A12 Flood Alleviation Scheme
Blythburgh, Suffolk
BLB 092

Archaeological Monitoring & Palaeoenvironmental Survey Report

SCCAS Report No. 2014/093

Client: Suffolk County Council

Author: M. Sommers

September 2014

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Author: M. Sommers

Contributions by: Kristina Krawiec (ASE)

Editor: Dr. R. Gardner

Report Date: September 2014

HER Information

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Report Number	**2014/093**
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Curatorial Officer:	**Jude Plouviez**
Project Officer:	**M. Sommers**
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Disclaimer

Any opinions expressed in this report about the need for further archaeological work are those of the Field Projects Team alone. Ultimately the need for further work will be determined by the Local Planning Authority and its Archaeological Advisors when a planning application is registered. Suffolk County Council's archaeological contracting services cannot accept responsibility for inconvenience caused to the clients should the Planning Authority take a different view to that expressed in the report.

Prepared By: M. Sommers
Date: 9th September 2014

Approved By: Dr. R. Gardner
Position: Contracts Manger
Date: 9th September 2014
Signed:

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Summary

Archaeological monitoring of the flood alleviation works undertaken on a stretch of the A12 Trunk Road just north of the village of Blythburgh during April, May and June of 2014. The road runs across the tidal floodplain of the River Blyth on a raised causeway and has been liable to flooding. The majority of the works involved the building up of flood banks on either side of the existing carriageway and the installation of sheet piles on the seaward side of the roadway and afforded little opportunity to expose archaeological levels. Associated works with the potential to expose buried archaeological remains consisted of the excavation of narrow trenches for drainage and the realignment of a ditch. Much of this work was monitored but no significant archaeological remains were identified.

In conjunction with these works a palaeoenvironmental survey of the peat deposits within the floodplain was undertaken the results of which revealed that the depth of the basal sands and gravels at the southern end of the crossing, close to the modern course of the River Blyth, lay at a depth of 6.60m bgl but shallowed out to 2.90m bgl to the north. They were overlain by a poorly humified reedy woody (floodplain) peat, which in turn was overlain by a grey brown mottled alluvial clay and topsoil. The period of peat formation at the sample locations has been radiocarbon dated from the Late Mesolithic period to the Middle Anglo Saxon Period. Pollen data recovered suggested limited indications of human activity within the vicinity of the sample site, with evidence for clearance occurring late in the sequence whilst the plant assemblage suggested the presence of grazing herbivores suggesting possible pastoral exploitation of the floodplain.

(Mark Sommers, Suffolk County Council Archaeological Service, Field Team, for Suffolk County Council)

1. Introduction

In order to reduce flooding on a stretch of the A12 Trunk Road immediatly to the north of the village of Blythburgh in Suffolk (see Fig. 1) the 'A12 Blythburgh Flood Alleviation Scheme' was initiated by Suffolk County Council. The stretch of road requiring protection runs approximately north-south across the River Blyth and its floodplain on a raised causeway. The proposed works primarily involved the raising of earthen banks on either side of the carriageway, one of which would be further strengthened with sheet piling.

To mitigate against the potential loss of archaeological evidence it was agreed that certain aspects of groundwork associated with this project was to be archaeologically monitored.

The archaeological work was undertaken in accordance with a Written Scheme of Investigation (WSI) produced by AECOM, consultants acting for Suffolk County Council, after seeking advice from English Heritage and the Suffolk County Council Conservation Team. The final draft of the document was approved by J. Plouviez, as the archaeological curatorial officer for Suffolk County Council. (Appendix 1).

An additional requirement stipulated by the WSI was the undertaking of a palaeoenvironmental survey to investigate the peat deposits within the Blyth valley in the vicinity of the scheme.

The archaeological monitoring was undertaken by the Suffolk County Council Archaeological Service, Field Team, who were commissioned and funded by Suffolk County Council. The palaeoenvironmental survey was undertaken by staff from Archaeology South-East, as sub-contractors for SCCAS/FT.

2. Geology and topography

The roadway that is the subject of the A12 Blythburgh Flood Alleviation Scheme runs north-south across the floodplain of the River Blyth on a causeway which in its centre, is at a height of approximately 1.5m OD. Immediately to the south of the scheme area runs the River Blyth, which is tidal at this point. It flows from the west down to the North

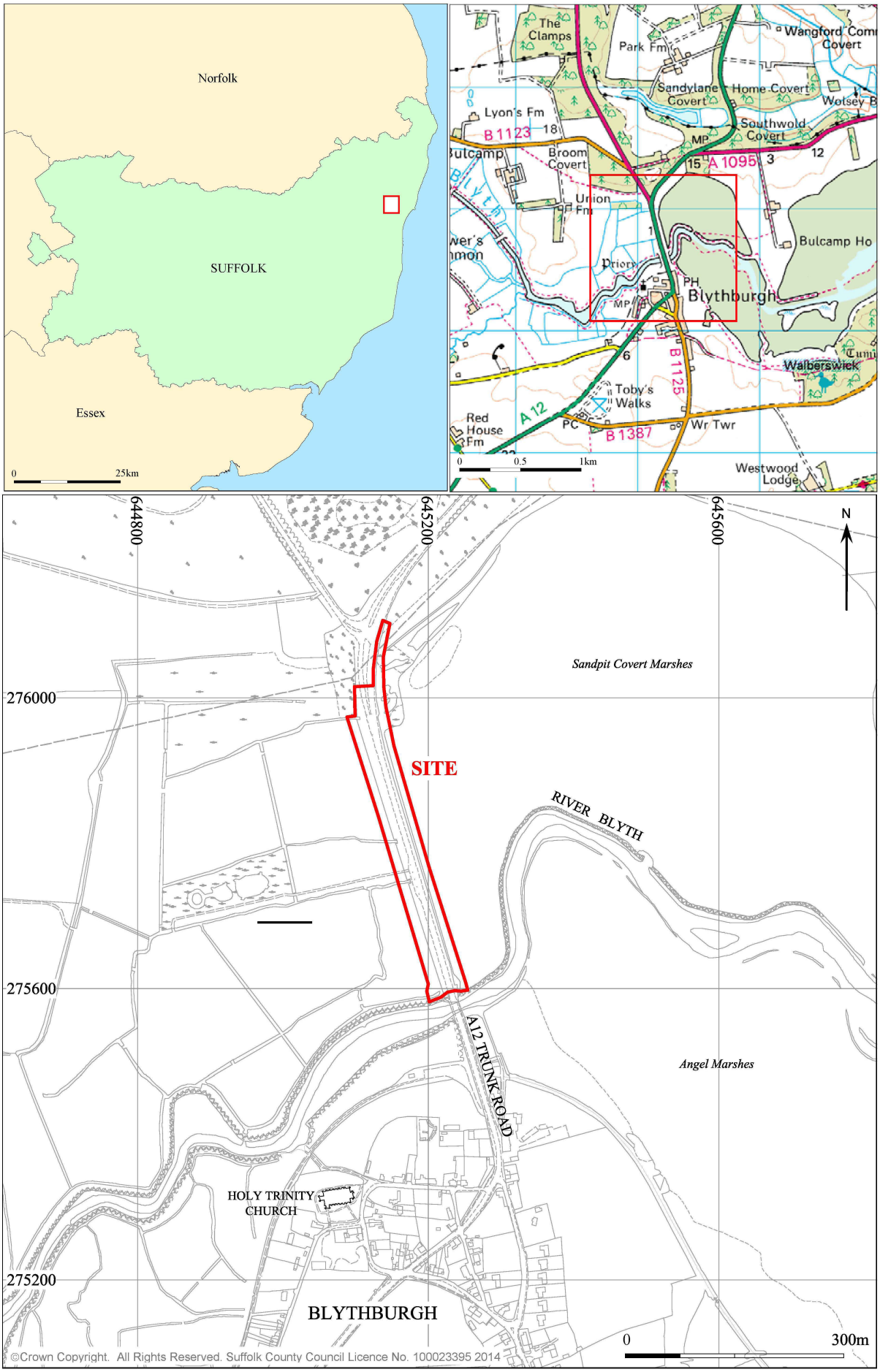

Figure 1. Location map

Sea, some 5.5km to the east. At the crossing point of the A12 the valley is approximately 0.5km wide and overlooked by higher ground which gently rises to approximately 15m OD. The river channel itself is situated close to the southern edge of the valley floodplain. To the west of the road lies a large flat area of former marshland at or just slightly above sea level. It has been drained and now consists of pasture that is protected by a river wall along the northern bank of the River Blyth. To the east lies a vast area of tidal mudflats that, prior to the mid-20th century, were also drained marshland converted to pasture. It was protected by river walls but these have been breached leaving the area to flood with each high tide which over a period of time has resulted in the mudflats.

The superficial geology in the local area, as recorded by the British Geological Society, varies between alluvium deposits of clay, silt, and gravel along with an area of peat to the west of the roadway whilst to the east it is dominated by tidal flat deposits of clay and silt. The higher ground to the north and south consists of the Lowestoft Formation, part of an extensive sheet of chalky till with outwash sands and gravels, silts and clays. The bedrock geology of the entire area comprises sedimentary sand of the Crag Group.

3. Archaeology and historical background

A Desk-Based Assessment of the A12 Blythburgh Flood Alleviation Scheme area was been undertaken in May 2011 (SCCAS Report 2011/081) which detailed its archaeological and historical background. The main conclusions are as follows:

There is little evidence for significant activity in the vicinity during the prehistoric or Roman periods but identified Blythburgh as the site of a significant and high status Anglo-Saxon settlement, as demonstrated by the presence of the tablet and stylii. It possessed an early Christian church, the tomb of a revered king, and was a possible Episcopal seat. It was also a possible port and it overlooked an important river crossing. The evidence for Saxon activity has come from documentary sources and from the large body of finds recovered on the southern bank of the river, in the area of present village, but there is also a record of significant quantities Saxon material having been recovered from the north bank. This may a result of later dredging and redeposition of material but could be related to actual activity on the opposite bank to the main

settlement. Additionally, the site of the 7th century Battle of Bulcamp is unknown and could potentially be within or close to the scheme area.

Settlement activity continues in and around Blythburgh throughout the medieval period and the post-medieval period. Again, much of this activity is on the raised area of land on which modern Blythburgh sits and the river crossing.

The present site of Blythburgh Bridge is c. 30m to the west of the site of the bridge recorded on the tithe map of 1841. This is probably the result of the new bridge, that was built in the 1850s, being alongside the existing bridge in order enable the earlier bridge to stay in use during the construction phase, or it may be related with a need to realign the roadway in order create a bridge over the Southwold Railway, which opened in the 1879.

4. Methodology

The monitoring was achieved through the repeated visits to site to undertake visual examination of groundworks underway in order to identify and record any significant archaeological features and/or deposits. The location of any significant phenomenon identified would then be plotted and stratigraphy recorded. The spoil was also examined in an attempt to recover datable finds.

In the event, the main method of recording was through the taking of digital photographs.

5. Results

Archaeological Monitoring

A total eleven visits were made to the site in order to inspect the works underway. No significant archaeological deposits, features or artefacts were identified at any time.

The aspects of the works monitored are as follows:

1. Striping of topsoil in advance of the deposition of material to raise the flood banks on the western side of the roadway.
2. Excavation of trenches for the installation of new drainage along the existing road.
3. Stripping and re-profiling of the eastern front of the flood defences.
4. Excavation of a new/realigned ditch at the toe of the new western flood bank.

See Figure 2 for a plan of the works and areas monitored.

The observations recorded during the monitoring of these aspects are as follows:

1. The initial topsoil strip of the roadside verge and the sloping side of the causeway on the western side of the roadway was inspected during April 2014. The work was undertaken with a toothless ditching bucket fitted to the back-acting hoe of a wheeled JCB type excavator. The topsoil was relatively thin and sandy. The resultant surface was slightly uneven as the main aim was to remove vegetation before the importation of material to raise a flood bank. A pale reddish-brown sand was revealed below the topsoil, but no features were apparent (plates 1 and 2).

2. Excavation of trenches for new drainage. These comprised linear trenches *c.* 0.5m wide and 0.6m deep running approximately north-south along the western edge of the existing road, with occasional boxes, *c.* 1.5m by 2m and 1m deep. Beneath the topsoil these excavations revealed a mass of brown silty sand with

occasional lenses of darker, slightly organic material, which continued down to at least 1m (plate 3).

One trench running east-west under the existing road revealed *c.*0.5m of road make-up (tarmacked surface over rammed hard-core) over layer of black fine grained sand and silt with occasional rounded pebbles to a depth of *c.* 1.4m, at which point the top of a deposit of yellow sand and a gravel was evident (plate 4).

3. The reconstruction of the front, in effect seaward face of the flood defence involved the removal of the existing rock armour and the immediately adjacent mudflat to a limited depth, building up the resultant surface with sand and laying on an 'asphalt sheet' before replacing the original rock and pushing disturbed mud back into place (plates 5 and 6). This work was relatively limited in its scope to reveal any archaeological remains and was only partly monitored. Once this stage was complete sheet piling was driven in along the entire length of the new defence and the soil then built up to the top of the sheeting (plate 8).

4. A new ditch was excavated at the toe of the new western flood bank to replace an existing drain that had been covered by the new bank. The new ditch was cut to a depth of *c.*1.3m and a width of 3.5m. Its profile comprised a flat base approximately 1.2m wide with sloping sides at an angle of 45°. It was cut through a thin peaty topsoil over a *c.*0.4m thick layer of grey silt which in turn overlay peat to the full depth of the ditch (plate 7).

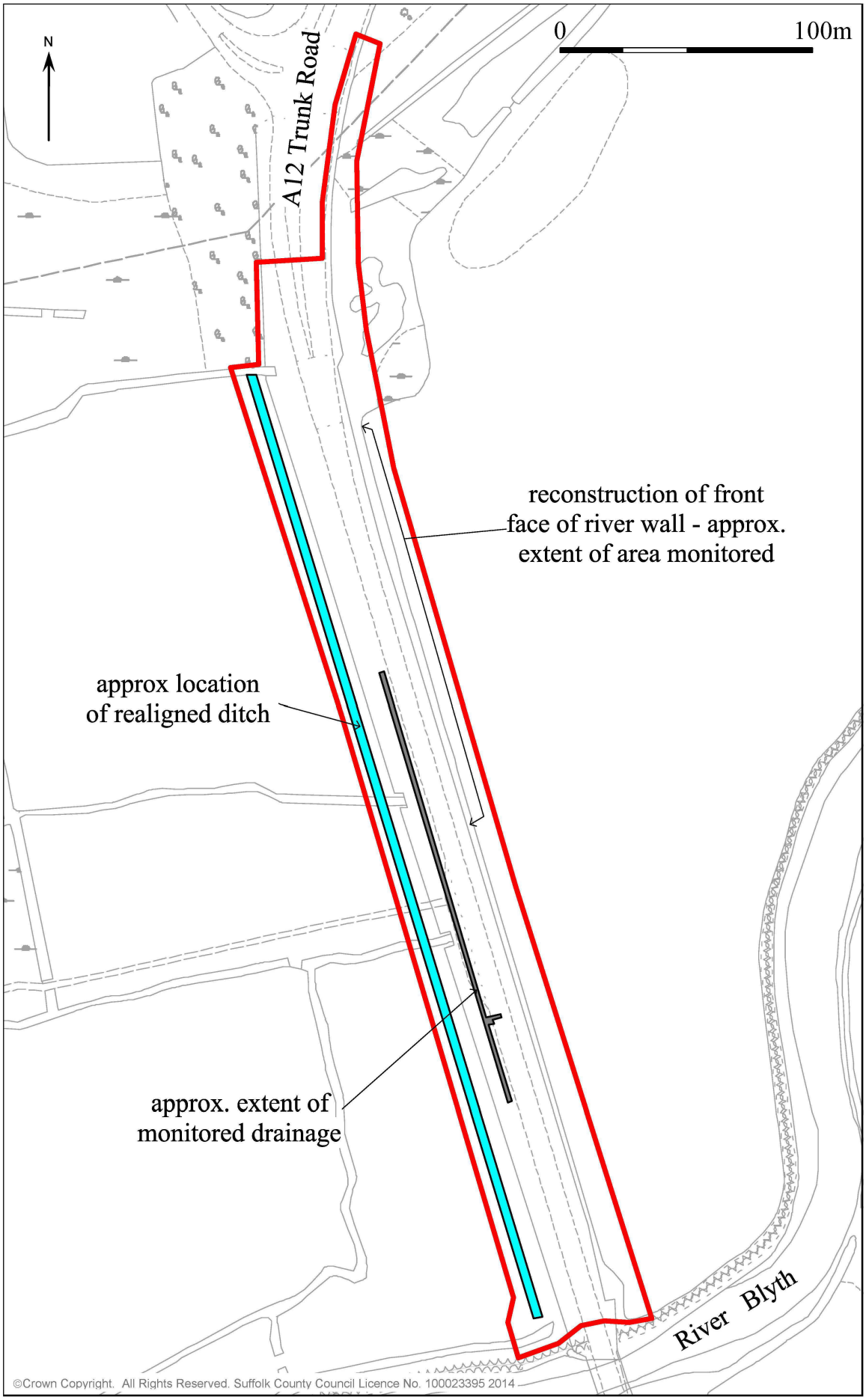

Figure 2. A12 Blythburgh Flood Alleviation Scheme area

Palaeoenvironmental survey

Kristina Krawiec (ASE)

A summary of the survey results follows below; see Appendix 2 for the full report:

The survey comprised 10 boreholes which were undertaken with a terrier rig in order to characterise the lithology of the site and with 2 boreholes retained to recover material for palaeoenvironmental analysis and radiocarbon dating. These boreholes were located along a narrow strip of land alongside the A12 in advance of flood alleviation works.

The survey identified the general trend in the depth of the basal sands and gravels which became deeper to the south, towards the modern course of the River Blyth. These were encountered at 6.60m bgl (-6.37m OD) and shallowed out to 2.90m bgl (-2.53m OD) to the north. The gravels were overlain by a poorly humified reedy woody (floodplain) peat, which in turn was overlain by a grey brown mottled alluvial clay and topsoil. The peat was assessed for pollen and plant macrofossils as well as radiocarbon dating. The period of peat formation at the sample locations has been dated to from the Late Mesolithic period to the Middle Anglo Saxon Period. The pollen assemblage was well-preserved but counts were low and therefore of limited value. The data recovered suggested limited indications of human activity within the vicinity of the sample site, with evidence for clearance occurring late in the sequence. The plant assemblage suggested the presence of grazing herbivores which may be related to pastoral exploitation of the floodplain. No further work is recommended for this sequence.

6. Finds

No pre-modern artefacts were identified during the monitoring of these works.

7. Discussion

The works undertaken to alleviate flooding on this stretch of the A12 resulted in limited disturbance to the existing ground levels and as such afforded little opportunity to reveal any significant archaeological deposits.

The material exposed in the initial topsoil strip is presumably an imported soil associated with the construction of the causeway but is likely to relate to a later, post-medieval build up. Similarly the material exposed in the drainage trenches on the western edge of the existing roadway is also part of the make-up of the causeway but as it was completely clean and contained no artefacts it is not possible to identify the date of its deposition although the probability is that it is post-medieval to modern. There was a marked difference in the material exposed in the roadside trenches as opposed to the trench under the existing road surface but again no dating evidence was obtained.

It is quite possible that the vast bulk of what presently forms the present causeway across the River Blyth valley was deposited relatively late in the route's history, the earlier crossing having been formed of timbers, brushwood and withies that have been lost or, given the limited depths of the monitored groundwork, were just not exposed during these works.

The palaeoenvironmental survey suggest that peat deposition ended around the 7th/8th century, probable as a result of a constraining of the river and land reclamation through enhanced draining of the marsh areas. This date roughly coincides with the expansion of Blythburgh as a significant settlement.

8. Archive deposition

Historic Environment Record reference under which the archive is held: BLB 092.
The digital archive will be stored on the SCC secure servers at the location:

R:\Environmental Protection\Conservation\Archaeology\Archive\Blythburgh\BLB 092 Monitoring (A12 Flood Alleviation)

Digital photographs are held under the references: HWS 33 to HWS 68

A summary of this project has been entered into OASIS, the online database, under the reference: suffolkc1-177650

9. Plates

Plate 1. Topsoil strip, western verge, camera facing north (ref. HWS 33)

Plate 2. Topsoil strip, western verge and slope of causeway, camera facing north (ref. HWS 34)

Plate 3. general view of drainage trench, camera facing northwest (ref. HWS 37)

Plate 4. view of drainage trench across existing road, camera facing north (ref. HWS 47)

Plate 5. east face of causeway after removal of rock armour, camera facing north (ref. HWS 42)

Plate 6. east face of causeway during reconstruction, camera facing south (ref. HWS 41)

Plate 7. Realigned ditch at toe of western flood bank, camera facing northwest (ref. HWS 42)

Plate 8. East face of causeway after insertion of sheet piling, camera facing northwest (ref. HWS 66)

Appendix 1. Written Scheme of Investigation

AECOM: A12 Flood Alleviation Scheme

Written Scheme of Investigation

Site Location:	The sites are located within the unitary authority of Suffolk County Council.
NGR (centre):	TM 45238 75578
Proposal:	The proposal for the area is to use the site for a flood alleviation scheme.
Site area:	A12 Ipswich to Lowestoft Road, north of Blythburgh, Suffolk.
Land use:	Highways
Client:	Suffolk County Council

Site Location and Description

The A12 Ipswich to Lowestoft Road crossed the Blyth estuary to the north of Blythburgh. An area of marshland lies to the east of the A12 and Scheme boundary. The northern end of the scheme is located at TM 45278 75459 and the southern end at TM 45135 76134.

Archaeological and Historical Background

The limited programme of window sampling is required to assess, record, and sample the peat deposits recorded in historic boreholes for a palaeoenvironmental and palaeoecological material. This includes microfauna and flora, pollen and organic material suitable for radiocarbon dating to give terminus post quern and terminus ante quern for the peat formations.

A desk-based assessment (DBA) and Environmental Review Report (ERR) has been undertaken for the Scheme and indicated archaeological and built heritage features both within and in proximity to the site. The ERR covered the Scheme boundary and a 1km study area surrounding it. A walkover survey and examination of historic maps and other documentary evidence were employed in to enhance the baseline data sets.

The ERR found a total of 62 assets recorded within the 1 km study area, including one Scheduled Monument, 12 listed buildings and one entry on the Register of Parks and Gardens. The Scheduled Monument comprises Blythburgh Priory (also a Grade II listed building) which dates to the medieval period. The 12 listed buildings include one Grade I listed, one Grade II* listed and 10 Grade II listed buildings which date from the medieval to modern periods. The Registered Park and Garden is that of Henham Park. The Scheme is also located within the Blythburgh Conservation Area. The undesignated assets date from the prehistoric to modern periods, although they mainly reflect the medieval and post-medieval development of the study area.

The ERR found that from the 62 assets recorded within the study area, only two were located within the Scheme boundary. These are the site of a former railway station and Blythburgh Bridge. The results of the ERR indicated that there was the potential for unrecorded archaeological remains to survive. There is also the potential for geoarchaeological and palaeoenvironmental remains.

Requirement for Work

The survey of window sampling is required to examine the area for potential geoarchaeological and palaeoenvironmental features. This information will be used to inform the requirement for further work.

The aim of this window sampling is to gather sufficient information to establish the terminus post quem and terminus ante quem for the peat formation along the Blyth estuary. The surveys should be undertaken following best practice guidance and the additional requirement from Suffolk County Council Archaeology Service to achieve the optimum results.

The programme will result in the preparation of a report, which should follow the report outline in the standards and guidance listed in the next paragraph.

The survey should be carried out in accordance with the Institute for Archaeologists (IfA) Standards and Guidance: Archaeological Field Evaluation (2008), English Heritage Geoarchaeology: Using earth sciences to understand the archaeological record (2007) and English Heritage Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (second edition) (2011).

Methodology

It is recommended that a limited programme of window sampling is undertaken to assess, record, and sample the peat deposits recorded in historic boreholes for palaeoenvironmental and palaeoecological material, including microfauna and flora, pollen and organic material suitable for radiocarbon dating to give terminus post quem and terminus ante quem for the peat formation. All works should be undertaken in line with Institute for Archaeologists standards and guidance and English Heritage guidance Environmental Archaeology (2011). This work is deemed necessary due to the potential harm or loss of the historic record caused through displacement and settling associated with the A12 flood defence improvements. The extent of the investigations and scope of works should be determined through liaison with the Suffolk County Archaeologist and Regional Scientific Advisor for English Heritage.

The purpose of the window sampling should be to provide information on subsurface geoarchaeological and palaeoenvironmental data. The scientific analysis should include recommendations of the potential for microfauna and flora, pollen and organic material and possible Carbon 14 dating. Further analysis should not be conducted at this stage although samples should be retained.

Both coring method and type equipment will be discussed with the appointed specialist and Suffolk County Council Archaeology Service. Differing coring devices may be employed in order to deal with the potential diversity of sediments which may be encountered.

The plan for the boreholes (frequency and number) must be appropriate for the amount of ground disturbance caused by the development. A plan must be produced prior to commencing coring and the plan must be agreed with Suffolk County Council and English Heritage.

During fieldwork a record should be made of surface and weather conditions that may have a bearing on subsequent interpretation on field data.

The successful contractor will be required to prepare an archaeological project design to be agreed with the Archaeologist at Suffolk County Council and the Regional Scientific Advisor for English Heritage. The project design should include sufficient information to detail the field methodology and be in accordance with the IfA's Standard and Guidance for Archaeological Field Evaluation (2008). It should comply with this Written Scheme of Investigation (WSI). The following should also be covered:

- Summary and introduction;
- A written statement on the project's overall objectives, strategy and methods;
- Field methodology;
- Report and preparation of contents;
- Copyright and publication;
- Publication and dissemination proposals;
- Timetable;
- Staffing and responsibilities (including sub-contractors and/or specialists);
- Health and safety policy and implementation; and
- Insurance.

Any variations to this methodology must be agreed in advance by AECOM and the Archaeologist for Suffolk County Council.

Monitoring Arrangements

To ensure that archaeological work is conducted in accordance with the agreed project design, monitoring of fieldwork and post-fieldwork analysis. This may be by AECOM stuff, or their representative, or the Archaeologist for Suffolk County Council

Monitoring will be arranged to satisfy section 3.5 of the IfA Standards for Guidance for Archaeological Field Evaluation (2008). The monitors are not liable in any way for the failings of the archaeological contractor and such monitoring is not intended to take the place of proper self-regulation.

Post-Fieldwork Methodology Analysis and Assessment

Upon completion of fieldwork, any samples should be processed, evaluated and properly stored. A field archive should be compiled consisting of all primary written documents, plans of extraction points, and photographs.

Identification and analysis of pollen, seed and faunal evidence within the cores should be conducted along with selection of suitable material for radiocarbon dating.

An interim statement of the results and preliminary plan of any archaeological remains should be provided as soon as possible, but no later than two weeks after completion of fieldwork.

The final report should be produced no later than four weeks upon completion of the fieldwork element but as early as possible. Any alterations to this will need to be agreed by AECOM.

Reporting

The report must define the location, extent and significance of archaeological features recorded as part of the evaluation. The final report should follow the guidance in the standards and guidance listed in paragraph 3.4, but is likely to consist of the following sections:

- Abstract
- Introduction
- 10 figure National Grid Reference
- Aims and objectives
- The archaeological background
- Methodology
- Results – the palaeoenvironmental results should be supported by a survey location plan (minimum scale 1:25000), a cross-section plan along each transect data and one or more interpretative plans (minimum scale of 1:1000)
- A table showing the details of the core samples, the National Grid reference and of any artefacts / ecofacts retained
- An assessment of the environmental potential for the site
- Discussion, including an interpretation of the archaeology and palaeoenvironmnet of the site
- Recommendations
- Conclusion
- Figures & Photographs
- Statement of Indemnity

The final report of the site should be presented in Word format and any digital images in tiff format should be produced within four weeks of completion of fieldwork, or sooner if at all possible. All site plans and models should be provided as shape files in addition to tiff format.

The site archive, to include all project records and cultural material produced by the project, is to be prepared in accordance with Guidelines for the preparation of excavation archives for long-term storage (UKIC 1990). On completion of the project the Archaeological Contractor will arrange for the archives to be deposited with an appropriate museum. Any alternative arrangements will be agreed with AECOM and the Archaeologist for Suffolk County Council.

Copies of the final report should be provided to the following:

- AECOM (hard copy and PDF), including copies for distribution to the client
- Archaeologist for Suffolk County Council
- OASIS (pdf)

Health and Safety and Insurance

Health and safety will take priority over archaeological matters. All archaeologists undertaking fieldwork must comply with all health and safety legislation. All archaeologists or archaeological organisations undertaking the fieldwork should ensure that they, or any proposed sub-contractors, are appropriately qualified and adequately insured to undertake such projects.

A site specific fieldwork Risk Assessment will be prepared prior to the survey.

The appointed archaeological contractor will need to provide a copy of their health and safety policy, copies of relevant insurance documents and site specific risk assessment.

Miscellaneous Requirements and Considerations

An indication of programme and availability to mobilise should be provided with the tender.

The archaeological contractor and commissioning agent are responsible for obtaining all necessary permissions and licences to carry out archaeological work at the site.

The archaeological contractors will be responsible for locating any drainage pipe, service pipes, cables etc, which may cross the area, and for taking the necessary measures to avoid disturbing such services.

References

English Heritage (2007) Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record.

English Heritage (2011) Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation.

Institute for Archaeologists (2008) Standard and Guidance for Archaeological Field Evaluation.

Suffolk County Council Archaeology Service (2011) Additional Requirements for a Palaeoenvironmental Assessment 2011 v1.1

Walker, K, (1990) Guidelines for the preparation of excavation archives for long-term storage, UKIC

Appendix 2. Palaeoenvironmental survey

BOREHOLE SURVEY AND PALAEOENVIRONMENTAL ASSESSMENT REPORT BLYTHBURGH, SUFFOLK

NGR: TM 45238 75578

ASE Project No: 6749
ASE Report No: 2014226

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June 2014

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Abstract

Archaeology South-East was commissioned by the Suffolk County Council Archaeological Service to undertake a borehole survey on reclaimed marshland adjacent to the A12 to the north of Blythburgh, Suffolk. The survey comprised 10 boreholes which were undertaken with a terrier rig in order to characterise the lithology of the site and with 2 boreholes retained to recover material for palaeoenvironmental analysis and radiocarbon dating. These boreholes were located along a narrow strip of land alongside the A12 in advance of flood alleviation works.

The survey identified the general trend in the depth of the basal sands and gravels which became deeper to the south, towards the modern course of the River Blyth. These were encountered at 6.60m bgl (-6.37m OD) and shallowed out to 2.90m bgl (-2.53m OD) to the north. The gravels were overlain by a poorly humified reedy woody (floodplain) peat, which in turn was overlain by a grey brown mottled alluvial clay and topsoil. The peat was assessed for pollen and plant macrofossils as well as radiocarbon dating. The period of peat formation at the sample locations has been dated to from the Late Mesolithic period to the Middle Anglo Saxon Period. The pollen assemblage was well-preserved but counts were low and therefore of limited value. The data recovered suggested limited indications of human activity within the vicinity of the sample site, with evidence for clearance occurring late in the sequence. The plant assemblage suggested the presence of grazing herbivores which may be related to pastoral exploitation of the floodplain. No further work is recommended for this sequence.

CONTENTS

1.0 INTRODUCTION

1.1 Site Background

1.1.1 Archaeology South-East (ASE), the contracting division of the Centre for Applied Archaeology (CAA), Institute of Archaeology (IoA), University College London (UCL) was commissioned by the Suffolk County Council Archaeological Service on behalf of Breheny Civil Engineering to undertake a borehole survey alongside the A12 to the North of Blythburgh, Suffolk (Figure 1, NGR:TM 45238 75578).

1.2 Geology and Topography

1.2.1 According to the British Geological Survey the underlying solid geology comprises the Crag group which is composed of sand. The overlying superficial geology is mapped as Alluvium, Peat and Tidal Flat deposits. The site lies within the Blyth Valley and at the edge of the Blyth estuary.

1.2.2 The current character of the site is that of drained and reclaimed marshland used for seasonal grazing. The areas to the east of the A12 have recently returned to saltmarsh and tidal mudflats, c.1920. At the time of the work the ground was still wet underfoot with occasional areas of standing water.

1.3 Aims and Objectives

1.3.1 The aim of this project was to characterise the sedimentology of the site by recording the lithology of the cores and to recover material suitable for palaeoenvironmental analysis and radiocarbon dating. This will be in order to understand the onset and cessation of peat formation, the changing environmental conditions and the level of preservation of palaeoenvironmental remains.

1.4 Scope of Report

1.4.1 This report covers a borehole survey undertaken on the 20th and 21st May 2014 by Kristina Krawiec and Arron Jones from Spektral Geo-Environmental. The fieldwork was managed by John Sygrave and the post-excavation by Jim Stevenson and Dan Swift.

2.0 METHODOLOGY

2.1 Fieldwork Methodology

2.1.1 The boreholes were located using an RTK-GPS along a north south transect avoiding areas of standing water. The boreholes were drilled using a windowless sampling terrier rig which recovered the sediment in 1m sleeved lengths. The lithology was recorded on site using the Troels-Smith soil classification system (1955). The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are also identified according to darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Dr) and the sharpness of the upper sediment boundary (UB). The core logs were supplemented by digital photographs.

2.1.2 A summary of the sedimentary and physical properties classified by Troels-Smith (1955) and a stratigraphic breakdown of the boreholes are provided in the Appendices.

Samples

2.1.4 Pollen preparation followed standard techniques including potassium hydroxide (KOH) digestion, hydrofluoric acid (HF) treatment and acetylation (Moore et al., 1991). For assessment level counts, at least 125 total land pollen grains (TLP) excluding aquatics and spores were attempted each sample, although this was achieved for ten of the samples due to very low pollen concentrations. In these cases, one complete slide was counted. Due to the low counts, percentages have not been calculated. Pollen was absent from two of the samples (2.4 and 6.3mbgl). Pollen nomenclature largely follows Bennett et al. (1994). Cerealia-type includes all grass pollen grains over 40µm in diameter, a group which as well as cultivated cereals can include wild taxa such as *Glyceria fluitans*, *Aira caryophyllea*, *Ammophila arenaria*, *Leymus arenarius* and *Elytrigia*. *Glyceria fluitans* is the most probable in the fresh water environments of Suffolk and this plant may thus be represented in the *Cerealia*-type. *Corylus avellena*-type includes hazel as well as sweet gale/bog myrtle, but the latter is unlikely in the case of the floodplain-sampling context represented.

2.1.3 A total of three bulk samples were revered from the remaining material of BH after subsampling for pollen was undertaken. A maximum of 2 litres of each small bulk sample was processed by wet sieving for plant macrofossil remains. They were washed through a stack of geological sieves (4mm, 2mm, 1mm, 500µm to 250µm) and each fraction was retained wet. Fractions were scanned under a stereozoom microscope at x7-45 magnifications and their contents recorded (Table 3). Preliminary identifications of macrobotanical remains were made with reference to modern comparative specimens and published reference material (Cappers et al. 2006, NIAB 2004). Nomenclature used follows Stace (1997).

2.2 Fieldwork Constraints

2.2.1 The area of the survey was adjacent to the active area of the site and some boreholes were moved due to the presence of spoil heaps and plant. In some areas of the site there were significant amounts of standing water which again led to the alteration of some of the boreholes locations.

2.3 The Site Archive

2.3.1 The site archive is currently held at the offices of ASE. The contents of the archive are tabulated below (Table 1).

No. of files/paper record	1 notebook
Photographs	20 digital photographs
Cores	2

Table 1: Quantification of site archive

3.0 RESULTS AND DISCUSSION

3.1 Lithology

3.1.1 The borehole survey sought to characterise the sediments that lie alongside the A12 which crosses the River Blyth, itself to the east of the Blyth estuary. A single north-south orientated transect was undertaken comprising 10 boreholes. The rate of sediment recovery was poor in the middle part of the sequence due to the level of waterlogging in the peat but the upper and lower part of the sequence was recovered successfully. A full description of each borehole is provided in Appendix 1.

3.1.2 The underlying Crag deposits (Westleton beds) comprised a pale grey coarse sand and gravel (Unit 1) which were encountered at 6.60mbgl (-6.37m OD) at the southern end of the transect and 2.90mbgl (-2.53m OD) at the northern end. This was overlain by a reedy, woody peat deposit (Unit 2) with an often sharp lower contact. In some instances the interface was characterised by a thin layer of black reed mat.

3.1.3 The peat was up to 5.84m thick at it greatest extent along the current course of the river and 2.10m towards the edge of the floodplain. The peat was poorly humified and contained frequent *Phragmites* remains and twigs as well as visible insect fragments. Occasionally the upper part of the deposit exhibited an increase in silt content. This appears to be a typical floodplain peat that characterises many of the river valleys of Suffolk. In some of the boreholes larger pieces of roundwood were recorded and in BH9 a large piece of *Quercus sp*. roundwood was recovered. This is of interest as it represents a non-wetland species in a wetland context and therefore may have arrived at the site by human agency.

3.1.4 The peat was overlain by a thin deposit of mottled silt clay (Unit 3) which exhibited occasional lenses of peat indicating that despite the change in depositional environment the area was still sufficiently waterlogged to allow peat formation in localised areas of the floodplain. The change to alluvial deposition suggests the channel may have become constrained reducing the level of overall waterlogging of the floodplain in combination with land reclamation through drainage. This would have led to a drying out of the floodplain as a whole and sediment deposition would have occurred through overbank flooding episodes.

3.1.5 The presence of this upper unit of clay has led to the creation of a perched water table making the current ground surface wet underfoot and leading to the formation of a peaty topsoil. In several locations the current ground surface was extremely waterlogged with pools of standing water.

3.2 Pollen

3.2.1 The pollen concentrations were low in the majority of the samples, and only those from 0.67, 0.86 and 2.80mbgl yielded sufficient grains for a reliable assessment level count (100+ total land pollen grains). It can be observed that on the whole pollen preservation was quite good, with relatively few indeterminable grains or especially high counts of resistant taxa such as Pteropsida (monolete) indet. (fern spores) or *Tilia* lime). A simple linear

regression between the radiocarbon dates from the top and base of the sequence indicates an accumulation rate of just under 10 years/cm^{-1}, which might imply that the low pollen concentrations are a reflection of this comparatively rapid sediment accumulation rate, rather than the loss or destruction of pollen through conditions during or subsequent to peat formation. The low counts preclude detailed interpretation of the pollen data but some general comments and observations are possible.

3.2.2 The basal half of the sequence (2.61-6.54mbgl, -2.38 to -6.31mOD) is characterised by a range of tree and shrub pollen, with *Alnus glutinosa* (alder) generally well represented. This supports the results of the macrofossil assessment (see above), which indicate the local growth of alder fen carr on and around the sampling site. The traces of other trees and shrubs, especially *Pinus sylvestris* (Scots' pine) and *Quercus* (oak), probably reflect the growth of these taxa on the dryland beyond the floodplain edge. On the basis of the higher and more reliable counts at 2.80m, other trees and shrubs such as *Tilia* and *Corylus*, seem not to have been very abundant, although this may be a function of the low counts or the over-representation of local pollen sources. Poaceae (wild grass) and Cyperaceae (sedges) perhaps also indicate the presence of these herbs as part of the local wetland vegetation, with the latter also recorded in the plant macrofossil samples (see below). There is no evidence for human presence or disturbance to the vegetation.

3.2.3 The upper half of the sequence (0.67-1.91mbgl, -0.44 to -1.68mOD) sees some reduction in *Alnus* and an increase in herbs, Poacaeae in particular, with other herbs indicative of open environments such as *Plantago lanceolata* (ribwort plantain) and Lactuceae undiff. (dandelions etc.) also appearing although in low quantities. Cereal-type grains are present in the uppermost two samples (0.67 and 0.86mbgl, -0.44 to -0.63mOD) and *Centaurea cyanus* (corn cockle) is also recorded in the top sample. This indicates a human presence and quite probably arable farming in the vicinity of the sampling site, although given the floodplain-sampling site, fluvial transport of pollen from further afield is possible. The cereal-type grains in 0.67mbgl were all crumpled; perhaps demonstrating these had been washed rather than blown onto the sampling location.

3.2.4 Given the nature of the sampling site and the results of the plant macrofossil assessment (see below), any arable cultivation was taking place beyond the floodplain edge and on the basis of the top radiocarbon dates, by the Anglo-Saxon period, but the low concentrations of pollen preclude much more detailed comment on the timing or character of human activity. However, it can be observed that the local landscape was unlikely to have been entirely cleared of woodland by the close of the sequence, and that alder carr probably remained on and around the sampling site, as the macrofossil assessment and pollen counts for *Alnus* and other trees including *Betula* demonstrate. Despite the macrofossil evidence for aquatic plants, aquatic pollen is limited to a few grains of *Sparganium emersum*-type (bur-reeds etc.) and *Typha latifolia* (reed mace). Finally, it can also be observed that low values of *Fagus sylvatica* (beech) are recorded in half of the samples; this tree is usually poorly represented palynologically, and it is possible that beech was present locally for much of the period of time represented by this sequence.

3.3 Plant macrofossils

3.3.1 Three samples, <1>, <3>, and <5> from BH1, were submitted for processing following archaeological work at the site to assess the presence and potential of environmental proxies such as macro plant remains, wood, mollusca and fauna.

3.3.2 Each of the samples contained varying quantities of white, fresh-looking roots with rootlets still attached. These may be comparatively modern intrusive elements within the peat from plants such as the *Phragmites australis* (common reed).

Sample <1> BH1 0.80-1.00mbgl, -0.57 to -0.77mOD

3.3.3 Wet sieved fractions from this poorly humified peat contained blackened fragments of stem/trunk wood and twigs. Many of these fragments retained bark and overall preservation of the wood was good. Macro plant remains such as seeds and other fruiting structure were moderately common (Table 3). The assemblage includes fine-leaved water-dropwort, branched bur-reed, celery-leaved buttercup and sedges. Each of these species is common on wet ground either within or associated with habitats such as ponds, stream sides and ditches. There is no evidence for plants that are typical indicators of habitation or grazing in this peat deposit.

Sample <3> BH1 2.40-3.00m, -2.17 to -2.77mOD

3.3.4 This sample contained fragments of twigs and trunk/stem wood. Several of the fragments retained bark and preservation was generally good. Occasional monocotyledon stem fragments were also noted. The macro plant remains assemblage comprised water plantain, branched bur-reed, sedges, celery-leaved buttercup, common water crowfoot and fine-leaved water-dropwort all of which are common in wet habitats as noted above. In addition seeds of larger trees such as alder and elder were present. Alder prefers damp woodland often associated with damp places such as streams or ponds and is entirely consistent with the wet-ground habitat seeds noted in this sample. Elder and stinging nettle provide evidence for phosphate rich ground in the vicinity which may result from human habitation in the area or enrichment of the ground from the dung of animals grazing. Occasional beetle wing cases were also apparent.

Sample <5> BH1 6.30-6.55mbgl, -6.07 to -6.32mOD

3.3.5 Wood and occasional twigs were recorded and, as noted in the samples <1> and <3>, bark was present on some of the fragments. The wood assemblage was generally well preserved. Wet ground taxa were also common in the macro plant remains assemblage with many of the same taxa noted (Table 4). In addition to celery-leaved crowfoot and sedge, ramsoms, which like damp, shaded soils (Tansley 1949, Stace 1997), and seeds and female catkins of alder were also evident. Since alder-carr vegetation is well known in this region the combination of taxa is not surprising. Hazel can also grow in such woodland vegetation. Plants such as stinging nettle, thistle, knotgrass/knotweed and nightshades are more

common on disturbed or rough ground some of which may have been associated with habitation and or grazing land. Further support for the evidence for habitation in the region is provided by moderate quantities of charcoal, particularly in the 2-4mm sample fraction. Occasional fish scales and beetle wing cases were also noted.

3.4 Radiocarbon Dating

3.4.1 Two samples of bulk sediment (peat) were submitted for radiocarbon dating to Beta Analytic Laboratories, Florida. The samples were selected from the deepest sequence in BH1 and two dates were returned for each sample marking the onset and cessation of peat formation. Both the humic and humin fractions of the bulk sediment were processed for dating in order to ensure more reliable results. Humic acids result from the decay of plant material and can travel downward through a sediment profile. In dating both the humic and humin component of the sediment it is hoped a more consistent date is recovered.

Lab number	Material	ASE number	13C/12 C ratio	Conventional Radiocarbon Age	Calibrated Age 2 sigma
BETA-383162	Peat Alkali-insoluble humic organics	ASE_DS_00266-6.53-6.56m-Humic (-6.30 to -6.33mOD)	-28.2 o/oo	5720±30BP	Cal BC 4675 to 4635 (Cal BP 6625 to 6585) and Cal BC 4615 to 4490 (Cal BP 6565 to 6440)
BETA-383163	Peat Alkali-soluble humin acid organics	ASE_DS_00266-6.53-6.56m-Humin (-6.30 to -6.33mOD)	-28.7 o/oo	5290±30BP	Cal BC 4235 to 4040 (Cal BP 6185 to 5990) and Cal BC 4015 to 4000 (Cal BP 5965 to 5950)
BETA-383164	Peat Alkali-insoluble humic acid organics	ASE_DS_00268-0.87-0.91m-Humic (-0.64 to -0.68mOD)	-28.6 o/oo	1390±30BP	Cal AD 610 to 670 (Cal BP 1340 to 1280)
BETA-383165	Peat Alkali-soluble humin organics	ASE_DS_00268-0.87-0.91m-Humin (-0.64 to -0.68mOD)	-28.4 o/oo	1340±30BP	Cal AD 650 to 690 (Cal BP 1300 to 1260) and Cal AD 750 to 760 (Cal BP 1200 to 1190)

Table 2: Radiocarbon dating results

3.4.2 The gap between the two radiocarbon dates for the basal peat may be due to the material selected for dating. The humic fraction of the peat is more likely to represent *in situ* accumulation with the humin fraction may travel downwards through the sediment bringing in younger material. At best the two dates provide a broad range of between 6625-6440BC for the onset of peat accumulation at this location.

4.0 CONCLUSIONS

4.1 The borehole survey undertaken at Blythburgh has provided some baseline data as to the date and state of preservation of the sediments at the site. The onset of organic accumulation has been dated to the Late Mesolithic with cessation sometime after the 7-8th century AD (mid Anglo-Saxon period). The pollen although in low concentrations has allowed some general observations to be made regarding the vegetation of the floodplain and the surrounding dryland. There seems to be little evidence of human activity in the lower part of the sequence when the floodplain was dominated by alder carr. This lack of woodland clearance or cultivation in the pollen record, however contrasts slightly with the plant macrofossil record which contained charcoal. This in and of itself is not a definitive sign of human activity and may be the result of natural forest fires but it is worthy of note.

4.2 The onset of peat accumulation probably relates to the ponding back of the fluvial system during a period of positive sea level tendency. The Blyth estuary has had previous palaeoenvironmental investigation carried out which broadly characterised a series of marine transgressions. The earliest of which has been dated to 6510-6385 BP (Late Mesolithic) which corresponds to the Thames II sea level rise (Brew et al 1992:73, Devoy 1979). The dates recovered from the base of the peat at the current site do overlap with this event and the humin date may prove slightly earlier than the dated sea level rise. This may be due to the fact that transgressive episodes are erosive events and the upper surface of the peat dated in the estuary may have lost its upper surface resulting in a younger date. Another reason may be that the sea level rise was gradual leading to gradually rising water tables and paludification of the floodplain.

4.3 The preservation of pollen was good although the grain counts were low leading to only a general picture of the vegetation growing on the floodplain and dryland. The lack of noticeable early woodland clearance within the pollen record may be due to the location of the sample site, being within the centre of a large wetland rather than proximal to the dryland. However the plant macrofossils do suggest the presence of enriched ground within the floodplain which may suggest the presence of large herbivores grazing at the site. It may be that early exploitation of the site was as grazing marshland although this is a tentative interpretation as it is uncertain whether these herbivores were for wild or domesticated animals.

4.4 Further towards the top of the sequence some evidence for human activity is recorded in the form of cereal-type pollen grains. The limited amount of cereal pollen and the crumpled condition of the grains suggests that any cultivation was occurring at some distance from the sample location and is relatively late in date. By the Anglo-Saxon period clearance of dryland vegetation has taken place and the peat sequence is curtailed by the onset of overbank sedimentation at the site. This is likely due to the drainage and management of the fluvial system leading to minerogenic accumulation.

4.5 These analyses have proven the potential of the deposits at the site to provide some limited environmental information. Although no further work is recommended on the sequence reported on here, should other areas of the

floodplain become available further investigation may yield more informative results.

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Sample/depth mbgl Taxa	0.67	0.86	1.51	1.71	1.91	2.4	2.61	2.8	2.96	3.95	6.3	6.54
Trees and Shrubs												
Betula	7	11	3	12	9	-	4	2	3	12	-	4
Pinus sylvestris	1	4	4	10	7	-	1	3	3	16	-	6
Quercus	-	14	-	4	9	-	5	12	10	7	-	-
Tilia	-	-	1	1	-	-	-	-	-	-	-	2
Ulmus	-	-	-	-	-	-	1	-	-	-	-	-
Alnus glutinosa	17	28	2	6	11	-	6	62	25	28	-	18
Salix	-	4	-	2	-	-	-	2	3	-	-	-
Fagus sylvatica	-	1	1	4	-	-	1	1	-	3	-	-
Corylus avellana-type	6	9	-	3	9	-	-	2	2	2	-	1
Juglans regia	-	-	-	-	1	-	-	-	-	-	-	-
Ericaceae	3	1	-	1	-	-	-		1	-	-	-
Herbs-												
Poaceae	39	24	-	12	13	-	2	4	12	5	-	2
Cereal-type	9	4	-	-	-	-	-	-	-	-	-	-
Cyperaceae	12	13	-	3	11	-	-	8	3	8	-	1
Apiaceae	2	-	-	-	-	-	-	5	-	-	-	-
Artemisia-type	1	-	-	-	-	-	1	-	-	-	-	-
Brassicaceae					1	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	1	-	-
Filipendula	1	1	-	-	-	-	-	-	-	-	-	-
Lactuceae undiif.	1	1	1	2	-	-	-	-	-	1	-	-
Centaurea cyanus	2	-		-	-	-	-	-	-	-	-	-
Cardueae/ Asteroideae undiff.	2	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	8	1	-	1	2	-	-	-	-	-	-	-
Potentilla-type	-	-	-	-	1	-	-	-	-	-	-	-
Ranunculaceae	-	-	-	1	-	-	-	-	-	-	-	-
Rumex								1	-	-	-	-

Thalictrum	-	1	-	--	-	-	-	-	-		-	-
Trifolium-type	1	-	-		-	-	-	-	-	-	-	-
Urtica	-	-	-	-	-	-	-	-	-	1	-	-
Valeriana dioica	-	1	-	-	-	-	-	1	-	-	-	-
Aquatics-												
Sparganium emersum-type	2	2	-	-	-	-	-	1	-	-	-	-
Typha latifolia	-	1	-	-	-	-	-	-	-	-	-	-
Spores												
Pteridum aquilinum	1	2	-	11	11	-	2	2	14	7	-	-
Pteropsida (monolete) indet.	5	11	3	17	6	-	4	8	20	17	-	2
Polypodium	-	2	-	-		-	1	-	-	1	-	-
Sphagnum	-	-	-	-	1	-	-	-	-	1	-	-
Indeterminate	34	31	1	3	10	-	4	25	11	8	-	1
TLP	116	121	12	67	74	-	21	101	65	84	-	34
TLP+Aquatics	118	124	12	67	74	-	21	102	65	84	-	34
TLP+Spores	124	136	15	95	92	-	28	111	99	107	-	36
TLP+ Indeterminate	150	152	16	70	85	-	25	136	76	92	-	37

Table 3: Results of pollen assessment. Figures are given as raw counts.

Table 4: Plant macrofossils from BH1 (Quantification - * = 1-10, ** = 11-50, *** = 51-250, *** = >250)

Sample Number	Context	Sample Volume (litres)	Sub-sample processed (litres)	Sieves used	Macrobotanical Remains	Idenitifcation and preservation notes	Wood	Notes on Preservation of Wood	Charcoal	Notes on preservation of charcoal	Faunal remains	Notes on faunal remains	Insects and Fly pupae	Notes on insect remains
1	0.80 - 1.00m	1	1	4, 2, 1mm, 500 & 250µm	**	Apiaceae cf. *Oenanthe* cf. *aquatica, Sparganium erectum, Ranunculus sceleratus, Carex* sp. (nutlets & urticle, some with both),	****	Blackened wood and twig fragments often with bark present, Rootlets (some very fresh and white)						
3	2.40 - 3.00m	3	2	4, 2, 1mm, 500 & 250µm	** (*)	*Alisma* sp., *Alnus glutinosa, Sparganium erectum, Sambucus nigra, Urtica dioica, Carex* sp, *Ranunculus sceleratus, Ranunculus* cf. *aquatilus, Ranunculus* sp., *Oenanthe aquatica*	****	Wood: twigs and trunk/stem frags. Bark present on some. Preservation generally good.					*	beetle wing cases
5	6.30 - 6.55	1	1	4, 2, 1mm, 500 & 250µm	***	*Corylus avellana* shell frag, *Solanum* sp., *Urtica dioica, Alnus glutinosa* (seed and female catkin), *Ranunculus sceleratus, Carex* sp., *Carduus* sp., *Polygonum/Persicaria* sp., *Alium* cf. *ursinium,* Monocotyledon stem fragments	****	Wood and occasional twigs. Bark present on some frags. Preservation generally good. Very small rootlets (some fresh and white) in <2mm fractions.	**	well preserved and firm. Noted mostly in 2-4mm fraction	*	fish scales	*	beetle wing cases

Appendix I: Borehole logs

BH1 (RETAINED)

0-0.20m	Gap				
0.20-0.39m	Ni	St	El	Sicc	UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil				
0.39-0.75m	Ni	St	El	Sicc	UB
	3	2	0	3	4
	Ag2 As2 Dh++				
	Dark grey-brown silt clay, band of peaty silt 0.52-0.58m, mottled at top, trends into				
0.75-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	2
	Dh3 As1 Tl+Sh++				
	Poorly humified peat, silty at top, pale rootlets. Occasional woody remains and *Phragmites*				
1.00-1.38m	Recut				
1.38-2.00m	Peat as above, more reed and wood remains with depth				
2.00-2.40m	Gap				
2.40-3.00m	Ni	St	El	Sicc	UB
	4	0	2	2	0
	Dh3 As1 Tl+Sh++				
	Woody, wet peat, twigs and reeds throughout, poorly humified				
3.00-3.60m	Gap. Very wet				
3.60-4.00m	Peat as above				
4.00-6.00m	No recovery, too wet				
6.00-6.20m	Gap				
6.20-6.59m	Ni	St	El	Sicc	UB
	4	0	2	2	0
	Dh3 As1 Tl+Sh++				
	Woody, wet peat, twigs and reeds throughout, wood plug at 6.50m				
6.59-6.90m	Ni	St	El	Sicc	UB
	2	3	0	3	4
	Gmin2 Gmaj2				
	Coarse grey sand onto sharp flint gravel				

BH2

0-0.24m	Gap					
0.24-0.48m	0.20-0.39m	Ni	St	El	Sicc	UB
	3	0	1	3	0	
	Dh2 Ag2					
	Peaty silty topsoil					

0.48-0.70m	Ni	St	El	Sicc	UB
	3	2	0	3	4
	Ag1 As3 Dh++				
	Dark grey silt clay, modern reeds, mottled at the top				
0.70-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	3
	Dh3 As1 Tl+Sh++				
	Poorly humified peat, pale rootlets. UB sharper than BH1				
1-1.34m	gap				
1.34-2.00m	Ni	St	El	Sicc	UB
	4	0	2	2/3	0
	Dh3 As1 Tl+Sh++				
	Poorly humified peat, pale rootlets, woody fragments and *Phragmites* rich				
2.00-2.60m	No recovery too wet				
2.60-3.00m	very wet silty peat, slop				
3.00-3.40m	gap, v wet				
3.40-4.00m	Ni	St	El	Sicc	UB
	4	0	2	2/3	0
	Dh3 As1 Tl+Sh++				
	Poorly humified peat, pale rootlets, woody fragments and *Phragmites* rich wood plug at base				
4.00-6.00m	no recovery				
6.00-6.61m	very wet sloppy peat				
6.61-7.00m	Ni	St	El	Sicc	UB
	2	2	0	3	4
	Gmin2 Gmaj1 Sh++				
	Pale grey fine sand, band of organics at top and occasional reed remains, becoming gravelly at base				

BH3

0-0.25m	Gap				
0.25-0.44m	0.20-0.39m	Ni	St	El	Sicc UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil, band of yellow sand at base (Made Ground?)				
0.44-0.64m	Ni	St	El	Sicc	UB
	3	0	0	3	4
	Ag1 As3 Dh++				
	Mottled grey silt clay, modern reeds throughout				
0.64m-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	4
	Dh3 As1 Tl+Sh++				
	Poorly humified rooty peat, *Phragmites* throughout				

1-1.50m	gap					
1.50-2.00m	Ni	St	El	Sicc	UB	
	4	0	2	3	0	
	Dh3 Tl1 Sh++					
	Poorly humified peat, very *Phragmites*-rich					
2.00-3.60m	No recovery					
3.60-4.00m	Ni	St	El	Sicc	UB	
	4	0	2	2	0	
	Dh2 Tl1 Sh1					
	Less poorly humified peat					
4.00-6.20m	No recovery					
6.20-6.55m	Ni	St	El	Sicc	UB	
	4	0	2	2	0	
	Dh2 Tl1 Sh1					
	Less poorly humified peat, black and woody at base					
6.55-7.00m	Ni	St	El	Sicc	UB	
	2	3	0	2	4	
	Gmin3 Gmaj1 As+					
	Pale grey fine sand, occasionally laminations of clay, occasional flint gravel, coarser sand with depth					

BH4

0-0.30m	Gap					
0.30-0.40m	0.20-0.39m	Ni	St	El	Sicc	UB
	3	0	1	3	0	
	Dh2 Ag2					
	Peaty silty topsoil, reedy, rooty					
0.40-0.68m	Ni	St	El	Sicc	UB	
	3	0	0	3	4	
	Ag1 As3 Dh++					
	Mottled grey silt clay, modern reeds throughout					
0.68m-1.00m	Ni	St	El	Sicc	UB	
	4	0	2	3	4	
	Dh3 As1 Tl+Sh++					
	Poorly humified rooty peat, *Phragmites* throughout					
1.00-1.50m	Gap					
1.50-2.00m	Peat as above, very reedy					
2.00-2.58m	gap					
2.58-3.00m	Ni	St	El	Sicc	UB	
	4	0	2	2	0	
	Dh3 As1 Tl+Sh++					
	Poorly humified rooty peat, *Phragmites* throughout, visible insect remains					
3.00-3.40m	gap					
3.40-4.00m	peat as above more woody remains, twigs					

4.00-5.20m	no recovery				
5.20-5.56m	very wet peat, sandy at base				
5.56-5.70m	Ni	St	El	Sicc	UB
	2	3	0	2	4
	Gmin4				
	Coarse pale grey sand				
5.70-6.00m	Ni	St	El	Sicc	UB
	2	3	0	2	3
	Gmaj3 Gmin1				
	Orange-grey coarse sand and gravel, sharp flint and rounded pebbles				

BH5 (RETAINED)

0-0.22m	Gap				
0.22-0.30m	Ni	St	El	Sicc	UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil, reedy, rooty				
0.30-0.54m	Ni	St	El	Sicc	UB
	3	0	0	3	4
	Ag1 As3 Dh++				
	Mottled grey silt clay, trends into				
0.54m-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	2
	Dh3 As1 Tl+Sh++				
	Poorly humified rooty peat, *Phragmites* throughout				
1.00-1.50m	Gap				
1.50-2.00m	Ni	St	El	Sicc	UB
	4	0	2	2	0
	Dh3 As1 Tl++Sh+				
	Poorly humified woody peat, *Phragmites* throughout, very wet				
2.00-2.30m	Gap				
2.30-3.00m	peat as above, very wet				
3-3.50m	poor recovery				
3.50-4.00m	Ni	St	El	Sicc	UB
	4	0	2	2	0
	Dh3 As1 Tl++Sh+				
	Poorly humified woody peat, wood well preserved, not compressed				
4.-5m	No recovery				
5-5.80m	Ni	St	El	Sicc	UB
	4	0	2	2	0
	Dh3 As1 Tl++Sh+				
	Poorly humified woody peat, black at base with reedy mat				
5.80-6.00m	Ni	St	El	Sicc	UB
	2	3	0	2	4

Gmin2 Gmaj2
Coarse pale grey sand and gravel

BH6

0-0.45m	Gap				
0.45-0.52m	Ni	St	El	Sicc	UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil, reedy, rooty				
0.52-0.72m	Orange sand and concrete, made ground				
0.72-0.80m	Ni	St	El	Sicc	UB
	3	0	0	3	4
	Ag1 As3 Dh++				
	Mottled grey silt clay				
0.80m-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	4
	Dh2 Tl1Sh1				
	Poorly humified rooty peat, *Phragmites* throughout				
1.00-1.55m	gap				
1.55-2.00m	peat as above, rooty				
2.00-2.45m	gap				
2.45-3.00m	Ni	St	El	Sicc	UB
	4	0	2	2	0
	Dh2 Tl1Sh1				
	Poorly humified rooty peat, very wet				
3.00-4.50m	gap				
4.50-4.77m	peat as above, black at base				
4.77-5.00m	Ni	St	El	Sicc	UB
	2	3	0	2	4
	Gmin2 Gmaj2				
	Coarse pale grey sand and gravel				

BH7

0-0.31m	Gap				
0.31-0.50m	Ni	St	El	Sicc	UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil, reedy, rooty				
0.50-0.75m	Ni	St	El	Sicc	UB
	3	0	0	3	4
	Ag1 As3 Dh++				
	Mottled grey silt clay, peaty at base				
0.75m-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	4

	Dh2 Tl1Sh1				
	Poorly humified rooty peat, *Phragmites* throughout				
1.00-1.60m	gap				
1.60-2.00m	peat as above, very reedy				
2.00-4.00m	no recovery				
4.00-4.54m	wet peat as above				
4.54-5.00m	Ni	St	El	Sicc	UB
	2	3	0	2	4
	Gmin2 Gmaj2				
	Coarse pale grey sand and gravel				
BH8					
0-0.32m	Gap				
0.32-0.47m	Ni	St	El	Sicc	UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil, reedy, rooty				
0.47-0.85m	Ni	St	El	Sicc	UB
	3	0	0	3	4
	Ag1 As3 Dh++ Gmin+				
	Mottled grey silt clay, peaty at base, sandy at the top				
0.85m-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	4
	Dh2 Tl1Sh1				
	Poorly humified woody peat, *Phragmites* throughout				
1.00-1.50m	gap				
1.50-2.00m	Ni	St	El	Sicc	UB
	4	0	2	3	4
	Dh2 Tl1Sh1				
	Poorly humified woody peat, silver birch twig at base				
2.00-3.00m	no recovery				
3.00-3.93m	Very loose wet peat as above				
3.93-5.00m	Ni	St	El	Sicc	UB
	2	3	0	2	4
	Gmin2 Gmaj2				
	Coarse pale grey sand and gravel				
BH9					
0-0.44m	Gap				
0.44-0.70m	Ni	St	El	Sicc	UB
	3	0	1	4	0
	As1 Ag2 Gmin1				
	Black grey sandy clay				
0.70m-1.00m	Ni	St	El	Sicc	UB
	4	2	2	3	3
	Dh2 Tl1Sh1 Ag++				
	Poorly humified woody peat, *Phragmites* throughout, band of silty peat 0.72-0.77m				

1.00-3.00m	no recovery				
3.00-3.83m	wet sloppy peat, large piece *Quercus* roundwood at base				
3.83-4.00m	Ni	St	El	Sicc	UB
	2	2	0	2	4
	Gmin3 Gmaj1				
	Pale grey-white sand, occasional gravel				

BH10

0-0.46m	Gap				
0.46-0.60m	Ni	St	El	Sicc	UB
	3	0	1	3	0
	Dh2 Ag2				
	Peaty silty topsoil, reedy, rooty				
0.60-0.80m	Ni	St	El	Sicc	UB
	3	0	0	3	4
	Ag1 As3 Dh++ Gmin+				
	Mottled grey silt clay, sandy at the top				
0.80m-1.00m	Ni	St	El	Sicc	UB
	4	0	2	3	4
	Dh2 Tl1Sh1				
	Poorly humified woody peat, *Phragmites* throughout				
1.00-2.00m	gap				
2.00-2.90m	very wet sloppy peat				
2.90-3.00m	Ni	St	El	Sicc	UB
	2	2	0	2	4
	Gmin3 Gmaj1				
	Grey-yellow sand occasional gravel				

Appendix II: Troels-Smith classification

Degree of Darkness	
nig.4	black
nig.3	
nig.2	
nig.1	
nig.0	white

Degree of Stratification	
strf.4	well stratified
strf.3	
strf.2	
strf.1	
strf.0	no stratification

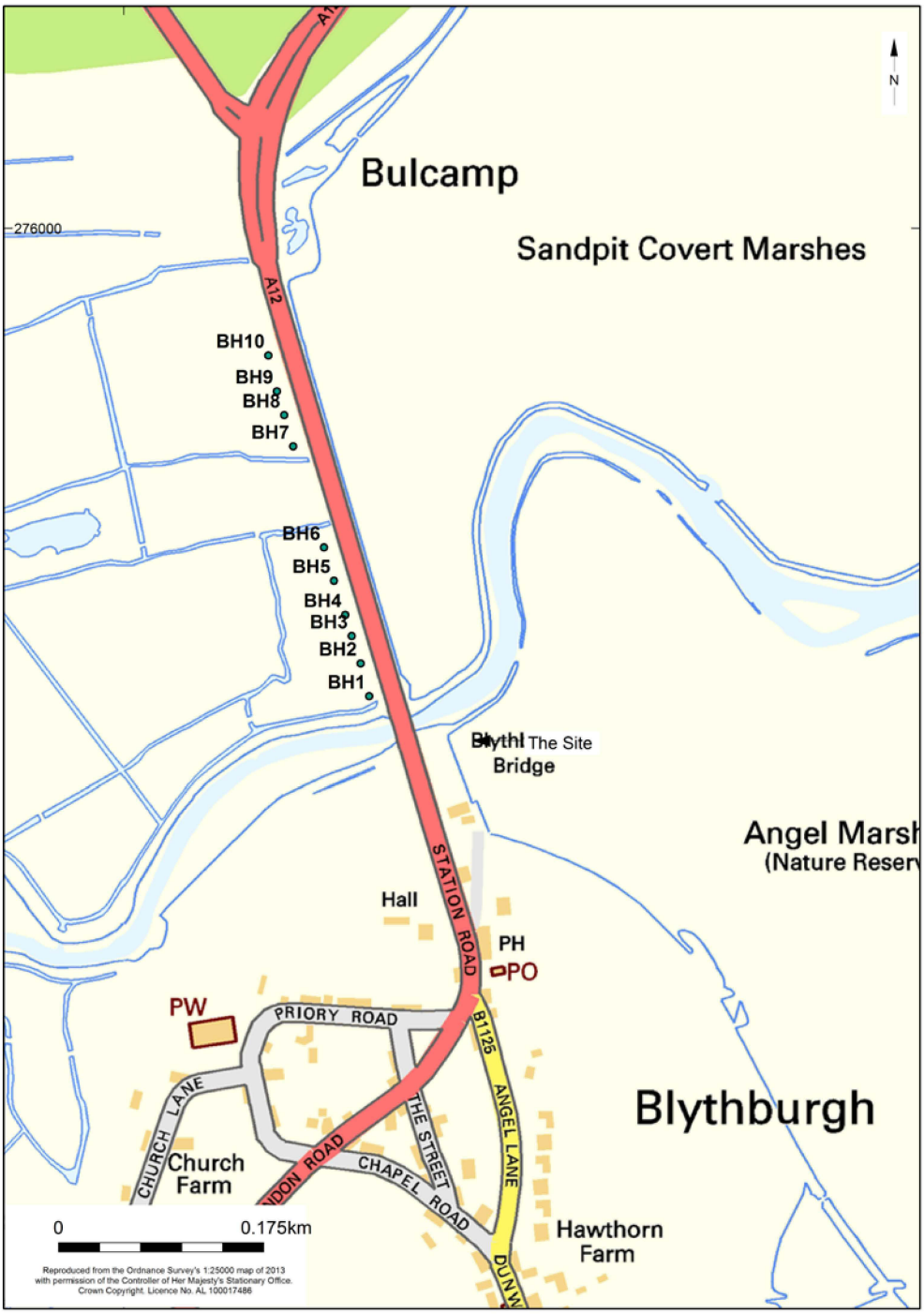
Degree of Elasticity	
elas.4	very elastic
elas.3	
elas.2	
elas.1	
elas.0	no elasticity

Degree of Dryness	
sicc.4	very dry
sicc.3	
sicc.2	
sicc.1	
sicc.0	water

	Sharpness of Upper Boundary
lim.4	< 0.5mm
lim.3	< 1.0 & > 0.5mm
lim.2	< 2.0 & > 1.0mm
lim.1	< 10.0 & > 2.0mm
lim.0	> 10.0mm

	Sh	*Substantia humosa*	Humous substance, homogeneous microscopic structure
I Turfa	*Tb*	*T. bryophytica*	Mosses +/- humous substance
	Tl	*T. lignosa*	Stumps, roots, intertwined rootlets, of ligneous plants
	Th	*T. herbacea*	Roots, intertwined rootlets, rhizomes of herbaceous plants
II Detritus	*Dl*	*D. lignosus*	Fragments of ligneous plants >2mm
	Dh	*D. herbosus*	Fragments of herbaceous plants >2mm
	Dg	*D. granosus*	Fragments of ligneous and herbaceous plants <2mm >0.1mm
III Limus	*Lf*	*L. ferrugineus*	Rust, non-hardened. Particles <0.1mm
IV Argilla	*As*	*A.steatodes*	Particles of clay
	Ag	*A. granosa*	Particles of silt
V Grana	*Ga*	*G. arenosa*	Mineral particles 0.6 to 0.2mm
	Gs	*G. saburralia*	Mineral particles 2.0 to 0.6mm
	Gg(min)	*G. glareosa minora*	Mineral particles 6.0 to 2.0mm
	Gg(maj)	*G. glareosa majora*	Mineral particles 20.0 to 6.0mm
	Ptm	*Particulae testae molloscorum*	Fragments of calcareous shells

Physical and sedimentary properties of deposits according to Troels-Smith (1955)



© Archaeology South-East		Blythburgh Boreholes	Fig. 1
Project Ref: 6749	2013	Borehole Locations	
Report Ref: 6749221	Drawn by: kk		

Appendix 3. OASIS data collection form

OASIS ID: suffolkc1-177650	
Project details	
Project name	A12 Flood Alleviation Scheme Blythburgh, Suffolk
Short description of the project	Monitoring of works to alleviate flooding on a stretch of the A12 at Blythburgh. Works primarily involved raising earthworks although some drainage work, including excavation of a drainage ditch, was monitored but with no significant results. Palaeoenvironmental Survey also undertaken which indicated peat beds to a maximum depth of 6.6m bgl. RC dating suggest deposition from Late Mesolithic period through to Middle Anglo-Saxon period.
Project dates	Start: 01-04-2014 End: 09-09-2014
Previous/future work	Yes / No
Any associated project reference codes	BLB092 - HER event no.
Type of project	Recording project
Current Land use	Other 12 - Verge
Monument type	NONE None
Significant Finds	NONE None
Investigation type	'"Salvage Record"'
Prompt	National Planning Policy Framework - NPPF
Project location	
Country	England
Site location	SUFFOLK SUFFOLK COASTAL BLYTHBURGH A12 Flood Alleviation Scheme
Study area	2.00 Hectares
Site coordinates	TM 4520 7569 52.3238320596 1.598694291 52 19 25 N 001 35 55 E Point
Project creators	
Name of Organisation	Suffolk County Council Archaeological Service
Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design originator	Suffolk County Council Archaeological Service, Field Team
Project director/manager	Rhodri Gardner
Project supervisor	Mark Sommers
Type of sponsor/funding body	County Council

Project archives	
Physical Archive Exists?	No
Digital Archive recipient	Suffolk County SMR
Digital Archive ID	BLB092
Digital Contents	"other"
Digital Media available	"Images raster / digital photography","Text"
Paper Archive recipient	Suffolk County SMR
Paper Archive ID	BLB092
Paper Contents	"other"
Paper Media available	"Correspondence","Notebook - Excavation',' Research',' General Notes","Report"
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Archaeological Monitoring and Palaeoenvironmental Survey Report: A12 Flood Alleviation Scheme Blythburgh, Suffolk
Author(s)/Editor(s)	Sommers, M.
Other bibliographic details	SCCAS 2014/093
Date	2014
Issuer or publisher	SCCAS
Place of issue or publication	Ipswich
Description	printed sheets of A4 paper with cards covers and plastic comb binding
Entered by	MS (mark.sommers@suffolk.gov.uk)
Entered on	9 September 2014

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