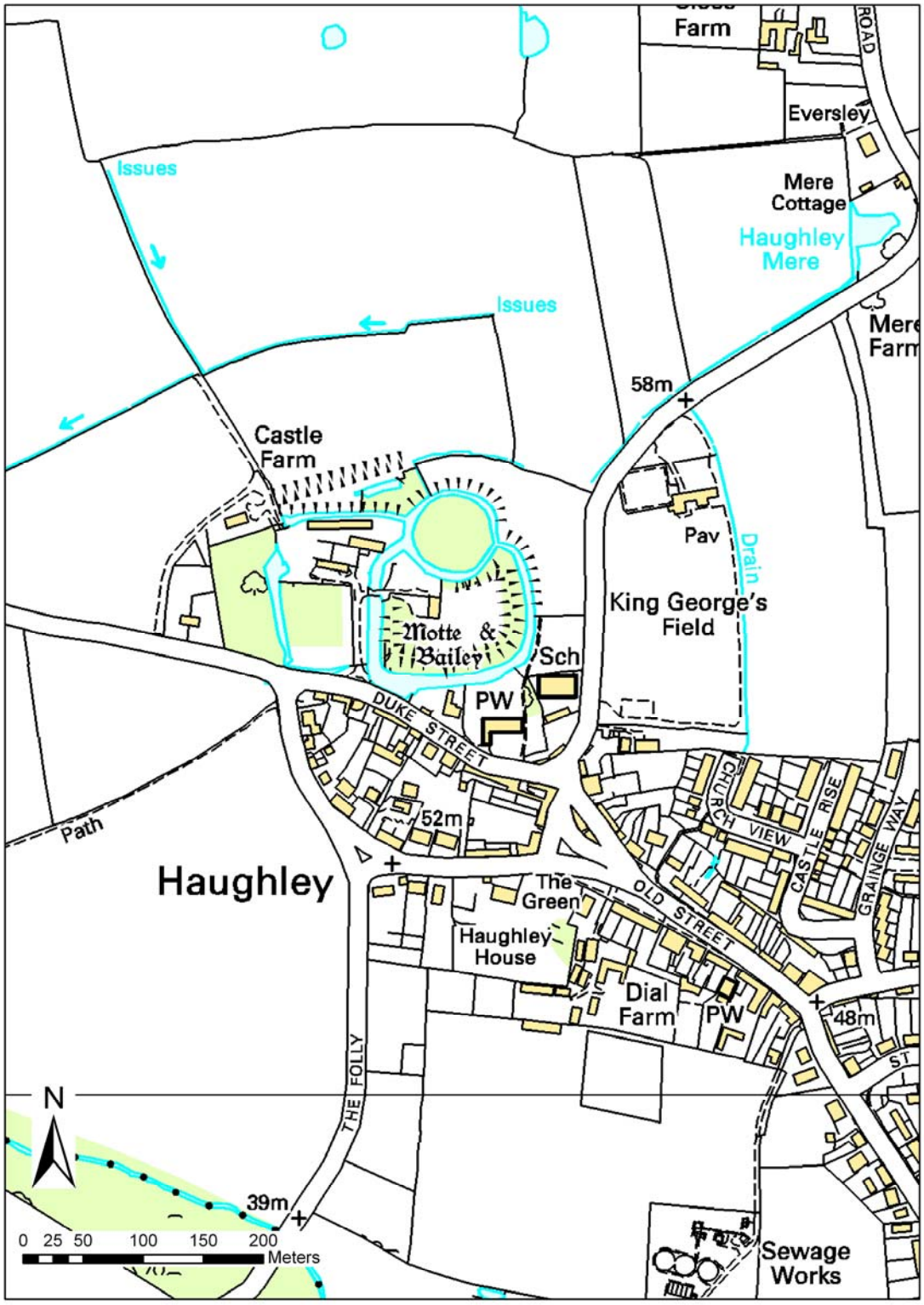

Figure 1: Site location

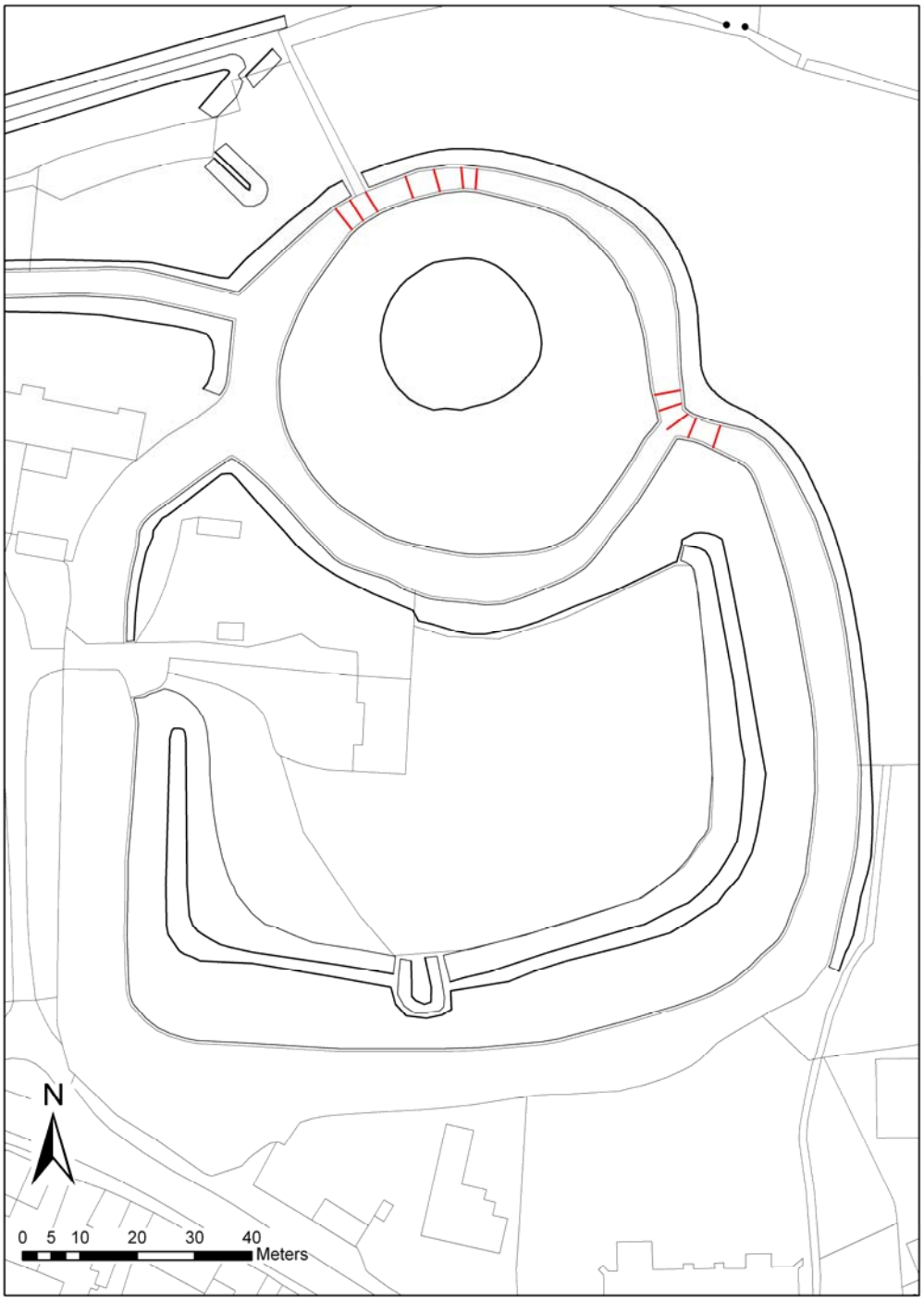

Figure 2: Transects

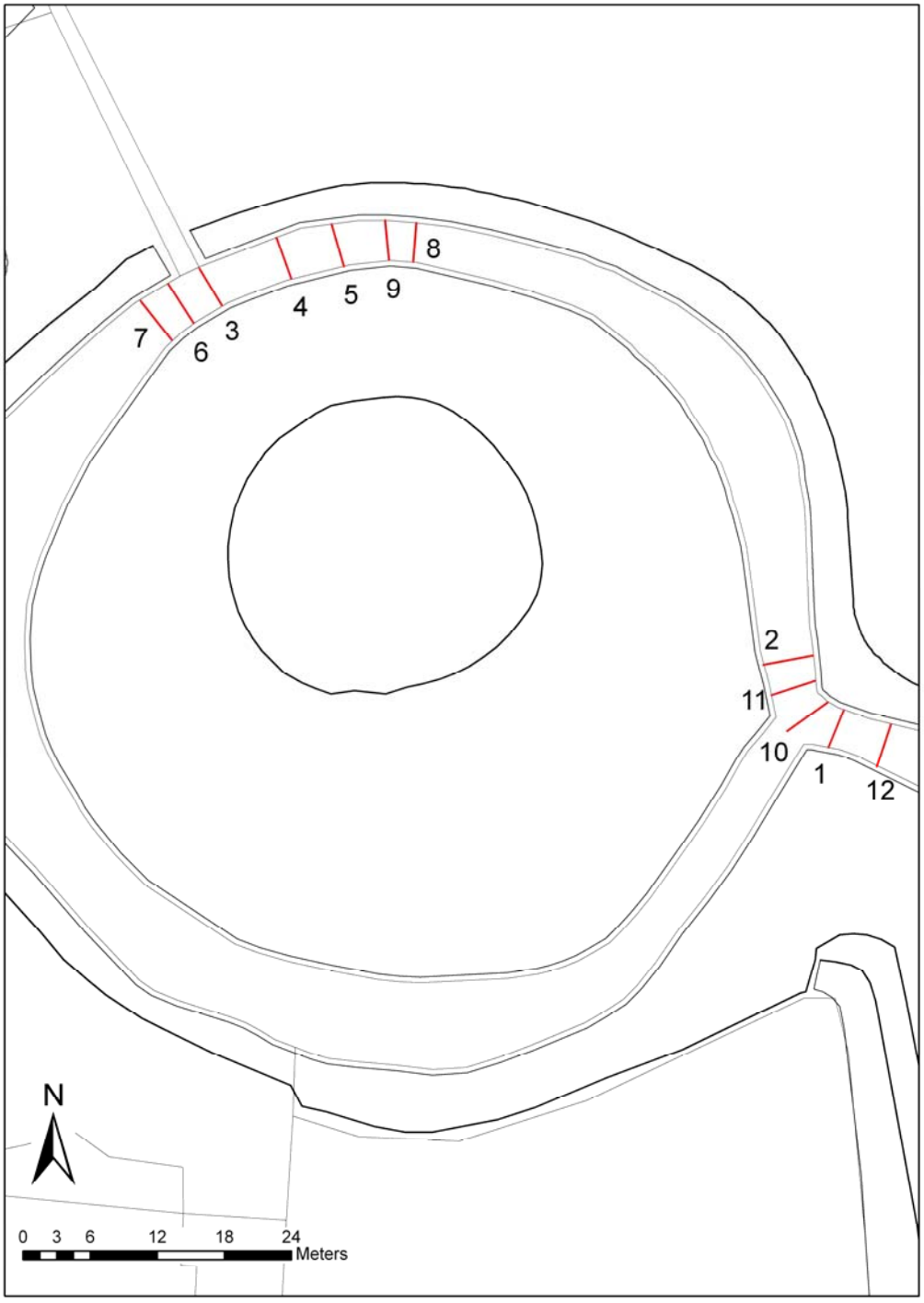

Figure 3: Transect numbers

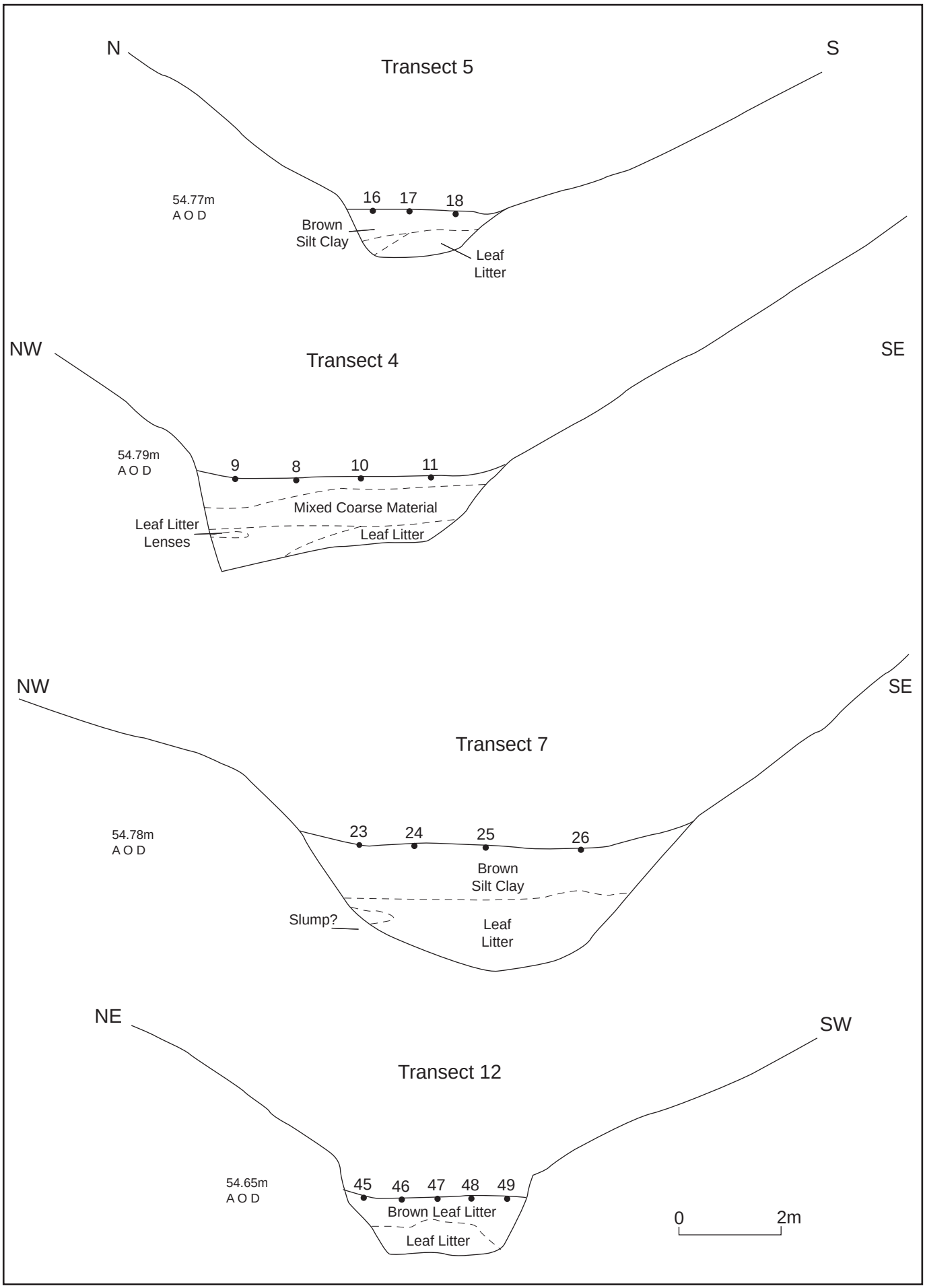
N
S
Transect 5
54.77m
A O D
16
17
18
Brown
Silt Clay
Leaf
Litter
NW
SE
Transect 4
54.79m
A O D
9
8
10
11
Mixed Coarse Material
Leaf Litter
Lenses
Leaf Litter
NW
SE
Transect 7
54.78m
A O D
23
24
25
26
Brown
Silt Clay
Slump?
Leaf
Litter
NE
SW
Transect 12
54.65m
A O D
45
46
47
48
49
Brown Leaf Litter
Leaf Litter
0
2m

Fig.4

Table 1: Radiocarbon dates

Lab number and depth	Material	13C/12C	Radiocarbon Age	Calibrated Age
BETA-287326 Core 10, 0.79m	wood	-27.2o/oo	Cal BP 280 to 170 and Cal BP 150 to 0 Cal BP 0 to 0	Cal AD 1670 to 1780 and Cal AD 1800 to 1950 Cal AD 1950 to 1960
BETA-288270 Core 21, 2.50m	wood	-25.6o/oo	Cal BP290 to 0	Cal AD 1660 to 1960

APPENDIX 1 - BA2131 Haughley Moat core logs

Transect 1

Core 1

0-0.55m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	0
	Dh2, Ag1, Th1				
	Upper brown silt, abundant twigs leaves, modern plant remains				
0.55-0.90m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	2	1
	Ga3, Ag1				
	Very sticky stiff blue grey clay, abundant chalk fragments, no organics				

Core 2

0-0.65m	Not recovered, too wet				
0.65-0.90m	**Da**	**St**	**El**	**Dr**	**UB**
	5	0	0	2	0
	Dh2, Ag1, Th1				
	Black poorly humified organic silt				
0.90-1.30m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	2	4
	Ga3, Ag1				
	Very sticky stiff blue grey clay, abundant chalk fragments, no organics, hit a stone				

Core 3

0-0.90m	Not recovered, too wet				
0.90-1.10m	**Da**	**St**	**El**	**Dr**	**UB**
	5	0	0	2	0
	Dh2, Ag1, Th1				
	Black poorly humified organic silt				
1.10-1.25m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	1	1
	Ga3, Ag1				
	Very sticky stiff blue grey clay, abundant chalk fragments				

Core 4

0-0.45m	Not recovered, too wet				
0.45-0.81m	**Da**	**St**	**El**	**Dr**	**UB**
	5	0	0	2	0
	Dh2, Ag1, Th1				
	Black poorly humified organic silt				
1.10-1.25m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	3	1
	Ga3, Ag1				
	Very sticky stiff blue grey clay, abundant chalk fragments				

Transect 2

Core 5

0-0.78m	Not recovered, too wet				
0.78-1.21m	**Da**	**St**	**El**	**Dr**	**UB**
	1	0	0	2	1
	Ga3, Ag1				
	Very sticky stiff blue grey clay, abundant chalk fragments, hit a stone				

Core 6

0-1.13m Not recovered, too wet

1.13-1.17m

Da	St	El	Dr	UB
3	0	0	2	0

Dh2, Ag1, Th1, ptm+

Brown organic silt, poorly humified organics, twigs, possible mollusc frags, hit a stone

Core 7

0-1.00m Not recovered, too wet

1.00-1.20m

Da	St	El	Dr	UB
5	0	0	2	0

Dh2, Ag1, Th1

Black poorly humifed organic silt

1.20-1.33m

Da	St	El	Dr	UB
2	0	0	1	1

Ag3, Ga 1, ptm+

Brown organic silts, abundant pale rootlets, occ mollusc frags

1.33-1.94m

Da	St	El	Dr	UB
1	0	0	2	3

Ga3, Ag1

Very sticky stiff blue grey clay, abundant chalk fragments, hit a stone

Transect 3

Core 8

0-0.15m

Da	St	El	Dr	UB
1	0	0	2	0

Ga3, Ag1

Brown silty sand with modern roots throughout

0.15-1.40m

Da	St	El	Dr	UB
2	3	0	2	1

Ggmin2, Ag2,ptm+

Mixed grey sandy silt with bands of sand and chalk frags at base (slump material), occ mollusc frags

1.40-1.45m

Da	St	El	Dr	UB
5	0	0	3	2

Dh2, Ag1, Th1

organic layer, black poorly humified leaf litter

1.45m Base

Core 9

0-0.60m

Da	St	El	Dr	UB
1	0	0	1	0

Ggmin3, Ag1

Orange brown very coarse sand, occ silt and modern roots

0.60-0.90m

Da	St	El	Dr	UB
1	0	0	2	1

Dh2, Ag1, Th1, Ggmin+

Coarse grey sandy silt, large chalk frags, flint, dark rootlets and poorly humified leaf litter

0.90-0.92m

Da	St	El	Dr	UB
4	0	0	3	1

Dh1, Ag3

Black poorly humified organic silt, visible plant material

0.92-0.99m

Da	St	El	Dr	UB
3	0	0	3	1

As2, Ag2, Dh+, Ggmin+
Grey brown silty clay, occ chalk and coarse material, organics

0.99-1.09m

Da	St	El	Dr	UB
4	0	0	3	4

Dh1, Ag3
Black poorly humified organic silt, woody fragments

1.09-1.22m

Da	St	El	Dr	UB
3	0	0	3	4

As2, Ag2, Dh+, Ggmin+
Grey brown silty clay, occ chalk and coarse material, organics

1.22-1.60m

Da	St	El	Dr	UB
3	0	0	3	1

As2, Ag2, Dh+, ptm+
Brown sticky silt clay, occ mollusc frags and pale rootlets

1.60-1.75m

Da	St	El	Dr	UB
1	0	0	1	1

As2, Ag2, Dh+, Ggmin+, ptm+
Light grey wet silt clay, occ molluscs, plant material, chalk frags

1.75-2.00m

Da	St	El	Dr	UB
1	0	0	3	1

As3, Ag1, Ggmaj+
Stiff chalk rich clay

Core 10

0-0.76m

Da	St	El	Dr	UB
3	0	0	3	0

As2, Ag2, Dh+, Ggmin+, ptm+
Grey brown silty clay, occ chalk frags, wood, mollusc frags and well humified organics

0.76-0.98m

Da	St	El	Dr	UB
3/4	0	0	3	1

Ag2, Ggmin2, Dh+
Grey black sandy silt, very organic towards base

0.98-1.25m

Da	St	El	Dr	UB
4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

Core 11

0-0.90m

Da	St	El	Dr	UB
3	0	0	2	0

Ag2, Ggmin1, Dh1
Brown coarse silt with flint frags, woody frags, becoming siltier with depth

0.90-1.15m

Da	St	El	Dr	UB
4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

1.15-1.25m

Da	St	El	Dr	UB
3	0	0	3	1

As2, Ag2, Dh+, Ggmin+
Grey brown silty clay, occ chalk frags, wood, and well humified organics

1.25-1.50m

Da	St	El	Dr	UB
2	0	0	2	3

As3, Ag1, Ggmaj+
Stiff dry clay with chalk fragments

Transect 4
Core 12

0-0.47m

Da	St	El	Dr	UB
2	0	0	2	0

As3, Ag 1, Ggmaj+
Coarse brown silt clay, large chalk pieces, occ rootlets

0.47-0.80m

Da	St	El	Dr	UB
2	0	0	2	1

As3, Dh1, Ggmaj+
Yellow grey stiff clay, occ black organics and chalk frags

0.80-0.90m

Da	St	El	Dr	UB
3	0	0	2	1

Ag2,As2, Dh+, Ggmaj+
Grey brown silty clay, occ chalk frags and organics, hit a stone?

Core 13

0-0.57m

Da	St	El	Dr	UB
3	0	0	1	1

Ag2,As2, Dh+, Ggmaj+
Brown, wet silt clay, occ chalk frags and poorly humified organics

0.57-1.05m

Da	St	El	Dr	UB
3/4	0	0	1	1

Ag3,As1, Dh++, Ggmaj+
Dark brown organic wet silt clay, leaf litter, hit stone at base

Core 14

0-0.40m

Da	St	El	Dr	UB
3	0	0	2	0

Ag2,As2
Brown silt clay

0.40-1.20m

Da	St	El	Dr	UB
4	0	0	2	1

Ag2, Dh2, Ggmaj+
Black brown mottled poorly humified organic silt, hit a stone at base

Core 15

0-0.80m

Da	St	El	Dr	UB
3	0	0	2	0

Ag2,As2, Dh++
Brown silt clay with modern leaf litter

Transect 5
Core 16

0-0.35m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0

Ag2,As2
Brown silt clay

0.35-0.60m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1

Ag2,As2, Dh, Ggmaj+
Stiff yellow brown silt clay, chalk frags and occ organics

0.60-0.90m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	3	1

Ag2,As2, Ggmin+, Dh+
Brown grey gritty silt clay, occ chalk and rootlets

Core 17

0-0.38m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0

Ag2,As2
Brown silt clay

0.38-0.94m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

Core 18

0-0.40m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0

Ag2,As2
Brown silt clay

0.40-0.76m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

0.76-1.10m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	3

As3, Ag1, Ggmaj+
Stiff,dry, grey clay with chalk fragments

Transect 6
Core 19

0-0.78m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0

Ag2,As2, Ggmin+
Brown gritty silt clay

0.78-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	2	1

Ag2,As2, Ggmin+, Dh+
Grey gritty silt clay, occ chalk and rootlets

1.00-1.20m

Da	St	El	Dr	UB
4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

1.20-1.50m

Da	St	El	Dr	UB
3	0	0	2	1

Ag2,As2, Ggmin+, ptm+
Brown gritty silt clay, occ mollusc frags

1.50-2.00m

Da	St	El	Dr	UB
2	0	0	3	3

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 20

0-1.14m

Da	St	El	Dr	UB
2	2	0	2	0

As2, Ag1, Ggmaj1
Grey brown silt clay, mixed slump deposit

1.14-2.40m

Da	St	El	Dr	UB
4	3	0	2	4

Ag1, Dh3, Ggmin+
Black poorly humified leaf litter, occasional bands of brown grey silt clay 5cm thick

2.40-2.60m

Da	St	El	Dr	UB
3	0	0	2	1

Ag2, As2, Dh+, Ggmin+
Mid brown grey silt clay, poorly humified monocot remains, chalk frags

2.60-2.63m

Da	St	El	Dr	UB
4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

2.63-2.66m

Da	St	El	Dr	UB
2	0	0	3	3

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 21

0-0.55m

Da	St	El	Dr	UB
3	0	0	1	0

Ag2,As2, Ggmin+
Brown gritty silt clay

0.55-1.20m

Da	St	El	Dr	UB
4	3	4	2	4

Ag1, Dh3, Ggmin+
Black poorly humified leaf litter, laminated with grey silt clay 10cm thick laminations

1.20-2.60m

Da	St	El	Dr	UB
4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

2.60m

Da	St	El	Dr	UB
2	0	0	2	3

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 22

0-0.63m

Da	St	El	Dr	UB
3	0	0	1	0

Ag2,As2, Ggmin+
Brown gritty silt clay

0.63-1.28m

Da	St	El	Dr	UB
4	3	4	2	4

Ag1, Dh3, Ggmin+
Black poorly humified leaf litter, laminated with grey silt clay 10cm thick laminations

1.28-1.55m

Da	St	El	Dr	UB
2	0	0	3	3

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Transect 7
Core 23

0-0.97m

Da	St	El	Dr	UB
3	0	0	1	0

Ag2,As2, Ggmin+
Brown gritty silt clay

0.97-1.09m

Da	St	El	Dr	UB
3	0	0	2	1

Ag2, As2, Dh+, Ggmin+
Mid brown grey silt clay, occ poorly humified organics

1.09-1.16m

Da	St	El	Dr	UB
4	0	0	2	1

Ag1, Dh3
Black poorly humified leaf litter

1.16-1.36m

Da	St	El	Dr	UB
3	0	0	2	1

Ag2, As2, Ggmin+
Brown grey silt clay, chalk fragments

1.36-1.42m

Da	St	El	Dr	UB
2	0	0	3	3

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 24

Too wet unable to recover

Core 25

Very wet, not good recovery
0-1.00m

Da	St	El	Dr	UB
3	0	0	1	0

Ag2,As2, Ggmin+
Brown gritty silt clay

1.00-2.37m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter, reed frags

Core 26

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

Ag2,As2, Ggmin+
Brown gritty silt clay

0.84-1.80m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter

Transect 8
Core 27

0-0.50m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0

Ag2,As2, Ggmin+
Brown gritty silt clay

0.50-100m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	3

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 28/29/30

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

Ag2,As2, Ggmin+, Dh++
Brown gritty silt clay, occ organics, hit stone? Unable to continue

Transect 9
Core 31

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

Ag2,As2, Ggmin+
Brown gritty silt clay

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

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 32

0-0.85m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	0

Ag1, Dh3
Black poorly humified leaf litter, poorly recovered as wet

0.85-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	3

As3, Ag1, Ggmaj+, ptm+
Stiff, dry, grey clay with chalk and mollusc fragments, hit stone at base

Core 33

0-0.40m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0

Ag2,As2, Ggmin+
Brown gritty silt clay

0.40-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter, poorly recovered as too wet, hit stone at base

Core 34

0-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter, poorly recovered as too wet

Core 35

0-0.80m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter, poorly recovered as too wet, hit stone? at base

Transect 10
Core 36

0-0.40m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0

Ag1, Dh3
Brown poorly humified leaf litter

0.40-0.75m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	1

Ag2, As2, Dh+, Ggmin+
Mid brown wet grey silt clay, chalk and organic frags

0.75-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 37

0-1.30m too wet to recover

Core 38

0-1.30m too wet to recover

Core 39

0-0.78m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0

Ag1, Dh3
Brown poorly humified leaf litter, very wet

Transect 11

Core 40

0-0.40m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0
	Ag2,As2, Ggmin+				
	Brown gritty silt clay				

Core 41

0-0.90m	too wet to recover				
0.90-1.50m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2
	As3, Ag1, Ggmaj+				
	Stiff, dry, grey clay with chalk fragments				

Core 42

0-0.90m	Too wet to recover				
0.90-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2
	As3, Ag1, Ggmaj+				
	Stiff, dry, grey clay with chalk fragments				

Core 43

0-1.30m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0
	Ag1, Dh3				
	Brown poorly humified leaf litter, very wet				
1.30-1.50m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2
	As3, Ag1, Ggmaj+				
	Stiff, dry, grey clay with chalk fragments				

Core 44

0-1.40m	too wet to recover				
1.40-1.50m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2
	As3, Ag1, Ggmaj+				
	Stiff, dry, grey clay with chalk fragments				

Transect 12
Core 45

0-0.40m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	2	0
	Ag2,As2, Ggmin+				
	Brown gritty silt clay				

Core 46

0-0.45m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0
	Ag1, Dh3				
	Brown poorly humified leaf litter, very wet				
0.45-1.10m	**Da**	**St**	**El**	**Dr**	**UB**

	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter

1.10-1.50m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 47

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

Ag1, Dh3
Brown poorly humified leaf litter, very wet

0.80-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter

1.00-1.50m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 48

0-0.45m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0

Ag1, Dh3
Brown poorly humified leaf litter, very wet

0.45-1.10m	**Da**	**St**	**El**	**Dr**	**UB**
	4	0	0	1	1

Ag1, Dh3
Black poorly humified leaf litter

1.10-1.50m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Core 49

0-0.50m	**Da**	**St**	**El**	**Dr**	**UB**
	3	0	0	1	0

Ag1, Dh3
Brown poorly humified leaf litter, very wet

0.50m-1.00m	**Da**	**St**	**El**	**Dr**	**UB**
	2	0	0	3	2

As3, Ag1, Ggmaj+
Stiff, dry, grey clay with chalk fragments

Appendix 2

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November 8, 2010

Dr. Kristina Krawiec
University of Birmingham
Birmingham Archaeology
Environmental
Edgbaston
Birmingham, B15 2TT
United Kingdom

RE: Radiocarbon Dating Result For Sample BA2131-0.79m-CORE 10

Dear Dr. Krawiec:

Enclosed is the radiocarbon dating result for one sample recently sent to us. It provided plenty of carbon for an accurate measurement and the analysis proceeded normally. As usual, the method of analysis is listed on the report sheet and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analysis. It was analyzed with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

Our invoice has been sent separately. Thank you for your prior efforts in arranging payment. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Kristina Krawiec

Report Date: 11/8/2010

University of Birmingham

Material Received: 11/1/2010

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 287326	150 +/- 40 BP	-27.2 o/oo	110 +/- 40 BP

SAMPLE : BA2131-0.79m-CORE 10
ANALYSIS : AMS-PRIORITY delivery
MATERIAL/PRETREATMENT : (wood): acid/alkali/acid
2 SIGMA CALIBRATION : Cal AD 1670 to 1780 (Cal BP 280 to 170) AND Cal AD 1800 to 1950 (Cal BP 150 to 0)
Cal AD 1950 to 1960 (Cal BP 0 to 0)

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.2:lab. mult=1)

Laboratory number: **Beta-287326**

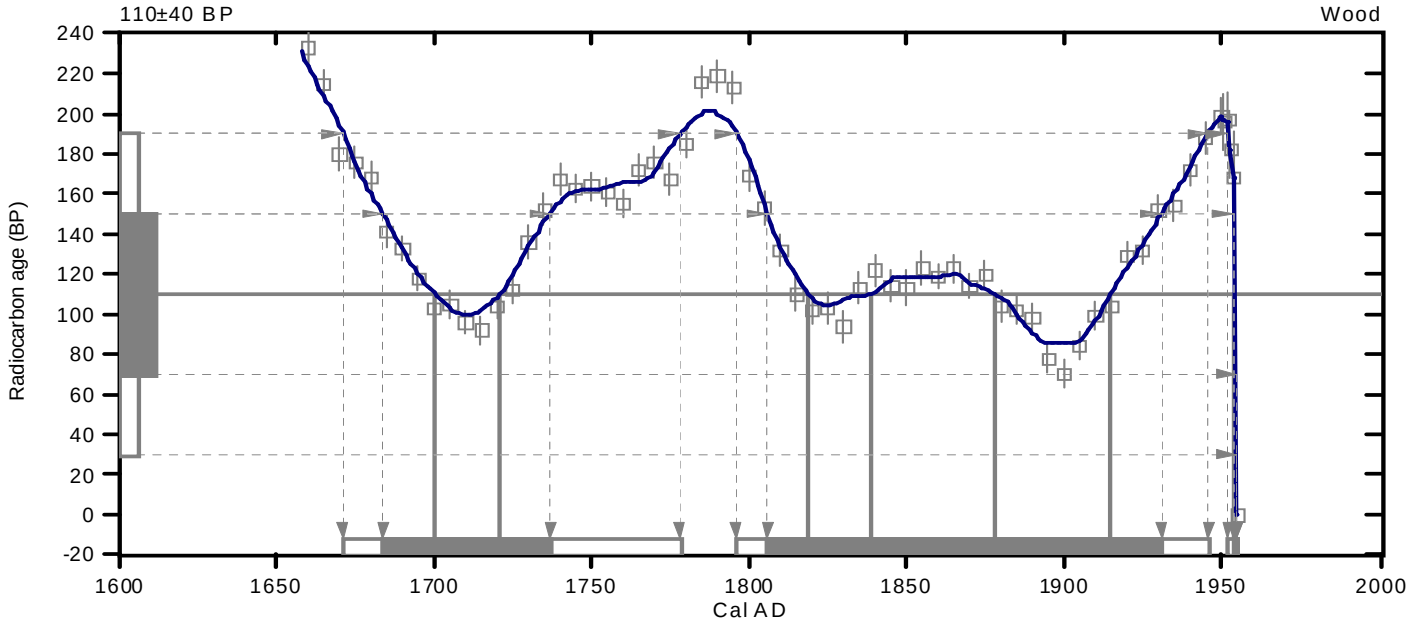
Conventional radiocarbon age: **110±40 BP**

2 Sigma calibrated results: **Cal AD 1670 to 1780 (Cal BP 280 to 170) and**
(95% probability) **Cal AD 1800 to 1950 (Cal BP 150 to 0) and**
Cal AD 1950 to 1960 (Cal BP 0 to 0)

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1700 (Cal BP 250) and
Cal AD 1720 (Cal BP 230) and
Cal AD 1820 (Cal BP 130) and
Cal AD 1840 (Cal BP 110) and
Cal AD 1880 (Cal BP 70) and
Cal AD 1920 (Cal BP 40) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: Cal AD 1680 to 1740 (Cal BP 270 to 210) and
(68% probability) Cal AD 1810 to 1930 (Cal BP 140 to 20) and
Cal AD 1950 to 1960 (Cal BP 0 to 0)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

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