00132

JSAC JOHN SAMUELS ARCHAEOLOGICAL CONSULTANTS

Archaeological Evaluation Excavation at Holland Park, Horseshoe Road, Spalding (Planning Application Ref. H16118700)

NGR TF 233 217

by

John Samuels Archaeological Consultants

on behalf of

Broadgate Builders (Spalding) Ltd
Broadgate House
Weston Hills
Spalding
Lincolnshire
PE12 6DB

JSAC 380/00/06
August 2000

Site Code : HPS 99
Accession No. : 2000.122

THE MANOR SOUTH STREET NORMANTON-ON-TRENT NEWARK NOTTINGHAMSHIRE NG23 6RQ
TELEPHONE 01636 821727 FAX 01636 822080 E-MAIL jsac@btconnect.com

Archaeological Evaluation Excavation at Holland Park, Horseshoe Road, Spalding

NGR TF 233 217

Contents

Summary

Broadgate Builders (Spalding) Ltd have applied for planning permission to develop an area of land south of Horseshoe Road, Spalding for residential accommodation. The site, also known as Holland Park, is centred on NGR TF 2335 2120 and covers an area of approximately 34ha, most recently in agricultural use.

Archaeological assessments which preceded this phase of evaluation comprised a desk-based assessment, aerial photographic analysis and geophysical survey. A small part of the development site had also been subject to evaluation excavation at an earlier stage in order to facilitate the construction programme (JSAC 380a/98/02).

The evaluation undertaken covered the remainder of the 34ha site and comprised the excavation of 25 trenches and two 5m^2 areas. The trenches were located to investigate geophysical anomalies, cropmarks and apparently 'blank' areas where no features had previously been identified. The results of the evaluation confirmed the layout of features as identified by the geophysical survey and aerial photographic analysis, although the anthropogenic nature of many of the features remains in question. Analysis of the features and the finds retrieved identified a small enclosure associated with salt production and probably dating to the early Roman period. No dateable ceramics were recovered and its exact date therefore remains uncertain; although a C^{14} date places it in the Late Iron Age - Early Roman period. Geophysical anomalies possibly indicating burning were on excavation, attributed to natural causes. A series of palaeochannels were identified crossing the site. It is suggested that these channels had an anthropogenic origin, but evidence for that had subsequently been destroyed through natural water action.

The archaeological remains within this site are limited to that area of the enclosure identified by geophysical survey. These features are considered to be of local-regional importance. The remainder of the site produced few post-medieval and modern field boundaries, and palaeochannels. These features are considered to be of no more than local importance.

1.0 Introduction

1.1 Site Location and Description

1.1.1 The proposed development site is situated to the west of the town of Spalding in South Holland District, Lincolnshire (NGR TF 23352120). It comprises 34ha of land currently in use for growing vegetable crops and formerly occupied by greenhouses. The land is relatively level at approximately 4m above Ordnance Datum and as such has been subject to multiple flooding episodes which have created the fertile alluvial soils of Spalding Fen.

1.2 Planning and Project Background

1.2.1 Outline planning permission has been granted for the development of this site for housing (Planning reference H16/1196/94). The site was identified as being of archaeological interest and a desk-based assessment was therefore commissioned (JSAC 380/98/01).

1.2.2 Geophysical surveys were undertaken and utilised in designing the trench layout (Johnson 1998; Johnson 1999; see Appendix B). A small part of the site has had a summary report written, to inform the planning authority on a separate planning application within the entire site (380b/00/01). The results from trenching within that area have been incorporated into this report (see Section 3.00).

1.2.3 The proposed development is for residential housing. Trench foundations are proposed with a maximum depth of 1m from the present ground surface.

1.3 Archaeological and Historic Background

1.3.1 A wealth of cropmarks exist extending from the west into the edge of the site. Many of these represent the former courses of streams, but others identified boundaries of human origin, including possible Romano-British or Iron Age field systems.

1.3.2 Geophysical survey has further identified a rectangular enclosure, which closely mirrors a site excavated 500m to the north. The excavated example was found to be the remains of a late Iron Age / early Romano-British salt processing and settlement site. It seems highly likely that

this second enclosure will have performed a similar function.

1.3.3 Little has been identified in the eastern part of the site, with the exception of the lines of former field boundaries. 19th century maps show a greater division of the site at that time and it seems likely that it is these boundaries that are being identified by geophysical survey.

1.4 Evaluation Aims

1.4.1 To establish the nature, date, extent and state of preservation of features identified from geophysical survey and aerial photographs.

1.4.2 To test the validity of the cropmarks and geophysical survey results by trenching in areas without identified anomalies or cropmarks.

1.4.3 To establish the location, layout and relationships of features in the western part of the site by way of detailed geophysical survey.

1.4.4 To establish a soil profile and the potential impact of the development on archaeological horizons, particularly in the eastern part of the site.

1.4.5 To allow a reasoned decision on the planning application and the need for archaeological mitigation.

1.4.6 To ensure that a mitigation strategy is devised that deals with archaeological remains within the site in the most efficient manner.

1.5 This specification conforms to the requirements of *Planning Policy Guidance : Archaeology and Planning* (DoE 1990) (PPG16). It has been designed in accordance with current best archaeological practice and the appropriate national standards and guidelines including:

Management of Archaeological Projects (English Heritage, 1991);

Model Briefs and Specifications for Archaeological Assessments and Field Evaluations (Association of County Archaeological Officers, 1994);

Code of Conduct (Institute of Field Archaeologists, 1994);

Standard and Guidance for Archaeological Excavations (Institute of Field Archaeologists, 1994); and

Archaeological Handbook (Lincolnshire County Council Archaeological Section 1998).

2.0 Methodology

2.1 The evaluation was undertaken in line with the specification agreed with the Lincolnshire County Archaeologist. Following the second phase of geophysical survey, which was undertaken concurrently with trenching in the eastern part of the site, trench locations were amended in consultation with the Lincolnshire County Archaeologist.

2.2 Problems in surveying between the geophysical survey and the trench layouts were identified during fieldwork and additional trenches were therefore placed to atone for this discrepancy.

2.3 Trenches were machine excavated in spits and cleaned by hand. Features and individual contexts were recorded on pro-forma context recording sheets and transferred to a Microsoft Access database. Trenches were drawn in section, and where appropriate, in plan. Individual features were also drawn in section if not recorded on the trench section. Trenches and individual features were recorded by colour print photography, supplemented by black and white and colour transparency where appropriate.

2.4 D James Rackham visited the site to advise on soil sequences and environmental sampling. Samples were labelled according to individual context and details of contexts forwarded to Mr Rackham. Large quantities of briquetage identified in the samples were passed on to Jane Cowgill for analysis. Their reports are included as appendices to this document.

2.5 The site was monitored by Jim Bonnor, Lincolnshire County Archaeologist, on behalf of South Holland District Council.

3.0 Results

3.1 A total of 25 trenches and two 5m x 5m areas were excavated across the site. With the exception of Trench 18, none of the excavated areas contained positively archaeological features. Of the 27 excavated areas, only 10 contained any significant features, archaeological or natural in origin.

3.2 Trenches 3, 7, 9, 10, 11 and 12 contained no features of archaeological interest. In summary, each trench comprised the following:

Context	Depth	Description
(100)	0.35 – 0.50m	Top strata of site weathering profile supporting rough vegetation. Lower c. 100mm more compact with occasional charcoal flecks
(101)	0.12-0.17m	Extensive layer exposed throughout the site directly below the modern topsoil. Comprised of bands of medium silt with occasional reduced lenses / bands. Iron rich with isolated concentrations of Iron Oxides. Generally horizontally bedded but laminations dip into palaeochannels / ditches where it forms a secondary - tertiary fill.
(102)	0.07–0.12m	Undulating but broadly horizontal peat layer, slightly leached into laminated silts below. In some trenches there is both an upper and lower banding of mid-light blue/grey clay. Absent in Trench 7 and unclear whether present in whole of Trench 1. Also denotes edge of palaeochannels / ditches. C^{14} dated to AD580-630.
(103)	>0.75m	Basal deposit exposed throughout the site and formed of multiple bands of fine yellow silt and alluvial lenses. Occ. Areas of iron salt concentrations

3.3 Trenches 8, 13, 15, 16, 17, 19, 20, 23, 24 and 25 contained only palaeochannels which had cut their way through 103. The fresh or brackish water formed peat layer, 102, was present in the base of each of these and the subsequent fill sequence is represented by naturally deposited marine silts. Whilst a date of AD580-630 has been obtained for the peat in 102, this does not prevent there having been channels in existence prior to this date. It merely indicates

their final two phases of activity – a period of standing fresh water deposition during the late 6th / early 7th century (102), followed by marine incursion and major silting.

3.4 Trench 1

20m x 2m NE-SW Focus : Cropmark

Contexts present: 100, 101, 102, 103, 104a-d, **105**, 106, **107**

3.4.1 Trench 1 was located on the eastern edge of the proposed development site. Two features were identified within this trench, one of which was interpreted as a palaeochannel. **105** measured 2.8m wide and 0.70m deep, cutting through the natural silts and sealed by 101. It was filled with a series of silts, 104a – 104d, representing individual marine flooding episodes with a final period of incursion represented by a sealing deposit, 101. The basal deposit, 104d was an organic, humified silt, indicating a period of vegetation growth. 104c and 104a represent periods of tidal activity which resulted in the deposition of laminated silts. 104b which separated these two periods of tidal deposition, is a clayey silt, indicating the sites deeper water cover at that time.

3.4.2 Ditch **107** was cut through the subsoil (101) and comprised a roughly E-W aligned linear cut. It measured 2.40m wide and 0.60m deep, with a bowl-shaped profile (see Figure 3). The single fill, 106 was a light grey silty sand and contained no finds. No function was determined for this feature, although it is possible that it represents a former field boundary, as previously recorded from aerial photographs.

3.5 Trench 2

40m x 2m SE-NW Focus : Blank area

Contexts present : 100, 101, 102, 103, 115, **116**, 117, **118**, 119a-b, **120**

3.5.1 Trench 2 was located in the south-eastern part of the site, aligned NW-SE. Three parallel linear features cut this trench on a northeast-southwest alignment, all sealed by the freshwater lagoon horizon, 102.

3.5.2 Cut **120** was located at the north-eastern end of the trench. It measured 3.50m wide by 0.68m deep with a broad v-shaped profile and a rounded base. It contained two fills, 119a, a coarse yellow silt with orange brown mottles, and 119b, a homogenous light grey/brown clayey silt. 5 metres to the south-west, ditch **118** measured 3.50m wide and 0.60m deep. It contained a single fill, 117, a light grey silt with orange-brown mottling. A further 8m south-

west along the trench, **116** was 2.80m wide and 0.74m deep. It contained 115, a mid greyish brown silty clay.

3.5.3 Given the alignment of these three features, it is surprising that they did not appear in Trench 3. All three features appear to pre-date the 6th century, as they are sealed by the C14 dated peat deposit (102). No finds were recovered and their purpose and precise date remain obscure.

3.5 Trench 4

40m x 2m N-S — Focus : Blank area

Contexts present : 100, 101, 102, 103, **112**, 113, 114

3.5.1 Trench 4 was positioned to the north of Trenches 2 and 3, aligned north-south. A single linear feature **112** cut this trench on a north-east – south-west alignment. The feature was 1.5m wide and 0.65m deep with a shallow irregular profile, obscured by root disturbance (see Figure 6). The two fills, 113 and 114, were both sandy silts, the latter containing 19th and 20th century pottery. The feature was interpreted as a modern field boundary.

3.6 Trench 5

40m x 2m NW-SE — Focus : Blank area

Contexts present : 100, 101, 102, 103, 121, **122**, 123, **124**

3.6.1 Trench 5 lay north west of Trench 4. A linear feature, **124**, was sealed by the freshwater deposits represented as 102. It measured 1.60m wide and 0.45m deep, and contained 123, a mid greyish brown clayey silt. This feature would have been a slight hollow when the lagoon developed, as 102 could be seen to slump into the depression at the top (see Figure 7).

3.6.2 **122** in the northern end of the trench was a modern pipe trench containing 121, a mid-dark grey silt with clay lumps.

3.7 Trench 6

40m x 2m NE-SW — Focus : Continuation of geophysical anomalies

Contexts present : 100, 101, 102, 103, 108a-c, **109**, 110a-e, **111**, **125**, **126**

3.7.1 Trench 6 was located in the western field, laid out on a north-east – south-west alignment. It contained four features comprising two probable field boundaries (**111 and 109**) and two

palaeochannels, **125** and **126**.

3.7.2 At the south-western end of the trench, cut **111** cut through the saltmarsh horizon on a north-west – south-east alignment. It measured 2.00m wide and 0.70m deep, with a stepped profile and a flat base (see Figure 8). The fills, 110a-e, comprised a series of yellow sandy silts and sands. No finds were recovered.

3.7.3 A north-south aligned ditch, **109**, may represent a recut of 111. This feature measured 1.05m wide and 0.50m deep with a relatively steep profile and a rounded base (see Figure 8). The fills, 108a - c, were varied, with the primary fill, 108c apparently the result of natural silting. Overlying this, 108b was filled with briquetage fragments as well as 19th century pottery. The presence of briquetage within this deposit would suggest that it is redeposited given the stratigraphic sequence identified. The upper fill, 108a, was a clean yellow sand, also apparently a deliberate back fill deposit. This feature is probably the same as that identified from aerial photographs.

3.8 Trench 14

30.6m x 2m N-S Focus : Cropmarks

Contexts present : 100, 101, 102, 103, **151**, 152, 153

3.8.1 A linear ditch, **151**, crossed trench 14 on an E-W alignment. It had a bowl shaped profile, 3.50m wide and 0.70m deep. It contained a primary fill of brown peaty silt, 153, overlain by a yellow sandy silt, 152. Again, this feature was originally identified as a cropmark from aerial photographs.

3.9 Trench 16

34m x 2m NW-SE Focus : Blank area

Contexts present : 100, 101, 102, 103, **155**, 156, **157**, 158

3.9.1 Trench 16 was located in the north-western part of the site in an apparently blank area but immediately adjacent to two linear cropmarks. Two features were identified, cutting through 102 and sealed by the topsoil, 101.

3.9.2 At the eastern end of the trench, **155** was a small square or rectangular pit, truncated by the baulk. It measured 1.30m wide and 0.70m deep. In profile it had very steep sides and a relatively flat base (see Figure 9). It contained 156, a mixed silty clay with modern pottery.

3.9.3 Towards the west, **157** was a shallow linear pit, 4.90m long and 0.23m deep (see Figure 9). Again this feature was truncated by the baulk. It contained 158, a light grey silty sand with no finds.

3.10 Trench 17

30m x 2m N-S Focus : Cropmarks

Contexts present : 100, 101, 102, 103, **159**, 160

3.10.1 Trench 17 was located to investigate two linear cropmarks. These were confirmed as palaeochannels. A single cut feature was identified in the centre of the trench. **159** was a linear ditch cut through 102, from beneath the topsoil. It measured 1.80m wide and 0.80m deep. In profile it had near vertical sides and a slightly rounded base (see Figure 10). The single fill, 160, was a light brown mottled grey clay.

3.11 Trench 18

45m x 2m NE-SW Focus : Geophysical anomalies

Contexts present : 100, 101, 102, 103, 134a-b, **135**, 136, **137**, 138a-e, **139**, 140a-c, **141**

3.11.1 Trench 18 contained a number of features notable for their briquetage content. A curving linear ditch, **135**, extended for11m along the southern baulk of the trench. An extension was added to the southern side of the trench to allow better exposure of this feature. It measured 0.80m wide and 0.38m deep. The fill, 134a, was a loose grey ashy silt containing a single sherd of IA/RB pottery and large quantities of briquetage (see Cowgill, Appendix A).

3.11.2 One metre to the west of this feature, a shallow pit, **137**, measured 4.20m x 1.40m x 0.18m. It contained136, a loose dark grey brown sandy silt also filled with briquetage.

3.11.3 A combination of intercutting features were identified to the west of **137**. The earliest of these, **141**, measured 5.20m wide and was cut by **137** on its eastern side. **141** was interpreted as a palaeochannel and was not fully excavated. However, those fills exposed comprised 140c, a yellow brown silt; 140b, a grey clay similar to that contexted as part of 102; and 140a, brownish yellow sandy silt. Following the deposition of the earliest of these fills (140c) a second linear was apparently cut through this feature. **139** measured 2.40m x 3.00m x 0.78m with an irregular stepped but rounded profile. It contained 138b, a dark brown silty clay

0.18m thick; 138c, a dark brown grey silty clay; 138d, a grey clayey silt and 138e a yellow brown silty clay, probably a natural slump. The stepped profile and arrangement of the fills within this feature suggest that it had been recut. A final recut, **154**, took place after the deposition of 140b, and contained 138a, a light grey brown sandy clay from which three fragments of briquetage were recovered. The presence of briquetage in the upper fill suggests this was contemporary with **135** and **137** also in this trench (although see para. 3.7.3, above).

3.12 Trench 21

38.2m x 2m E-W Focus : Cropmarks

Contexts present : 100, 101, 102, 103, 127, **128**, 129, **130**

3.12.1 Trench 21 was located in the extreme south-western corner of the site. One feature was identified in this trench. **128** was a bowl shaped ditch cut from beneath the topsoil, 3.60m wide and 0.70m deep. It contained 127, a dark brown black peaty silt. This feature was interpreted as a former field boundary, as seen on aerial photographs. It sat within the upper fill of a large palaeochannel, recorded as **130**. This was also recorded in the aerial photographic assessment.

3.13 Trench 22

45m x 2m NW-SE Focus : Continuation of cropmarks

Contexts present : 100, 101, 102, 103, 145, 146, 147, **148**, 149, **150**

3.13.1 A single feature was identified, **148**. This large linear cut measured 5.40m wide and >0.50m deep. It was sealed by a buried topsoil horizon, 146, which in turn underlay a layer of redeposited natural,145, designed to build up the ground surface in this location. **148** contained 147, a dark brown coarse silt. This feature was interpreted as a former field boundary.

3.13.2 A further linear feature, **150**, interpreted as a palaeochannel is worthy of mention. This feature, unlike those other palaeochannels identified on the site was sealed by the freshwater deposits, 102, rather than formed by them. It contained a dark brown fine silt, mottled with orange. This fill, 149, was also unlike those laminated silts which typify the fills of other palaeochannels. It is clear, therefore, that this feature filled prior to the freshwater lagoon phase and is certainly, therefore pre-Saxon. Insufficient of this feature was exposed to determine its nature and extent. It may be a continuation of the palaeochannel identified from coprmarks to the south-west.

3.14 Area B

5m x 5m

Focus : Geophysical anomalies

Contexts present : 100, 101, 102, 103, 131, **132**

3.14.1 Area B contained a single linear feature, **132**, which crossed the trench SE-NW. It measured over 3.6m long, 1.1m wide and 0.50m deep. It contained 131, a medium firm mid grey brown mottled silty clay. No finds were recovered from this feature.

4.0 Discussion and Conclusions

4.1 The evaluation of Holland Park, Spalding has produced little evidence for intensive past human activity. With the exception of a small number of relatively modern field boundaries, only one area of the site, that first identified as an enclosure through geophysical survey, is of archaeological significance.

4.2 The enclosure identified by geophysics and partially exposed in Trench 18 measures approximately 11m x 11m and appears to have an entrance on its western side. A further ditch and a number of pits are associated with this feature, not all of which were identified by the geophysical survey. The quantities of briquetage from within the enclosure ditch suggest the nearby presence of a saltern, possibly with the salt being extracted from the briquetage containers within this enclosure, leading to the deposition of the briquetage in the ditches. A very similar site has been excavated 500m to the north, where a date in the late Iron Age/ early Roman period was suggested by ceramic remains. The single sherd of shell-tempered pottery recovered from the enclosure ditch is likely to be late Iron Age - Romano-British in date, but is generally undiagnostic. However, comparison of the site's morphology with that of the more securely dated site to the north increases the certainty with which this saltern can be dated to this period. Also comparable in terms of plan is the published site excavated at Holbeach St Johns (Gurney 1999). Interestingly, the briquetage recovered from that site is also comparable with that from Holland Park (see Cowgill, Appendix A)

4.3 Finds of briquetage in the modern field boundary ditch, 109, are enigmatic (see Cowgill, Appendix A). The density and quantity of briquetage vessel fragments in 108b are more akin to primary deposition of the material than a redeposited dump. However, the stratigraphic sequence clearly places this feature in the modern period, with pottery from the context immediately below positively dated to the 19th and 20th centuries.

4.4 The presence of a large number of palaeochannels is not surprising in this fenland context. However, the layout visible from aerial photographs and suggested by geophysical survey might be considered too regular to be of natural origin. Whilst the peat has been positively dated to the 6th-7th centuries, it clearly formed in existing channels. It is possible, although unproven, that the creeks were in part canalized as part of the salt production process. James Rackham has suggested that the Late Iron Age / Early Roman environment might have been similar to that in which the lower deposits of the creeks were deposited (see Appendix B).

4.5 The remainder of the site is relatively blank, with only field boundaries identified. In trenches 2 and 22, linear features pre-dating the saltmarsh hint at some form of land division potentially contemporary with the saltern. Others are clearly dated to the late post-medieval and modern periods.

4.6 Of additional interest in terms of past land use is the suggestion from environmental sampling of the creation of sea defences in the middle Saxon period. The existing creeks were filled with the same peat as was identified across the site. Radiocarbon dating places its formation in the 6th-7th century.

4.7 On the whole this site is of interest more in terms of palaeoenvironmental evidence than for the archaeological activities that might have taken place. It is suggested that this site has a largely low archaeological potential, with the exception of the area around Trench 18. The saltern is considered to be of regional importance and some form of mitigation would be necessary to ensure its preservation either by record or *in situ* if planning permission is granted.

5.0 Figures and Plates

Figure 1 : Site location

Figure 2 : Trench layout

Figure 3 : Trench 1, 107

Figure 4 : Trench 2, 120 & 118

Figure 5 : Trench 2, 116

Figure 6 : Trench 4, 112

Figure 7 : Trench 5, 124

Figure 8 : Trench 6, 109 & 111

Figure 9 : Trench 16, 155 & 157

Figure 10 : Trench 17, 159

Figure 11 : Trench 18

Figure 12 : Trench 22, 150 & 148

Plate 1 : Trench 1 - **105**

Plate 2 : Trench 1 - **107**

Plate 3 : Trench 2 - **116**

Plate 4 : Trench 2 - **118**

Plate 5 : Trench 2 - **120**

Plate 6 : Trench 4 - **112**

Plate 7 : Trench 5 - **124**

Plate 8 : Trench 6 - **111, 109**

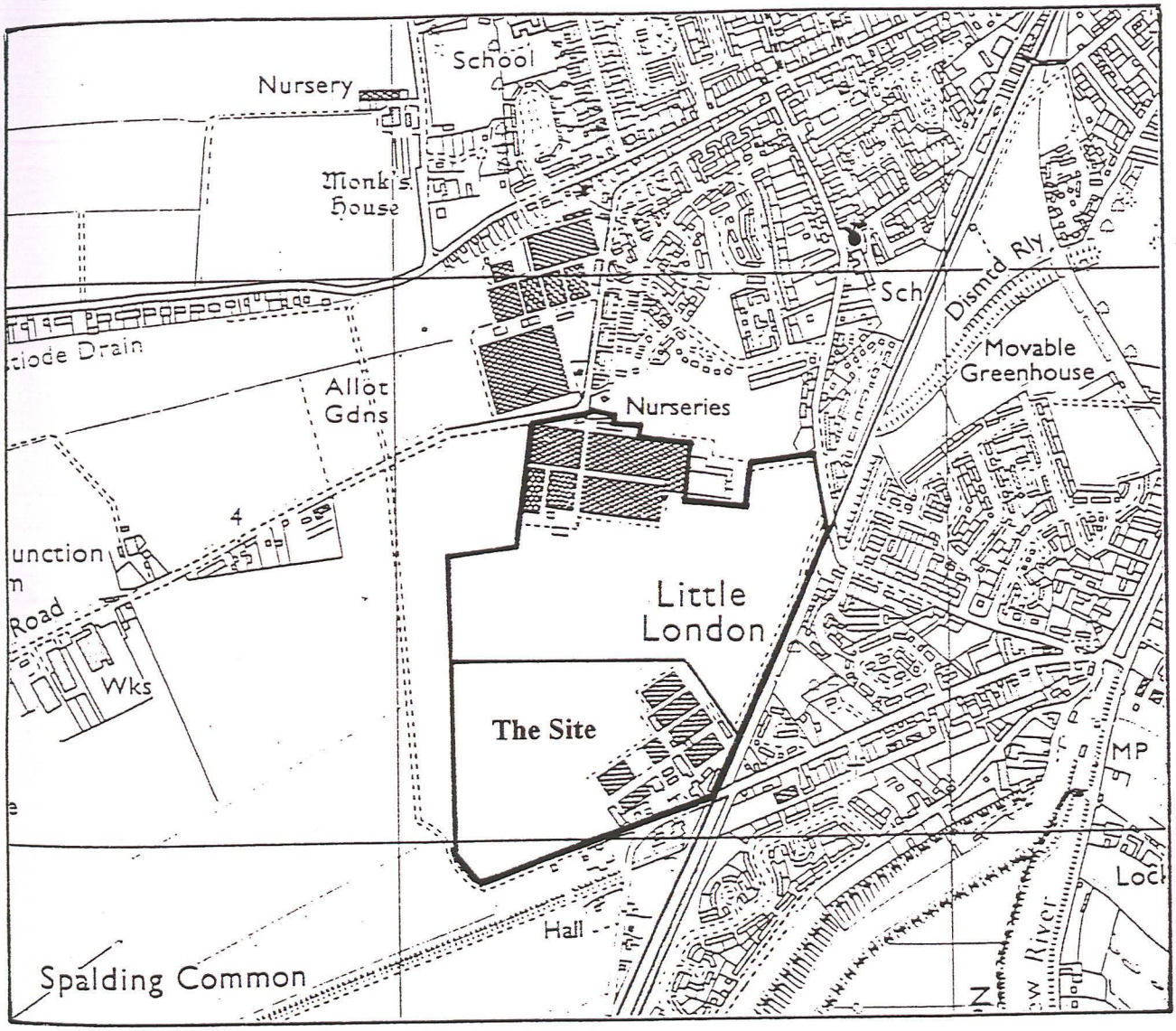
Plate 9 : Trench 14 - **151**

Plate 10 : Trench 18 - **135**

Plate 11 : Trench 18 - **137**

Plate 12 : Trench 18 - **139** (mistakenly indicated as 137)

Plate 13 : Area B - **132**



Note : Map based upon Ordnance Survey with the sanction of the Controller of H.M. Stationery Office, Crown Copyright Reserved. Licence No. AL 52216A0001

Fig. 1: Proposed development site, 1:10,000

Figure 2 : Trench Locations

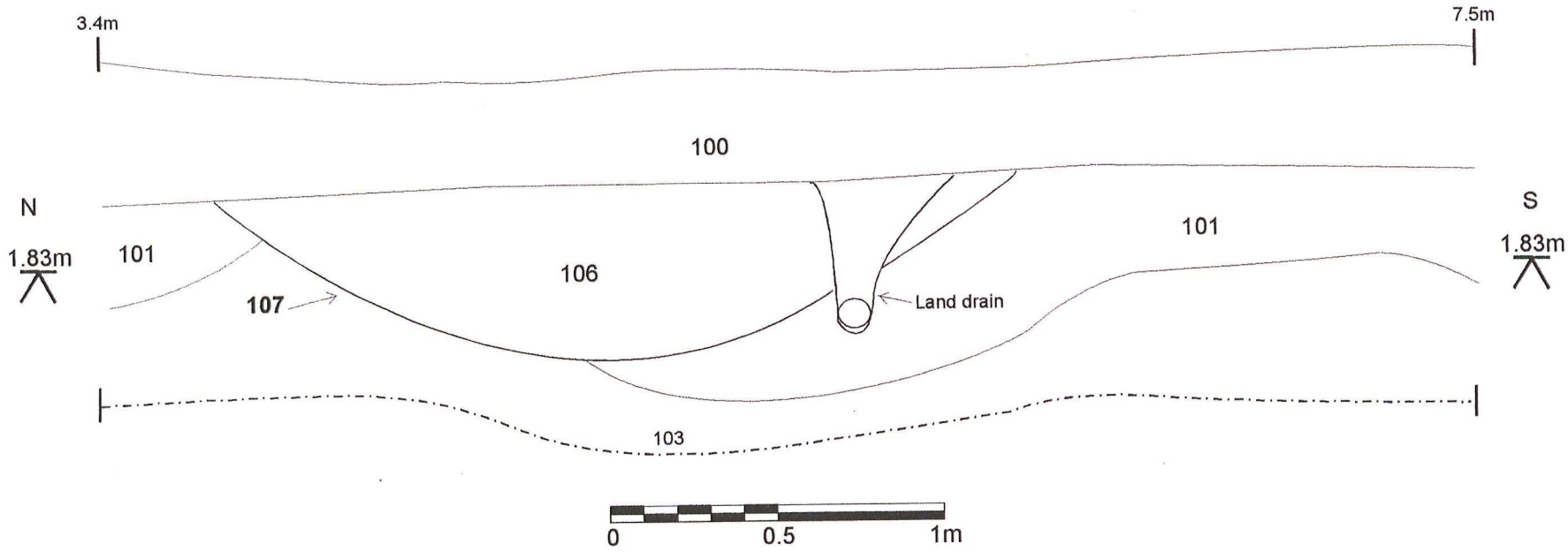
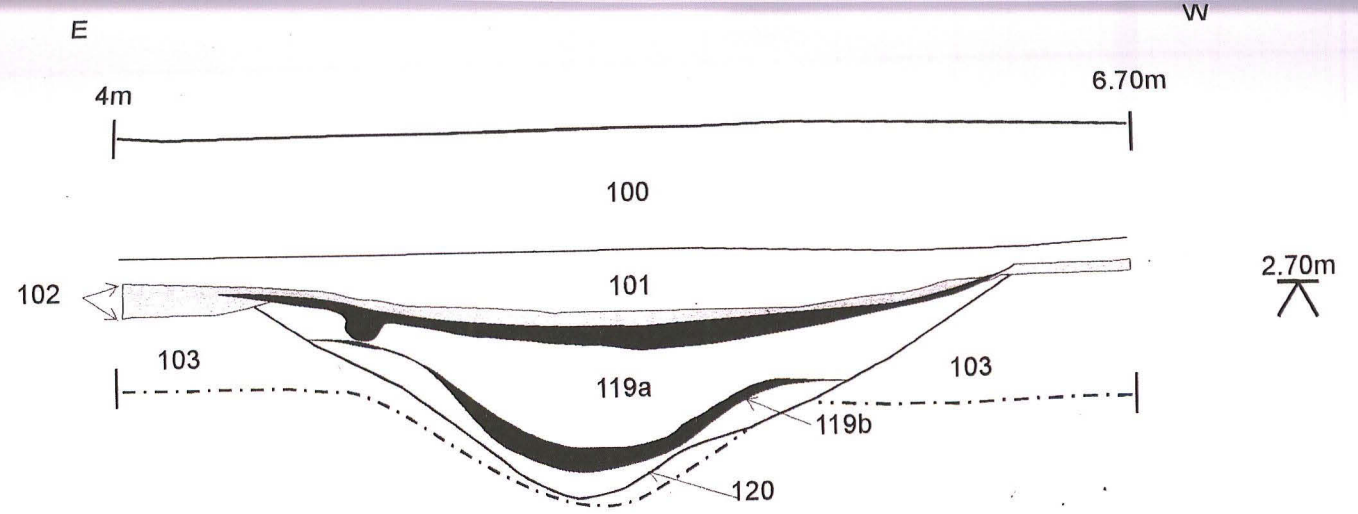


Figure 3 : Trench 1, **107**



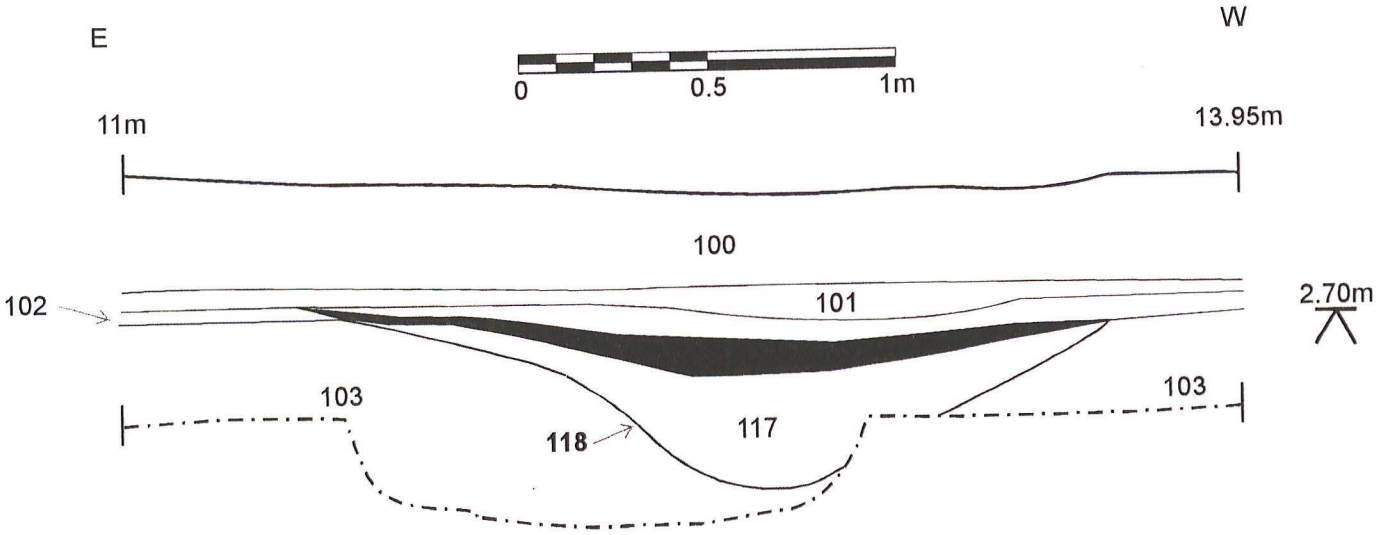


Figure 4 : Trench 2, **120** & **118**

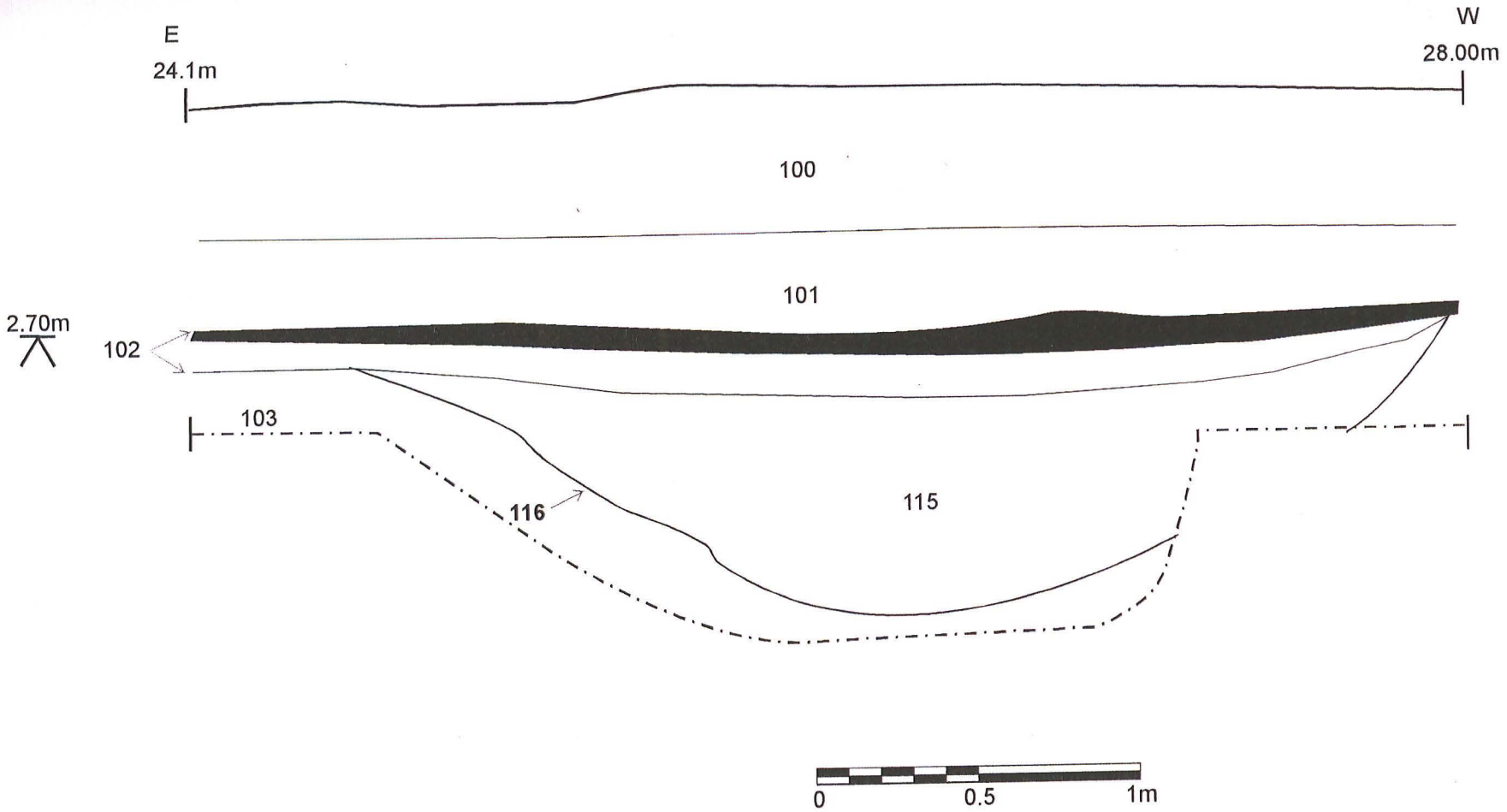


Figure 5 : Trench 2, **116**

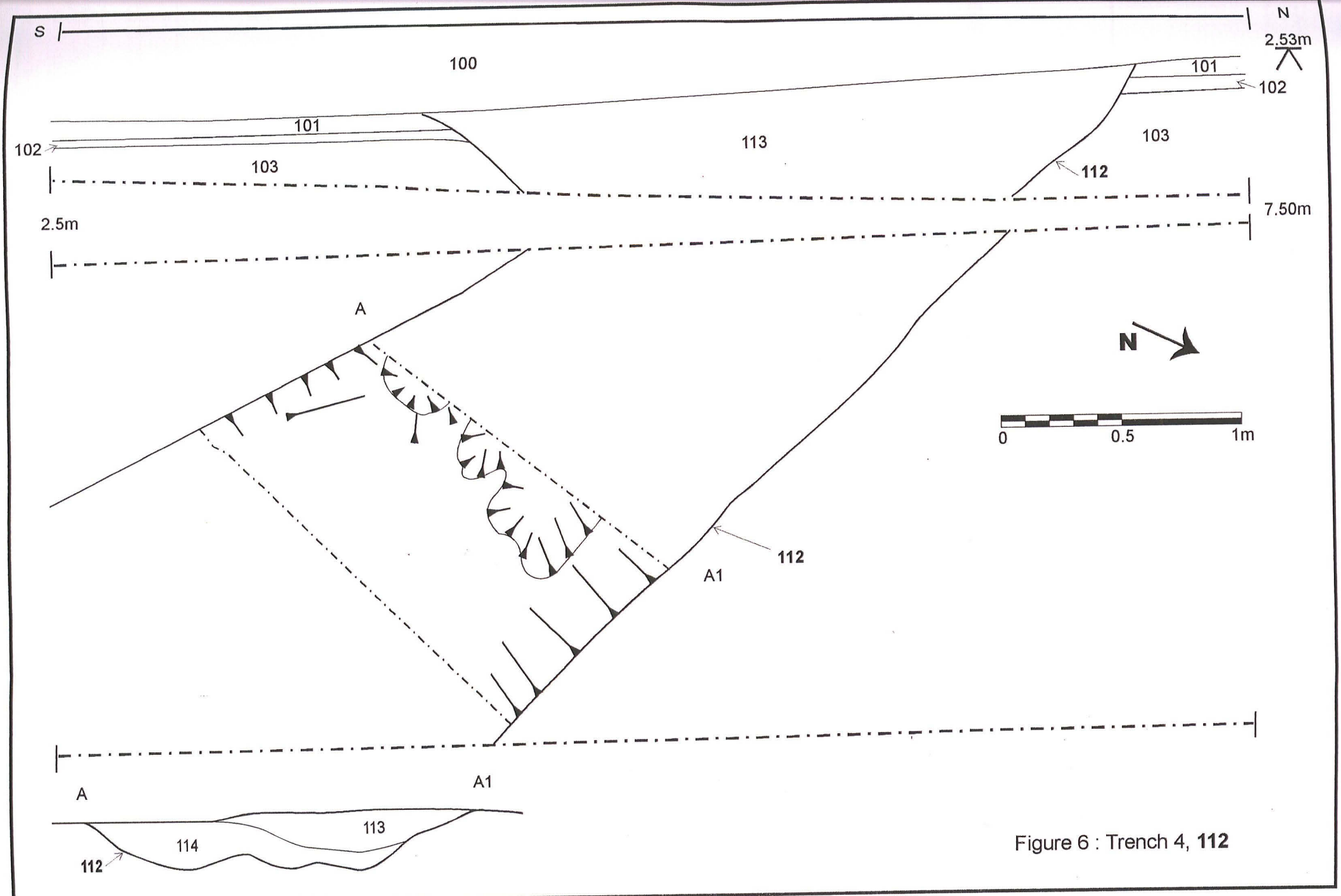


Figure 6 : Trench 4, **112**

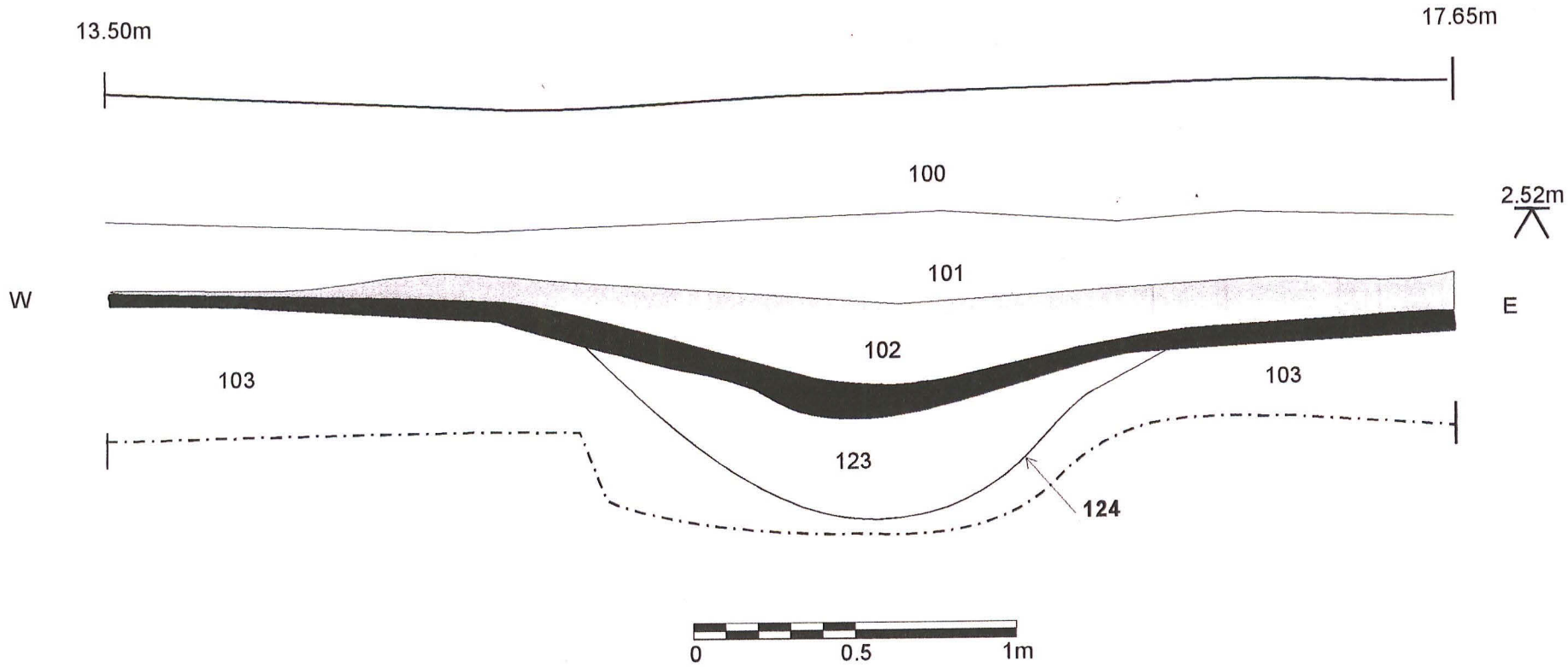


Figure 7 : Trench 5, **124**

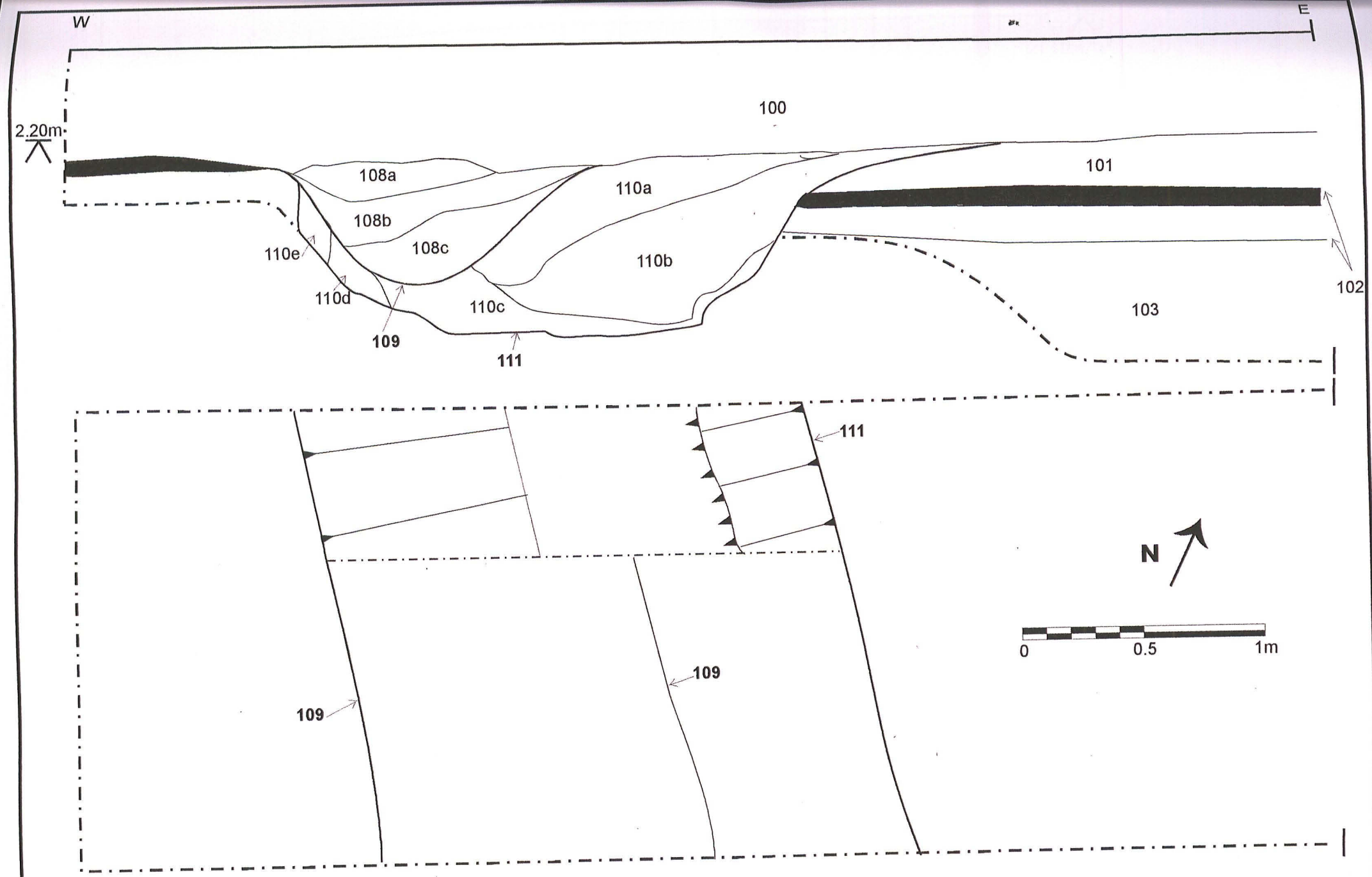


Figure 8 : Trench 6, **109** & **111**

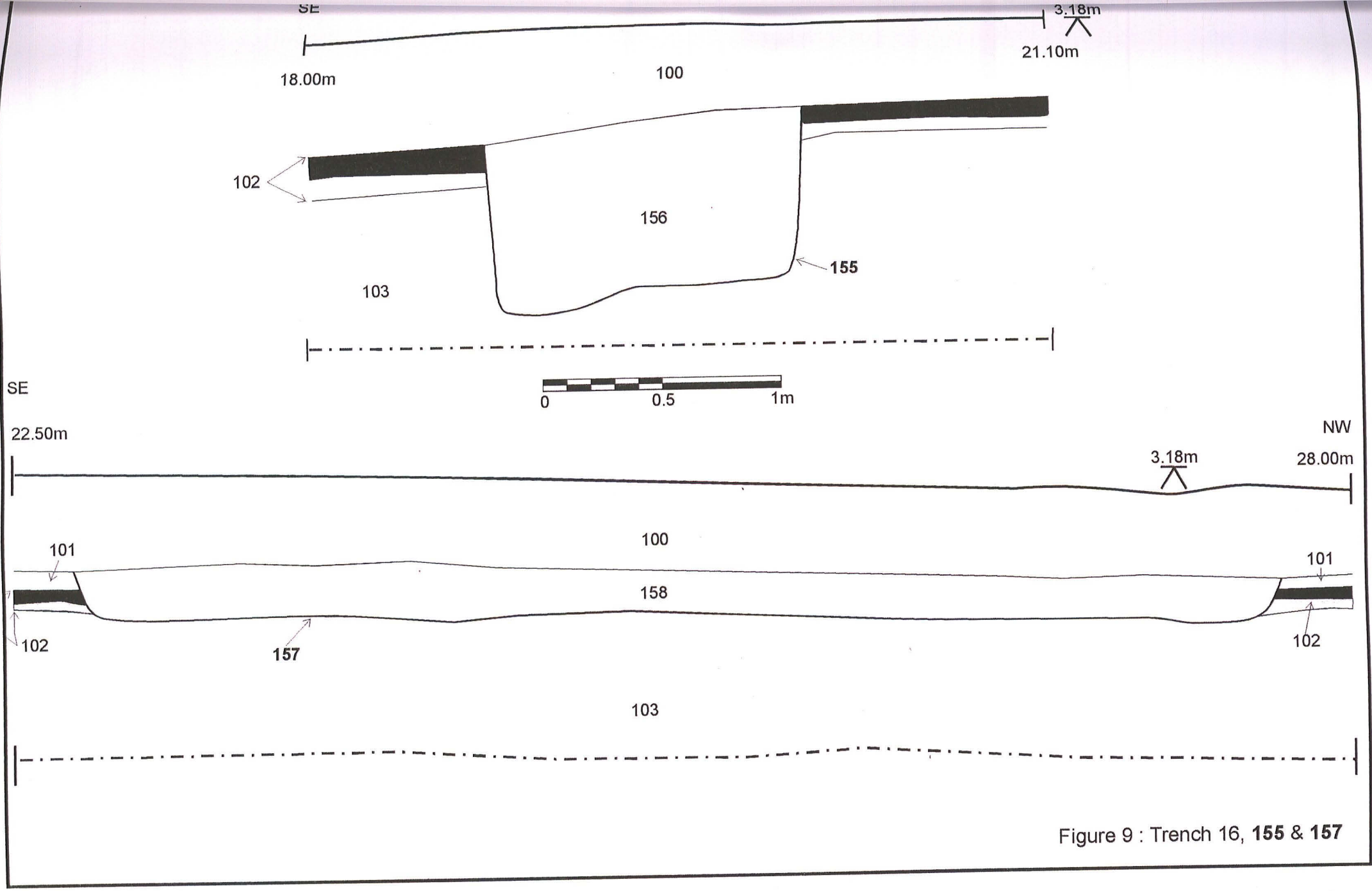


Figure 9 : Trench 16, **155** & **157**

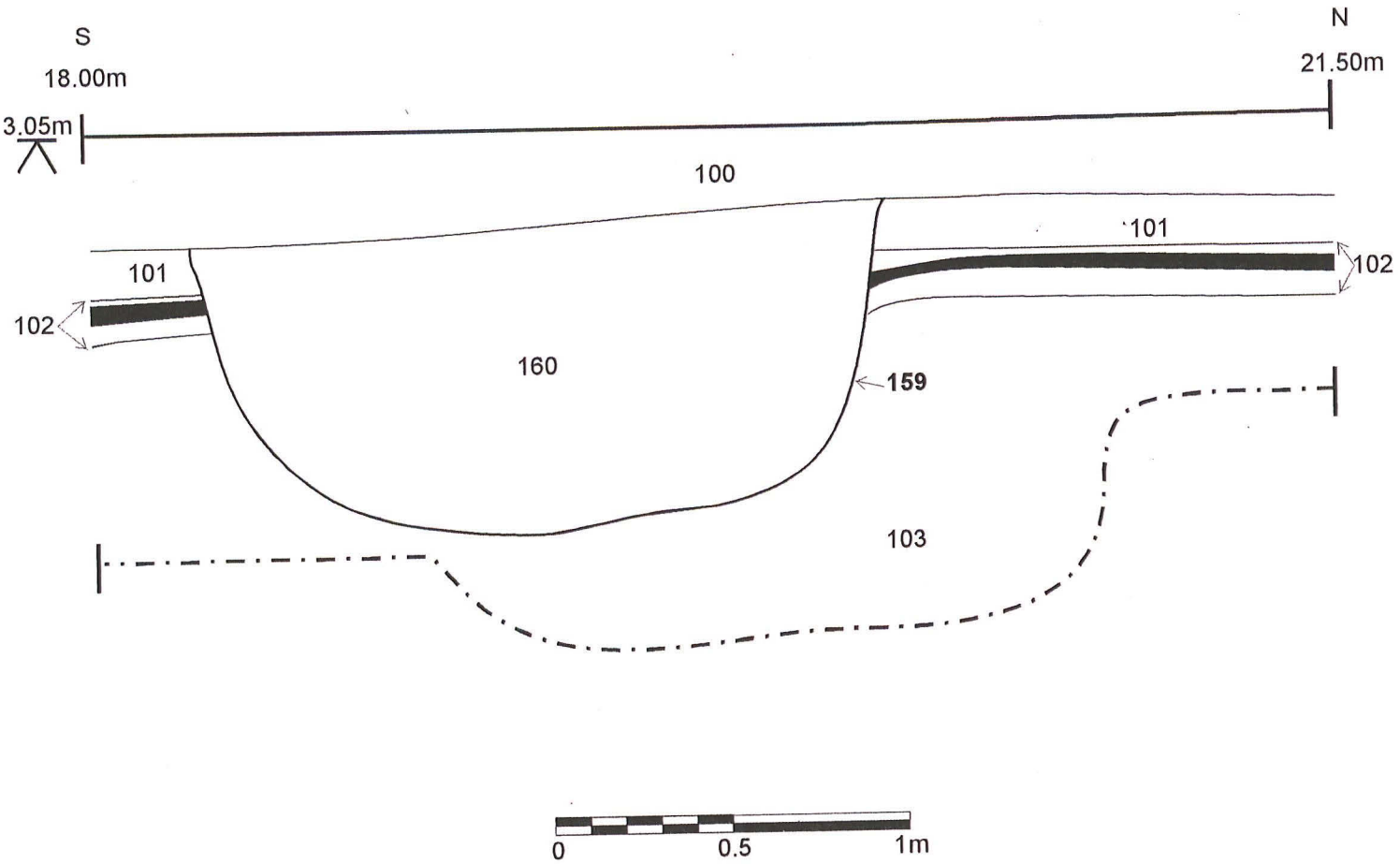
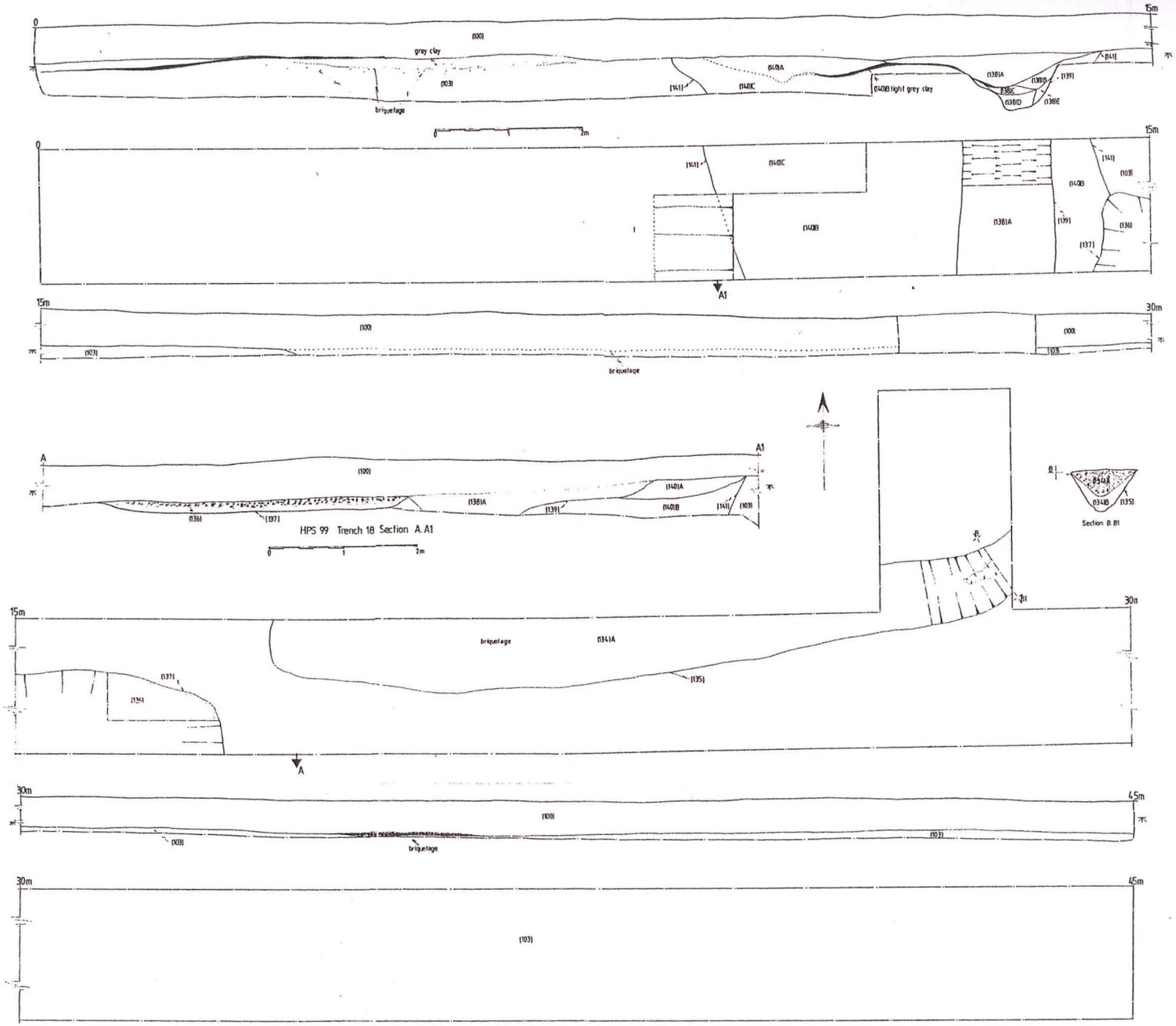


Figure 10 : Trench 17, **159**


0
15m
(100)
grey clay
(103)
(141)
(140A)
(140C)
(140B) light grey clay
(138A)
(138B)
(139)
(138C)
(138D)
(138E)
briquetage
0
2m
(140C)
(140B)
(138A)
(139)
(136)
(137)
A1
30m
A
(134A)
(134B)
(135)
Section B-B1
HPS 99 Trench 18 Section A-A1
(341A)
45m

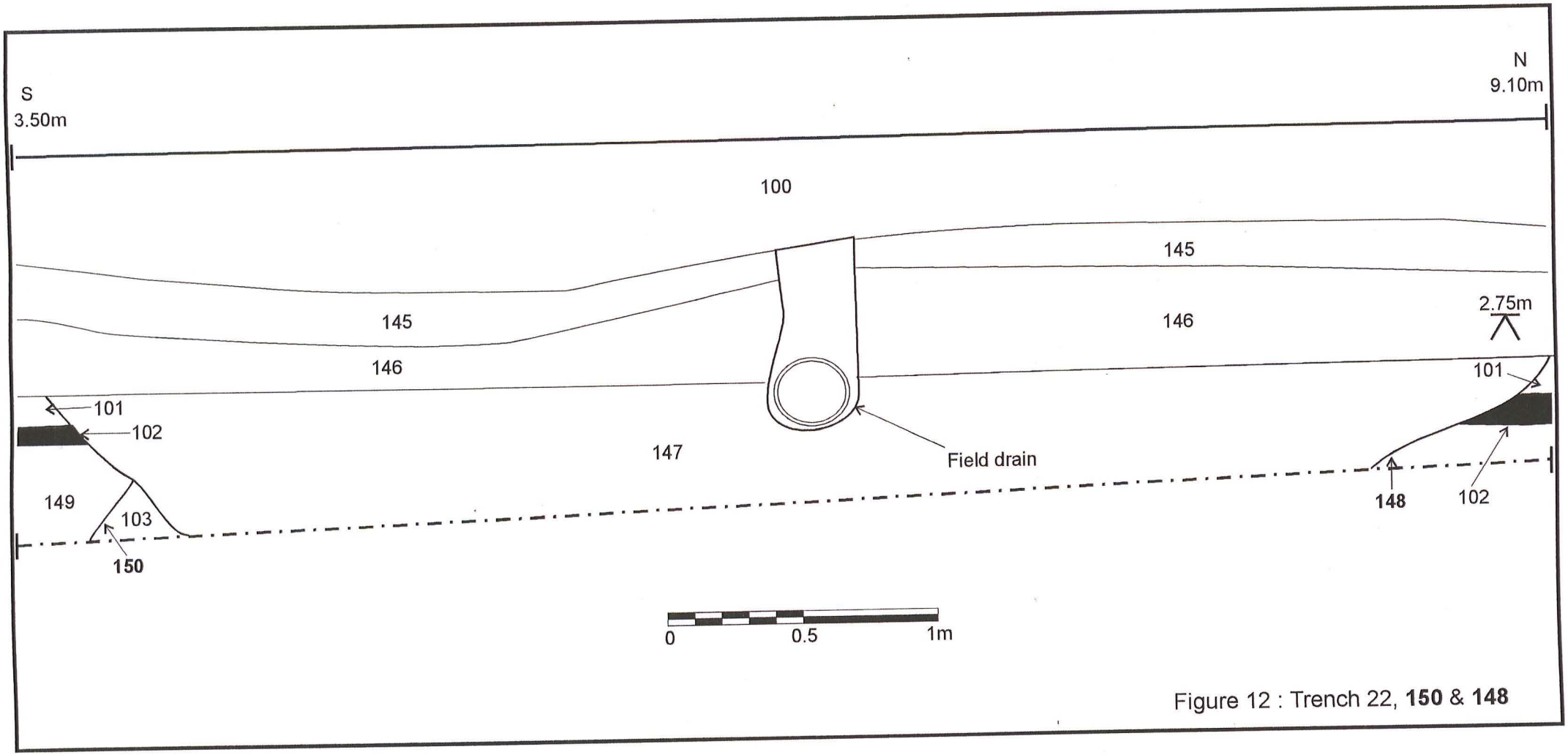


Figure 12 : Trench 22, **150** & **148**

Plate 1 : Trench 1 - **105**

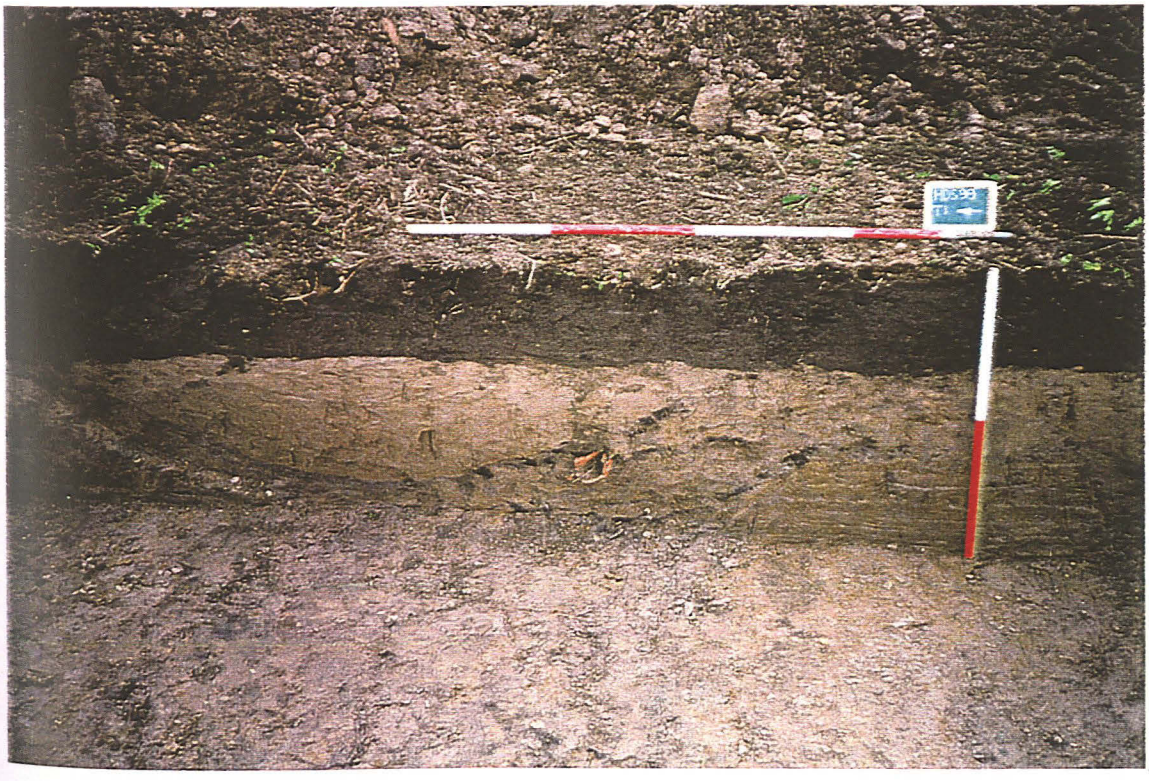


Plate 2 : Trench 1 - **107**

Plate 3 : Trench 2 - **116**

Plate 4 : Trench 2 - **118**

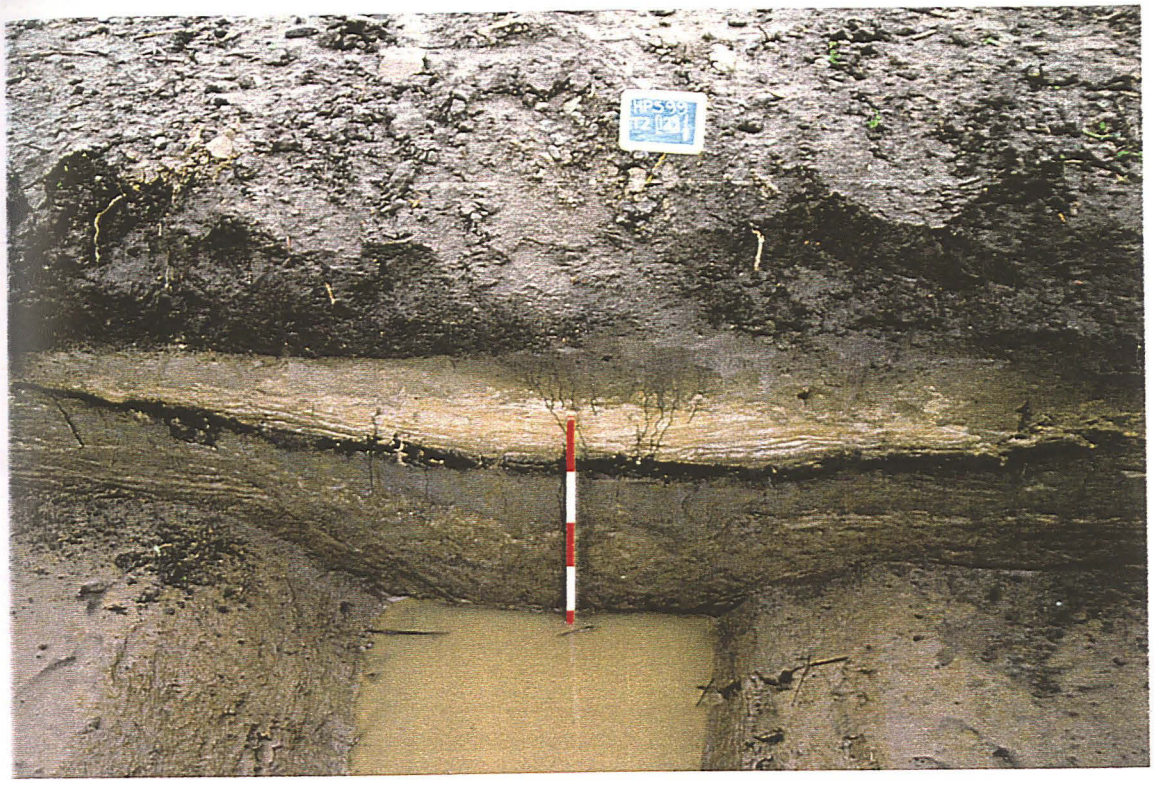


Plate 5 : Trench 2 - **120**

Plate 6 : Trench 4 - **112**

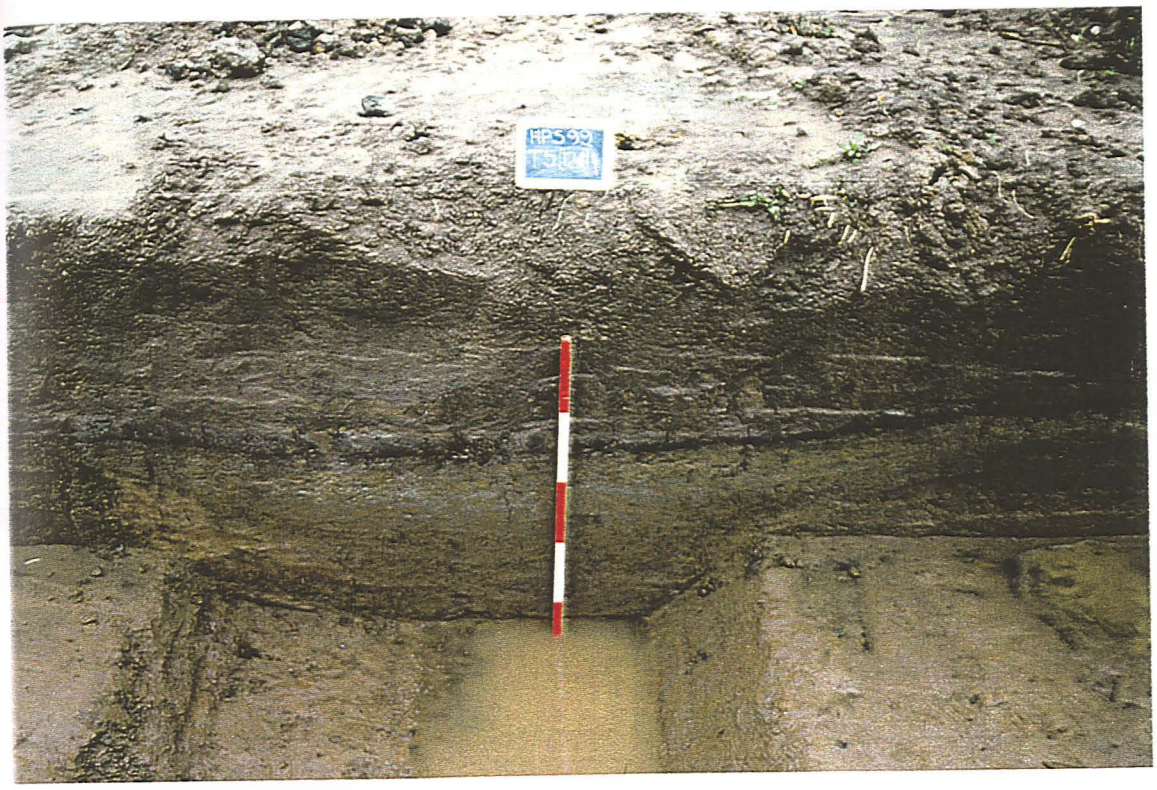


Plate 7 : Trench 5 - **124**

Plate 8 : Trench 6 - **111, 109**

Plate 9 : Trench 14 - **151**

Plate 10 : Trench 18 - **135**

Plate 11 : Trench 18 - **137**

Plate 12 : Trench 18 - **137**

Plate 13 : Area B - **132**

6.0 References and Sources Consulted

Gurney, D 1999. 'A Romano-British Salt-making Site at Shell Bridge, Holbeach St Johns: Excavations by Ernest Greenfield, 1961'. In A Bell, D Gurney & H Healey *Lincolnshire Salterns: Excavations at Helpringham, Holbeach St Johns and Bicker Haven*. East Anglian Archaeology Report No 89. Heritage Trust for Lincolnshire.

Johnson, A E 2000. *Land South of Horseshoe Road, Spalding, Lincolnshire (2): Magnetometer (Gradiometer) Survey*. Unpublished Oxford Archaeotechnics Report 2001199/HSL/SAM

Johnson, S 1998. *An Archaeological Desk-Based Assessment of Holland Park II, Spalding*. Unpublished JSAC report 380/98/01

Palmer, R 1998. *Holland Park, TF233215, Spalding, Lincolnshire : Aerial Photographic Assessment*. Unpublished Air Photo Services Report 1998/13

Pullen, R & Rosenberg, N 1998. *An Archaeological Excavation on Land South of Bourne Road, Spalding, Lincolnshire*. Unpublished JSAC report 379/98/02

7.0 Site Archive

154 Context sheets

2 Level record sheets

15 Sheets of pencil (site) drawings

3 A1 paper survey plans

162 colour photographs

87 monochrome photographs

168 colour transparencies (mounted)

1 file general correspondence

6 boxes briquetage

1 bag environmental residues

1 sherd pottery

Appendix A :
Briquetage

Jane Cowgill

REPORT ON THE BRIQUETAGE FROM THE EVALUATION AT HOLLAND PARK, SPALDING (HPS 99)

Jane Cowgill©
June 2000

Introduction.
Several trenches were excavated during the evalution undertaken by John Samuels Archaeological Consultants, during which part of a saltern site was identified. One sample of briquetage was taken to enable a thorough recovery of the material and a representative sample of the different forms that may be present. Two other samples were also taken for general environmental information as well as briquetage recovery. Only a small group was hand collected.

Methodology.
The samples containing briquetage were recovered from contexts 108B, 134A and 136, and to avoid any chance of bias the fills were put into the sample tubs in their entirety. The samples were processed by the Environmental Archaeology Consultancy. Sample 108B, 136 and 60 litres of 134A were processed by flotation whilst the rest of 134A was wet sieved using a 8mm mesh to wash the briquetage. (For details of sample size and the methodology employed during the sample processing see DJ Rackham, Appendix**00.**) Great care was taken when handling the material wet to try to minimize damage, or surface erosion. There is no noticeable difference between the material that was wet sieved and that washed by flotation, the techniques being basically the same (in the Appendix 1 Catalogue these are differentiated by the word SIEVE or C14 in the Area field).

The briquetage element of the residues have been sorted into those with recognisable surfaces and those without. For the very large residues from 134A this was undertaken as a rapid scan and there are likely to be additional recordable pieces (mainly vessel sherds) in the sieved residue because, through a shortage of time, this was scanned particularly fast. The assemblage from the site has been identified and recorded on *pro forma* recording sheets. This information was entered into a Microsoft Access database and consists of the following encoded fields: Site; Area; Context; Material; Type; Quantity; Weight; Comments; Draw. The briquetage was visually examined and identified on the basis of fabric and form, sometimes with the aid of a x10 binocular microscope. (For a full catalogue see Appendix 1.) A count and weight for the pieces has been given in most instances. The comment section is probably the most informative element of the catalogue because of the unusual nature of the assemblage. The majority of the lengths given are the surviving length of the object, the only true lengths will be in instances where the object is recorded as complete. To aid future researchers who may wish to re-examine this assemblage all types and most elements of the catalogue have been bagged and labelled separately.

A total of 2577 pieces (weight 17.170kg) of briquetage was recorded in detail; the total assemblage weighs *c.* 36kg.

The only archaeological finds recovered from these three samples was briquetage and related materials, with the sole exception of a single small sherd of pottery from context 134A. This is the only piece of pottery to have been recovered from the site.

The Briquetage.
This is not a standard Lincolnshire briquetage assemblage. Parallels for many of the forms are difficult to find and therefore the names given to the types present are a mixture of the standard terminology (based on Lane 1992) and newly named forms. The latter include some fairly inelegant terms (*eg* 'blocks') but it is difficult finding words appropriate for briquetage that have not already

been ascribed to a type and reuse of these words would only cause confusion. (A list of the minimum number that require illustration to elucidate the form types is given in Appendix 2.) The assemblage is also very fragmented and it was often difficult to establish whether surfaces were true on many of the non-vessel fragments.

This assemblage is discussed below under the subheadings: vessels, non-vessel fabrics and forms.

Vessels.

The vessel fragments form a high percentage of this assemblage. Most of the pieces are small – commonly with surfaces no more than 1 or 2cm^2. The walls are thin with a range of 7 – 12mm but the majority are less than 10mm thick. The distinguishing feature of this group is the fact that the majority are tempered with a mass of finely chopped organic material probably grasses with perhaps some chaff. This temper has been added to a very fine sandy silt (much finer than the other briquetage) with some possible clay content. Most are hard, a red/brown colour with some having paler or white surfaces. The very silty fabric gives the sherds a look of being finely finished, almost the glassiness of a burnish. The temper would help to bind the silty matrix, but it would also make the vessels light and improve the thermal shock resistance because of the presence of the voids (Morris forthcoming). These vessels, however, are quite thin walled which may have made them susceptible to breakage. Morris has suggested that organic temper was used for briquetage vessels in the Late Iron Age and Early Romano-British periods while earlier traditions used grog, flint or shell as temper (ibid.).

Table 1. Recorded vessel rims and bases compared to total sherd counts and weights by fabric.

	Organic fabric	Natural sandy silt	Fabric?
Near rim?	1		
Rounded	4	5 2* 1#	
Square			2
Cut square	1	1*	
Rounded point		1	
Base?	1	1	
Base with some wall	1	1	
Internal basal angle?	1		
Total sherd count	541	22	4
Total sherd weight	1243g	133g	7g
Average sherd weight	2.3g	6g	1.75g

* some organic inclusions

?thick rim with 4mm perforation (recorded as briquetage not vessel in catalogue).

Reconstructing any details concerning the vessel form or size is virtually impossible with this particular assemblage. Of the 541 recorded pieces with the chopped organic temper (Table 1) only nine are rim or possible base fragments. All the rims are too small to judge whether the wall was straight or had some curvature. Rim sherds are under represented on saltern sites, but this is an exceptionally small group. Four of the rims are rounded and only one is cut. Some vessel wall sherds do curve, however, but it is not possible to judge if this is in the vertical, horizontal or both planes. Of the three bases (two only tentatively identified) the suggestion is that the wall joined the base if not at a right angle then at a fairly steep angle. The only definite base clearly has a curved

outer edge as does one of the possible examples. The maximum wall height attached to the base is 45mm. If these are from troughs it would suggest gutter troughs were being used with either rounded ends or, if rectangular in plan, had corners exhibiting a wide diameter. The curvature is similar to a Morton example (Crossby forthcoming, Fig 2/2/7 no. 4) but a bit greater in diameter to an example from Bourne Road, Spalding (Hopkins unpublished drawings, no. 10). At Morton Saltern, however, flat-based pans are the suggested vessel used but at Holland Park, the lack of basal angles would perhaps indicate the use of a vessel with a cylindrical profile along its length. The quantity of wedges, supports and related forms may reinforce this. Reconstructing the form is not aided by the fact that there are no recognisable vessel imprints on any of the supports or related pieces except for one possible raised straight edge on a support.

There is also a small group of rims and bases in fabrics with either little or no added organic temper – most being made from the natural sandy silts (Table 1). Of the 22 pieces catalogued as vessel 12 are described as rims or bases, however, some of the rims in particular maybe misidentifications. This is the main fabric used for the production of supports *etc*. and some of the wedge/supports have straight rim-like edges and could be mistaken for vessel rims. One piece of interest which has not been catalogued as a vessel is perhaps an unusually thick rim (minimum 30mm thick). It has a 4mm wide hole running along the length of the sherd 15mm below the rim and 7mm in from the ?internal face. The perforation was made pre-firing.

The production of vessels for use on the various salterns may have been a specialised job and Crossby has suggested that they were made by potters (Crossby forthcoming, 108). The difference in the fabric between the vessels and the other briquetage suggests that they may not have been made on this site, but if they were then particularly fine sandy silts were being specifically selected for their production.

Non-vessel fabrics.

All the non- vessel briquetage is made from a range of fine sandy silts that naturally occurred on the site; there is virtually no clay content. This range can clearly be seen in some of the 'blocks' (particularly some in the 134A 8mm sieve residue) all of which represent cut natural sediments (see below) varying from thin very silty bands to orange/brown sandier deposits. There is no evidence for any selection of soil types for any particular briquetage form with the possible exception of the bricks, which appear to have always been made in a sand-rich material. The colour of the individual pieces seems to have been largely influenced by the soil composition. The greater the silt content the more mauve/purple the pieces tend to be while the sandier pieces have usually fired to a red/brown. This is a broad generalisation but generally it proved to be true.

In many instances the sandy silt sediments have no added temper and the only organic element in these is that which would have occurred naturally. The medium organic fabric tends to have longer and more random pieces of organic temper than the finely chopped pieces that were so apparent in the vessels.

Table 2 indicates which fabrics were used to produce the non-vessel briquetage forms that have been identified at Holland Park. The form, with the quantity catalogued in brackets, is listed under the main fabric in which it occurs. The dotted lines indicate that some (but a minority) occur in the other fabrics. Most forms are made in a single fabric, only the plates and slivers definitely seem to occur in a range. Three of the forms in the lower part of the table overlap fabrics but all of these were difficult to categorize and, in a less fragmented assemblage, it may have been possible to establish whether this range was genuine rather than an identification problem.

Table 2. The fabrics used to produce the briquetage non-vessel forms.

Natural sandy silt	Some/medium organic temper	Vessel fabric
Block (209+)		
Brick (5)		
	Brick/pedestal (3)	
	Oval brick (2)	
Pedestal (6)		
	Plate (5)----------	--------?
Prop (4)		
----------	----------	Slivers (199+)
	----------	Support (4)
Support or bar (7)---	----------	
Wedge (1)		
	----------	Wedge/support (4)

Forms

All the briquetage was hand made with only roughly finished sides and edges. It is this irregularity that makes many of the pieces difficult to categorise. Although the pieces have been subdivided into a number of forms, within each form there is a diverse range of shapes and it is evident that consistency of shape was not a significant factor in their production. It is always important to remember that they were probably quickly made to solve a problem, namely balancing the vessels over the hearth. Many of the pieces may have only been used once and only reused if to hand and the right shape. Shapes may also have been influenced by the method each individual salt-maker chose to work.

Table 3. The briquetage forms recorded.

Type	Quantity	Weight
Block	208*	5870g
Brick	5	589g
Brick/pedestal	3	206g
Briquetage	1561*	7198g
Fired clay	2	7g
Oval Brick	2	607g
Pedestal	6	145g
Plate	5	74g
Prop	4	28g
Slivers	199*	389g
Support	4	150g
Support or bar	7	371g
Vessel	566*	1351g
Wedge	1	18g
Wedge/support	4	166g

* Minimum number given.

Bricks, brick/pedestals and oval bricks.

The three brick/pedestals identified, all well wedged and with medium organic inclusions, probably had square sections (width of between 42 - 49mm) and tapered between the base and the top. Parallels for the form can be found at the Romano-British site at Morton (Crossby forthcoming,

Fig. 2/2/10, nos. 38 and 39) and the Middle to Late Iron Age site at Helpringham Fen (Healey 1999, Fig. 8, nos. 11-18). The form of the bricks, however, is less clear. They are all made from a sandy silt fabric and much less of them survives. When corners are present most are right angles but some are slightly acute. They probably have a rectangular section rather than square. There was some indication that they were used lying on their sides rather than standing on one end as with the brick/pedestals. The two oval brick fragments are similar in shape and size to each other but only one end of each survives. They are probably the remains of quite large objects. 'Flat slabs or bricks' as well as similar 'elongated oval objects' were recorded as being present in some quantity at a Romano-British saltern at Shell Bridge, Holbeach St Johns (Gurney 1999, 62). It is possible that these elongated oval objects are parallels.

Supports, Supports/bars, Pedestals, Wedge and Props.
The only complete support is cylindrical, but waisted, with a sloping top and bottom surface (see Crossby forthcoming, Fig. 2/2/9, no. 29). All the other examples only have one angled end surviving. The complete example is 45mm high. The three support/bars are a cross between Lanes 'cylindrical supports' from Morton and Cowbit (Lane 1992, Fig. 130, nos. 12 and 13) and Gurneys 'tapered bar or handle' (Gurney 1999, Fig. 42, nos. 40 and 41). These pieces seem not to have a flat base and were probably used at an angle rather than vertically. Unfortunately all the pedestal pieces from Holland Park are fragmentary. The feature they have in common is a small rounded base, sometimes flat, upon which they stood. There is also one larger example put into this category which is a squat oval/cylindrical shape but again only one end survives. There is only one obvious wedge and this is complete. It measures 35 x 31 x 25mm. There are a number of much smaller ?complete pieces, recorded generally as briquetage, that probably also functioned as wedges. The four props should perhaps be termed as 'hourglass supports' (Lane 1992, Fig .130, nos. 1 and 2) but these examples are rather squatter versions, ranging in height from 10 – 16mm. In section they all differ being variously triangular, square, round and oval, probably just a reflection of the rapid *ad hoc* method of production. These pieces may have been used in conjunction with supports or sideways on as wedges.

Wedge/Supports.
The wedge/supports are a distinct form of which there are two complete examples. A parallel for these has not been identified. They have flat ends, a roughly flat back and the two ends have a raised triangular shape with a hollow in between (illustration needed!). The reason for the ambiguous name is because they could have been used standing on one of the two ends as a support or lying on their backs as a form of wedge.

Plates.
The plates have flat even tops and bases, all are between 14 and 16mm thick and have curved extensively thumbed and fingered edges. The edges are usually vitrified, with patches of green 'glaze' on a buff fabric. Away from the edge the fabric has a mauve or strong purple coloration. The outer edges are too irregular to measure a diameter. Only rim sherds have been identified, small body sherds would easily be mistaken for vessels. The degree of heat exhibited on these pieces is unusual for briquetage (but see slivers below).

Slivers.
A very unusual type of evidence is presented by the mass of thin brittle pieces of briquetage most of which have thin holes through them. The slivers are very hard, most in a fine sandy silt often with a mass of organic temper. There are also a large number that are totally vitrified and resemble a slag and have evidently been heated up to a high enough temperature to allow the silica to fuse. The perforations are 1 – 5mm in diameter, irregularly spaced and some do not penetrate fully

through the piece. It is unclear whether they were made on purpose or are a result of thick pieces of reed or some other temper burning away leaving the holes; the latter is perhaps most likely. They all have one smoothish surface and most have an uneven underside that also appears to have been a sort of surface. They resemble spalled repairs to perhaps an oven or hearth. If these are spalls, perhaps from the base of a hearth, the perforations may have been an attempt to stop the hearth breaking up under the high temperatures it was going to be submitted to. The mass of vitrified pieces clearly indicate that significant temperatures were reached. This may have been particularly apt if the hearth was cut into the natural laminated silts found in the Fenlands. The only parallels for these pieces are from the evaluation at Bourne Road, Spalding, but there is a difference in that it was clear from those pieces that the holes had been casually, perhaps rapidly, made using a twig or piece of reed (Cowgill 1998). The clay that had been pushed through from the hole was clearly visible on the underside, which is not the case with any of these pieces. The majority of the pierced pieces are small in size, most are barely 20mm across, so it may be significant that all the examples found on both sites were recovered from bulk samples (the pieces being too small for normal hand collection).

Blocks.
These are another, perhaps unique, type found on this site. They consist of pieces of cut natural but no recorded pieces have more than two surfaces. In each instance one face is smooth and is usually a buff to white colour while the second (always surviving as a shorter length) is either hand finished or much rougher than the former. On most of the pieces the natural layers of silt sedimentation, interposed with sandier deposits, is clearly visible. On the majority the smooth surface is at a right angle to the sediment layers, although some are parallel to it. The smooth surface is always higher fired than the rougher face (maximum recorded depth 70mm) and on some pieces it was noticeable that the degree of firing lessened in the fabric the further away it was from the smooth face. On the rough side, and sometimes the smooth, drag marks are clearly visible from the cutting tool (a sharp knife or spade?). The angle between the two faces is usually a sharp right angle, although there are some more rounded examples. A few also have a much more acute angle and where the rough faces survive for enough length they are not flat but curve outwards. The sides of the blocks are straight with the exception of just four pieces that have a curved edge, probably following a roughly similar wide diameter. The layers of the silt sediment in all these four examples are parallel to the smooth surface.

It is unclear how large these blocks were (largest recorded piece being 95 x 90mm, depth 70mm) or even whether they were lifted out of the ground to become individual three-dimensional forms. The fact that on no piece was there ever more than two sides and no 'ends' were present suggests they may be the remains of a structural feature cut into the natural soil, perhaps the sides of hearths. They do, however, form a significant proportion of the assemblage, 209 by count but 5.870kg by weight (a third of the assemblage), of the recorded material.

Discussion
The assemblage recorded here represents a very small percentage of the material that occurred on the site, and being an evaluation exercise few cut features were uncovered or excavated. With so little excavated structural evidence it is difficult to envisage how the different elements of this assemblage functioned. There are also comparatively few pieces of briquetage that could be positively identified to type, but even having stated that there is a key common form that is surprisingly missing from this assemblage. Clips, sometimes called bridges, were used to secure and stabilise the rims of neighbouring vessels or support rims resting against a hearth wall. They are small and fairly easy to recognise and usually survive in reasonable numbers, therefore their total absence here is probably because they were not made at this site. It is possible that the

wedge/supports or other small wedge type forms replaced them or that, considering the general lack of rims in this assemblage, the rims with the clips were mainly disposed of in another area of the site.

Site Discussion.

During the evaluation at Holland Park three bulk samples were taken, two from the area of the Saltern in Trench 18 and one from a trench some distance away (108B). The Saltern samples were from a rectangular ?enclosure ditch (134A) and a small pit that was about 1m outside the ditch (136) (pers. comm. N Rosenberg). The third sample was from a ditch with 19th century pottery in its primary fill that was uncovered about 80m distant from the Saltern (pers. comm. S Johnson). The briquetage from 138 is all hand collected material from another section through the ?enclosure ditch. Although clearly a salt-production site few archaeological features were uncovered to help elucidate the methods employed. .

Table 4. The range of briquetage recovered from each context.

	108B	108B	134A	134A	136	136	138	138
Type	Count	Weight	Count	Weight	Count	Weight	Count	Weight
Block			202	5832g	6	38g		
Brick			5	589g				
Brick/pedestal			3	206g				
Briquetage	155*	828g	1302*	6157g	103	204g	1	9g
Fired clay					2	7g		
Oval Brick			2	607g				
Pedestal			6	145g				
Plate	4	56g	1	18g				
Prop			4	28g				
Slivers			8	19g	191*	370g		
Support			3	104g	1	46g		
Support or bar			7	371g				
Vessel	162	319g	215*	627g	187	400g	2	5g
Wedge			1	18g				
Wedge/support			4	166g				

* Minimum number (and therefore also weight) given.

The three processed samples contain distinct assemblages (Table 4) but these may be interlinked by common forms. The largest group, from context 134A, inevitably contains the greatest range of forms. It is dominated by the 'block' type, whereas the group from pit 136, just outside the rectangular ditch, contained few pieces of block but the majority of all the slivers including all the recorded vitrified slivers (a very small amount are present in the >7mm residue from 134A). The assemblage from the ditch 108B contains a very high percentage of vessel fragments and four pieces of plate, all of the latter have vitrified edges whereas the sole piece from 134A does not. The material from 108B is definitely Saltern debris and probably contemporary (or near contemporary) with the main assemblage but being *c.* 80m distant it is unclear if it belongs to the Trench 18 Saltern or another. Although the 108B sample was smaller than the others, it is noticeable that no pieces of 'block' were recovered from it.

The fact that the three assemblages are so distinct, particular 134A and 136 which were found only a metre apart, is of enormous importance. The differences were only recognisable because the material was recovered as bulk samples, the perforated slivers from 136 and the mass of small

vessel sherds from 108B (average weight 2.3g) would never have been recovered by hand. These differences may well reflect the different activities being undertaken on the site and in future it is important that more samples are taken from along the length of , for example ditches, to try to reconstruct activity areas on salt-production sites.

Conclusions

The evaluation at Holland Park, Spalding, uncovered part of a salt-production site. The briquetage includes some unusual forms. It is suggested that gutter troughs may have been the main vessel type used because of the general lack of basal sherds. Wedges and a range of supports seem to have been the main type of briquetage used to help balance the vessels; clips surprisingly seem to be absent from the collection. Perforated slivers were recovered but continue to be an enigmatic form. Large numbers of pieces, termed 'blocks', were found but these maybe parts of cut structural features, such as hearths, rather than free standing three-dimensional forms.

The differences in the three samples indicates how important it is to recover briquetage by bulk sampling rather than hand collection. The perforated slivers have only been found on sites where total earth samples have been taken and the mass of small vessel fragments that make sample 108B distinctly different would certainly have never been recovered by hand. These samples show, for the first time, that it may be possible to reconstruct activity areas on salt-production sites, providing enough samples are taken at regular intervals. This is an important assemblage that contributes to the diverse range of briquetage assemblages that are found on Lincolnshire salt-production sites.

Recommendations.

If no further work is undertaken at the site the small fraction of the Carbon 14 residue (<7mm) can be discarded. Although no further work is required on this assemblage as an archive it is a site that warrants publishing because of the unusual forms present and the distinctiveness of the three sampled groups. For a publication a greater number of illustrations would be needed and a full catalogue produced for those illustrated. A thin section of one of the 'blocks' which contains the greatest range of sediments would also be valuable because it would show just how great a range of sandy silts can occur naturally on salterns. It is all too easy to allocate too many fabric types on a single site when the actual source is naturally very variable.

Acknowledgments.

I should like to thank Alison Foster and Jeremy Dubber for the sample processing.

Bibliography

Bell, Antony, Gurney, David and Healey, Hilary, 1999, *Lincolnshire Salterns: Excavations at Helpringham, Holbeach St Johns and Bicker Haven*. East Anglian Archaeology Report No **89**.

Cowgill, Jane, 1998, 'Assessment of the Briquetage from the Excavation at Bourne Road, Spalding' (BRS98). Unpublished report produced for John Samuel Archaeological Consultants.

Crossby, Andrew, forthcoming, 'The Morton Saltern Briquetage' in T.W. Lane and E.L. Morris (eds.) forthcoming.

Gurney, David, 1999, 'A Romano- British Salt-making Site at Shell Bridge, Holbeach St Johns: Excavations by Ernest Greenfield, 1961' in Antony Bell, David Gurney and Hilary Healey 1999.

Healey, Hilary, 1999, 'An Iron Age Salt-making Site at Helpringham Fen' in Antony Bell, David Gurney and Hilary Healey 199.

Lane Tom, 1992, 'Iron Age And Roman Salterns In The South-Western Fens', in P.P. Hayes and T.W. Lane *The Fenland Project Number 5: Lincolnshire Survey, The South-West Fens*, East Anglian Archaeology Report No **55**.

Lane T.W. and Morris E.L. (eds.) forthcoming, *A millenium of salt making: Prehistoric and Romano-British salt production in the Fenland.* Lincolnshire Archaeology and Heritage Report Series No **4**.

Morris, E.L. forthcoming 'The Briquetage' in T.W. Lane and E.L. Morris (eds.) forthcoming.

APPENDIX 1
CATALOGUE OF THE BRIQUETAGE.

Abbreviations used in the Catalogue

BRIQ	Briquetage	IRREG	Irregular	SQ	Square
C14	Carbon 14 sample	L	Length	T	Thick
CURV	Curved	MAX	Maximum	TH	Thickness
FIREC	Fired clay	ORGA	Organic	V	Very
FRAG	Fragment	POSS	Possibly	VESS	Vessel
H	Height	SIEVE	Sample sieved using an 8mm mesh	W	Width
INCL	Inclusion	size		//	Parallel

Context	Area	Type	Count	Weight	Comment	Dra
108B		BRIQ	0	499	>7MM SIZED PIECES ONLY RAPIDLY SORTED	
108B		BRIQ	31	154	ORGA INCL LARGER THAN VESS; PIECES WITH CURVED SURFACES SOME POSSIBLY PROP + WEDGE	
108B		BRIQ	103	99	PIECES WITH A SINGLE SURFACE; MOST PROBABLY VESS FRAGMENTS	
108B		BRIQ	16	60	PIECES WITH CURVED SURFACES - FORM NOT IDENTIFIABLE; SANDY SILT NATURAL FABRIC	
108B		BRIQ	5	16	SURFACES; HIGHLY FIRED + VERY HARD; ORGA INCL; WHITE SURFACES V PURPLE CORE	
108B		PLATE	3	29	FLAT WITH CURVED EDGE; 14-15MM TH; EDGE UNEVEN AND ROUGHLY THUMBED; EDGE GLAZED PURPLE THEN PINK	Y
108B		PLATE	1	27	FLAT WITH CURVED UNEVEN + ROUGHLY THUMBED EDGE; EDGE GLAZED; 3 JOINING SHERDS	Y
108B		VESS	157	294	MOST ORGA INCL; 7 - 10MM TH; FEW SANDY SILT = 9 - 12 TH; WALL SHAPE UNCERTAIN - CURVED OR STRAIGHT?	
108B		VESS	3	5	ROUNDED RIMS; ONLY ONE HAS ORGA INCL	
108B		VESS	1	1	SQUARED RIM	
108B		VESS	1	19	VESS WALL WITH BASAL ANGLE; CIRCULAR VESS; ORGA INCL	
134A		BRIQ	1	85	CURVED SURFACES; AREA WITH PERFORATIONS BUT SOFTER	
134A		VESS	3	22		
134A		WEDGE/SUPPORT	1	38	COMPLETE; SEE OTHERS; H: 43MM; W: 60MM; T: 18MM	Y?
134A	C14	BLOCK	60	1403	18 SURFACES // TO SILT LAYERS; 18 RGT ANGLE TO SILT; 22 RELATIONSHIP UNCERTAIN	
134A	C14	BLOCK	7	125	CUT FROM NATURAL; ALL TWO FACES - ALL ANGLES RGT ANGLES BUT MOST CURVED (NOT SHARP)	
134A	C14	BLOCK	1	23	CUT FROM NATURAL; SURFACE // TO SILT LAYERS; CURVED EDGE	
134A	C14	BLOCK	14	803	NO SURFACES - 4 WITH SILT LAYERS REST SANDIER SILTS	
134A	C14	BRICK	1	79	BLOCK? WEDGED? 2 FACES; SANDY NATURAL FABRIC	
134A	C14	BRICK	1	199	SANDY SILT; SOME WEDGED; 3 FACES; L: 90MM; W:40MM; T: 63MM	
134A	C14	BRICK	1	19	TAPERING FORM? CORNER ACUTE NOT RGT ANGLE; SANDY NATURAL FABRIC	
134A	C14	BRIQ	1	71	BAR/SUPPORT/SMALL BRICK? RECTANGULAR L: 55MM; W: 33MM; T: 45MM; ADDED ORGA INCL?	Y
134A	C14	BRIQ	3	6	COMPLETE SMALL PIECES - WEDGES?	
134A	C14	BRIQ	45	610	FRAGMENTS OF 'FORMS'	
134A	C14	BRIQ	221	543	PIECES 1 FLAT SURFACE; MOST NOT VESS FABRIC - MOST NATURAL SANDY SILT	
134A	C14	BRIQ	1	178	ROUGH FLAT BASE; V ROUGHLY SHAPED; NO REAL FORM	

134A	C14	BRIQ	143	516	SMALL PIECES WITH CURVED SURFACE/S; MOST SANDY SILT NATURAL FABRIC; 'FORMS' NOT IDENTIFIABLE	
134A	C14	BRIQ	1	32	V THICK RIM? HOLE RUNNING THROUGH // TO RIM; HOLE DIAMETER 4MM	Y
134A	C14	OVAL BRICK	1	414	MEDIUM ORGANIC SANDY SILT; ROUGHLY MADE; C SECTION; ONE END SURVIVES	
134A	C14	PEDESTAL	3	37	ALL WITH SMALL FLAT BASES; ONLY MEASURABLE DIAMETER 31MM	
134A	C14	PEDESTAL	2	42	FLAT CURVED BASES - ONLY FRAGMENT OF WALL SURVIVES	
134A	C14	PROP	1	4	SANDY SILT NATURAL FABRIC; DIAMETER 25MM; H 10MM	
134A	C14	PROP	1	5	SANDY SILT NATURAL FABRIC; ROUGHLY SQ; L: 23MM; W?; H 15MM	Y
134A	C14	PROP	1	10	SANDY SILT NATURAL FABRIC; ROUGHLY TRIANGULAR 36 X 26 X 15MM	
134A	C14	SLIVERS	8	19	SMALL COMPLETE PIECES - 1 WITH HOLES = NATURAL FROM COARSE TEMPER?	
134A	C14	SUPPORT/BAR	1	59	ALMOST COMPLETE; ANGLED END SMOOTH THE OTHER IRREGULAR; H:57MM; W: 68MM; T: 26MM; ORGA INCL?	Y
134A	C14	SUPPORT/BAR	5	281	VARIATIONS BUT ALL ONE SMOOTH END; ONLY 1 MAY HAVE ORGA INCL	
134A	C14	VESS	3	9	6 - 10MM TH; SANDY SILT NATURAL FABRIC	
134A	C14	VESS	1	11	BASE? 16MM TH; FLAT; SANDY SILT NATURAL FABRIC; PURPLE	
134A	C14	VESS	1	26	CURVED WALL; 12MM TH; MEDIUM ORGA INCL;	Y
134A	C14	VESS	1	3	INTERNAL FACE CURVED = ANGLE INTO BASE? SANDY SILT NATURAL FABRIC	
134A	C14	VESS	57	148	MOST 7 - 12MM TH; ALL FLAT - BUT 2 CURV WALLS; MASS ORGA INCL	
134A	C14	VESS	1	1	SMALL SQUARED RIM; FABRIC?	
134A	C14	VESS	1	1	SQUARED CUT RIM; ORGA INCL	
134A	C14	VESS	2	5	VERY SMALL ROUNDED RIMS; ORGA INCL	
134A	C14	VESS	2	2	VERY SMALL ROUNDED RIMS; SANDY SILT NATURAL FABRIC	
134A	C14	WEDGE	1	18	TRIANGULAR SECTION; COMPLETE? SANDY SILT NATURAL FABRIC; 35 X 31 X 25MM	Y?
134A	SIEVE	BLOCK	2	40	ACUTE ANGLED CORNERS; 1 SURFACE SMOOTH 2ND MUCH MORE IRREGULAR - NOT HAND MADE	
134A	SIEVE	BLOCK	35	593	ALL ONE FLAT SMOOTH FACE; ANGLE SEDIMENT UNCLEAR	
134A	SIEVE	BLOCK	1	14	CUT TOP SURFACE; CURVED SIDE EDGE; H: 30MM; SIDE NOT HAND MADE - MORE IRREGULAR	
134A	SIEVE	BLOCK	36	1089	NO SURFACES; MIXED SOME SANDY SOME MORE SILTY - SOME MIXED	
134A	SIEVE	BLOCK	1	26	PIECE WITH A ROUNDED RGT ANGLE CORNER	
134A	SIEVE	BLOCK	5	111	PIECES WITH SHARP RGT ANGLE CORNER; MAX H: 42MM; 1 CUT SURFACE - 2ND HAND MADE/MORE IRREGULAR	
134A	SIEVE	BLOCK	3	67	SILT LAYERS // TO SURFACE BUT ALL THIN	
134A	SIEVE	BLOCK	30	737	SILT LAYERS AT RGT ANGLE TO SURFACES	
134A	SIEVE	BLOCK	1	113	UNWORKED CUT NATURAL; 1 FACE; 55X52MM; DEPTH 52MM; APPLIED UPPER LAYER/EDGE	Y
134A	SIEVE	BLOCK	1	391	UNWORKED CUT NATURAL; 1 FACE; 95X90MM; DEPTH 70MM; FACE RGT ANGLE TO SILT LAYERS	Y?
134A	SIEVE	BLOCK	1	200	UNWORKED CUT NATURAL; 2 FACES; H 60MM; W 40MM; L 90MM	Y?
134A	SIEVE	BLOCK	2	31	UNWORKED CUT NATURAL; FACES 50X 42MM; 44X42MM; DEPTHS 10MM AND 11MM; FACES // TO SILT	
134A	SIEVE	BLOCK	2	66	UNWORKED CUT NATURAL; FLAT FACES BUT CURVED SIDES WITH SIMILAR WIDE DIAMETERS; SILT LAYERS // FACES	Y
134A	SIEVE	BRICK	1	24	BAR? 2 SIDES WITH RGT ANGLE CORNER; WEDGED; L: 38MM; W: 40MM; T: 16MM	
134A	SIEVE	BRICK	1	268	WEDGED SANDY SILT; 3 SIDES - FLAT BASE + END; SIDE TAPERING; MAX L 97MM; H 55MM; W 57MM; NOT SQUARE	Y
134A	SIEVE	BRICK/PEDESTAL	1	30	2 SIDES POSS BEGINING 3RD; ORGA INCL; TAPERING? SQ SECTION L 36MM; W 45MM; T 18MM; // MORTON SALTERN	
134A	SIEVE	BRICK/PEDESTAL	1	119	WEDGED; SOME ORGA INCL; 4 SIDES; IRREG SURFACE WITH THIN APPLIED LAYER; SQ SECTION? L 67MM; W 49 H38	Y
134A	SIEVE	BRICK/PEDESTAL	1	57	WEDGED; SOME ORGA INCL; SQ SECTION; L 65MM; W 42MM; H 35MM; // MORTON SALTERN?	
134A	SIEVE	BRIQ	1	29	BAR/SUPPORT; NO ENDS; IRREGULAR SECTION; WEDGED BUT NO TEMPER; ROUGHLY MADE	
134A	SIEVE	BRIQ	1	86	MASS ORGA; ROUGHLY MADE WITH FINGER IMPRINTS; OVAL BRICK? WIDE SUPPORT?	
134A	SIEVE	BRIQ	1	19	ORGA INCL; BAR/SUPPORT/WEDGE? V IRREGULAR SECTION; ROUGHLY MADE; FINGER IMPRINTS	
134A	SIEVE	BRIQ	1	90	PEDESTAL/SUPPORT OR ODD BAR; SANDY SILT NATURAL FABRIC; POORLY WEDGED; RECTANGULAR BASE?	Y
134A	SIEVE	BRIQ	112	1600	PIECES WITH 'FORMS' - SOME PROBABLY IDENTIFIABLE	
134A	SIEVE	BRIQ	547	1665	PIECES WITH 1 OR 2 FACES - ABOUT A THIRD VESSELS; GROUP NOT FULLY SORTED	

134A	SIEVE	BRIQ	220	587	PIECES WITH CURVED SURFACE/S; 'FORM' NOT IDENTIFIABLE	
134A	SIEVE	BRIQ	1	2	PROP FRAG? BASE AND CURVED SIDE; H: 12MM	
134A	SIEVE	BRIQ	1	26	PROP? BAR? CLIP?? MOST ROUGHLY SHAPED BUT 1 SMOOTH CURVED SURFACE; NATURAL FABRIC	Y
134A	SIEVE	BRIQ	1	12	WEDGE/SUPPORT? MEDIUM ORGA INCL	
134A	SIEVE	OVAL BRICK	1	193	MEDIUM ORGA SANDY SILT; ROUGHLY MADE; C SECTION; ONE END SURVIVES; L 110MM; W 55MM; T 40MM	Y
134A	SIEVE	PEDESTAL	1	66	SQUAT OVAL/CYLINDRICAL; POORLY WEDGED; NO ORGA; ROUGHLY SHAPED; SURVIVING H 52MM; BASE DIAM 55MM?	Y
134A	SIEVE	PLATE	1	18	IRREG RIM; RIM BUFF THEN PINK THEN PURPLE; VERY FLAT; ORGA INCL	Y
134A	SIEVE	PROP	1	9	COMPLETE; FLAT BASE; FLATTISH TOP; OVALISH; 33 X 22 X 16MM; TEMPERED?	
134A	SIEVE	SUPPORT	1	56	ANGLED END; ORGA INCL; BAR? L: 20MM; W: 55MM; T: 24MM	Y
134A	SIEVE	SUPPORT	1	23	ORGA INCL; ANGLED END BUT FORM UNCLEAR	
134A	SIEVE	SUPPORT	1	25	SANDY SILT NATURAL FABRIC; ANGLED END FLAT	
134A	SIEVE	SUPPORT/BAR	1	31	SANDY SILT NATURAL FABRIC; FLAT ANGLED END	
134A	SIEVE	VESS	7	26	8-12MM TH; INFREQUENT ORGA INCL - NATURAL.	
134A	SIEVE	VESS	1	7	BASE? CURVED WALL? ONE SMOOTH EDGE; ORGA TEMPER	Y
134A	SIEVE	VESS	1	39	CURV BASE; VESS WALL VERTICAL; HEIGHT 45MM; WALL 18MM TH; BASE 15MM TH; ORGA INCL	Y
134A	SIEVE	VESS	128	309	MOST 8-12MM TH; MOST FLATTISH SOME CURV;MASS ORGA INCL; VARIABLE SANDY SILT FABRIC	
134A	SIEVE	VESS	3	10	NEAR RIM? VERY PURPLE COLORATION; ORGA TEMPER	
134A	SIEVE	VESS?	1	2	CUT SQUARE RIM; SANDY SILT NATURAL FABRIC - FEW ORGA INCL	
134A	SIEVE	VESS?	1	2	ROUNDED SMALL RIM FRAG; SANDY SILT NATURAL FABRIC - FEW ORGA	
134A	SIEVE	VESS?	1	4	ROUNDED SMALL RIM FRAGMENT; ORGA INCL	
134A	SIEVE	WEDGE/SUPPORT	1	62	ALMOST COMPLETE; MEDIUM ORGA INCL; FLAT TOP AND BASE; ROUGHLY FLAT BACK; ENDS TAPER; H 52MM; L 78MM;	Y
134A	SIEVE	WEDGE/SUPPORT	1	30	ORGA INCL; MOST MISSING BUT PROBABLY THIS FORM	
134A	SIEVE	WEDGE/SUPPORT	1	36	TOP; BASE AND ONLY ONE END; ORGA INCL; L: 51; W: 48; T 25MM	Y
136		BLOCK	4	29	SMALL PIECES WITH 1 SURFACE	
136		BLOCK	2	9	SMALL PIECES WITH TRACES OF A RGT ANGLES CORNER	
136		BRIQ	1	24	2 SIDES WITH ROUNDED CORNER; BAR/BRICK? MEDIUM ORGA INCL	
136		BRIQ	82	79	ONE SURFACE ONLY; 30% VESS 30% POSSIBLE PERF FRAGS	
136		BRIQ	20	101	PIECES WITH CURVED SURFACE/S - FORM NOT IDENTIFIABLE; MOST ORGA INCL	
136		FIREC	2	7	V DENSE; V HARD AND HIGH FIRED; FLAT SURFACES; CLAY CONTENT?	
136		SLIVERS	33	42	HIGH FIRED AND HARD; MOST FINE FABRIC; VARIES FROM NO TO MASS ORGA INCL; MASS SLIVERS >7MM RESIDUE	
136		SLIVERS	158	214	SPALLS WITH FREQUENT PERFORATIONS OF VARIOUS SIZES; MOST ORGA INCL - 1 - 5MM DIAMETER; BRITTLE	
136		SLIVERS	0	114	VITRIFIED + SOME GLASSY; BRITTLE; MANY PERFORATED; ORGA INCL IN MOST; SOME STILL IN RESIDUE	
136		SUPPORT	1	46	CYLINDRICAL; FLAT TOP AND BASE; WAISTED; COMPLETE; H: 45MM; TOP RIDGE FROM TRAY EDGE?? MEDIUM ORGA?	Y
136		VESS	2	17	ROUNDED RIMS; MEDIUM ORGA INCL = DIFFERENT TO NORMAL VESS FABRIC	
136		VESS	185	383	SLIGHT CURVE ON LARGER PIECES - MOST SMALL; MASS ORGA INCL; 5 - 12MM TH; MOST 7 - 9 MM.	
138		BRIQ	1	9	ROUNDED SURFACE - FORM NOT IDENTIFIABLE; MASS ORGA INCL	
138		VESS	1	3	RIM; TAPERS TO A ROUNDED POINT	
138		VESS	1	2	WHITE SURFACE BUT V PURPLE CORE	

APPENDIX 2
THE MINIMUM NUMBER OF PIECES THAT REQUIRE ILLUSTRATION

Type	Comment	Context	Area
BLOCK	UNWORKED CUT NATURAL; 1 FACE; 55X52MM; DEPTH 52MM; APPLIED UPPER LAYER/EDGE	134A	SIEVE
BLOCK	UNWORKED CUT NATURAL; FLAT FACES BUT CURVED SIDES WITH SIMILAR WIDE DIAMETERS; SILT LAYERS // FACES	134A	SIEVE
BRICK	WEDGED SANDY SILT; 3 SIDES - FLAT BASE + END; SIDE TAPERING; MAX L 97MM; H 55MM; W 57MM; NOT SQUARE	134A	SIEVE
BRICK/PEDESTAL	WEDGED; SOME ORGA INCL; 4 SIDES; IRREG SURFACE WITH THIN APPLIED LAYER; SQ SECTION? L 67MM; W 49 H38	134A	SIEVE
BRIQ	BAR/SUPPORT/SMALL BRICK? RECTANGULAR L: 55MM; W: 33MM; T: 45MM; ADDED ORGA INCL?	134A	C14
BRIQ	PEDESTAL/SUPPORT OR ODD BAR; SANDY SILT NATURAL FABRIC; POORLY WEDGED; RECTANGULAR BASE?	134A	SIEVE
BRIQ	PROP? BAR? CLIP?? MOST ROUGHLY SHAPED BUT 1 SMOOTH CURVED SURFACE; NATURAL FABRIC	134A	SIEVE
BRIQ	V THICK RIM? HOLE RUNNING THROUGH // TO RIM; HOLE DIAMETER 4MM	134A	C14
OVAL BRICK	MEDIUM ORGA SANDY SILT; ROUGHLY MADE; C SECTION; ONE END SURVIVES; L 110MM; W 55MM; T 40MM	134A	SIEVE
PEDESTAL	SQUAT OVAL/CYLINDRICAL; POORLY WEDGED; NO ORGA; ROUGHLY SHAPED; SURVIVING H 52MM; BASE DIAM 55MM?	134A	SIEVE
PLATE	FLAT WITH CURVED EDGE; 14-15MM TH; EDGE UNEVEN AND ROUGHLY THUMBED; EDGE GLAZED PURPLE THEN PINK	108B	
PLATE	FLAT WITH CURVED UNEVEN + ROUGHLY THUMBED EDGE; EDGE GLAZED; 3 JOINING SHERDS	108B	
PLATE	IRREG RIM; RIM BUFF THEN PINK THEN PURPLE; VERY FLAT; ORGA INCL	134A	SIEVE
PROP	SANDY SILT NATURAL FABRIC; ROUGHLY SQ; L: 23MM; W?; H 15MM	134A	C14
SUPPORT	ANGLED END; ORGA INCL; BAR? L: 20MM; W: 55MM; T: 24MM	134A	SIEVE
SUPPORT	CYLINDRICAL; FLAT TOP AND BASE; WAISTED; COMPLETE; H: 45MM; TOP RIDGE FROM TRAY EDGE?? MEDIUM ORGA?	136	
SUPPORT/BAR	ALMOST COMPLETE; ANGLED END SMOOTH THE OTHER IRREGULAR; H:57MM; W: 68MM; T: 26MM; ORGA INCL?	134A	C14
VESS	BASE? CURVED WALL? ONE SMOOTH EDGE; ORGA TEMPER	134A	SIEVE
VESS	CURV BASE; VESS WALL VERTICAL; HEIGHT 45MM; WALL 18MM TH; BASE 15MM TH; ORGA INCL	134A	SIEVE
VESS	CURVED WALL; 12MM TH; MEDIUM ORGA INCL;	134A	C14
WEDGE/SUPPORT	ALMOST COMPLETE; MEDIUM ORGA INCL; FLAT TOP AND BASE; ROUGHLY FLAT BACK; ENDS TAPER; H 52MM; L 78MM;	134A	SIEVE
WEDGE/SUPPORT	TOP; BASE AND ONLY ONE END; ORGA INCL; L: 51; W: 48; T 25MM	134A	SIEVE

Appendix B :

Environmental Archaeology

D James Rackham

Holland Park, Spalding HPS99

Environmental Archaeology Report

Introduction

Evaluation excavations just west of Spalding at Grid Ref 230/205 uncovered an intertidal and saltmarsh environment with a saltern sitting on slightly higher ground in the western half of the area being evaluated. Most of the site was laminated tidal silts and sands with a number of small creeks cutting through these sediments. In each of the evaluation trenches lying on the lower parts of the site a thin humified peat horizon (102 in Figs 1 and 2), occasionally disappearing, occurred between laminated silty fine sands and sandy silts. This peat horizon usually continued into the fills of the creeks where it often thickened, and was in a number of the trenches preceded by and followed by a thin silt or silty clay deposit, generally no more than 2-3 centimetres in thickness.

During the evaluation three bulk samples were taken for environmental analysis from features containing saltern debris, and one large bulk sample was collected for the recovery of briquetage and finds. In addition a series of samples were taken from the deposits associated with two of the supposed tidal creeks that had dissected the landscape. A sample was taken from 102, the humified peat, for radiocarbon analysis. All the samples are listed below in Table 1.

Table 1: Samples taken for environmental analysis and briquetage recovery

site	trench	sample	context	volume	analysis	description
HPS99	?		108B*	8 l.	general enviro.	ditch fill (with 19th C pot?)
HPS99	18		136	30 l.	general enviro.	fill of small pit
HPS99	18		134A	60 l.	general enviro.	rectangular enclosure ditch fill
HPS99	18		134A	>100	briquetage recovery	rectangular enclosure ditch fill
HPS99	6		102		C14	silty humified peat
HPS99	2	70cm	101	50 ml	foraminifera	fine light brown sand
HPS99	2	62 cm		50 ml	foram. and pollen	slightly sandy clayey silt
HPS99	2	60 cm	102	50 ml	foram. and pollen	black humified silty peat
HPS99	2	45 cm	119a	50 ml	foram. and pollen	slightly sandy mottled clayey silt
HPS99	2	30 cm	119a	50 ml	foram. and pollen	slightly clayey fine sandy silt
HPS99	2	10 cm	119b	50 ml	foraminifera	slightly silty fine sand
HPS99	6	1	101	50 ml	foraminifera	fine sand
HPS99	6	2	101	50 ml	foram. and pollen	fine slightly sticky silt
HPS99	6	3	102	50 ml	foram. and pollen	silty black humified peat
HPS99	6	4	102	50 ml	foram. and pollen	silty black humified peat
HPS99	6	5		50 ml	foram. and pollen	slightly sandy silt
HPS99	6	6	103	50 ml	foraminifera	fine sand

* - sample when delivered was numbered '5' – renumbered by N.Rosenburg

Methodology

The samples taken for general environmental assessment were processed in the following manner. Sample volume and weight was measured prior to processing. The samples were washed in a 'Siraf' tank (Williams 1973) using a flotation sieve with a 0.5mm mesh and an internal wet-sieve of 1mm mesh for the residue. Both residue and float were dried, and the residues subsequently re-floated to ensure the efficient recovery of charred material. The dry volume of the flots was measured, and the volume and weight of the residue recorded.

Figure 2: Trench 6 - eastern end Creek section

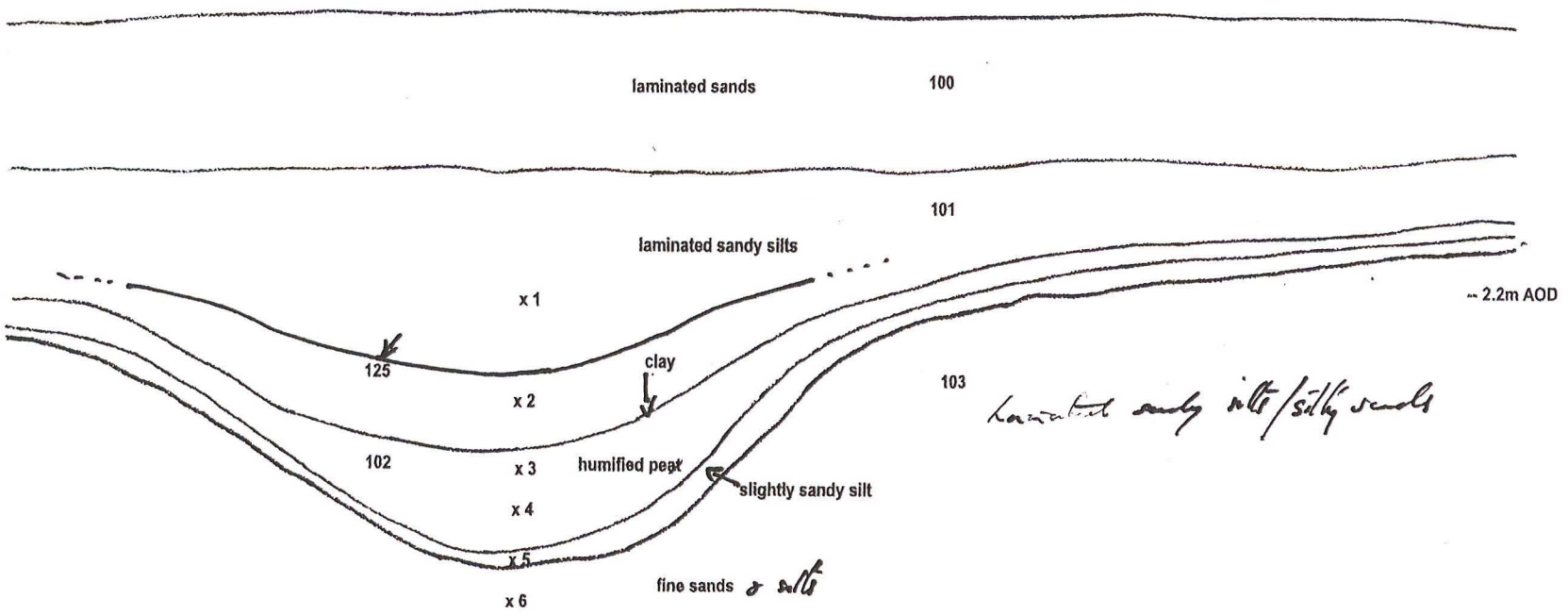
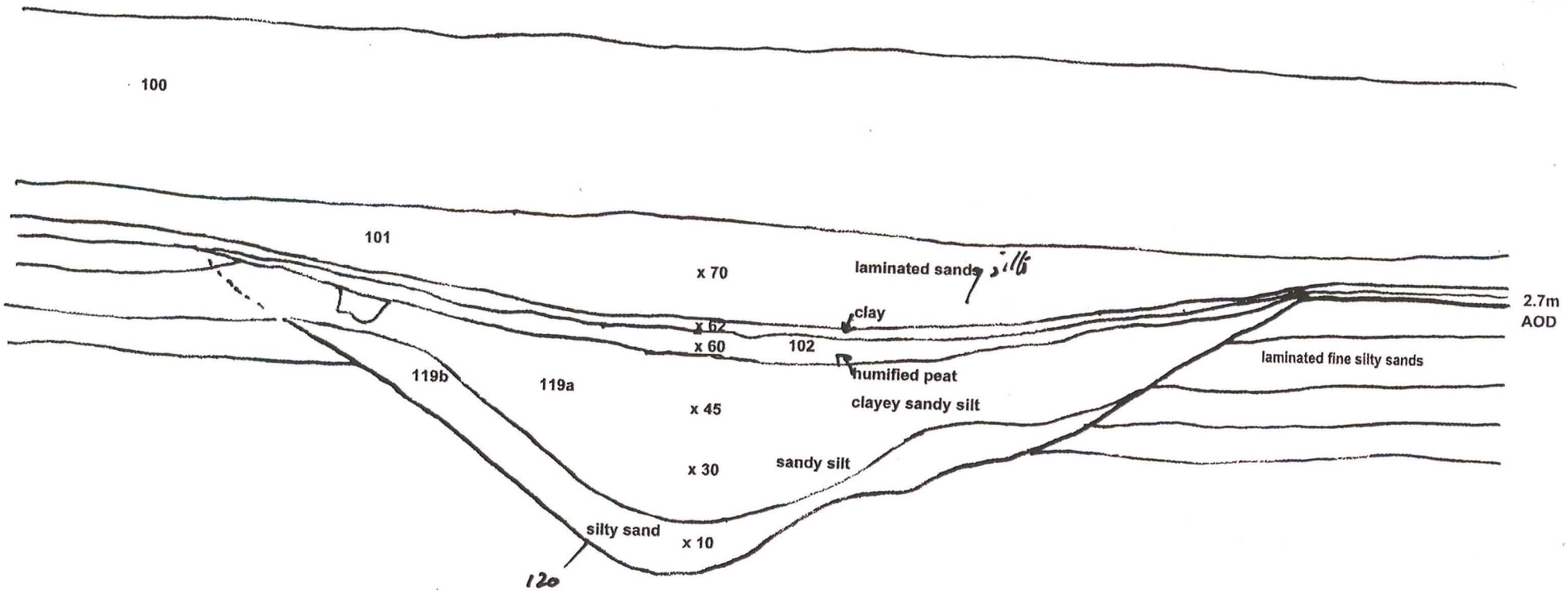


Figure 1: Trench 2 - south end Creek section



The residue was sorted by eye, and environmental and archaeological finds picked out, noted on the assessment sheet and bagged independently. A magnet was run through each residue in order to recover magnetised material such as hammerscale and prill. The residue was then discarded. The float of each sample was studied under a low power binocular microscope. The presence of environmental finds (ie snails, charcoal, carbonised seeds, bones etc) was noted and their abundance and species diversity recorded on the assessment sheet. The float was then bagged. The float and finds from the sorted residue constitute the material archive of the samples.

The sample washed for the recovery of briquetage was wet-sieved over an 8mm mesh sieve and the whole of the residue retained and dried. This material which was composed almost entirely of fragmented briquetage was passed to Jane Cowgill for study.

The individual components of the general environmental samples were then preliminarily identified and the results are summarised below (Table 2).

In addition to the bulk samples a short sequence of samples for foraminifera (indicators of salinity) and pollen analysis was taken from the deposits in two of the creek fills in Trenches 2 and 6 (Fig. 1 and 2). These samples were taken from each distinct sedimentological horizon (except for the peat which was sampled as upper and lower in Trench 6).

The samples collected from the 'creek' deposits were submitted for pollen and foraminiferal analysis. The pollen samples (see below) were taken in order to discover whether the pollen survived and could give some indication of the surrounding landscape, particularly the character of the fen, and any evidence for grazed grasslands or arable in the vicinity. The samples for foraminifera were taken to assess the levels of salinity in each of the sediments and allow an interpretation of the depositional environment of each sampled strata.

Results of the general environmental sample assessment

The samples washed and floated for general environmental analysis (Table 2) produced residues entirely composed of fired sandy silts or briquetage, with many vessel fragments, other pieces and amorphous fragments. This material is reported elsewhere (see Cowgill). Context 136 also included quantities of vitrified slaggy material presumably formed from over-heating of the sand rich silts that form the fabric of the briquetage and the natural sediments on the site.

Table 2: Finds from the bulk samples

cont	vol in l.	residue vol in l.	briq. >7mm in g.	slag in g.	bone in g.	marine shell g.	flot vol in ml	char-coal *	charr'd seeds *	snails */#	comments
108B	8	2.25	1220	+	<1	<1	3	2	1	2/2	cockle, indet bone
136	30	5	1590	72	<1		85	3	3	3/2	3g charcoal
134A	60	20	5847		2		6	2	2	2/2	

(* abundance: 1= 1-10; 2= 11-50; 3=51-150; 4=151-250; 5=>250 items
diversity: 1=1-3; 2=4-10; 3= 11-25 species or taxa)
+ present

Environmental material from the residue of the samples included fragments of unidentifiable burnt bone and cockle shell. The flots of the samples included small quantities of charcoal (although context 136 produced over 3 grammes of wood charcoal suitable for radiocarbon dating), a few charred weed seeds, rare mineralised weed seed, and snail shells. The latter included snails commonly found on damp grassland, marsh or wetland habitats, with shells of *Vallonia* sp, *Succinea* sp., *Acanthinula* sp., *Lymnaea truncatula*, *Bithynia leachii*, *Planorbis planorbis*, *Planorbis leucostoma* and *Valvata macrostoma*. One burnt shell of *Hydrobia ulva* in context 134A was the only evidence among the mollusca of an estuarine or saltmarsh environment.

A few uncharred weed seeds in the flots suggest some contamination by recent seeds (see below).

Radiocarbon dating

Two samples were submitted for radiocarbon dating to Beta Analytic Inc., Miami, Florida. The charcoal from context 136 from the saltern and a sample of the peat, context 102, from the sampled creek in Trench 6 (see Fig. 2).

The results of the analysis of the charcoal from the saltern gave a calibrated date of 160 BC – AD 350 at 2 sigma (Beta 145723), with an intercept of 90 AD (see Fig. 5). No other secure dating evidence was obtained from the saltern features and a late Iron Age or Roman date is indicated for the site.

In one of the evaluation trench sequences briquetage material was recovered from beneath the black humified peat that occurred in many of the sections and is illustrated, context 102, in Figures 1 and 2. A radiocarbon sample from the humified peat, 102 in Trench 6, has been dated to cal. AD 530- 680 at 2 sigma (Beta 143278)) with the intercept at AD 630 (Fig. 6), indicating an early to middle Saxon date for the formation of this deposit.

The Charred Plant Remains

John Giorgi

The charred plant remains from the bulk samples from contexts 134A and 136 in the saltern deposits were selected for study. The flots were divided into fractions using a stack of sieves for ease of sorting. A binocular microscope was used for the sorting and identification of the botanical material.

Results

The two samples produced small assemblages of charred and 'waterlogged' plant material. A relatively large quantity of uncharred plant material was present in both samples with wood, roots and stem fragments plus weed seeds. The latter derived mainly from high seed-producing plants of waste places and disturbed ground particularly goosefoots/oraches etc. (*Chenopodium/Atriplex* spp.), together with small nettle (*Urtica urens*), chickweeds (*Stellaria media* gp.), fumitory (*Fumaria* sp.), sun spurge (*Euphorbia helioscopia*) and brambles (*Rubus* spp.). Little comment may be made on this material which is probably intrusive and of recent origin.

The results of the identification of the charred material are tabulated in Table 3. The charred remains consist mainly of very fragmented charcoal plus a small number of seeds of wild

plants, most of which were recovered from 134A. The identifiable seeds mainly belong to plants of wetland habitats, eg spike-rush (*Eleocharis palustris/uniglumis*), a marshland plant, and ?bulrush (cf. *Schoenoplectus lacustris*), which is found in rivers, lakes and ponds, usually where there is abundant silt (Clapham *et al*, 1987). Sedges (Cyperaceae) were identified in both samples, many species of which are found in wetland habitats. Small seeded indeterminate grasses (Poaceae) were relatively well represented in both samples, while a leguminous fragment was present in 134A.

Discussion

The paucity of charred plant remains in the two samples does not allow detailed comments to be made on the character of the local environment. What is present probably blew or washed in from elsewhere on the site where the fires and hearths of the saltern were located. Nevertheless the range of species, albeit limited, is similar to charred plant remains recovered from excavations of another saltern of a similar date at Bourne Road, Spalding (Giorgi 1998). At this site, the good representation of grasses together with a smaller number of wetland plants, particularly Cyperaceae, was interpreted as part of the burnt residues of plant material, used as fuel in salt making (Giorgi 1998). It could be tentatively suggested that the charred plant remains from Holland Park represent similar residues with the wetland plants indicating that the material was gathered locally from the surrounding fenland environment.

Table 3: The charred plant remains from Holland Park, Spalding (HPS99)

	trench	18	18
	context	134 A	136
	vol.soil (l)	60	30
species	flot size (ml)	6	85
Fabaceae indet.	indet legume frags	1	
Eleocharis palustris/uniglumis	spike-rush	3	
cf. *Schoenoplectus lacustris*	?bulrush	2	
Carex spp.	sedges	2	
Cyperaceae	-	1	2
Poaceae indet.	small seeded grasses	8	3
indet seeds		+	+
charcoal		++	+++

key: + = 1-10 items; ++ = 11-50 items; +++ = 50+ items.

The Creek deposits

The sequence of sediments within the two creeks samples that have been sampled (see Figures 1 and 2) is representative of the stratigraphic sequence across most of the site, with a thin peat, 102, sealed by a thin clay layer, representing a consistent horizon in most of the evaluation trenches. This horizon lay within a sequence of laminated silty sand and sandy silt sediments and in a number of places where palaeochannels or creeks were observed in the trench sections this peat dropped into and thickened in the fills of the creeks. The initial field interpretation of this sequence was a lower series of estuarine and tidal laminated silts and sands, with a sea level regression episode resulting in a local fresh or brackish water marsh environment within which peat deposits built up. A later transgression led to the inundation of these peats by the sea and a further series of laminated tidal deposits forming across the whole site.

In order to test this field interpretation and establish a picture of the fenland landscape of the area during the marsh phase of the sequence, pollen and foraminiferal samples were taken from these two creeks and submitted for analysis.

Pollen Analysis of Intertidal Sediment and Peat
Dr Robert G Scaife

Introduction and aims
The evaluation excavations revealed sediment filled palaeochannels which possibly accumulated in an intertidal/saltmarsh environment. Part of the fill comprised a definite layer of peat at between 2.3 and 2.7metres OD. This clearly offered potential for pollen analysis and reconstruction of various aspects of the past environment under which this material was deposited and the adjacent land use. The principal aims of the pollen evaluation were:

-to ascertain if pollen and spores are present in these sediments.

-to produce, if pollen was present, preliminary pollen diagrams from the two sections from trenches 2 and 6

-to provide an indication of the plant taxa and vegetation environment present during the time span represented by the sediment accumulation.

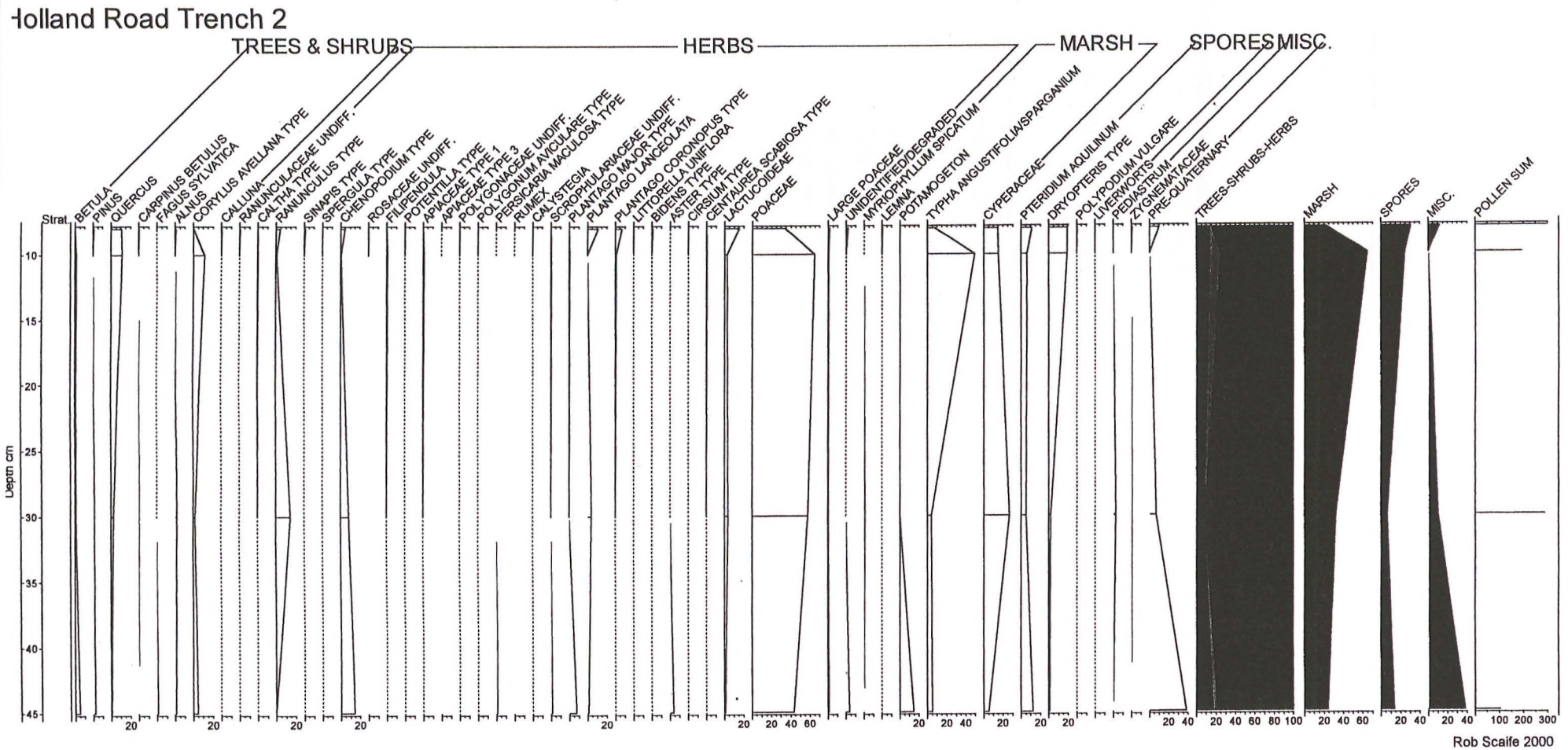
-to relate the results to the evidence for sea level changes at the site.

Pollen Methodology
Samples for pollen analysis were obtained from the faces of Trenches 2 and 6 (Figs 1 and 2). Sub-samples of 1-2ml volume were prepared in the laboratory using standard procedures for the extraction of sub-fossil pollen and spores (Moore and Webb 1978 and Moore *et al.* 1991). Pollen was generally abundant and counts of 300-400 grains per level (the pollen sum) were made where possible plus all extant marsh/aquatic taxa and spores of ferns. Thus, in some cases substantial pollen totals were achieved where there were large quantities of marsh taxa such as *Typha angustifolia/Sparganium* type. Identification and counting was carried out using an Olympus biological microscope (BH) fitted with Leitz optics. Data obtained are presented in standard pollen diagram form (Figures 3 and 4) with percentages calculated as follows:

Sum =	% total dry land pollen (tdlp)
Marsh/aquatic =	% tdlp+sum of marsh/aquatics
Spores=	% tdlp+sum of spores
Misc.=	% tdlp+sum of misc. taxa.

Taxonomy in general follows that of Moore and Webb (1978) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions. The pollen diagrams were plotted using Tilia and Tilia Graph. These procedures were carried out in the Department of Geography, University of Southampton.

Figure 3: Pollen Diagram for the creek section, Trench 2



The Pollen Data

Although the two profiles from Trenches 2 and 6 are thought to be contemporaneous, it was decided to examine this, since small spatial differences can result in differing ages of sediments, especially where sea level change may have caused time transgressive sedimentation. Some minor differences are evident between profiles.

Trench 2

This profile spans the fills of the salting/creek, cut 120 (Fig. 1), comprising sandy silt (context 119a), clayey/sandy silt, overlying peat (context 102) and a thin overlying clay lens (un-numbered). Samples were submitted only from contexts 119a, 102 and the thin clay lens capping 102. Pollen was present in all of these units (Fig. 3).

Context 119a (45 and 30cm – levels 30 and 45 respectively on the pollen diagram). Sandy silt and clayey silt. Herbs are dominant with Poaceae (to 60%). The basal level has greater numbers of *Chenopodium* type (15%), *Plantago media/major* type, *Aster* type (5%), *Potamogeton* type, *Pteridium aquilinum* and pre-Quaternary spores (40%). Above this, Poaceae is dominant but also with high values of Cyperaceae (19%) and *Ranunculus* type. There are few trees with *Quercus* (to 9%), *Fagus, Betula, Pinus* and *Alnus* occurring sporadically.

Context 102, (60cm – level 10 on the pollen diagram). Peat. Poaceae remains dominant (65%) with *Typha/Sparganium* (50%) and Cyperaceae. There is, however, an increase in herb diversity and expansion of trees-*Quercus* (to 13%) and *Corylus* type (14%).

Immediately above Context 102 (62cm – level 2 on the pollen diagram). Clay lens. There is a decrease of trees and shrubs to low values with an increase of *Plantago coronopus, Plantago lanceolata,* Lactucoideae, large Poaceae and spores of *Pteridium aquilinum, Dryopteris* type and derived pre-Quaternary palynomorphs.

Trench 6

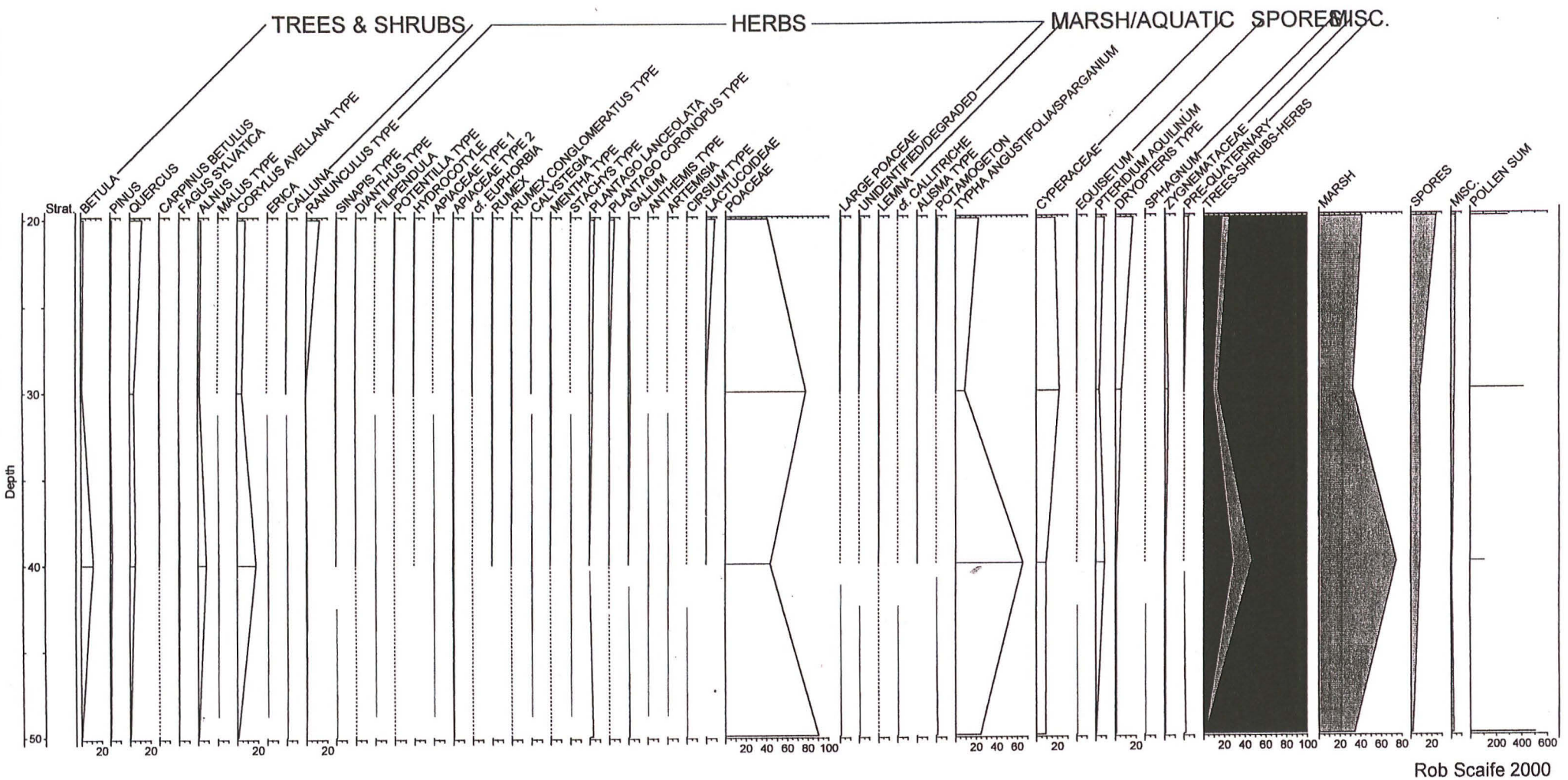
The four samples from this profile (samples 2-5, Table 1; Fig. 2) span the basal grey silt (sample 5), humified peat (samples 3 and 4) and overlying sand/silt.

Herb pollen is dominant throughout the sequence (Fig. 4) although there are higher values of trees and shrubs in the lower peat sample (sample 4). Herbs comprise large quantities of Poaceae (to 90% in sample 5) and *Typha angustifolia/Sparganium* type (68% at 40cm) in the peat. The pollen in the principal stratigraphical units is characterised as follows:

Basal Clay (sample 5) Pollen is abundant. Poaceae are dominant (92%) with highest values. There are negligible numbers of trees and shrubs. Large Poaceae (cereal and/or halophytic types) and *Plantago lanceolata* are the only other herbs present. Marsh taxa comprise *Typha angustifolia/Sparganium* (25%) and Cyperaceae (10%) are the main marsh taxa with occasional aquatics-*Callitriche, Alisma* type and *Potamogeton* type.

Humic Peat (samples 3 and 4). The lowest sample within the peat contained the highest values of trees and shrubs comprising *Betula* (18%), *Quercus* (8%), *Alnus* (6%) and *Corylus* type (20%). Poaceae remain dominant with a greater herbaceous diversity. Marsh taxa show highest values of *Typha/Sparganium* type (68%) declining with Cyperaceae expanding (22%). There is some increase in spores of *Pteridium aquilinum.*

Figure 4: Pollen Diagram for the creek section, Trench 6



Laminated Sands/silts (sample 2). Poaceae (40%) is dominant but with increases in *Quercus* (14%), *Ranunculus* type (13%) *Plantago lanceolata* (5%), *Plantago coronopus* type (5%) and Lactucoideae. *Typha/Sparganium* and Cyperaceae are the principal marsh taxa. There is some increase in spores with *Pteridium* (6%), *Dryopteris* type (16%).

Discussion

Overall, the pollen spectra reflect the changing depositional characteristics of the past intertidal salt marsh/saltern habitat. Although both sample profiles (Trenches 2 and 6) are broadly contemporaneous having similar stratigraphical characteristics, that is, peat intercalated with ?marine/brackish water laminated sediments, there are some palynological differences. This may in part be due to the complex taphonomy of the pollen being derived fluvially and via airborne means.

The peat deposit is perhaps the clearest depositional habitat. In both profiles this was clearly formed in a reed swamp comprising *Typha angustifolia/Sparganium* (reed mace and bur reed) with Cyperaceae (sedges) and possibly Poaceae (grasses which may also come from adjacent grassland/pasture). In Trench 6, this organic/peat accumulation is thicker and appears to show a transition from *Typha/Sparganium* to sedge domination. Note, however, this is conjectural since there are only 2 pollen levels.

In sediments below the peat horizon, (especially Trench 2) the pollen assemblages include taxa suggesting salt marsh/halophytic conditions including *Chenopodium* type (*Salicornia*; glassworts, *Atriplex;* oraches and *Chenopodium* spp; goosefoots) and coastal grassland swards (*Plantago coronopus, P. media/major, P. lanceolata;* plantains) and *Spergula* (spurrey) and muddy habitats (*Littorella uniflora;* shoreweed). Freshwater/aquatic conditions are also represented and possibly derive from fluvial/freshwater sources contributing to the pollen spectra (e.g. *Lemna;* duckweed, *Myriophyllum;* water-milfoil, *Potamogeton* type (pondweed but also possibly *Triglochin*) and algal *Pediastrum*). The lithogenic characteristics are also reflected by typically large numbers of derived geological palynomorphs especially in the lower part of the creek in Trench 2. Above the peat horizon there is a re-incursion of these minerogenic deposits and pollen derived from a diversity of sources.

Adjacent Environment

One of the questions posed in this study was to define the character of the environment adjacent to the creek/saltern. Whilst there are many limitations in pollen analysis, including the difficulty in defining just how far the pollen found has travelled, some general impressions can be gained by examination of the pollen spectra. Here, there is a clear absence of trees and shrubs including alder (which might be expected in such a wetland habitat) and a marked dominance of herbs. There is little evidence of arable cultivation, the large Poaceae found being largely from halophytic grasses which have large diameters but are unlike cereals being generally thinner walled and having smaller pori. Poaceae (smaller grains) are dominant throughout but are a difficult group to define ecologically because of the wide range of habitats in which grasses may be an important constituent. Here, the presence of other taxa such as *Plantago lanceolata* (ribwort plantain), *Ranunculus* type (buttercups), *Trifolium* type (vetches) and Lactucoideae (dandelion types) for example suggest that grassland was important adjacent to the marsh. It was certainly an open landscape with few trees and shrubs.

Marine influences
Given the topographical position of the site, it is clear that changes in Holocene relative sea level must have played an important role in the shaping/formation of this sediment archive. The mineral sediments may have been deposited under brackish water/tidal conditions and this is to some extent evidenced in the pollen spectra. Trench 2 especially has quantities of Chenopodiaceae pollen which is typical of such marine/brackish sediments being derived from a variety of salt marsh plants such as *Suaeda maritima, Salicornia* (glassworts) and *Atriplex* (oraches). There are also strong indications of locally disturbed sandy soils and typical coastal grassland turf/swards with *Plantago coronopus, Plantago media/major, Spergula, Calystegia, Aster* type and possibly *Potentilla* and other less well ecologically definable taxa. These floristic elements are found in the minerogenic deposits above and below the peat. In the sediments there is also a strong indication of freshwater/aquatic vegetation including *Lemna* (duckweed), *Alisma plantago-aquatic, Typha angustifolia/Sparganium, Potamogeton* type (possibly also including *Triglochin maritima*) and algal *Pediastrum* cysts. It seems plausible that these aquatic elements were fluvially derived from upstream sources, This of course assumes that the sediments were laid down in a saline/brackish water/estuarine environment (see below). The onset of peat formation is likely to have been due to standstill or negative eustatic change (negative RSL) in which peat accumulation was able to form from reed swamp which was expanding its growth area laterally and from areas upstream. Such succession to dominance of *Typha* reedswamp is highly characteristic of both transgressive and regressive phases providing a suitable muddy habitat for reed colonisation. Given time, the natural succession would have been towards damp woodland. This was not the case here, and further marine/brackish water inundation took place with further deposition of mineral sediment.

It must be stated that these ideas are conjectural since only a limited number of samples from each section have been examined. Ordinarily, samples at 4cm intervals throughout would be normal for adequate interpretation.

Foraminiferal analysis
Dr Mike Godwin

Trench 2 - south end of creek section
10cm - base of creek (119b)
The overwhelming dominance of *Haynesina germanica* (Table 4) speaks of extremely stressful environmental conditions. The overall aspect of the assemblage is that of a marsh creek. However, the fauna does not suggest very strong diurnal salinity fluctuations so the site may have been proximal to the seaward side of the creek system. The presence of outer estuarine and shallow shelf species indicates an open connection to the Wash. Salinity levels would have been in the 10 to 25 per mille range with about half a metre of standing water at high tide.

30cm - coarse silt (119a)
This assemblage is typical of a lagoonal type setting. The opportunistic coloniser of low oxygen/high nutrient environments *Elphidium oceanensis* forms about 20% of the assemblage and is a characteristic component of a shallow lagoonal fauna. Only one exotic foram was present suggesting a restricted connection to marine waters. Salinity levels would have been around 20 per mille and current activity would have been low.

45cm - clayey coarse silt (119a)
The sediment residues here were very micaceous and contained some plant debris. No foraminifera were detected and it seems probable that brackish water had been excluded from the feature at this point.

Table 4: Foraminifera from the creek deposits in Trench 2

Foraminifera context	**119b**	**119a**	**119a**	**102**		**101**
Depth from base	10cm	30cm	45cm	60cm	62cm	70cm
Haynesina germanica	78	52				5
Elphidium excavata forma *lidoensis*	8					
Elphidium excavata forma *clavata*		3				2
Ammonia beccarii forma *tepida*	8	5				1
Ammonia beccarii forma *batavus*	1	1				
Elphidium williamsoni	2	1				
Elphidium oceanesis	1	16				
Rosalina williamsoni		1				
Buccella frigida	3					1
Bulimina gibba	1					
Lagena sulcata	1					
Brizalina spathula	1					
Fissurina lucida						1
Totals	**104**	**88**	**0**	**0**	**0**	**10**

60cm - humified peat (102); 62cm - organic rich mud
Both these samples contained abundant plant debris and freshwater molluscan shell fragments. A freshwater environment is indicated.

70cm - slightly sandy silt (101)
This sample sees a return to brackish water conditions. The sparse fauna could be interpreted as an estuarine fauna (low intertidal to sub-tidal) - there are no diagnostic species typical of a creek system present. This may represent a marine flooding event, possibly one of a series - similar laminated flood silts have been examined on the Nordelph Road sections just above the road metalling.

Summary
This sequence can be interpreted as the infilling of a creek bed which had cut into a Late Roman marsh surface which was subsequently buried by flood events. The basal layer contains a salt marsh creek fauna. Above this brackish water incursions are restricted and a lagoon or pond develops. This is probably due to the construction of a Saxon seawall as this part of the coast does not form natural barriers (i.e. spits and bars like those of Great Yarmouth). The sample at 45 indicates that all marine influence was terminated before the formation of the thin peat. The thin mud above the peat may represent a freshwater flood event as it is draped across the landscape. However the laminated silts above this would appear to represent marine floods.

Trench 6 - Creek section

Sample 6 - Sandy silt with peat (103)

The residue contained abundant coal, mica and plant debris. A single specimen of *Jadammina macrescens* (an upper saltmarsh species) (Table 4) was found. Freshwater ostracods and freshwater molluscan shell debris were found as well. This suggests that the depositional environment was basically freshwater which was occasionally under mild brackish influence. As the stratigraphically higher levels of context 103 have not been sampled it is impossible to say whether these freshwater conditions prevailed to the top of the context. I suspect not as the succeeding cut was made under the influence of brackish waters by a migrating creek channel.

Sample 5 - Silt under peat

The fauna here is small (Table 4) and may be partially size-sorted. The assemblage is typical of a marsh creek with a direct connection to marine waters as it contains a number of estuarine and marine species which have been transported into the site. A number of diagnostic marsh creek ecotypes are present which suggest strongly fluctuating salinities possibly in the 10 to 30 per mille range. The sorting suggests fairly high energy levels in the creek.

Table 4: Foraminifera from the creek section in Trench 6

Foraminifera sample	**6**	**5**	**4**	**3**	**2**	**1**
Jadammina macrescens	1	1				
Haynesina germanica -		6				33
Elphidium excavata forma *lidoensis*		4				25
Elphidium excavata forma *selseyensis*		1				
Elphidium excavata forma *clavata*		1				4
Ammonia beccarii forma *tepida*		3				9
Ammonia beccarii forma *limnetes*		1				
Ammonia beccarii forma *batavus*						8
Elphidium williamsoni		1				4
Elphidium oceanesis		3				6
Oolina melo		1				3
Gavelininopsis praegeri		1				1
Roasalina anomala						1
Roasalina williamsoni		1				
Fissurina lucida						2
Planorbulina mediterranensis						2
Asterigerinata mamilla						1
Buccella frigida						1
Elphidium earlanidi						1
Elphidium gerthi						2
Brizalina variablis						1
Brizalina spathula						1
Cibicides lobatulus						3
Lagena semistriata						1
Buliminella elegantissima						1
Globigerina bulloides						2
Totals	**1**	**24**	**0**	**0**	**0**	**112**

Samples 2, 3 and 4 - humified peat and silts (102 and base 101 below cut 125)
These samples were barren of foraminifers and represent freshwater marsh deposits. Sample 2 probably came from a freshwater channel in the marsh which was conservatively following the original saltmarsh drainage pattern.

Sample 1 - laminated silts (101)
This sample contained thousands of foraminifers and was subdivided using a microsplitter four times. The assemblage here is typical of a low intertidal flat deposit. However it is the stratigraphical equivalent of the 70cm sample in Trench 2 which was interpreted as a possible flood deposit. Either interpretation is possible but the present elevation of the site at >2m above OD would support flooding as a major source of deposition at this site.

Summary
The findings of this analysis tend to support the field interpretation of the site. Looking at both of the sections together (which have very similar sequences) it can be seen that the creeks cut down into a marsh surface probably of Roman age. Initially deposition prior to the creek formation was in freshwater but brackish influences soon pervaded due to the relative rise in sea level which reached a maximum around 400 AD (Coles and Funnel 1981). Thereafter sea level entered a regressive phase during Saxon times which lasted until the Early Medieval period. It appears likely that brackish waters were excluded from the marsh, probably by the construction of a Saxon sea wall, which led to lagoonal (rapidly followed by freshwater) conditions developing. The overlying deposits probably represent marine floods of various ages.

Interpretation
The field interpretation of the natural sequence of deposits at the site has been broadly substantiated by the results of the analyses. This field interpretation was as follows. The site lies in an intertidal and saltmarsh landscape that was left high by a relative drop in sea level or protected from the sea by the construction of a seabank. This lead to the creation of freshwater conditions and the development of a marsh and the formation of peat. The peat horizon, which is traceable across most of the site, particularly the eastern half, probably dried out towards the end of this episode. This was followed by a new inundation by the sea, the infilling of the creeks (and the formation of new creeks with no peat) and the covering of the site with further laminated silty sands and sandy silts. The two silt and clayey layers presumably reflecting periods of standing water or flood deposits or perhaps upper saltmarsh sediments, before and after the peat formation. The humified peat occurs between approximately 2.3 and 2.7m OD (except where it dips into the creeks). The saltern activity appears to be associated with the period before the formation of the peat, presumably when the sea was in retreat, since a few small fragments of briquetage were found in the deposits beneath the peat in one trench. The sequence across the whole site (about 10 trenches) appears to be consistent.

The radiocarbon results tie this sequence into a chronology. The saltern activity is dated to the late Iron Age or Roman period. Unfortunately the precision of the date is not sufficient to be more specific. Apart from the fact that briquetage was found beneath the peat horizon in one of the evaluation trenches the saltern cannot be linked stratigraphically with the creek sequences that have been studied. Therefore the precise environment over the site within which the saltern was operating has not been established from this evaluation. It is presumed that this was probably similar to the environment indicated by the basal sediments in the

creeks. The formaminifera have suggested that the deposits in the base of the creek in Trench 2 suggest that the creek bottom may have been standing in half a metre of water at high tide. From this one might infer a contemporary mean high tide level of somewhere in the region of 2.5m OD. A level adequate for the creeks and hollows around the saltern site to have contained sea water at high tide and probably been filled by spring tides. The sediments beneath the creek in Trench 6, into which the creek has cut, show a slightly different picture. There was only a single foram in the sample which otherwise contained freshwater ostracods and mollusca, and plant debris. This is primarily a freshwater environment with some brackish water input and indicates an earlier freshwater phase in the sedimentary sequence in Trench 6 at an OD height of approximately 1.4m. Unfortunately this was not recognised during the fieldwork and no pollen samples or radiocarbon samples were collected from these sandy silts, so the age of this episode of deposition in freshwater conditions is not known. It is presumed that the upper laminated sandy silts and silty fine sands of context 103 (Fig. 2) in this section were deposited in a tidal/estuarine environment, although no samples of this were studied, and may have been contemporary with the saltern activity on the site. The charred plant remains from the saltern site include bulrush, spike-rush and sedges and suggest the local presence of freshwater environments and sedge communities.

The two sampled creeks represent marginally different periods on the site since the peat in Trench 2 occurs much higher in the sequence than that in Trench one, and therefore presumably reflects a longer period of sediment formation within it than the sediment below the peat in Trench 6. The peat and deposits overlying it are the only directly relateable stratigraphic units in the two sections, although deposits 103 in both trenches are presumed to be the same unit. The lower fills of the creek in Trench 2 show both a fining upwards of the sediment and a tendency to reducing salinity with the upper half of context 119a containing no forams, probably indicating exclusion of brackish water during this period of sedimentation. This shows a period of reducing salinity, and the onset of freshwater conditions in the creek, well before the formation of the peat deposits above. In contrast the silts below the peat in the creek in Trench 6 indicate a direct connection with marine waters, fluctuating salinities and fairly high energy levels. These deposits are significantly lower than those in Trench 2 (approx. 1.75m OD in trench 6 and 2.3m OD in Trench 2) and this may have been sufficient to account for the different depositional environment in the two creeks assuming the sediments are broadly contemporary. The rapid change in Trench 6 from fairly high energy levels and strongly fluctuating salinities to peats immediately above contrasts with the fining up sequence in Trench 2. This may support the suggestion made above that the restriction of brackish water from these creeks was due to construction of a sea bank. If this was the case then this would indicate construction of sea defences in this area as early as the middle Saxon period.

Although only a sample of the peat from the thicker deposit in Trench 6 was dated it has been assumed that this horizon is broadly contemporary across the whole site. The radiocarbon date indicates that it was laid down in the early to middle Saxon period, AD 530-680. The pollen evidence shows a relative peak in the pollen of tree, shrub and marsh taxa in both creeks (Figs 3 and 4), with particularly high values for *Typha angustifolia/Sparganium* type (reedmace/bur-reed). This deposit was clearly formed in a reedswamp, and its presence in most of the evaluation trenches indicates that this swamp was locally extensive. If the changes to the local environment in the area were in part due to construction of a sea bank this may also have been responsible for the formation of a lagoonal environment in which the peat formed. The peat was typically covered by a thin lens of clay (see Fig. 2) across much of

its extent which appears to represent a flood event. The absence of forams in this layer in trench 2 suggests that this was a freshwater flood and the pollen evidence indicates an increase in herbs, *Plantago lanceolata*, *Plantago coronopus* and large Poaceae, suggesting perhaps an expansion of grassland at the expense of the marsh elements of the flora. The peats are well humified and may have dried out at this time prior to the flooding.

Overlying these freshwater sediments two samples were studied for forams from Trenches 2 and 6. The field interpretation of the laminated silty sands and sandy silts of context 101 was that these represented tidal sediments. Certainly the small foram assemblage from sample 70cm in trench 2 indicates a return to brackish water conditions, the sparse estuarine fauna possibly deriving from marine flooding. The evidence at the top of the two sequences is at variance and it is probable that they either do not represent contemporary sediments and/or the height differential (approximately 0.4m) between the deposits is responsible for differences in the foram assemblages. Sample 1 from Trench 6 contains an abundant foram fauna typical of a low inter-tidal mudflat with no diagnostic creek taxa. This may represent marine flooding, but the continuation of these fine sandy and silty deposits to the modern ground surface is indicative of a period of regular tidal or marine flood sedimentation building up nearly 0.8m of sediments before reclamation activities protected the area from further inundation. At similar levels in Cowbit Wash (above 1.67m OD) Shennan (1986) records sandy silts of freshwater origin probably resulting from flooding of the Welland marshes and some similar freshwater flood sediments may have been deposited in the upper levels of the sequence at Holland Park.

Conclusions

Whether this change from freshwater, to marine, to fresh, to marine and finally terrestrial (with some possible seasonal flood sediments) environments on the site is directly relateable to relative sea level changes or sea bank construction or combinations of both is not known. The upper peat at Cowbit Wash, with a surface at 1.67m OD is dated by radiocarbon to 2595±60 BP (Hv-10808) significantly earlier than the peat horizon (at between 2.3 and 2.7m OD) at Holland Park, and earlier than the saltern activity. This is more consistent with the lower freshwater sandy silts beneath the creek in trench 6 and might suggest that these deposits date to the middle Iron Age, the saltern being associated with the subsequent marine phase on the site. This is not the place for any extended discussion on the relevance of the site to sea level change but with the documented rise in sea level in the Roman period reaching a maximum around AD 400 (Coles and Funnel, 1981) the saltern activity is likely to date to the period of relative rise before this. The Saxon peats would indicate a reversal or regressive phase although the length of this episode has not been established at Holland Park. Finally the deposits indicate further marine inundation at the site, but whether regular tidal incursion or much less frequent marine flood events is not known, although the tidal model seems more likely. In any event, except for those areas where the ground is slightly higher such as the saltern site, the archaeological exploitation of this area is likely to have been limited to transient wild fowling, fishing, reed harvesting and perhaps episodes of pasturing rather than more permanent settlement or established farming, at least until late medieval or later times.

With hindsight a greater number of samples through the creek sediments and more extensive sampling of the deposits through which the creeks had cut and those that covered the upper fills would have added greater clarity and accuracy to the interpretation of the changes in the environment across the site. In the context of an evaluation designed to assess the archaeological threat of a development this scale of study may not have been justifiable.

Acknowledgments
I should like to thank Alison Foster and Jeremy Dubber for the sample processing.

Bibliography
Bennett, K.D., Whittington, G. and Edwards, K.J. 1994 'Recent plant nomenclatural changes and pollen morphology in the British Isles'. *Quaternary Newsletter* 73,1-6.
Cameron, R.A.D. and Redfern, M. 1976 *British Land Snails*. Linnean Soc. Synopses of the British Fauna No. 6
Clapham A., Tutin T., and Moore D. 1987, *Flora of the British Isles. 3rd edition.* Cambridge University Press.
Coles, B.P.L. and Funnel, B.M. 1981 *Holocene palaeoenvironments of Broadland, England.* Special publication of the Int Assoc. of Sedimentologists, Vol. 5, 123-131
Evans, J.G. 1972 *Lands Snails in Archaeology*, Academic Press
Giorgi J.1998, The charred plant remains from Bourne Road, Spalding (BRS98)
Moore, P.D. and Webb, J.A. 1978 *An illustrated guide to pollen analysis*. London: Hodder and Stoughton.
Moore, P.D., Webb, J.A. and Collinson, M.E. 1991 *Pollen analysis* Second edition. Oxford: Blackwell Scientific.
Shennan, I. 1986 Flandrian sea-level changes in the Fenland. I: the geographical setting and evidence of relative sea-level changes. *J. Quat.Sci.* 1, 119-154
Stace, C. 1991 *New flora of the British Isles*. Cambridge: Cambridge University Press
Williams, D.1973 Flotation at Siraf, *Antiquity*, 47, 198-202

Figure 6: Radiocarbon date and calibration for peat from context 102

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-145723**

Conventional radiocarbon age[1]: **1910±100 BP**

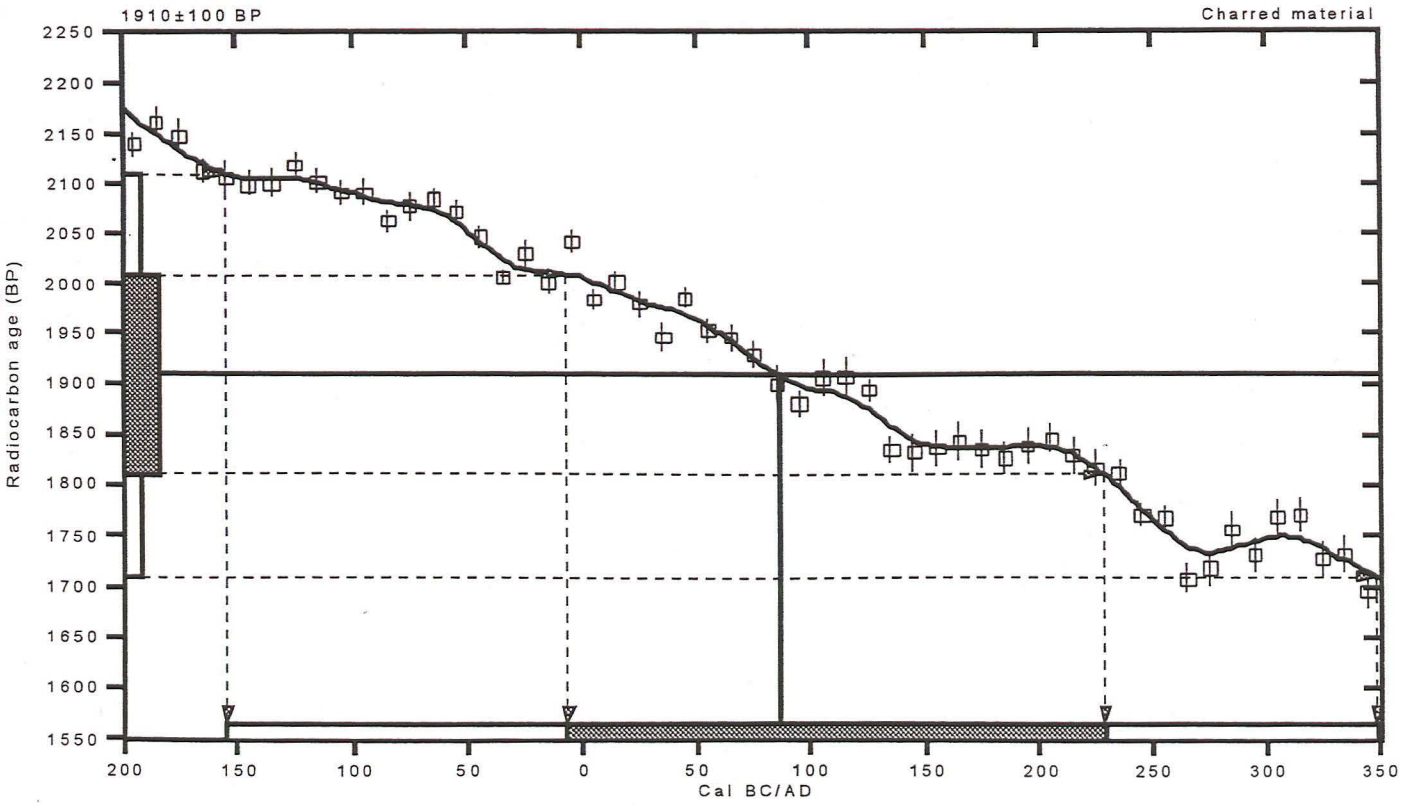
2 Sigma calibrated result: (95% probability) **Cal BC 160 to Cal AD 350 (Cal BP 2100 to 1600)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 90 (Cal BP 1860)

1 Sigma calibrated result: (68% probability) Cal BC 10 to Cal AD 230 (Cal BP 1960 to 1720)



References:

Database used

Calibration Database

Editorial Comment

Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii

INTCAL98 Radiocarbon Age Calibration

Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083

Mathematics

A Simplified Approach to Calibrating C14 Dates

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

Beta Analytic Inc.

4985 SW 74 Court, Miami, Florida 33155 USA • Tel: (305) 667 5167 • Fax: (305) 663 0964 • E-Mail: beta@radiocarbon.com

Figure 5: Radiocarbon date and calibration for charcoal from context 136

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-143278**

Conventional radiocarbon age[1]: **1440±60 BP**

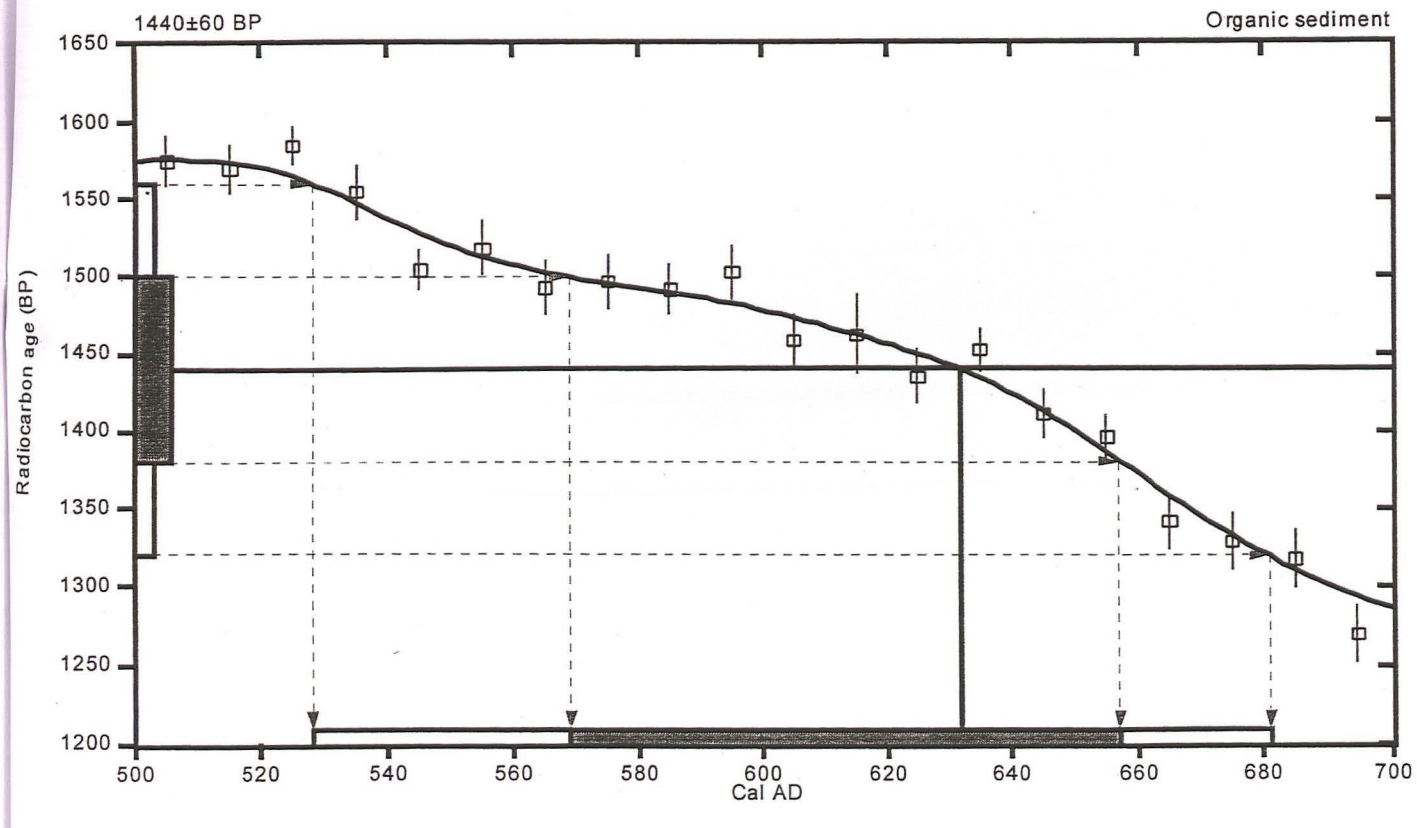
2 Sigma calibrated result: (95% probability) **Cal AD 530 to 680 (Cal BP 1420 to 1270)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 630 (Cal BP 1320)

1 Sigma calibrated result: (68% probability) Cal AD 570 to 655 (Cal BP 1380 to 1295)



References:

Database used
INTCAL98
Calibration Database
Editorial Comment
Stuiver, M., van der Plicht, H., 1998, Radiocarbon 40(3), pxii-xiii
INTCAL98 Radiocarbon Age Calibration
Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
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
4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

Appendix C :

Trench and Context Summary

Contexts

Location	All trenches		
	Category	**Context No**	**Interpretation**
	Layer	100	Modern topsoil. Lower 100mm represents an agricultural panning or A2 horizon; difficult to know either way, but the presence of the charcoal flecks within the lower band and their relative absence in the upper margins may support an A2 hypothesis.
	Layer	101	Extensive waterborne accumulation sealed by the modern topsoil. Seals ?buried land surface 102 and forms upper fill material of palaeochannels / ditches. Forms an indistinct interface with the overlying (100) A2 band owing to active soil processes.
	Layer	102	?Previous land surface. Would appear to represent a vegetational horizon across the site and forms the banks of channels / ditches. Sealed by a laminated series of fine silts (101). Does this suggest seasonal flooding after the ditches are allowed to silt up - possibly after abandonment of saltern?
	Layer	103	Natural silt accumulation - mudflat

Location	Area 1		
	Category	**Context No**	**Interpretation**
	Cut	144	Linear cut for modern drain / sewer pipe
	Fill	142	Lower fill of modern drain cut 144
	Fill	143	Upper fill of modern sewer / water pipe cut 144

Location	Area 2		
	Category	**Context No**	**Interpretation**
	Cut	132	Linear feature purpose not known but runs in general direction of saltern. Inusfficient evidence to expand.
	Fill	131	Fill of 132

Location	T01		
	Category	**Context No**	**Interpretation**
	Cut	105	Palaeochannel
	Cut	107	Palaeochannel
	Fill	104a	Fill of 105
	Fill	104b	Fill of 105
	Fill	104c	Fill of 105
	Fill	104d	Fill of 105
	Fill	106	Fill of 107

Location	T02		
	Category	**Context No**	**Interpretation**
	Cut	116	Palaeochannel pre-dating saltmarsh
	Cut	118	E-W aligned palaeochannel
	Cut	120	Palaeochannel on E-W alignment
	Fill	115	Fill of Palaeochannel 116
	Fill	117	Fill of 118
	Fill	119a	Inwash deposit in 120
	Fill	119b	Primary silting of 120

Location	T04		
	Category	**Context No**	**Interpretation**
	Cut	112	Field boundary. Possibly recut (see profile) but not sure as division between fills in not distinct in section.
	Fill	113	Secondary fill of ditch 112
	Fill	114	Primary fill of field boundary ditch 112

Location	T05		
	Category	**Context No**	**Interpretation**
	Cut	122	Possible pipe trench same as 144
	Cut	124	Palaeochannel predating saltmarsh phase
	Fill	121	Fill of possible pipe trench 122 - same as 144
	Fill	123	Fill of 124

Location	T06		
	Category	**Context No**	**Interpretation**
	Cut	109	?Field boundary. Contains fill series 108. Lower fill 108c probably due to natural silting but 108 a & b appear to be deliberate backfill deposits
	Cut	111	?Field boundary
	Cut	125	Palaeochannel. Dimensions difficult to establish as it is defined by overlying deposits rather than being a defined cut/fill per se.
	Cut	126	N-S aligned linear field / boundary ditch / channel (see 125)
	Fill	108a	Fill of 109
	Fill	108b	Fill of 109
	Fill	108c	Fill of 109

Fill	110a	This fill series appears to relate to a series of inwash deposits of material banked up to either side of the feature suggesting a short lived episode. Contained by 111
Fill	110b	Fill of 111
Fill	110c	Fill of 111
Fill	110d	Fill of 111
Fill	110e	Fill of 111

Location T14

Category	Context No	Interpretation
Cut	151	Linear ditch
fill	152	Fill of 151
fill	153	Fill of 151

Location T18

Category	Context No	Interpretation
Cut	135	Part of linear saltern enclosure. ***Actually part of enclosure associated with saltern - interpretation based on presence of extensive quantities of briquetage in the fills. There is no evidence (ie burning / hearths) of a saltern on this actual site.***
Cut	137	Purpose not determined. Did not appear to have any structural evidence or any other usage except as a repository for discarded material.
Cut	139	This feature, together with the channel 141 would appear to e the outer enclosure ditch anomaly on the geophysical survey. The presence of fill 140b between 138a & 138b indicates that the two features were open at the same time.
Cut	141	Natural channel contemporary with settlement. Secondary fill 140b also partially fills 139
Fill	134a	Upper fill of ditch 135. Represents abandonment of saltern
Fill	134b	Primary sedimentation of ditch 135
Fill	136	Fill of a shallow ?pit 137.
Fill	138a	Fill of 139
Fill	138b	Fill of 139
Fill	138c	Fill of 139
fill	138d	Fill of 139
fill	138e	Fill of 139. Not clear whether this deposit was weathering or if the section through the series was overcut.
Fill	140a	Upper fill of 141
Fill	140b	Fill of 141 & 139
Fill	140c	Fill of 141

Location	T21		
	Category	**Context No**	**Interpretation**
	Cut	128	Purpose of feature probably agricultural field boundary or dyke. May be realted to saltern activity but impossible to confirm without further excavation.
	Cut	130	Channel of unknown origin probably natural caused by tidal activity
	Fill	127	Modern linear feature - probable field boundary / ditch
	Fill	129	Fill of 130

Location	T25		
	Category	**Context No**	**Interpretation**
	Cut	148	Post 19th century intrusion
	Cut	150	Broadly E-W aligned palaeochannel pre-dating saltmarsh
	Fill	147	Fill of modern intrusion 148
	Fill	149	Fill of palaeochannel 150
	Layer	145	Modern made ground comprised of redeposited natural
	Layer	146	Buried topsoil horizon