



Flag Fen Lives:

Archaeological Evaluation Assessment Report

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Flag Fen Lives

Archaeological Evaluation

Assessment Report

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Purpose of Document

This document has been prepared as a Project Design for the third season of a community-based research excavation at Flag Fen. It is submitted in support of an application for Scheduled Monument Consent, defining how DigVentures intends to deliver a project that meets the quality expectations of English Heritage. DigVentures accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared. DigVentures has no liability regarding the use of this document except to Vivacity.

Document Control Grid

Title:	Flag Fen Lives Archaeological Evaluation Assessment Report
Author(s):	Brendon Wilkins, Mike Bamforth, Ben Gearey and Ian Panter
Derivation:	N/A
Origination Date:	1/01/13
Reviser(s):	Ben Gearey, Ben Roberts, Lisa Westcott Wilkins, Raksha Dave
Date of last revision:	1/07/2013
Date Printed:	N/A
Version:	V1.1
Status:	Final
Summary of Changes:	N/A
Circulation:	English Heritage
Required Action:	None
File Name / Location:	Flag Fen Lives_Assessment_Report_V1.2
Approval: (Signature)	Lisa Westcott Wilkins

Executive summary

DigVentures Ltd was appointed by Vivacity (hereafter 'the Client') to undertake a community-based archaeological research project at Flag Fen Bronze Age Centre (hereafter 'the Site') on land designated as a Scheduled Ancient Monument (Scheduled Monument No: SM, HA 1406460; TL 2253 9893).

Scheduled Monument Consent was granted by the Secretary of State for Culture, Media & Sport on 17th July 2012 "*...in respect of proposed works at [Flag Fen] scheduled monument concerning the undertaking of an archaeological evaluation (first execution stage) in advance of a 6 year project*" (English Heritage reference S000041195). It was issued on the basis of a *Project Design for an Archaeological Evaluation* (Wilkins *et al* 2012), following consultation with Will Fletcher, Ancient Monuments Inspector, pursuant to wider consultation with English Heritage's specialist archaeological and scientific advisors.

The works detailed in this report comprise the first execution stage of the project, designed to provide baseline information on the Flag Fen Scheduled Ancient Monument; redefine the physical extent of the waterlogged Bronze Age platform; assess the physical condition of the post alignment and platform; and define the extent and character of Bronze Age settlement features on the dryland margin of Northey Island. Fieldwork (followed by post-excavation assessment) was undertaken from July 23rd until 12th August 2012, comprising:

- GIS Modelling and Archive Consolidation;
- Auger Survey;
- Archaeological Investigation (Test Pits and Trenches)
- Palaeoenvironmental Assessment (pollen, plant macrofossils and insect remains);
- Archaeological Wood Assessment;
- Condition Assessment of Timber;
- Faunal Assessment;
- Finds Assessment (Pottery and Struck Flint).

The results presented in this report comprise the first Execution Stage of the project, and will be circulated for peer review and consultation (Review Point 3). The purpose of this review will be to assess the potential of the results to achieve the Aims and Objectives of the project, and formulate any required actions, products and resources into an Updated Project Design to be applied to subsequent Execution Stages.

Acknowledgements

In pioneering the world's first crowdfunded and crowdsourced excavation we were helped by a cast of hundreds, and whilst it's inevitable we'll miss people out if we try and list everyone by name, we're still going to give it a go!

Thanks to our project partners and current custodians of Flag Fen, Vivacity, and in particular to former Head of Heritage (and Project Executive) Sarah Stannage, who's vision and drive sustained us throughout. Sarah was assisted on site by David Savory, Stuart Orme, Sarah Wilson and James Beatty – and numerous volunteers in the Flag Fen visitors centre.

Thanks are also extended to Will Fletcher, English Heritage Inspector, for helpful advice and direction throughout the project, and to Dave Kenny, English Heritage Monument Warden, for guidance on site. The project benefited greatly from marketing support by Adrian Smith at Emulus Communications, technical advice from Jess Ogden and Guy Hunt at LP Archaeology, and satellite connectivity from Nigel Gough at SIS Live. Steve Kiln was kind enough to provide support from the Robert Kiln Trust, in addition to Oliver Gilkes and Flora Scutt at Andante Travels.

With an 'open-door' policy throughout site work, we were extremely fortunate to receive helpful advice and comments from our colleagues, many of whom gave up their time to present their recent work to our students. We give sincere thanks to Duncan Brown, Bob Bewley, Tony Brown, Martin Carver, Charlie French, Kasia Gdaniec, Vince Gaffney, John Gater, Ben Gearey, Mark Night, Mike Heyworth, Kerry Murrell, Francis Pryor, Tony Robinson, Andrew Selkirk, Maisie Taylor and Will Fletcher.

The project was managed for DigVentures by Brendon Wilkins, with Lisa Westcott Wilkins in the role of Project Executive. Mike Bamforth, Dave Britchfield, Raksha Dave and Ben Gearey led the project team, supported by Louise Iles, Matt Juddery, Daniel Juhasz, Kris Krawiec, Kate Davies, Cornelius Barton, Paul Flintoff and Laura James. We were accompanied on site by many of the specialist team, including Ian Panter, Ben Roberts, Fay Worley and Ian Rowlandson, as well as off site assistance from Hugo Anderson-Whymark, David Smith, Wendy Smith and Jane Young. Graphics were all completed by Ronald Bake, and the website was developed by Tom Goskar, who ensured our digital platform continued uninterrupted whilst we were in the field. Thanks to also Kezia Evans, Tim Schadla Hall and David Prince for undertaking and offering guidance on the public archaeology evaluation.

The project was funded entirely by voluntary contributions from the public, so final thanks must go to our community of Venturers – without whom this work would never have taken place. David Allsop, Katie Arbuckle, Richard Arnopp, Patricia Barber, Philip Barker, Alison Barker, Cornilius Barton, Charlotte Beattie, Christine Beddoe, Duncan Berryman, Sharron Betts, Christopher Booth, Andrew Borg, Annette Boulton, Fiona Boyd, Matthew Bradwell, John Bratt, Terry Brock, Suzanne Brown, Deb Butterfield, Jessamy Carlsson, Victoria Carter, Kevin Christopher, Paul Clabburn, Sarah Clark, Gary Colcombe, Steven Cole, David Connolly, David Connolly, Sheelagh Conran, John Cooper, Roger Craven, Deborah Curtis, Christine Cuthbertson, Lynne Davey, Victoria Davidson, Margarita de Guzman, Amie Dillon, Keith Edwards, Mike Efstathiou, Joby Elliott, Stewart Ferris, Alex Fisher, Hugh Fiske, Joe Flatman, Hayley Forsyth, Emma Freeman, Andrew French, Charlotte, Frost, Steve Gamester, Pippa Gardner, Rebecca Gibbs, Jamie Gibbs, Clare Gillett, Louise Glasson, Susan

Greaney, Dorothy Halfhide, Tracy Harley, Neil Hart, Mark Haworth, Sarah Hefford, Sian Hill, Steve Holden, seana rhiannon hovel, Leighton Howells, Colin Howey, Jack Hughes, Susan Ing, Nicola Jennings, Scott Johnson, Eleanor Johnson, Rhona Johnstone, Maxine Kaye, Dave and Rachel, Brian Kerr, Alice Kershaw, Anita Kimber, Jodie King, Karen Kirk, Jackie Kirkham, Joanne Kirton, Kayt Lamballe Armstrong, Cally Langhurst, Matt Law, Eugene Lefeuvre, Penny Lock, Stephanie Lockwood, Zoe MacDonald, Rena Maguire, Jeffrey Marks, Margaret Massey, Olwen Mayes, Brenden McIntyre, Tina McNeil, Patrick McNulty, Matthew Miller, Shaun Mitchem, Bob Moody, Declan Moore, Tracy Morgan, Gabriel Moshenska, Jim Mower, Abbie Muir, Philip Mullen, Tim Nash, Ray Newton, Rachel Norman, Jeremy Norman, Ros O Maolduin, Gillian O'Boyle, Nina O'Hare, Gill Osler, Andrew Pacey, Catherine Parker Heath, Rebecca Parr, Reena Pastakia, Diana Perkins, Hazel Perry, Stuart Pierson, The Celtic Myth Podshow / attn Ruthie Smith, Lesley Probert, Pip Pulfer, Jessica Ramsey, Miia Ranta, Rachel Renwick, James Rimmer, Toni Ring, Jacky Robertson, Roy Robson, Gillian Rowe, Ian Rowlandson, Susan Royce, Joanna Russell, Bronwen Russell, Gloria Sanders, Emily Sanders, Mike Sarna, Christopher Scott, Faye Sharpe, Nick Shepherd, Ita Sherlock, Mary Sherlock, Louise Sherratt, Daniel Shoup, Alan Simkins, Lorraine Slade, Thomas Slager, Barendina Smedley, Adrian Smith, Kerri Spangaro, Cliff Stanton, Barry Sterry, Ben Stokes, Margaret Struckmeier, John Suckling, Alex Suddaby, Joan Sutherland, Ben Swain, Chris Swindells, Michelle Thick, Andrew Thomas, Guy Thornton, Rebecca Try, Nicholas Turland, Melanie Turner, Marion Uckelmann, Frank Villeneuve-smith, Eileen Wade, Jon Walker, Rebecca Wells, Adam Wells, Joanne and Bob Westcott, Ruth Wheeler, Nik Whitehead, Theodore Wilkins, Lucy Wilkins, Mark Williams, Rob Wiseman, Katie Witherington, Neil Witney, Rebbecca Woodman, Richard Worth, Jill Wozniak, Mrs Wright, Donna Yates and Tina Yates.

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1 INTRODUCTION AND SCOPE

1.1 Project Background

- 1.1.1 DigVentures Ltd was appointed by Vivacity (hereafter 'the Client') to undertake a community-based archaeological research project at Flag Fen Bronze Age Centre (hereafter 'the Site' – Figure 1). Following consultation with English Heritage, a project model was devised according to the MoRPHE framework (Management of Research Projects in the Historic Environment - 2006). This included Start-up, Review Point 1, Project Initiation and Review Point 2, culminating in the submission of a fully illustrated Project Design to DCMS outlining key archaeological research questions, roles, procedures, stages and outputs (Wilkins *et al* 2012). These project steps are described below to elucidate the main project drivers.
- 1.1.2 Start-up stage immediately followed a masterclass hosted by English Heritage in Cambridge (November 2011), and attended by Opportunity Peterborough's Heritage Regeneration Team, Sarah Stannage (Head of Heritage, Vivacity), Greer Roberts (Head of Arts, Vivacity) and Cllr Mathew Lee (Heritage Champion, Peterborough City Council). The future regeneration plans of Peterborough City Council were discussed, and in particular, the potential scope to develop the city centre Southbank site and Flag Fen as a combined cultural and tourist proposition.
- 1.1.3 Further to discussions with English Heritage's specialist team, it was clear that the encroaching development context in Peterborough's Eastern Industrial Area presented a significant danger to Flag Fen, and that in the first instance, a longer-term conservation management and research strategy should be created to improve the site's 'at risk' status. This advice was formulated into a project brief by the Client to create a community archaeology project with multiple opportunities for public participation, serving to develop a coherent research strategy and quantify the public interest necessary to leverage future funding from the Heritage Lottery Fund.
- 1.1.4 DigVentures was appointed as Project Management responsible for the Project Team, and an Expert Team was assembled from Birmingham University, the British Museum, Durham University, York Archaeological Trust, English Heritage and a number of independent researchers. The Client assumed the role of Project Executive and Project Sponsor, with DigVentures offsetting costs for the first Execution Stage with a public fundraising campaign under the banner 'Flag Fen Lives'.
- 1.1.5 A project proposal was issued to English Heritage (Review Point 1) followed by Initiation Stage, and following favourable consultation, a Project Design and Risk Log addressing the principle archaeological imperative to provide baseline information on the Flag Fen Scheduled Ancient Monument was submitted (TL 2253 9893). Scheduled Monument Consent was granted to undertake a program of archaeological survey and evaluation by the Secretary of State for Culture, Media & Sport on 17th July 2012:

"...The Secretary of State is agreeable for the works to proceed... in respect of proposed works at [Flag Fen] scheduled monument concerning the undertaking of an archaeological evaluation (first execution stage) in

advance of a 6 year project... providing the conditions [of Scheduled Monument Consent] are adhered to, and that accordingly Scheduled Monument Consent is hereby granted under section 2 of the 1979 Act for the works described above..." (English Heritage reference S000041195).

- 1.1.6 Fieldwork was undertaken from July 23rd until 12th August 2012, consisting of an auger survey, targeted excavation on Northey Island, test pits above the water logged structures, archive consolidation and deposit modelling.
- 1.1.7 The results presented in this report comprise the first Execution Stage of the project, and will be followed by Review Point 3. An evaluation of the public archaeology aspects of the project (as detailed in Section 1.1.2 and 1.1.3 above), and assessment of the community impact (such as breadth, depth and diversity of audience reach and engagement) is beyond the scope of this document, and has been formulated into a separate report (Westcott Wilkins 2013, and Figure 9).
- 1.1.8 This report is one of a number of archive and dissemination products to have been generated by the project, including a digital archive and metadata, paper archive, and artefact archive processed for temporary storage. Review Point 3 will assess the potential of the results and associated archive to achieve the Aims and Objectives of the project, and formulate any further actions and products into an Updated Project Design to be applied to subsequent Execution Stages.

1.2 Site Description

- 1.2.1 The Site is limited to the land occupied by the Flag Fen Bronze Age Centre (TL 2253 9893 – Figure 1) and is designated as a Scheduled Ancient Monument (No: SM, HA 1406460). Several buildings comprise the Flag Fen Bronze Age Centre, including an artificial lake, gravelled and tarmac parking areas and grassed areas. The Site is surrounded by farmland to the north, east and south, and bounded to the west by Peterborough power station, in the industrial area known as Fengate.
- 1.2.2 The Site lies within the Flag Fen basin, and encompasses the wetland/dryland interface between the Flag Fen basin and Northey Island (Figure 2). The basin lays at the western extent of the East Anglian fens, to the east of the modern city of Peterborough, 0.5km north of the modern channel of the River Nene. The Site is generally flat, lying at around 2.30m AOD, with a slight incline towards the eastern margin and Northey island (Figure 2). The geology of the Flag Fen basin consists of marine derived Oxford Clay (British Geological Survey), overlain by Flandrian peat and clay deposits (Waller & Hall 1991). To the west of the basin the solid geology consists of Jurassic Limestone overlain by drift deposits comprising of First Nene Terrace gravels, shelving off into the fen (Waller & Hall 1991).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

- 2.1.1 Protruding from the edge of a freshly re-cut drainage dyke, the chance discovery in November 1982 of Flag Fen's waterlogged timbers set in train

one of the iconic 'Great Excavations' of British Archaeology (Schofield 2011). Seasonal excavations led by Francis Pryor and 'The Fenland Archaeological Trust' continued until 1995, funded principally by English Heritage. This work has been published in numerous books and journals, with a comprehensive statement on the geological, topographic, archaeological and historical background published in 'The Flag Fen Basin: Archaeology and environment of a Fenland landscape' (Pryor 2001; See also 1991; 1998; and 2010). Some of the issues presented in that volume and subsequent publications are outlined below to provide a context and rationale behind this project's Aims and Objectives.

2.2 The Flag Fen Basin

- 2.2.1 The Flag Fen basin lies at the western edge of the East Anglian fens in an area of deep Holocene sediments that accumulated in response to a progressive rise in relative sea level. The precise date and rate of progression of inundation of the Flag Fen basin is the subject of active research, but organic sediments are considered to have first formed in a shallow natural depression at the eastern edge of the East Anglian fens at approximately 7000 BC. Accumulated organic deposits first began to form in deeper sections of the Flag Fen basin at approximately 2000 BC (Scaife 2001, 367), with evidence for salt-extraction briquetage at Fengate and Northey indicating that it was becoming increasingly saline by 1300 BC.
- 2.2.2 This was the 'high water mark' of a process that had led to the flooding of 'Doggerland' and the southern North Sea basin (Shennan 1982; Gaffney *et al.* 2007). It produced what Rob Scaife has called a 'negative hydrosere', reversing the typical Holocene succession of underwater environment giving way to terrestrial landform and turning it on its head. The principal phase of archaeological activity at Flag Fen – the Bronze Age post alignment and platform – was constructed in this increasingly wetter environment, with dendrochronological determinations indicating that it was actively maintained between 1300 and 900 BC.
- 2.2.3 After this the post alignment was no longer repaired, although the site continued to be visited during the Late Bronze Age and Iron Age, and a Roman Road known as the fen causeway cut across the neck of the Flag Fen basin. Water levels continued to rise from the Late Roman period onwards, with persistent flooding leading to total inundation, until the large-scale Flemish drainage works of the 17th Century brought the land back into agricultural use and led ultimately to Flag Fen's discovery.

2.3 The Archaeological Narrative

- 2.3.1 The Flag Fen post alignment consists of five parallel lines of vertically set wooden posts running for approximately 1km across the neck of the Flag Fen basin, from the high ground of Fengate in the west to Northey in the east. A large artificial timber platform, approximately two Hectares in diameter, was identified through excavation and auger survey some 200m west of the Northey landfall. Although its function, development and precise scale is not yet defined, significant quantities of ritually deposited artefacts and similarities in construction methodology indicate that it was closely related to the post alignment physically and functionally.

- 2.3.2 Since the large-scale English Heritage funded excavations during the 1980s and 90s, there have been no other major research projects at Flag Fen to elucidate these questions, other than development-led work outlined in Section 2.5 below. However, there are several unpublished projects in the immediate locality that have cast Flag Fen into a new interpretive light. The Cambridge Archaeology Unit (CAU) has undertaken major development-led excavations at Bradley Fen, Whittlesey (1km southeast of Flag Fen) Must Farm (2km southeast of Flag Fen). In addition to the well publicised discovery of nine prehistoric log boats, the on-going excavations at Must Farm have so far uncovered fish weirs, eel traps, intact bronze and iron weaponry; and the buried remains of Neolithic and Bronze Age settlements, trackways and burial monuments. This work has highlighted significant gaps in our knowledge of Flag Fen, particularly in relation to the phasing and chronology of the post alignment and the potential antecedents to the waterlogged structures.
- 2.3.3 CAU are currently GIS modelling the data, following work to map the progression of freshwater and marine sediments originally undertaken by 'The Fenland Project' (Waller 1994). By revealing the character and extent of land available for settlement, the model seeks to understand the human response to the changing landscape within the Flag Fen basin (Knight and Murrell 2012, 20). This model has been ground-truthed by what CAU have called 'deep space' archaeological investigations. By exposing large tracts of open area at Bradley Fen and Must Farm, evidence has been revealed for a much earlier 'dry-land' archaeological landscape than so far identified at Flag Fen (Knight 2012).
- 2.3.4 Centring on a low-lying stretch of pre historic river valley, the CAU model extends back into the Neolithic, situating burial mounds, monuments and numerous animal trackways in an open, extensively settled landscape. As large areas of the lower land became saturated, the on-set of peat formation enveloped these earlier Bronze Age and Neolithic features, resulting in a 'pristine' landscape of dry-land archaeology remaining undisturbed by later activity. This conforms to earlier investigation at Flag Fen adjacent to Trench 2 (see Section 6.4 and Figure 5) that identified evidence for Early Bronze Age activity in the form of a Beaker settlement on the western edge of Northey Island (Britchfield 2010).
- 2.3.5 Periodic flooding constrained movement of people and animals, although this was still some time before the open water environment of the Flag Fen embayment contemporary with the Bronze Age post alignment. At around 1500 BC, land tenure began to change, with linear ditches with upcast banks parcelling the land into a complex pattern of droveways, yards and paddocks. This was laid out to manage large numbers of livestock (particularly sheep and cattle) with summer grazing on the rich wetland pastures, followed by over-wintering on the higher dry land. This phase of activity was recorded at Flag Fen too, with a ditch identified in Trench NT2 and 2003/2 that was later truncated by the post alignment (See Section 6.3 and Figure 4).
- 2.3.6 After 1300 BC, large areas of low lying land became permanently submerged, as the landscape changed from a place once connected by a

river to a series of separate islands set within the Flag Fen embayment. The first phases of timber constructions at Flag Fen and Must Farm coincide with this period. This followed shortly after the lower fields had become covered in peat, and corresponded with the first deposition of metal work that characterised the Flag Fen monument.

- 2.3.7 The deposition of non-ferrous metalwork at Flag Fen commenced in this period, dated typologically to c. 1300-300 BC (Coombs 1992) and at Bradley Fen from between c. 1140-1020 BC (Appleby 2005). This has attracted substantial scholarly attention in Britain and beyond, due to the relatively rare occurrence of a Bronze or Early Iron Age hoard excavated under controlled conditions, as well as the exceptional quality of the contextual evidence for metalwork deposition afforded by the waterlogged environment.
- 2.3.8 Although the post alignment was no longer maintained from 900 BC, finds dating to the Late Bronze Age and Iron Age have been recovered from the power station end of the post alignment, suggesting that the alignment still held a ritual status during this period (Pryor 2001). The Fen Causeway (SMR No: 50710), a Roman Road constructed in the 1st century AD, runs from Denver in the east to join Ermine Street (The Great North Road) at its western extent. Margary (1967) describes the road as consisting of layers of redeposited terrace gravel and layers of clay. Excavations at Flag Fen, where the Medieval Mustdyke truncates the road, found the road to be constructed from a thick layer of re-deposited gravel, sitting directly on the fen peats. The Cats Water drain runs east-west across the southern boundary of the site and is thought to be of artificial origin, possibly dating to the Roman period (SMR No: 10032).

2.4 The Preservation Environment

- 2.4.1 Wetlands have long served as abundant socio-economic environments by humans of all periods, whilst their liminal nature at the edge or between settlements has also fostered an ideological or cultural value (Coles 1984). The archaeological significance of wetland sites is a consequence of their wet or anaerobic burial environment. As the majority of artefacts in the past were organic, this optimum preservation can lead to an 'enhanced' archaeological record potentially far more informative than equivalent dryland sites. In addition to well-preserved artifactual evidence, past ecological habitats and economic practices can also be reconstructed through a multi-proxy investigation of palaeoenvironmental material.
- 2.4.2 Since the discovery of waterlogged timbers in 1982, the integrity of the preservation environment has been at issue, with concerns that an accelerated rate of degradation is having a serious impact on the Site's archaeological sustainability (Lillie and Cheetham 2002). The rates to which these factors are affecting the preservation of the site are currently unknown, as is their synergy with remedial measures (such as the construction of the Flag Fen Mere). Specific threats include:
- Deep ploughing and slurry injection farming practices in adjacent fields.

- Deepening of the Mustdyke/Padholme Drain to provide the principle flood-relief channel for the Eastern Industrial Area.
- Existing structures and commercial development in the Eastern Industrial Area, and proposals for the PREL development on the immediate site boundary.

2.4.3 Drainage, farming and development impacts have been exacerbated by an annual trend of exceptionally low rainfall in the eastern counties. Reductions in water levels may reduce saturation within the peat, resulting in oxidisation, fluctuating acidity, and degradation of organic archaeological materials. As water-table monitoring (Lillie & Cheetham 2002), microbial decay analysis (Powell 1999, and Section 8 below), and condition assessment of the waterlogged wood (Bamforth 2010, and Section 7 below) was last undertaken over 10 years ago, the present baseline study represents a significant opportunity to take stock of the resource.

2.5 The Research Context

- 2.5.1 The original Flag Fen excavations took place in the context of a growing professional awareness of the importance of 'public outreach', informed by the seminal English Heritage publication 'Visitors Welcome' (Binks *et al* 1988). What began as a temporary viewing platform and exhibition area during the early years of the excavation, developed into the 'Flag Fen Bronze Age Centre' – a major regional visitor attraction, including a museum, visitor centre, and experiential landscape designed to represent a Bronze Age settlement (Figure 10).
- 2.5.2 Some of this infrastructure required pre-development investigation (see Figure 3, or Britchfield 2001 for full details). No other major archaeological work has taken place on site since the original campaign of the 1980's and 1990's, aside from small-scale training excavations at the east of the post alignment (2003-2004), and limited test trenches across the western portion of the post alignment (2005). As a consequence of this hiatus, outstanding questions regarding the character and purpose of the waterlogged structures (and association with the adjacent dryland) remain to be addressed, exacerbated by the presumption that the integrity of burial environment is in decline.
- 2.5.3 In January 2000 the majority of the Flag Fen archive was destroyed in a catastrophic fire, taking with it the potential to reinterpret the site by record alone, or provide baseline data to model the deterioration of the burial environment. Development-led archaeology at Must Farm and Bradley Fen (within a 2km radius of the site) has also raised further questions about Flag Fen and its role within a regional landscape, although this work remains unpublished.
- 2.5.4 The Department of Culture, Media and Sport (DCMS) scheduled Flag Fen as an ancient site and monument in March 2012, and shortly after the Site was placed on the 'At Risk' register. The statement of significance associated with Flag Fen is as follows:

"The source of Flag Fen's unique and outstanding significance lies in its ability to provide a tangible link to an era of northern European prehistory, which is still shrouded in mystery. As the best- preserved and most accessible site of its kind in Britain, the Flag Fen basin has been and will remain, instrumental in shaping our understanding of life 3,000 years ago. In addition, Flag Fen has been one of the leading sites driving the development of the archaeological profession in the late 20th century – a profession which enjoys much support and interest from the general public. If it is possible to communicate the extraordinary values and potential of the site effectively and in a sustainable way to the public, Flag Fen has the potential to develop into one of Britain's most important heritage attractions." (PLB Consulting - Flag Fen Audience Development Plan).

- 2.5.5 In May 2013, the nine Prehistoric boats discovered at Must Farm were accessioned at Flag Fen in a cold storage barn conversion, funded by a £100k grant by English Heritage, and overseen by a partnership including Vivacity, Hanson UK, English Heritage, Peterborough City Council, Cambridge Archaeological Unit and York Archaeological Trust. The public interest in this double British Archaeological Award winning project has brought renewed interest to Flag Fen, with a new temporary exhibition space to observe the on-site conservation work, providing added impetus to the Client's ambitious heritage regeneration plans.

3 PROJECT AIMS & OBJECTIVES

3.1 Background

- 3.1.1 The following is based on the project aims detailed in the *Project Design for an Archaeological Evaluation* (Wilkins et al 2012, Section 2.1). The business case for this work has been designed in accordance with the fundamental principles of SHAPE (Strategic framework for the Historic Environment: Activities and Programmes in English Heritage, 2008) and English heritage's 'Strategy for Wetland' (2002).
- 3.1.2 The overarching aim of the project is to contribute to the future management and presentation of the Flag Fen Scheduled Ancient Monument, ensuring that appropriate management information is available to decision makers and that this is communicated as effectively as possible to the community (SHAPE sub-programme number 11111.130: development of a sound evidence base for specific locales and historic assets). An assessment of the potential of the excavation results (and associate archive products) to achieve the project aims and objectives will be undertaken in Review Point 3 (see section 1.1.6 above). Any further required actions, products and resources will be applied in subsequent Execution Stages (or closure) and be detailed in an Updated Project Design.
- 3.1.3 The wider objectives of Vivacity and Peterborough City Council to understand, manage, and promote the archaeology of Peterborough fall under separate SHAPE sub-programmes (31521.110 and 12212.110) and although these formed a major consideration of the project, the 'public archaeology' dimension has been assessed and reported on in another document (Westcott Wilkins 2013).

- 3.2** **Aim 1:** Redefine and establish the precise physical extent of the site.
- **Objective 1.1:** Define the edge of the Flag Fen timber platform within the landscape incorporating the results of previous excavations.
 - **Objective 1.2:** Determine the nature of the pre-peat landscape and the stratigraphy of the overlying sediments.
 - **Objective 1.3:** identify and investigate any archaeological features within the research areas.
- 3.3** **Aim 2:** Establish the current state of preservation of the *in situ* archaeological and palaeoenvironmental material across the site.
- **Objective 2.1:** Obtain appropriate samples for archaeological, artifactual and palaeoenvironmental assessment from test pits, trenches and auger survey, as defined in Aim 1.
 - **Objective 2.2:** Assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques.
 - **Objective 2.3:** Assess these data in association with the results from previous investigations at Flag Fen (1983-2007).
- 3.4** **Aim 3:** Assess any metal work identified during the course of the evaluation, appraising the research potential in the light of new ideas and recent discoveries.
- **Objective 3.1:** Obtain appropriate samples for assessment from the excavation as defined in Aim 1.
 - **Objective 3.2:** Assess the significance of these objects (Typo-chronology; regional interconnectedness; depositional practices).
 - **Objective 3.3:** Compare these results with the extant metalwork archive, with recommendations for a reassessment of the archive if necessary in light of recent research and new discoveries.
- 3.5** **Aim 4:** Develop an Updated Project Design with recommendations for further work.
- **Objective 4.1:** Collate all the data from Aims 1-3.
 - **Objective 4.2:** Assess the state to which the archaeological and palaeoenvironmental resource at Flag Fen is being successfully preserved *in situ* in light of attritional threats.
 - **Objective 4.3:** Formulate recommendations for further archaeological and palaeoenvironmental study at Flag Fen based on Objectives 4.1 and 4.2.

4 METHODOLOGY

4.1 General Requirements

- 4.1.1 The archaeological fieldwork was carried out in accordance with the methodology defined in the *Project Design for an Archaeological Evaluation* (Wilkins *et al* 2012, Section 5). All work was undertaken in conjunction with best practice, national guidelines and published standards (*ibid*, Section 1.7). Methodological summaries are presented below, following detailed descriptions in the Project Design linking specific techniques to aims and objectives (*ibid*, Section 5).

4.2 Auger Survey Methodology

- 4.2.1 An auger survey was undertaken to identify the northern and western limits of the Bronze Age platform (between the Catswater and Mustdyke drainage ditches) and inform the final positioning of Test Pit 1 (Figure 3). This area was initially marked out by GPS, with the auger survey commencing in the northeast corner (thought to be outside the limits of the wooden platform) moving progressively closer to the presumed location of the monument.
- 4.2.2 15 auger points were taken in total using an Eijkelkamp hand-held gouge auger, with the location of all points recoded using a Global Positioning System (GPS). The presence or absence of the platform was inferred via the presence or absence of waterlogged wood in the augered material, and the results of this survey informed the subsequent positioning of Test Pit 1 (Figure 3).

4.3 Excavation Methodology

- 4.3.1 A total of two machine-excavated trial trenches and three hand-dug test pits were excavated during the project (Figure 3). All trenches were marked out on the ground using a GPS prior to the commencement of work, and initially scanned for surface finds prior to excavation.
- 4.3.2 Machine excavation was carried out using a JCB 3CX fitted with a toothless ditching bucket, removing the overburden to the top of the first recognisable archaeological horizon, under the constant supervision of an experienced archaeologist. Trenches were subsequently hand-cleaned planned and photographed prior to hand-excavation. Palaeo-land surfaces in trench 1 and 2 were removed in grid squares, with all deposit coarse sieved for artefacts.
- 4.3.3 Any archaeological features and deposits exposed in the evaluation trenches were hand cleaned and excavated to determine their nature, character and date. Carefully chosen cross-sections were then excavated through features to enable sufficient information about form, development, date and stratigraphic relationships to be recorded. All interventions were surveyed using a GPS tied into the Ordnance Survey grid and all recording was undertaken using DigVentures *pro forma* recording system. A complete drawn record of the evaluation trenches and test pits comprises both plans and sections, drawn to appropriate scales and annotated with coordinates and AOD heights.

- 4.3.4 A single context recording system was used to record the deposits. A full list is presented in Appendix 1. Layers and fills are recorded (001). The cut of the feature is shown [001]. Each number has been attributed to a specific trench with the primary number(s) relating to specific trenches (i.e. Trench 1, 1001+, Trench 2, 2001+, and all Test Pits follow a number sequence from 3000 onwards).

4.4 Archaeological Wood Methodology

- 4.4.1 Waterlogged wood was excavated by hand from within the confines of the excavation test pits, in accordance with English Heritage guidelines for the treatment of waterlogged wood (Bunning 2010). The retention strategy was designed in accordance with made by the Society of Museum Archaeologists (1993). The material was sampled and recorded in accordance with the methodology devised at Flag Fen for the 'A' series (Taylor 2001). Joints and fixings were described in accordance with the Museum of London archaeological site manual (Spence 1994).
- 4.4.2 Each discreet item was recorded individually using a pro forma 'wood recording sheet.' This was based on the sheet developed by the Fenland Archaeological Trust for the post excavation recording of waterlogged wood to ensure continuity with previous investigations. All records were then entered into a database, with metric data measured with rulers and tapes and the tool marks measured using a profile gauge.
- 4.4.3 Every effort was made to refit broken or fragmented items, however, due to the nature of the material some discreet yet broken items may have been processed as their constituent parts as opposed to as a whole. Items that were identifiable to species by morphological traits visible with a hand lens (such as oak – *Quercus* sp.) were noted, with other items sub-sampled to allow later identification to taxa via microscopic identification as necessary. Relevant samples were selected for condition assessment (Panter and Spriggs 1996) and specific methodologies relating to this analysis is detailed in Section 8 below.

4.5 Health and Safety

- 4.5.1 All work was carried out in accordance with its company Health and Safety Policy, to standards defined in *The Health and Safety at Work etc. Act 1974*, and *The Management of Health and Safety Regulations 1992*, and in accordance with the SCAUM (Standing Conference of Archaeological Unit Managers) health and safety manual *Health and Safety in Field Archaeology* (1996), and DigVentures' health and Safety Policy.

5 AUGER SURVEY RESULTS

By Ben Gearey

5.1 Introduction

- 5.1.1 Boreholes were positioned in a grid pattern across the postulated edge of the timber platform in order to accurately position Test Pit 1 (Figure 3). The purpose of this work was to 'redefine and establish the precise physical extent of the site' (Aim 1). The specific objectives were to 'Define the edge

of the Flag Fen timber platform within the landscape incorporating the results of previous excavations' (Objective 1.1) and 'determine the nature of the pre-peat landscape and the stratigraphy of the overlying sediments' (Objective 1.2).

5.2 Stratigraphy

5.2.1 Detailed stratigraphy for each borehole is provided in Appendix 2, but in general the sequence was similar to that which has been previously described for the Flag Fen Basin (Pryor 2001, 400) and consisted of (from ground level):

1. Top soil/made ground in some locations
2. Stiff grey silty clay, oxidized with fragments of molluscs and organics in places
3. Brown organic clay/silt trending into humified peaty silt/*gyttja* Occasional sub-fossil wood remains.
4. Grey and Blue-grey silts, occasional sub-fossil wood and monocot remains. Brown silt in places. Sandy to base.

5.2.2 Boreholes were excavated to a depth of at least 2.4 to 2.6m, and although this sequence was observed in the majority, variation was recorded due to sub-surface obstructions and in at least one location, and the apparent presence of a service trench (Borehole C2).

5.2.3 The absence of extensive sub-fossil wood remains in any of the borehole samples was more difficult to explain, given the presumed location of the auger survey points directly above the postulated timber platform. This would seem to imply that the timber platform is not as extensive or continuous as has been previously suggested. Alternatively, the methodology of borehole excavation to identify the extent of the archaeological horizon is not fit for purpose. However, the absence of archaeological wood in Test Pit 1 (See Section 6.5 below) would appear to support the hypothesis that if the Flag Fen platform does extend far to the west of the Mustdyke, it may be a relatively discontinuous structure.

6 EXCAVATION RESULTS

By Brendon Wilkins and Mike Bamforth

6.1 Introduction

6.1.1 Two evaluation trenches and three test pits were positioned in different locations on the waterlogged structures and dryland/wetland margin of the Site (Figure 3), with the principle purpose to 'redefine and establish the precise physical extent of the site' (Aim 1) and 'establish the current state of preservation of the *in situ* archaeological and palaeoenvironmental material across the site' (Aim 2). The specific objectives were to 'determine the nature of the pre-peat landscape and the stratigraphy of the overlying sediments' (Objective 1.2), 'identify and investigate any archaeological features within the research areas' (Objective 1.3) and 'obtain appropriate samples for archaeological, artifactual and palaeoenvironmental assessment' (Objective 2.1)

- 6.1.2 This section presents the excavation results with detailed descriptions of the trenches and test pits included in Appendix 1. Figure 3 shows the overall location of each targeted area, and Figures 4 – 8 provide illustration of individual trenches and test pits containing archaeological remains.

6.2 Stratigraphic Sequence

- 6.2.1 As the trenches and test pits differed significantly in relation to the Northey fen-edge, a slight variation on a common stratigraphic sequence was recognised across the site, in keeping with the results from previous investigations. In Trench 1 this comprised topsoil (1000) overlying peaty alluvium (1001), followed by a buried palaeosoil (1003) overlying natural gravel (1002).
- 6.2.2 The stratigraphic sequence was deeper in Trench 2 due to the addition of several layers of redeposited clay and gravel explained by proximity of the Mustdyke) and varied in the test pits due to the depth of accumulated organic deposits and the presence or otherwise of waterlogged structures (see Section 4.6.2). A palaeosoil horizon was identified in both Trench 1 and 2, and mechanical excavation ceased at this boundary. The average thickness of this deposit was 0.15m, and wherever it was observed it was excavated by hand in a grid pattern, with all deposit coarse sieved for artefacts.

6.3 GIS Modelling and Archive Consolidation

- 6.3.1 Previous attempts to take stock of the Flag Fen archive in the wake of the fire (January 2000) provided the motivation for a basic GIS model of the Site indicating all previous interventions. Whilst the accuracy of this was assured for later trenches, the position of some of the earlier trenches could only be estimated approximately. Although the fire destroyed the entire corpus of ink drafted site plans and graphics, some of the original film permatrace site plans survived. Many of these were burnt and melted around the edges, but were still comprised a functional record of the waterlogged wood.
- 6.3.2 In the first instance the project team sought to improve the GIS model, verifying the geographic location of all previous trenches by resurveying any visible trench edges wherever possible. Any errors in the GIS were then corrected in advance of the position of the new trenches and test pits being finalised. Unfortunately not all errors in the original survey drawings were correctable, and Test Pit 2 was excavated partially above a trench previously excavated in 1990 (Figure 10).
- 6.3.3 A scoping exercise was then undertaken to see if the original permatrace plans could be scanned and digitised into the GIS model. Once unrolled however, the original A2 sheets proved too brittle to be manipulated with a conventional A3 scanner. As a test sample a number of sheets were scanned by Duncan Brown, Head of Archaeological Archives, on a large-scale scanner at English Heritage's offices at Fort Cumberland. This proved successful, producing High-Res Tiff files that could then be digitised by hand in GIS, and recommendations have been made to the Client on further treatment and storage of the archive.

6.4 Trench 1 Results

6.4.1 Trench 1 was located along the eastern boundary of the Flag Fen Archaeology Park, directly where the Bronze Age post alignment made landfall with Northey Island (Figure 3). It measured 20 metres by 4 metres and was positioned to overlap with earlier trench interventions (Trench 2003/2 and NT2, Area 3). It was targeted to further define the edge of the wetland/dryland margin, addressing the high potential for features associated with the post alignment, and identify any evidence for earlier activity in this area (Figure 4).

6.4.2 Previous investigation had identified a dense distribution of postholes and stake holes in this location, in addition to an East-West orientated ditch, terminating in trench NT2 and extending into the open Fen (Britchfield 2010, 44). In keeping with previous results, a dark grey brown silty clay deposit (1003) approximately 0.12m thick was identified in the central area of the site, representing an initial basal palaeosoil that was naturally truncated and degraded as water levels rose. Mechanical excavation ceased at this point and the deposit was removed by hand to reveal seven struck flints distributed throughout the layer with no discernable pattern (see Section 11). A number of features were exposed during this hand clean, including ditch feature [1070] and numerous postholes associated with the Bronze Age post alignment. These are discussed below, followed by full feature descriptions in Appendix 1.

Ditch Feature [1070]

6.4.3 Ditch feature [1070] extended east-west across the trench. This feature was originally observed during excavation of the adjacent 'Green Wheel' cycle path (recorded as feature D1), and was initially thought to be curving or horseshoe-shaped, possibly forming a 'henge-type' monument. Subsequent investigation in trench NT2 demonstrated that the curvature was an illusion created by later deposits, and that the ditch was relatively straight, terminating in a clear butt-end and continuing down towards the fen edge into Trench 2003/2.

6.4.4 The ditch measured 0.8m wide and 4m+ long, and was 0.35m deep. It was excavated (and numbered separately) in four slots: Slot 1 [1070]; Slot 2 [1119]; Slot 3 [1116] and slot 4 [1159]. It had gently sloping sides, and a rounded bottom that had been naturally filled by a light orange silty clay primary deposit and a dark grey brown silty clay secondary deposit. The faint remnants of an upcast bank (1168) could be observed in the east facing section of Slot 1, comprising a mid brown sandy silt approximately 0.2m thick. No finds were recovered from this feature, however, previous interpretations that the ditch silted prior to the construction of the Bronze Age post alignment was supported by several posthole features [including 1053, 1035 and 1023] truncating primary and secondary ditch deposits.

Discrete Features – Postholes and Stakeholes

6.4.5 There were 52 Postholes and 15 Stakeholes excavated in Trench 1 of similar size and shape; 16 of these contained the wooden tips of former posts and were in an advanced state of decay (see Appendix 1 and Section 8, Table 2). Previous work in adjacent Trench 2003/2 and NT2, Area 3, had identified a schematic model of five equally spaced parallel lines of posts and

stakeholes, constructed in symmetry with the main body of the Bronze Age post alignment. This arrangement was less clear in Trench 1, although a similar density and distribution of features was observed. Once all posthole and stakehole features had been half sectioned and recorded, any with remaining wooden posts *in situ* were box excavated to remove posts for wood recording and condition assessment.

- 6.4.6 The natural gravels were encountered at 0.7m AOD; Sediment descriptions and sub-samples were taken and are detailed in Appendix 1 below. The dimensions of features with remaining wooden posts *in situ* and associated wood numbers can also be found in Appendix 1, and includes [1029, 1023, 1027, 1041, 1025, 1049, 1109, 1017, 1065, 1153, 1135, 1099, 1051, 1069, 1021 and 1167]. No structured patterning to the preservation of waterlogged wood found in these features could be discerned, and no datable artefacts were recovered from any fills. A shallow outlying pit feature [1074] was excavated to the north of the main cluster of posthole features, but was likely to be a tree bole and could be relatively recent. A number of unstratified animal bones were also recovered from the topsoil during the initial machining (see Section 10), and a single unstratified dark brown-grey un-oxidised sherd of Beaker pottery (see Section 11).

6.5 Trench 2 Results

- 6.5.1 Trench 2 was a stepped trench, measuring 15 x 2 metres at base, and targeted to further define the extent of archaeological activity predating the post alignment on Northey Island (Figure 5, and Appendix 1). The stratigraphic model comprised alluvial peat, overlying a palaeosoil surface at 1.3 metres OD, which gave way to a clean, lower gravel terrace. The upper sequence made up from upcast gravels from the adjacent Mustdyke. As with deposit (1003) in Trench 1, palaeosoil deposit (2006) was removed by hand, and coarse sieved for artefacts, producing 13 struck flint artefacts.
- 6.5.2 Trench 2 was located adjacent to Trench NT 1, a trench previously excavated in advance of the neighbouring 'Green Wheel' cycle track. Trench NT 1 contained features producing Beaker pottery, in association with stakeholes interpreted as a fencerow. A continuation of these features was identified in Trench 2, including 7 pits, 6 postholes and 3 stakeholes. The majority of these features were much more ephemeral than those that had previously been excavated in adjacent Trench NT 1, in many cases to little more than 0.1m deep. No structural pattern could be observed either, and these features may be a reflection of fen edge activity to stabilise the contemporary ground surface – general trample and disturbance rather than negative cut features.
- 6.5.3 Pit feature [2028] was much more substantial, and similar in character to the Early Bronze Age phase of activity identified in the adjacent trench. Measuring 0.46m in length, 0.20m in width and 0.26m deep, the cut had sharp concave sides and a flat base, and was filled with loose, mid grey brown silty gravel. No pottery was recovered from this trench; although pit feature [2028] contained 11 struck flints and 13 other flint artefacts were recovered from the palaeosoil deposit (2006).

6.6 Test Pit 1 Results

- 6.6.1 Test Pit 1 was located adjacent to the postulated northern edge of the Bronze Age platform, to the east of the Mustdyke with the precise location informed by an auger and GPS survey (Figure 6, and Appendix 1). The purpose of the auger survey was to identify the northern and western limits of the platform, however, the absence of extensive sub-fossil wood remains in any of the auger points led to the decision to position the test pit some distance in from the published edge of the platform.
- 6.6.2 Once the position of the Test Pit had been finalised, it was excavated by hand, and stepped in order to reach depth safely. The results of this test pit were less than conclusive, with a very limited range of woody material identified and a complete absence of archaeological wood. This would appear to support the hypothesis that if the Flag Fen may be a relatively discontinuous structure, or does extend far to the west of the Mustdyke. In the original Flag fen excavations on the platform, wood free zones were also identified, in particular the 'poolside' area in 6D which was edged by oak planks, and contained a number of placed objects including a concentration of dog bones and a sword scabbard.
- 6.6.3 A complex sequence of deposition was recorded in this test pit, due mainly to proximity to the Fen Causeway and the impact of recent landscaping associated with relatively recent modifications to the Flag Fen Archaeology Park. Monolith samples were used to assess the accumulated organic deposits, and a description of the sequence can be found in Section 9.
- 6.6.4 Made ground extended to approximately 0.5m below ground surface, comprising topsoil (3017), a gravel deposit (3018) and orange brown gritty clay (3019), and six sherds of medieval pottery were recovered from this context. This overlay light bluish alluvial clay (3020) and loose orange coarse sandy silt deposit (3021), likely to date stratigraphically to a Post-Roman depositional environment. A small quantity of animal bone fragments (pig mandible) was also recovered from this context. A single sherd of post-medieval pottery was recovered from deposit (3020) with two sherd of joining Late Bronze Age/iron Age pottery. This may be due to disturbance and the effects of recent landscaping.

6.7 Test Pit 2 Results

- 6.7.1 Test Pit 2 was located between the Preservation Hall and the Mustdyke, positioned above the post alignment in an area presumed to be at risk due to dewatering (Figure 7). The original aim of Area 7 was to assess the condition of the timbers of the post alignment on the east side of the Must Dyke. Four rows of posts were encountered, thought to represent rows 2 to 4 of the alignment. With the exception of a small area in the northwest corner that was excavated down to reveal horizontal wood, the remainder of the trench (including the area re-excavated by Test Pit 2) was only excavated as far as the tops of the upright posts. The trench was then sealed with polythene sheeting and backfilled (Pryor 2001, 88).
- 6.7.2 After removing topsoil and backfill, black polythene sheeting (3003) was encountered in the base of Test Pit 2, where it had been held in place by

house bricks. Under the sheeting, the tops of three upright posts were visible (C77/D0123, C78/D0124 and C79/D0125). Each upright post had been covered in a finds bag and was labelled with Dymo tape. The tops of the posts had been sawn off – presumably to recover sub-samples for dendrochronological dating.

- 6.7.3 A thin layer of trample (3004) was removed to empty the original trench cut [3014] and reveal the top of *in-situ* desiccated peat (3015). During the removal of the desiccated peat, a further nine upright posts were identified, giving a total of twelve posts within the test pit. The top of the highest post was encountered at 0.92m OD (C79/D0125). Five horizontal items were also encountered (upper spit, Figure 7). Mid-grey and light-yellow coarse sand was noted adhering to the underside of several items recovered from this test pit. Similar sandy material has been noted in past excavations, where it has been interpreted as a deliberately placed deposit, laid down to aid traction on the slippery timbers of the platform and post alignment (Pryor 2001). The waterlogged structures recoded in this Test Pit are described in Section 7 below.

6.8 Test Pit 3 Results

- 6.8.1 Test Pit 3 was located 12m to the east of Time Team Trench 1 (TT1) excavated in 1999 (Figure 3). It was positioned east of the Preservation Hall equidistant from Test Pit 2, above the post alignment close to the Northey Island landfall in an area of significant surface drying and topsoil cracking. Waterlogged wood was present in the upper horizon of waterlogged peat (3016), immediately below desiccated peat (3002) (Figure 8). This suggests that the wet/dry boundary between these two contexts (at 0.49m OD) also defines the preservation horizon for waterlogged wood in this area.
- 6.8.2 The archive relating to the Time Team excavation was destroyed by fire in January 2000. However, the information that is available describes a similar sequence to that seen in Test Pit 3. Two spits of waterlogged wood were excavated, prior to the trench being backfilled. In addition to the two spits of horizontal material encountered, seven upright posts of the alignment were also present. The upper spit contained several substantial timbers, as well as debris and roundwood (pers. exp.). However, no woodworking evidence was recorded. The lack of woodworking evidence was attributed to the poor condition of the material. The wood excavated in the second spit seems to have been in better condition, with several split timbers recorded (Britchfield 2010, 54). A description of the waterlogged structures and deposit sequence identified in Test Pit 3 can be found in Section 7 below.

7 WATERLOGGED WOOD

By Mike Bamforth

7.1 Introduction

- 7.1.1 The waterlogged wood assemblage consisted of 19 discrete items recovered from multiple contexts in Trench 1, in addition to 137 items and six bulk collections from Test pits 1, 2 and 3. The purpose of this work was to 'establish the current state of preservation of the archaeological and palaeoenvironmental material across the site' (Aim 2). The specific objective

was to 'assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques' (Objective 2.2) and 'assess these data in association with the results from previous investigations at Flag Fen' (Objective 2.3).

- 7.1.2 Waterlogged wood was recovered and recorded on site under the direction of wood specialist Mike Bamforth, and is discussed below in accordance with the methodologies outlined on Section 4.4. The archaeological potential of this assemblage has been assessed in terms of woodworking technology, woodland reconstruction, decay analysis, species identification, dendrochronology, conservation and retention.

7.2 Results – Condition of Material

- 7.2.1 The condition assessment for waterlogged wood was based on the scale developed by the Humber Wetlands Project (Van de Noort *et al.* 1995: Table 15.1) will be used throughout this report (Appendix 4, Table 4.1). This condition scale is based primarily on the clarity of surface data. Material is allocated a score dependent on the types of analysis that can be carried out, given the state of preservation.
- 7.2.2 The condition score reflects the possibility of a given type of analysis but does not take into account the suitability of the item for a given process. If preservation varies within a discrete item, the section that is best preserved is considered when assigning the item a condition score. Items that were set vertically in the ground often display relatively better preservation lower down and relatively poorer preservation higher up.
- 7.2.3 Twelve items (8%) score 4 for condition, reflecting a well-preserved timber. Technological analysis, an assessment of possible woodland management practices and species identification is possible with these items.
- 7.2.4 Using the above condition scale, the majority of the material (ninety-four items, 60%) scores a 3 (Table 2). A condition score of '3' reflects a moderately well preserved item. Technological analysis may be possible, but evidence of woodworking, particularly tool faceting, will not always be clearly visible. An assessment of potential woodland management practices and species identification is possible with these items.
- 7.2.5 Forty-three items (28%) score a '2', reflecting a poorly preserved item. Although evidence of conversion may be visible, it will be difficult to assign this to cultural practices. Tool facets will not be visible. Seven items (4%) score a '1', reflecting an item in very poor condition. It is unlikely that any woodworking evidence will be visible. Species identification may be possible.

Trench 1

- 7.2.6 Trench 1 was targeted to define the edge of Northey Island, in an area of high archaeological potential for dryland features associated with the post alignment (see Section 4.8 above). Archival records have survived for Trench 2003/2, positioned directly adjacent to Trench 1, enabling direct comparison of the material contained in both trenches. Numerous postholes and

stakeholes were excavated in this Trench 1, nineteen of which contained the remnants of wooden posts within their fills.

- 7.2.7 The posts were generally in a poor (56%) to very poor (28%) condition (Appendix 4, Table 4.5), with the top of the highest post encountered at approximately 0.73m OD. Despite the fact that Trench 1 was located to the west of and lower down the fen edge than Trench 2003 / 2, the upright posts from Trench 1 tend to score a point lower for condition than those recorded in 2003 / 2 (Appendix 4, Table 4.5).
- 7.2.8 Of the nineteen posts recovered from 2003 / 2, tool facets were recorded from twelve items. There was also some sapwood and bark survival (Appendix 4, Table 4.6). However, of the eighteen upright posts recovered from Trench 1 in 2012, tool facets were recorded from only five items, and there is only a single case of bark, sapwood and heartwood survival, the rest being heartwood only (Appendix 4, Table 4.6). In terms of condition score and proxy indicators such as survival of sapwood and tool faceting, the upright posts recorded in 2012 are in a measurably poorer condition than those recorded in 2003.

Test Pit 1

- 7.2.9 Test Pit 1 was located on what was presumed to be the northern edge of the platform, east of the Mustdyke (see Section 4.10 above, and Figure 6). Despite the high potential for encountering the monument in this area, no culturally converted wood was recovered or recorded in this test pit. The highest wood encountered was a layer of possible roots recorded between 0.70 and 0.60m OD, in context (3023). This material is thought to represent the roots of alder carr, which has been recorded elsewhere in the Flag Fen Basin (Pryor 2001). When natural, unconverted wood was encountered in the underlying waterlogged basin deposits, sub-samples were collected for decay analysis.

Test Pit 2

- 7.2.10 Test Pit 2 was located between the Preservation Hall and the Mustdyke, directly above Area 7, a 25 x 5m trench previously excavated in 1990 (see Section 4.11 above, and Figure 7). A total of 60 discrete pieces of waterlogged wood were recovered from Test Pit 2 (see Appendix 4, Table 4.7). Roundwood was the most frequent category (55%), with debris (23%) and timber (22%) also present. The majority of the material lay horizontally, with twelve upright posts of the alignment also encountered. The horizontal material was excavated in two spits. Additional material was recovered from lower down the sequence as bulk samples (D160 and D161), during the removal of four upright posts, both of which scored 4 for condition.
- 7.2.11 The majority of the wood encountered in the upper spit, i.e. recovered from desiccated peat (3015), scored a '2' for condition. Although only five items were encountered, two of the items were split. No evidence of faceting was seen. However the vast majority of the wood encountered in the lower spit, i.e. recovered from waterlogged peat (3027), scored a '3' (Appendix 4, Table 4.4), describing material in a condition where woodworking evidence is likely to survive. Indeed, of the thirteen split items recorded, two also had tool facets showing trimming.

- 7.2.12 Within Test Pit 2, upright timbers survive beneath 0.92m OD, immediately below the original trench cut, and material located lower than approximately 0.47m OD survives in sufficient condition to allow the preservation of woodworking data. A second, lower spit of horizontal wood was excavated beneath this, within waterlogged peat (3027, Plan 77). Forty-two items were encountered between 0.47 to 0.38mOD. During the extraction of the upright posts, two bulk collections of material were collected to be submitted for decay analysis, the material from both of these samples scored a '4' for condition.
- 7.2.13 As would be expected, the tops of all the upright posts were degraded where they passed through the preservation horizon for waterlogged wood. Radial drying cracks often extend for some distance down the length of vertical timbers, from the degraded top. The radial drying cracks recorded from the timbers in this test pit were deeper than would normally be expected and have also travelled further down the timber than has been seen in previous excavations (pers. exp.).
- 7.2.14 Radial drying cracks with a depth of 45mm and a width of 27mm were recorded from upright D127, and extended down 195mm to the limit of excavation. Radial drying cracks of a similar size were recorded on upright post D128. This 1065mm long post was extracted intact, and the radial drying cracks were seen to run 850mm down from the top of the post, well into the area of tool faceting. As these cracks present themselves as voids in the timber, they not only mechanically damage the timber in question, but may also allow air and water to travel down through the matrix, potentially disturbing the wider burial environment.

Test Pit 3

- 7.2.15 In Test Pit 3, waterlogged wood was present in the upper horizon of waterlogged peat (3016), immediately below desiccated peat (3002) (see Section 4.12 above, and Figure 8). This suggests that the wet/dry boundary between these two contexts (at 0.49m OD) also defines the preservation horizon for waterlogged wood in this area. Sixty-seven discrete items of wood were recorded from this test pit, with the assemblage dominated by roundwood (64%). Debris (28%) and timber (7%) were also present (see Table 7). The material all lay horizontally; no vertical elements were encountered.
- 7.2.16 The discrete items were excavated in two spits. The upper spit, illustrated in Plan 60, contained 31 items between 0.49 and 0.33m OD. The lower spit, illustrated in Plan 111, contained 36 items between 0.38 and 0.18m. The majority of the material in the upper spit scores a condition score of '2' or less, whilst the majority of the material in the lower spit scores a '3' or more (Table 3). The division between a score of '2' (poor) and a score of '3' (moderate) essentially describes the preservation boundary between which evidence of woodworking is likely to be visible or not.
- 7.2.17 The preservation horizon is therefore described by the desiccated peat/humic peat boundary at approximately 0.49m OD. However, the height below which waterlogged wood is in sufficiently good condition to identify woodworking technology lies at around 0.35m OD (hereby referred to as the 'analytical horizon'). This 'analytical horizon' is clearly reflected in

the prevalence of woodworking evidence. Whilst thirteen items from the upper spit are recorded as being worked or possibly worked, not a single item displays any evidence of trimming, i.e. displays preserved tool facets. However, in the lower spit there is a much higher ratio of preserved tool faceting to wood items. Nine items are recorded as being split, and two items have visible tool facets originating from trimming or hewing. Given that the monument is constructed mainly from worked timbers, the prevalence of tool faceting can be used as a proxy indicator of condition, much as the presence of stop marks has been used to discuss condition during previous research at Flag Fen (Bamforth 2010).

7.3 Range and Variation

- 7.3.1 A total of 156 discrete items were recorded during the evaluation (Appendix 4, Table 4.7). In addition, six bulk samples were also recovered. A moderate range of material was recovered, with all major categories except artefacts represented (Table 7).

Roundwood

- 7.3.2 A total of 87 items of roundwood, representing 56% of the total assemblage, were recorded. Roundwood was present in all three test pits, representing the largest percentage category of material in each. No roundwood was recovered from Trench 1. The roundwood in Test Pit 2 and Test Pit 3 was lying horizontally, within the uprights of the post alignment. The material in Test Pit 1 was also lying horizontally, and is thought to be naturally accumulated roundwood and roots, possibly similar to the alder carr recorded elsewhere in the Flag Fen Basin (Pryor 2001).
- 7.3.3 None of the roundwood was identified to taxa via visible macroscopic features. Two pieces of roundwood are classed as root (D014 and D042). Both items were from context (3016) Test Pit 3, and have diameters of 52 x 39mm and 40 x 20mm respectively.
- 7.3.4 Damage was noted from 82 items (94%). This consisted of a frequent occurrence of compression damage, in addition to a moderate occurrence of both radial drying cracks and degraded or broken ends. Wet rot (Eaton and Hale 1993) was noted on the underside/outside of D060, context (3027) Test Pit 2. The items vary in length from 64-1010mm. All but two of the items are recorded as having a distorted diameter, caused by compression of the items as a result of shrinkage of the surrounding peat matrix. Diameters across the wider, horizontal axes vary from 15-120mm.
- 7.3.5 Morphological traits associated with coppicing (Rackham 1977) were noted from fifteen items (17%). In all cases, this was limited to the presence of a straight, even stem with central pith, devoid of any side branches. No other types of coppicing evidence were noted. Woodworking evidence was recorded from two items (2%) of the roundwood assemblage. D060, context (3027), Test Pit 2, may have been a half split item or may have degraded into this shape. Due to the poor condition of the item and the converted face being uppermost in the ground and showing evidence of wet rot, it is not possible to verify. D153, context (3016) Test Pit 3, shows tool faceting where a single side branch has been trimmed away from one direction.

Debris

- 7.3.6 Thirty-five items are classified as debris, representing 22% of the total assemblage. All the sub-categories of debris are present (Table 8), with material classed as debris present in Test Pit 2, Test Pit 3 and Trench 1.
- 7.3.7 A single item of bark, D028 (context (3016) Test Pit 3) was recovered. Measuring 126 x 32 x 18mm, the thickness of this item suggests it is derived from a large timber. There is no evidence of woodworking.
- 7.3.8 Seven items of debris have not been assigned to a sub-category. D017, (3016) Test Pit 3 is a decayed lump of unknown conversion measuring 77 x 49 x 24mm. D022, (3016) Test Pit 3 is tangentially converted, although it remains unclear if this is a cultural or natural conversion, and measures 80 x 20 x 10mm. D031, (3016) Test Pit 3 is a decayed lump of unknown conversion, measuring 89 x 39 x 19mm. D104, (3027) Test Pit 2 is a radially converted piece of oak. It remains unclear if this is a cultural or natural conversion. This item is tentatively interpreted as representing a piece of woodworking debris and measures 160 x 43 x 28mm. D121, (3016) Test Pit 3 is a radially split item with a broken or decayed end, measuring 135 x 30 x 24mm. D122, [1109] Trench 1 is a vertically set oak stake. It has been radially split and measures 96 x 34 x 27mm. D158, (3016) Test Pit 3 is a tangentially split item, with a single broken or decayed end, measuring 150 x 40 x 10mm.
- 7.3.9 Six items are classed as roundwood debris. All were lying horizontally among the uprights of the post alignment in context (3016) Test Pit 3. None of the items could be identified to taxa via visible macroscopic features. Damage is noted from five of the items, with frequent broken or decayed ends and occasional compression damage. All the items are radially split, with three recorded as half-split, two as third-split and one as a quarter-split. Lengths vary from 175-440mm and original diameters from 28-60mm.
- 7.3.10 Seventeen items are classed as timber debris. Of these, a single item, D051, was recovered from ditch [1159] in Trench 1 and is thought to be a degraded part of an upright post of the alignment. It is a radial 1/8 conversion, although given the poor condition of the item; this may well be an artefact of degradation and extreme radial shrinkage (Taylor 2001). The remaining items were lying horizontally amongst the uprights of the post alignment in Test Pit 2 and Test Pit 3. Eight of these items were identified as oak.
- 7.3.11 Damage is noted from nine items, with frequent decayed or broken ends and occasional compression damage and radial drying cracks. All are split, the majority being radially aligned and a single item being tangentially aligned. A single item, D086, shows tool faceting where it has been trimmed at one end from one direction. Lengths vary from 120-790mm, maximum breadth from 30-140mm and maximum thickness from 15-72mm. where it was possible to estimate the original diameter, these varied from 20mm to over 260mm.
- 7.3.12 Four woodchips were recovered from Test Pit 2 and Test Pit 3, lying horizontally amongst the uprights of the post alignment. None of the items could be identified to taxa via visible macroscopic features. Two items, D009 (164 x 104 x 37mm) and D013 (90 x 49 x 13mm) are slabs: tangentially aligned

items consisting of bark and sapwood, indicative of bark removal from timbers. Two items, D021 (90 x 22 x 5mm) and D058 (110 x 28 x 3mm) are radially aligned and are likely to have been produced by facing radially cleft timbers, or possibly from trimming radially cleft posts to a point.

Timber

- 7.3.13 Thirty-four items (22% of the assemblage) are classed as timber. The five items recovered from Test Pit 3 were all lying horizontally, amongst the uprights of the post alignment. Of the thirteen timbers recovered from Test Pit 2, one lay horizontally, whilst the remainder were vertical posts of the alignment, as were all the timbers recovered from TR1.
- 7.3.14 Test Pit 3 – Horizontal timbers: Of the five timbers recovered from Test Pit 3, one was identified as oak. Damage is noted on four items, with moderate occurrence of broken or decayed ends, compression damage and radial drying cracks. Occasional root damage was also noted. A single item (D025) is noted as having ancient damage, with wet rot (Eaton and Hale 1993) noted on the upper surface. Four of the items are split – three are radial half splits and the fourth is tangentially aligned. The unconverted timber (D159) has been trimmed at one end from one direction and shows tool faceting where one face has been lightly hewn. The items vary in length from 620-1042mm, in maximum breadth from 69-130mm and in maximum thickness from 40-41mm. The unconverted item has a maximum diameter of 155mm.
- 7.3.15 Test Pit 2 – Post alignment and horizontal timbers: A single horizontal timber was recovered from Test Pit 2. D084 is a radially quarter split oak timber, trimmed at one end from one direction. The unworked end is degraded and has radial drying cracks, raising the possibility that this timber may originally have been vertically set. If this was the case, it was removed from its setting in antiquity. The item measures 950 x 105 x 60mm.
- 7.3.16 The remaining twelve timbers recorded from Test Pit 2 were vertically set posts of the alignment, four of which were identified as oak. Posts D123, D124 and D125, which were previously encountered during excavation of Area 7 (1990) had their tops sawn off during this intervention, presumably to recover sub-samples. The top ends of the remaining posts have degraded away where they pass through the preservation horizon for waterlogged wood. Posts D127 and D128 are noted as having severe radial drying cracks.
- 7.3.17 Seven of the posts have been split, with four items tangentially aligned and three items radially aligned. Only four posts were extracted, all of which had been trimmed to a point at the bottom end. The items varied in length from 365-1420mm, in breadth from 56-215mm and in thickness from 33-205mm. The unconverted items have diameters ranging from 90-200mm. There are two cases where larger posts (D0124 and D0125) seem to be supported by smaller posts (D0135 and D0148 respectively), inserted hard up against them, possibly as support.
- 7.3.18 Trench 1 – Post alignment timbers: The sixteen timbers recorded from Trench 1 all formed upright posts of the alignment. As all the timbers were vertically set, all show degraded tops where the timber has been truncated by the preservation horizon for waterlogged wood. There is also a moderate

prevalence of both radial drying cracks and moderate root damage. The radial shrinkage, and in some cases extreme general drying, mean that in all cases both the size of the timbers and the conversion (particularly in terms of radial shrinkage) may have been seriously distorted by post depositional damage.

- 7.3.19 Ten of the timbers are identified as oak. Seven are noted as being possibly split, of which five are interpreted as radial quarter splits, a single timber as a radial eighth split and a single timber as tangentially split. Five of the split timbers show evidence of having been trimmed to a point at the lower end. Recorded lengths vary from 70-520mm, breadths from 30-130mm and thickness from 15-90mm.

7.4 Recommendations

The Woodworking technology

- 7.4.1 The assessment of evidence for woodworking of these samples (Objective 2.2) in relation to the results of previous work (Objective 2.3) has revealed signatures typical of other Flag Fen material (basic splitting, trimming, hewing and shaping - Taylor 2001, Bamforth 2010). The prevalence of tool faceting and tool marks is somewhat lower than was expected from previous excavations. It is hypothesized that this is a result of the relatively poor condition of the material recovered during this evaluation.

- 7.4.2 Further work to compare the prevalence of woodworking evidence recorded between this and previous seasons will help elucidate the stability of the burial environment at Flag Fen. As relatively little of the post alignment has been excavated within the basin, particularly between the fen-edge landfalls and the platform, it would also be valuable to compare the material from the post alignment excavated this season from the east of the platform, with that excavated in 1995 from the west of the platform (Bamforth 2010).

Woodland reconstruction and species identification

- 7.4.3 The identification of the assemblage to species (Objective 2.2) was completed for twenty-seven items (17% of the assemblage). These were identified as oak (*Quercus* sp.), in keeping with the results from previous investigations. Oak is an easily worked and hardwearing timber that has incredibly wide ranging uses (Gale and Cutler 2000). It grows in stands and mixed woodland, generally on free draining soils, and is likely to have been growing within the vicinity of the site.
- 7.4.4 Further comparisons with previously excavated material (Objective 2.3) will require identification of the remainder of the assemblage to taxa. Species identification will also help to confirm whether the potential roots seen in the upper layers of Test Pit 1 are indeed alder carr. As is typically seen at Flag Fen, the majority of the timber is straight grained and of good quality, and there is also some morphological evidence of coppicing. Undertaking growth-ring counts will produce a complete archive and allow comparisons to be drawn with previously excavated material.

Dendrochronology

- 7.4.5 Dendrochronological dating requires samples of oak with a suggested minimum 50 years of growth and sapwood or bark edge present. Despite several speculative samples being recovered (Objective 2.1), no timbers excavated during this phase of work were viable for this method of dating.

Archive Comparison

- 7.4.6 An overall assessment of the waterlogged wood assemblage indicates several different avenues to achieve the project aims and objectives further Flag Fen research. The potential of this data to establish the current state of preservation across the *in situ* archaeological and palaeoenvironmental material (Aim 2) could be further realised with further comparative work.
- 7.4.7 An analysis of condition scores and the prevalence of proxy indicators of condition between this work and previous excavation results (such as stop marks and tool faceting), particularly in relation to height above OD, will allow a deeper understanding of both the current burial environment and possible changes through time. This will be of particular value when considered alongside the results of the programme of waterlogged wood decay analysis and soil chemistry being undertaken by York Archaeological Trust (See Section 8 below).
- 7.4.8 The presence of sandy deposits amongst the timbers of Test Pit 2 is of interest and should be compared against the findings of previous investigations, where this material has been interpreted as deliberately placed to aid traction on the slippery timbers of the alignment and platform (Pryor 2001).

7.5 Archive

- 7.5.1 Once removed from an anoxic burial environment, waterlogged wooden remains begin to break down and decay. It is therefore advised that provisions for additional recording work and analysis take place as soon as possible, preferably within one year of excavation. None of the excavated material is of sufficient interest to warrant retention through conservation.

8 CONDITION ASSESSMENT OF TIMBER

By Ian Panter, with contributions from Kirsty High

8.1 Introduction

- 8.1.1 In total, 48 samples were taken for condition assessment of timber from each test pit and trench (except trench 2), of which 31 samples were selected for decay analysis and taken to York on the 28th August 2012. Ian Panter, Project Conservator and Waterlogged Wood Specialist, undertook this work on a *Pro Bono* basis, with the aim to 'establish the current state of preservation of the archaeological and palaeoenvironmental material across the site' (Aim 2).
- 8.1.2 The specific objective was to 'assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques' (Objective 2.2) and 'assess these data in association with the results from previous investigations at Flag Fen' (Objective 2.3). The Client has also commissioned York Archaeological Trust a wider study to develop a

conservation management plan and condition assessment for the causeway timbers currently on open display in the Preservation Hall, enabling comparisons to be drawn in future between both data sets.

- 8.1.3 A site visit was made on the 2nd August 2012 to direct sampling strategy (Objective 2.1), with a further visit made on the 8th August to available samples. All other samples were taken on site by Mike Bamforth once all sections and plans had been drawn, and temporarily stored on site in plastic packaging containing sufficient water to maintain saturated conditions, and at ambient temperatures, until removal to York.

Location	Number selected	Number assessed
Trench 1	16	9
Test Pit 1	5	5
Test Pit 2	19	11
Test Pit 3	8	6

Table 1 – timbers selected for condition assessment (no timbers survived in Trench 2)

8.2 Methodology

- 8.2.1 The condition of the wood was assessed using the following techniques: maximum water content ($U_{\max}$); Scanning electron microscopy (SEM); Fourier Transform Infrared Spectroscopy (FT-IR); and pyrolysis – Gas Chromatography (py-GC). The results of each of these techniques are discussed below, preceded by a brief description of the corresponding method.

8.3 Results

Maximum water content

- 8.3.1 The maximum water content ($U_{\max}$) is one of the most common techniques used to describe the physical state of waterlogged archaeological wood, and is expressed as the weight of the water as a percentage of the weight of the dry wood. Typically, un-decayed wood will have a maximum water content of less than 100%, and therefore increasing $U_{\max}$ values greater than 100% indicate increased levels of decay; as the cell walls decay, the pore volume increases as does the volume of water that can be held in the cell.
- 8.3.2 To measure maximum water content sub-samples were cut from the main body of each timber sample and fully saturated by submerging under water and under vacuum until bubbling had ceased, at which point the vacuum was released, and the increase in pressure forces the water into the wood. This cycle was repeated a further two times at which point no air bubbles was present and each sample was deemed fully water saturated. Excess water was removed from the surface of each sample using an absorbent paper towel and each sample was weighed and dried at 60°C for 60 hours. Drying below a temperature of 100°C is preferred, as a higher drying temperature could possibly give rise to loss of minerals which would affect the results.
- 8.3.3 For the purposes of this assessment, one sub-sample was selected from each timber apart from the upright post D0128 from Test Pit 2, where two sub-

samples were taken due to a clear visual differentiation between a decayed outer zone (exhibiting desiccation cracks) and a less decayed inner core. The majority of the other timbers appeared to have undergone a more homogenous degradation pattern, and the results are shown in table 2 below.

Timber	Feature	Location	Maximum water content %
Trench 1			
D0002	[1029]	TR1	458
D0003	[1023]	TR1	283
D0006	[1041]	TR1	409
D0007	[1025]	TR1	250
D0122	[1109]	TR1	800
D0162	[1017]	TR1	750
D0166	[1099]	TR1	543
D0167	[1051]	TR1	450
D0170	[1067]	TR1	551
Test Pit 1			
D0052	N/A	TP1	280
D0053	N/A	TP1	585
D0054	N/A	TP1	300
D0055	N/A	TP1	389
D0056	N/A	TP1	541
Test Pit 2			
D0060	N/A	TP2	437
D0067	N/A	TP2	370
D0127	N/A	TP2	540
D0128	N/A	TP2	482/391
D0129	N/A	TP2	350
D0131	N/A	TP2	380
D0135	N/A	TP2	601
D0146	N/A	TP2	650
D0148	N/A	TP2	289
D0161	N/A	TP2	311
D0162	N/A	TP2	299
Test Pit 3			
D0149	N/A	TP3	379
D0152	N/A	TP3	400
D0155	N/A	TP3	650
D0171	N/A	TP3	563
D0172	N/A	TP3	390
D0173	N/A	TP3	271

Table 2 – Maximum water content per sample

Scanning electron microscopy (SEM)

- 8.3.4 The SEM is a very useful tool capable of producing good quality three-dimensional images of the wood cell structures and their components at relatively high magnifications. In particular, the technique is good at investigating the condition of the cellulose-rich secondary cell wall (if

present) as well as ascertaining the presence/absence of mineral contamination, and microbial/fungal decay.

- 8.3.5 Four samples (D0053, D0122, D0128 and D0155) were prepared by Meg Stark (Bioscience Technology Facility, University of York) using the following method: Where possible, transverse sections were cut using a razor blade and washed in de-ionised water for 3 hours. The samples were then fixed in a solution of 5% glutaraldehyde in 100mM phosphate buffer (at pH 7.2) for 18 hours, then washed in 100mM phosphate solution, 3 changes of solution over 3.5 hours. The samples were then dried in successive baths of acetone: 25% acetone (4 hrs.), 50% acetone (overnight), 70% acetone (8.5 hrs.), 90% acetone (over a weekend at 4°C) and finally into 100% (3 changes over 24hrs). The samples were then dried using a critical point drier, and then mounted on standard SEM pin-stubs and sputter coated with gold/palladium.
- 8.3.6 The samples were then viewed using the JEOL JSM-6490LV SEM unit by the author and are included as Plates 1-5 at the end of this document.

Fourier Transform Infrared Spectroscopy (FT-IR) and pyrolysis – Gas Chromatography (py-GC)

- 8.3.7 These two techniques were used to investigate the condition of the surviving cellulose and lignin components of six sub-samples (D003, D007, D0053, D0128, D0149 and D0155). The facilities of the Chemistry Department, University were used and Kirsty High (the PhD student working on the Star Carr project) very kindly prepared the samples, operated the equipment and provided the initial interpretation of the results.
- 8.3.8 FT-IR uses infrared spectroscopy to generate absorbance spectra of organic compounds and is now widely used as a diagnostic tool for identifying unknown compounds. The technique was applied here as a broad indicator of relative lignin and cellulose content in order to supplement the results of the other tests, that is, to confirm the presence/absence of cellulose and lignin.
- 8.3.9 Dried samples were analysed using a Vertex 70 FT-IR spectrometer (Bruker) using an attenuated total reflectance unit. Each sample was scanned between 800 and 3600cm⁻¹ using an averaged 16 scans at a 4cm⁻¹ resolution. The resulting spectra for D0128 is shown here:
- 8.3.10 Kirsty High reports: "The presence of some cellulose was indicated by a peak at 1375cm⁻¹, although in most the disappearance of the peak at 1325cm⁻¹...indicates that the cellulose has undergone degradation, Little or no alteration of the lignin was observed, as indicated by little alteration of the lignin peaks at 1240cm⁻¹ and 1510cm⁻¹. Analysis of three sections of the stake D0128 indicates that the lower section is better preserved, as both cellulose peaks are present".
- 8.3.11 Py-GC analysis of the samples indicated that lignin was present in large quantities in all samples, although breakdown of two of the principle components (syringyl and guaiacyl) was evidenced by the increase in the relative phenol peak heights.

8.4 Discussion

8.4.1 All of the samples that were examined in this study had undergone severe deterioration. In almost all cases the surface was very soft and spongy and with the exception of two samples (D0149, TP3 and D0128, TP2) easily broken into fragments using minimal force. The very decayed nature was attested by the presence of numerous rootlets penetrating through the wood, a feature often observed on prehistoric wood buried in peat deposits, including wood from the Somerset Levels. The wood could be compressed very easily which resulted in water exuding out onto the surface. This again is a very clear indication that the cellulose component has deteriorated to a substantial degree.

8.4.2 When broken, samples often exhibited elongated oval-shaped voids, within the transverse face, and these are typical desiccation voids that have formed during episodes of fluctuating water levels. Additional desiccation cracks were observed on several of the uprights, for example, D0148, an upright timber, which had cracks running for a length of 30cm from its top. Such cracks may well act as conduits for oxygen, creating unfavourable micro-conditions within deposits that could be considered, overall, as highly reducing.

8.4.3 Water content assays attempt to quantify the level of degradation that the Flag Fen timbers have suffered. Assigning timbers using the "de Jong" classification (1977), it is clear that the worst preserved timbers are to be found from Trench 1, where over three-quarters of the samples examined were deemed as Class III types, that is "highly degraded with little or no sound core surviving. What does survive is in terminal decline and it is highly unlikely any timber will be present in this location after another 5 years or so.

CLASS	DESCRIPTION	TR1	TP1	TP2	TP3
I	< 185% water, Has a sound core beneath a thin deteriorated layer.	0	0	0	0
II	185 – 400% water has a comparatively small core present	22%	60%	55%	67%
III	>400% water. Highly degraded wood predominates	78%	40%	45%	33%

Table 3 – Class Description percentage per Test Pit and Trench

8.4.4 Wood from the three test pits can be considered to be in a slightly better state of preservation, with a higher percentage of samples assigned to Class II than to Class III in all three Test Pits. The results from Test Pit 2 are interesting as this intervention came down onto an area previously opened up and backfilled by Francis Pryor during the original excavations. At this time, the tops of the uprights had been exposed and labelled, then covered with peat, followed by a layer of polythene sheet, then more peat. The intervention appears to have had minimal impact upon the preservation of the timbers, although proportionally there are more highly degraded timbers than in the other two test pits.

8.4.5 Visual evidence provided by the SEM micrographs reveals the extent of the breakdown of the cellulose-rich secondary walls of the wood cells. Only

D0053 (TP1) and D0128 (TP2) had traces of cellulose although in both cases the secondary cell walls are heavily degraded and detached from the middle lamella. Only the lignin rich middle lamella appears to survive in the other two samples, D0122 (TR1) and D0155 (TP3). Materials deposited within the voids are probably iron salts, derived from the groundwater.

- 8.4.6 Evidence from the pyrolysis and FT-IR techniques indicate that degraded cellulose survives in the samples and that the lignin has also undergone diagenesis.
- 8.4.7 Overall, the condition of the wood is no surprise, given its age and the (probable) dynamic nature of the burial environment. Samples extracted from the lowest levels (e.g. the base of the stake D0128) appear to be marginally less decayed than samples from the upper horizons. This implies a fluctuating water table, where conditions in the upper levels fluctuate between highly reducing and less reducing, whereas much deeper sediments remain highly reducing for most of the time.

9 PALAEOENVIRONMENTAL RESULTS

By Ben Gearey, with contributions from Emma Hopla, David Smith and Wendy Smith

9.1 Introduction

- 9.1.1 The palaeoenvironmental sampling strategy was designed to recover samples of wet-preserved sediment from the three test pits excavated in the wetland area. The purpose of this work was to 'establish the current state of preservation of the archaeological and palaeoenvironmental material across the site' (Aim 2). All sampling was overseen by Ben Gearey, who attended site throughout the excavation.
- 9.1.2 Eleven spits were collected in Test Pit 1 from between 1.03m below ground surface and 2.27m below ground surface, usually in 10cm intervals, except for the top and bottom spits. Continuous monolith sequences were also sampled from each test pit for pollen assessment and associated bulk samples for General Biological Assessment (waterlogged plant remains and beetles) were also collected in spits of 10 to 20cm from open faces adjacent to the monoliths (Objective 2.1). This material was then used to 'assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques' (Objective 2.1) and 'assess these data in association with the results from previous investigations at Flag Fen' (Objective 2.2).
- 9.1.3 All eleven Test Pit 1 samples were assessed for insect remains, and six samples (odd samples 15, 17, 19, 21, 23 and 25) were assessed for plant macrofossils to establish whether sub-fossil remains were well preserved and potentially interpretable throughout the section (Kenward *et al.* 1985; 1980). Four spits between 1.04m and 1.84m were sampled in Test Pit 2 at 20cm intervals and three samples (2 bulk samples and one spit sample) were collected from Test Pit 3.

- 9.1.4 All samples from Test Pits 2 and 3 were analysed, with the exception of sample 1 from Test Pit 3, context 3002; which was extremely clayey and did not disaggregate, even after two weeks treatment with Na (OH₂)₆ and hot water. Sub-samples of 1cm³ were taken from the monoliths for pollen assessment at variable intervals during detailed stratigraphic recording (see Appendix 5) and were prepared using standard techniques (Moore *et al.* 1991) including HF treatment and acetylation. For each sample, a total of 125 total land pollen (TLP) grains were counted, but pollen concentration was low in certain of the samples and this total was hence not always achieved.

9.2 Results - Pollen

- 9.2.1 The results of the assessment are presented in Appendix 5, Tables 5.1, 5.2 and 5.3. Pollen concentrations were variable in the five sub-samples in the Test Pit 1 sequence, with those from 1.27m and 1.99m yielding sufficient concentrations for assessment level counts. Preservation also varied, with only 1.99m recorded as medium to good. The uppermost sample (1.27m) contained relatively high percentages of the wetland/carr tree/shrubs *Alnus glutinosa* (alder) and *Salix* (willow) with dryland land trees represented by low percentages of *Quercus* (oak). A range of herbs including indicators of open, pastoral areas (*Plantago lanceolata*, ribwort plantain) as well as wetland vegetation (Cyperaceae, sedges) and Poaceae (grasses, possibly including dryland as well as fen taxa such as *Phragmites*) were present. The samples from 1.51 and 1.75m did not yield sufficient grains for interpretation. That at 1.99m implies relatively open conditions on and around the sampling site, with Poaceae dominating the spectrum, and Cyperaceae also well represented. Trees and shrubs were recorded in lower quantities of which *Alnus glutinosa* and *Corylus avellana*-type (hazel) attained the highest percentages. Relatively high values of *Sparganium*-type (bur-reed; 22%TLP+aquatics) indicate the presence of standing water on the sampling site. The basal sample (2.23m) did not produce sufficient grains for interpretation.
- 9.2.2 Three samples were assessed from Test Pit 2 of which two (1.36 and 1.68m) produced sufficient concentrations of relatively well-preserved pollen. The middle sample (1.52m) yielded low concentrations of poorly preserved pollen. The top sample (1.36m) was dominated by herbs, Poaceae and Cyperaceae suggesting largely open conditions around the sampling site, with trees/shrubs restricted to *Quercus* and *Salix* and trace values of *Alnus glutinosa*, *Betula* and *Corylus avellana*-type, implying distant or scattered woodland. The basal sample indicates a reversal of this situation, with high values for *A. glutinosa* and lower percentages of Poaceae implying the presence of alder carr in/around the wetland area. Herbs recorded indicate open conditions (*P. lanceolata*, *Aster*-type) and aquatic taxa (*Sparganium*-type) demonstrate open water on the sampling site.
- 9.2.3 Six sub-samples were assessed from Test Pit 3 and only one of these (0.88m) did not produce sufficient pollen for an assessment count. Pollen preservation was on the whole good with the exception of the basal sample (1.00m). The four uppermost samples (0.70-0.82m) contained very similar spectra with high *A. glutinosa* percentages, which increased markedly down the section. These data indicate alder carr on and around the sampling site,

although this appears to have become more open by the top of the sequence, with higher values of Poaceae and Cyperaceae. The sample from 0.88m contained very low concentrations of pollen and an assessment count was not attained, but that from the base (1.00m) somewhat higher concentrations and produced a spectrum indicating fen woodland (*A. glutinosa* and *Salix*) as well as dryland woodland (*Quercus*, *Corylus*) and herb communities (Poaceae, Cyperaceae).

9.3 Results – Plant Macrofossils

- 9.3.1 The plant macrofossil results are presented in Appendix 6, with Table 6.1 detailing the results from Test Pit 1 and Table 6.2 presenting the results from Test Pits 2–3. Nomenclature and taxonomic order follows Stace (2010). Data are scored as 1 (only one item observed), + = < 5 items observed, ++ = 5 – 10 items observed, +++ = 10 – 25 items observed, ++++ = 25 – 50 items observed and +++++ = >50 items, but more typically >100 items observed, especially when related to plant frass or wood fragments. Preservation of plant macrofossils improved with depth and higher samples (closer to 1m below ground surface) clearly showed signs of oxidation. Alder (*Alnus glutinosa* (L.) Gaertn.) fruits in TP1 1.67 – 1.77m had eroded outer coats, with only the internal cotyledon preserved. Alder is usually a more robust, 'woody' plant macrofossil and these relatively poorly preserved remains may suggest that the deposits at Flag Fen have dried out in the past or, indeed, currently are drying out/ unstable.
- 9.3.2 In general, the range and quantity of plant macrofossils was relatively limited. This could be related to the fairly small sub-samples used for the recovery of plant macrofossils. The vast majority of plant macrofossils recovered are directly related to damp, waterside and/or wet environments and it is likely, therefore, that these reflect the immediate environment sampled. Very little evidence of plants existing outside these damp to aquatic conditions were noted; however, some of the plants including meadow/ creeping/ bulbous buttercups (*Ranunculus acris* L./ *repens* L./*bulbosus* L.), hemp agrimony (*Eupatorium cannabinum* L.) and knotgrass (*Polygonum* spp.) can all indicate slightly drier environments; such as marsh or grasslands, which may occur somewhat beyond the main wetland environment suggested by the overall assemblage.
- 9.3.3 Minute wood fragments were recovered throughout all samples, but plant remains related to trees was limited, with alder only recovered from one sample in TP1 (1.84 – 1.94m) and two samples in TP2 (1.44 - 1.64m and 1.64 - 1.84m). Common reed (*Phragmites australis* (Cav.) Trin. ex Steud) leaf fragments were found were also recovered from these two TP2 deposits, but were much more abundant in lower deposits in TP1 (1.87 - 1.97m and 2.07 - 2.27m). These sampling locations are slightly separated and, therefore, may be reflecting complexities in the immediate wetland environment with shifting areas of open water, reed bed and alder carr developing and/or receding as water conditions alter and/or in more stable environments classic still water vegetation succession sequences develop (i.e. open water pool – water pool with small areas of reed bed – to monoculture reed bed – to damp scrub – to carr – woodland). The presence of highly fragmented wood and plant tissues may serve as a filter preventing or barring seeds and other reproductive plant parts from easily entering the depositional

environment. This may well suppress the quantity of reproductive plant parts recovered and, therefore, larger sample volumes may circumvent such issues.

9.4 Results – Insects

- 9.4.1 The insect taxa recovered are listed Appendix 7, Table 7.1. The taxonomy follows that of Lucht (1987) for the Coleoptera (beetles). The numbers of individuals present for each taxa is estimated using the following scale: + = 1-2 individuals, ++ = 2-5 individuals, +++ = 5-10 individuals, ++++ = 10-20 individuals, +++++ = 100s of individuals. The nature of the preservation and the potential for archaeological interpretation is outlined in Appendix 7, Table 7.2.
- 9.4.2 The majority of the insect fauna recovered were Coleoptera (beetles) with smaller numbers of the larvae of caseless caddis flies (Tricoptera) and the resting stage of Daphnia water fleas. Preservation was generally good throughout the material examined. The size of fauna produced is often moderate to large in size. This is quite striking given that many of the samples processed were only 3 – 5 litres in size.

9.5 Palaeoenvironmental Discussion

Test Pit 1

- 9.5.1 The insect samples from Test Pit 1 were quite similar with a range of taxa associated with slow or still water dominating the insect faunas. Typical of these are the 'water beetles' such as *Hygrotus*, *Hydroporus*, *Agabus*, *Rhantus*, *Coelostoma orbiculare*, *Chaetarthria seminulum*, *Ochthebius*, *Hydraena*, *Gyrinus*, *Helodidae*, *Dryops* and *Bagous* spp. (Nilsson and Holmen 1995; Foster and Friday 2011; Hansen 1986, Duff 2012). The large numbers of *Tanysphyrus lemnae* also suggests the presence of still water since this species is associated solely with the aquatic plant duckweed (*Lemna* spp.) (Koch 1992). There are indicators of pasture or grassland by the recovery of a limited fauna of *Aphodius* 'dung beetles' and taxa such as *Phyllopertha horticola* and *Gymnetron*, which are associated with grassland (Jessop 1986; Koch 1992).
- 9.5.2 There are very clear indications for the presence of stands of waterside vegetation, such as common reed (*Phragmites australis* (L.) Trin. ex Steud. throughout the sequence. The large numbers of *Donacia/Plateumaris* 'reed beetles' recovered suggests this. Such stands of waterside vegetation are the habitat favoured by *Odacantha melanura* *Corylophus cassidoides*, *Silis ruficollis*, *Phalacrus* spp. and *Limnobaris* spp. (Koch 1992; Luff 2007; Duff 2013) as well. Several of the Carabidae 'ground beetles' recovered also are associated with this environment (Luff 2007). Indicators for reed bed appear to decline between 1.27 – 1.77 metres below the ground surface. It is not clear if this is a result of a change in environment at this time, for example a fluctuation in watertable, or due to human activity in the wetland area disturbing the vegetation.
- 9.5.3 Between 1.27 and 1.87 metres below the ground surface there are limited indications for deadwood and timber. This is primarily suggested by small numbers of the 'woodworms' (*Anobium punctatum* and *Grynobius planus*)

and examples of the 'bark beetle' Scolytidae. The 'leaf beetle' *Agelastica alni* is primarily associated with alder (*Alnus glutinosa* (L.) Gaertn.) (Koch 1992). Similarly, very small numbers of Lathridiidae and Cryptophagidae were encountered between 1.67 – 1.87 m below the ground surface. These taxa are common insects in settlement waste in the archaeological record (i.e. Kenward and Hall 1995); however, they can occur in a wide range of natural deposits as well.

Test Pit 2

- 9.5.4 The four samples from Test Pit 2 all produced relatively large and well-preserved insect fauna. As in Test Pit 1, the faunas are dominated by large numbers of 'water beetles' typical of slow-flowing or still water such as *Hygrotus*, *Hydroporus*, *Agabus*, *Gyrinus*, *Laccobius*, *Ochthebius*, Helodidae and *Dryops*. Once again the large numbers of *T. lemnae* recovered indicate slow-flowing water, with a surface partially (or completely) covered in duckweed. The *Phalacrus* and the large numbers of *Donacia/ Plateumaris* recovered also indicate the presence of a dense stand of water reed throughout the sequence. In addition, there are indications for the presence of pasture and grassland since *Onthophagus* and *Aphodius* 'dung beetles' were recovered in some numbers. Finally, there are some indicators for the presence of deadwood such as *Anobium punctatum*, *Grynobius planus* and *Melasis buprestoides*.

Test Pit 3

- 9.5.5 The insect faunas from Trench 3 were large in size and well preserved. Essentially, the same range of species encountered in Trenches 1 and 2 were also recovered here.
- 9.5.6 A comparison between this insect assemblage and data from previous studies from the Flag Fen platform (Robinson 1991; 1992) (Objective 2.3) indicates some interesting similarities and differences. A range of water beetles, and *T. lemnae* and *Donacia/Plateumaris* 'reed beetles' also dominates the insect faunas from this work. As with the faunas described here *Onthophagus* and *Aphodius* 'dung beetles' also indicated the presence of grazing animals and pasture. Where there is a clear difference is that Robinson did not encounter any woodworms or taxa such as Lathridiidae and Cryptophagidae and interpreted their absence as indicating that the water level rose so sharply that the timber was inundated before 'woodworms' could infest the standing timber; and that no discernible human activity had occurred within the structure. The insect faunas from this phase of work suggest that these conclusions may have to be partially rethought.

Pollen Assessments

- 9.5.7 The pollen assessment indicates somewhat variable preservation across the Test Pits. The samples from Test Pits 2 and 3 focus solely on the 'fen peat' deposits, which contain the organic archaeological remains of the post-row and platform. The Test Pit 1 sequence includes samples from this fen peat unit (1.27, 1.51 and 1.75m) and also from the underlying organic muds/*gytija* (1.99m) and basal organic silts (2.23m). In Test Pit 1, good preservation was evident in the uppermost sample (1.27m) but poor preservation and concentration in the two other samples from the fen peat (1.51 and 1.75m).

Likewise, preservation and concentration was variable in Test Pit 2 and apparently best in Test Pit 3. However, further assessment would be required to investigate the pattern and status of pollen preservation.

- 9.5.8 Given the broad sampling intervals and assessment level data, the results of the beetle and pollen assessments cannot be compared too closely in terms of implied palaeoenvironment, but the dominance of alder in and around the basin and aquatic/waterside vegetation including reeds is clear in both records and also in the plant macrofossil assessment (see above). Scaife (2001) recorded a general pattern of a steady decline in Alder carr over time in his pollen diagram from the Mere section, and this was also tentatively identified in Test Pit 3. The top and base of the fen peat deposits in Scaife's (2001) Northey section was radiocarbon dated to 2180±60 BP (GU-5616) and 3130±60 BP (GU-5617) providing a useful comparator in lieu of further radiocarbon determinations.

9.6 Recommendations

- 9.6.1 The Environmental Archaeology Bibliography (English Heritage 2004) indicates that there are very few comparable insect faunas of this age and date in Cambridgeshire. Aside from the site at Flag Fen itself (Robinson 2001) there has been little exploration of the insect faunas preserved in the peats of the Flag Fen basin, although it is hoped that this will be addressed by the forthcoming publication of the Bradley Fen and Must Farm sites (Cambridge Archaeological Unit).
- 9.6.2 Comparisons with an unpublished series of 23 boreholes associated with the proposed Magna Park site to the south of Flag Fen, indicate the same range of insect taxa and a similar wetland environment to that seen both in Robinson's work at Flag Fen and this report (see Gearey *et al.* 2009). An assessment report on a range of samples from the 1998 excavation at 3rd Drove, Peterborough also produced a number of insect faunas that are essentially similar to those seen here (Smith 1998).
- 9.6.3 The pollen assessments demonstrate variable preservation across the Test Pits, despite Scaife (2001) not reporting any issues regarding low pollen concentrations or poor preservation in his previous analyses. To this end, it is recommended that more detailed assessments (0.08-0.04m intervals) should be carried out on the three test pit sequences. This will establish if any pattern in terms of pollen preservation can be determined and to establish what impact recent changes in site hydrology might have had on the palaeoenvironmental record. It can be noted that although the upper fen organic deposits appear to be situated above the watertable for some of the year at least, preservation of insect remains does not yet appear to have been compromised. This is very similar to the results of recent preservation assessments of sub-fossil remains at the later prehistoric site of Beccles (Gearey *et al.*, forthcoming)
- 9.6.4 Previous archaeobotanical analyses at Flag Fen have been relatively limited, notwithstanding the major forthcoming publications from CAU. Plant macrofossils from the Fengate excavations at the Power Station site (1968 – 1997) were studied by Scaife (2001, 352; see also Wilson 1984) and included analyses of pollen from four profiles associated with the main platform and its

immediate environs. This plant macrofossil assessment was only carried out to determine if cultivated and/or economic plants were evident; but since they were absent, no further analysis was undertaken. Hall and Fischer (1986) have reported on Bronze Age macrofossils from the 1984–85 excavations at Flag Fen, but concluded that these results are “likely to include much contamination” (English Heritage 2004). Finally, Arthur (1978) reported on plant macrofossils from Large Pit W17 and Well B3 at the Storey’s Bar Road Sub-site, but the taxa are much more typical of rough ground/ grassland, the samples are small (largest sample being 18.73g) and a relatively limited range of taxa was recovered. As a result, although the taxa presented here form moderately small to poor assemblages, uniformly indicating damp to fully submerged aquatic conditions, it is recommended that those plant macrofossil samples associated with productive archaeoentomological samples are brought to full analysis.

- 9.6.5 Given the importance of the site at Flag Fen and the lack of other published work within the Basin, it is recommended that the insect faunas recovered here should also be fully analysed since they are of both regional and national importance. A full identification of the taxa will allow a much more detailed reconstruction of the landscapes surrounding this area to occur. This is particularly the case with many of the plant feeding phytophages encountered such as *Donacia/Plateumaris*, which are readily identifiable to species level. Precise identification to species level will enable a very detailed reconstruction of the nature of waterside vegetation and water conditions in the area, with potential to characterise the surrounding landscape beyond the water course/ waterside.
- 9.6.6 It is also recommended that all insect and plant macrofossil samples be analysed in full. At present, only the flots (the material which floats on the water’s surface during processing) have been assessed. This is often all that will be analysed from a waterlogged archaeobotanical deposit. However, given the limited recovery and the potential for heavier plant macrofossils (alder cones, hazelnuts) to sink, it is recommended that the heavy residues be sorted as part of the full analysis programme. Currently there are only limited baseline archaeobotanical dataset for the main site of Flag Fen. As part of this procedure, it is recommended that the general condition of plant macrofossils should be recorded (e.g. Jones *et al.* 2007). This is a crucial component of recording and documenting the existing state of preservation at Flag Fen for future reference in terms of the overall preservation of the environmental remains on site. The plant macrofossil remains have not been sorted from these flots and it is recommended that this be undertaken within the next calendar year, to ensure that they are stable (stored in ethanol in specimen tubes).
- 9.6.7 Finally, it is recommended that a programme of rangefinder radiocarbon dating be implemented. This is essential to establish the age range of the extant organic deposits in each of the Test Pits and to generate a baseline absolute chronology for the palaeoenvironmental assessments.

9.7 Archive

- 9.7.1 The palaeoenvironmental archive is stored in the Institute of Archaeology and Antiquity, University of Birmingham. Although adequately stored, it is

recommended that any additional analyses be undertaken within one calendar year of completion of the assessment.

10 FAUNAL REMAINS

By Fay Worley

10.1 Introduction

10.1.1 The animal bone assemblage derived from 3 contexts, and comprised a total 25 hand collected bone fragments. Of these, ten fragments were from topsoil (1000) in Trench 1, five derived from occupation layer (3020) in Test Pit 1, with the remaining ten fragments from layer (3022), also recovered from Test Pit 1. Fay Worley, Project Zooarchaeologist, attended site on 8th August 2012 and oversaw recovery and processing of samples.

10.1.2 The faunal remains are assessed below according to Trench/Test Pit context, with appropriate methodologies adopted for recording and assessment detailed accordingly. The specific objective of this work was to 'assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques' (Objective 2.2) and 'assess these data in association with the results from previous investigations at Flag Fen' (Objective 2.3).

10.2 Method

10.2.1 The animal bones were identified and recorded by Fay Worley in Fort Cumberland, Portsmouth, using the English Heritage comparative reference collection (Ayton et al 2011). Each bone fragment was recorded to taxon, element and side, with evidence of age-at-death, pathologies, taphonomic (burning, gnawing, condition) or cultural modifications (butchery) noted. All skeletally mature elements were measured following von den Driesch (1976), and their completeness was recorded using Serjeantson's (1996) zone system. The data were tabulated and can be found in Appendix 8.

10.3 Results

Trench 1

10.3.1 As might be expected from unstratified finds, the bone fragments recovered from topsoil (1000) are in mixed condition, and represent a variety of species (Table 8.1, Appendix 8). There are a number of dog bones, which may have derived from a single individual. The length of a dog tibia suggests that the dog would have stood 45cm tall at the withers. The well-preserved dog mandible may exhibit butchery marks (two probable fine cuts on the lateral body, below the first molar). Marks seen on the equid tibia are modern damage rather than butchery marks and include possibly scavenger gnawing.

Test Pit 1

10.3.2 The five bone fragments from deposit (3020) include most of a fused pig mandible (three refitting fragments and a fourth which is likely to be from the same bone), from a young female. Tooth eruption suggests that the sow was around 18-20 months old at death (based on eruption of the third molar and development of the canine (Habermehl 1975, 144-6). The fifth bone

fragment is from a medium mammal sized rib. All fragments are in good or very good condition.

- 10.3.3 The ten fragments from deposit (3022) are also all in good or very good condition. They include two refitting fragments from a sheep or goat skull. A further two refitting medium mammal indeterminate fragments and a medium mammal skull fragments may all also be part of the sheep skull. Water vole was represented by a complete mandible and perhaps also a maxillary incisor and tibia (both identified as small mammal). The final bone was a carpometacarpus from a mallard (*Anas platyrhynchos*) sized duck.

10.4 Recommendations

- 10.4.1 As stratigraphically insecure topsoil finds, the bones from (1000) in Trench 1 have little interpretative potential. The stratified assemblage from Test Pit 1 also has little potential, beyond the presence of species. There is no butchery mark evidence, and while the sheep or goat and pig cranial bones most likely derive from human activity at the site, the wild species may be natural casualties. No further work is required on the hand-collected bones.

10.5 Archive

- 10.5.1 The bones have been washed and are individually itemised with item numbers and site code on bags. They are not marked. The bones may need marking with suitable ink, and full contextual details (site code, context numbers and item numbers) written on the bags prior deposition, depending on the requirements of the receiving archive.

11 STRUCK FLINT

By Hugo Anderson-Whymark

11.1 Introduction

- 11.1.1 The struck flint assemblage comprises 31 items derived from multiple contexts, and were assessed with recommendations for further work by Project Lithic specialist, Hugo Anderson-Whymark (see Table 1 below). Nineteen artefacts were recovered from a palaeosoil located in Trenches 1 and 2 (1003/2006) and a further eleven flints were retrieved from an early Bronze Age pit (feature 2028, fill 2029); and one further unstratified flint was recovered from Trench 1. The objective of this work was to 'assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques' (Objective 2.2) and 'assess these data in association with the results from previous investigations at Flag Fen' (Objective 2.3).

CATEGORY TYPE	Trench 1 U/S	Palaeosoil (1003)	Palaeosoil (2006)	Pit [2028] Fill (2029)	Grand Total
Flake	1	3	8	4	16
Blade				1	1
Bladelet			2		2
Burin spall			1		1
Rejuvenation flake tablet			1		1

CATEGORY TYPE	Trench 1 U/S	Palaeosoil (1003)	Palaeosoil (2006)	Pit [2028] Fill (2029)	Grand Total
Tested nodule/bashed lump				1	1
End scraper				2	2
End and side scraper				1	1
Thumbnail scraper		1		2	3
Serrated blade		1			1
Denticulate			1		1
Polished flint axe (reworked)		1			1
Grand total	1	6	13	11	31

Table 4: The flint assemblage from Flag Fen by context

11.2 Methodology

- 11.2.1 The flints were catalogued according to broad artefact/debitage type and retouched pieces were classified following standard morphological descriptions (Bamford 1985, 72-77; Healy 1988, 48-49; Bradley 1999, 211-227; Butler 2005). A blade is defined as a flake over twice as long as it is wide and a bladelet is a blade under 40mm in length. Additional information was recorded on the condition of the artefacts including, burning, breakage, the degree of edge-damage and the degree of cortication. The assemblage was catalogued directly onto a Microsoft Access database and data manipulated in Microsoft Excel. The flint assemblage is discussed by context below.

11.3 Results

Palaeosoil (1003) and (2006)

- 11.3.1 Six flints were recovered from palaeosoil 1003 in Trench 1 and thirteen were recovered from palaeosoil 2006 in Trench 2 (Table 1). Five flints (two bladelet, a flake, a core platform tablet and a burin spall) from palaeosoil 2006 derived from a blade-orientated industry probably dating from the Mesolithic, although with such a small number of artefacts an early Neolithic date cannot be entirely ruled out.
- 11.3.2 The great part of the assemblage is, however, characteristic of later Neolithic or early Bronze Age flake-orientated industries with the exception of a thumbnail scraper (SF14) that can be more accurately dated to the early Bronze Age and a coarse denticulate with five teeth spaces at 12-13mm intervals (SF7) that is more characteristic of middle to late Bronze Age flint-working techniques. A small axe-head that exhibits minimal polishing along the blade edge dates from the Neolithic, but the presence of differential cortication on the artefact's surface and two episodes of reworking as a flake core (see condition above) indicate that it was ultimately deposited when it was of considerable antiquity, possibly in the early Bronze Age.

Pit feature (2028)

- 11.3.3 Eleven struck flints were recovered from deposit (2029) within pit feature [2028]. These comprise four flakes, one blade, a small fragment of flint that exhibits a single flake removal and five scrapers, including two thumbnail forms. The flint forms a coherent assemblage dating from the early Bronze Age with the exception of the blade which derives from a Mesolithic (or potentially early Neolithic) blade-orientated assemblage.

Provenance

- 11.3.4 With the exception of one artefact, the flints were all recovered from stratified prehistoric deposits. The greater part of the assemblage was recovered from a palaeosoil in Trenches 1 and 2 and a small number of flints were recovered from a pit that was sealed by this soil – pit [2028] and fill (2029).

Raw material

- 11.3.5 The flint was typically translucent, light to dark brown, and free from inclusions. Comparatively few flints exhibited cortex, but where present the darker flints typically exhibited a thick unweathered grey-white cortex, characteristic of raw materials obtained directly from the chalk, while the lighter coloured flints typically exhibited exhibit worn and abraded cortical surfaces, including a few that heavily abraded and pitted. The latter flints will have been obtained from fluvial gravels of glacial and/or river origin.
- 11.3.6 One flake (palaeosoil 2006, SF33) was manufactured from Bullhead Bed flint, which exhibits a distinctive thin olive green cortex with an underlying orange band. This raw material is found on the unconformity between the Chalk and the Reading Beds and can be obtained from the London Basin to the south.

Condition

- 11.3.7 The vast majority of the flints were in fresh condition, although occasional pieces exhibited slight edge-damage. This indicates that these artefacts have been subject little post-depositional movement and can be considered *in situ*.
- 11.3.8 The flints were free from surface cortication with the exception of the reworked polished axe-head (palaeosoil 1003, SF19) that exhibited a bluish-white cortication on its original surface, a light white cortication on flake scars struck from its blade edge and no cortication on a flake scar struck from its butt end. This indicates that the axe-head was of considerable antiquity when flakes were removed from the blade edge and much older again when a flake was struck from the butt. A small number of the flints exhibit a subtle orange iron staining.
- 11.3.9 None of the struck flint is burnt, but four flakes and one thumbnail scraper are broken. Use-damage was present on several flakes and scrapers.

11.4 Recommendations

- 11.4.1 It is recommended that approximately ten artefacts require illustration to highlight the range of typological forms in the forthcoming publication, and that assessment descriptions should be enhanced and a comprehensive

discussion in relation to earlier phases of work. Photographic illustration is recommended for the axe-head to highlight the pattern of differential cortication and re-use, and this technique may also be used to illustrate the other artefacts in place of traditional pen and ink illustration providing that the photographs are scaled, paged-up and annotated following standard guidelines for lithic illustration (Martingell and Saville 1988).

11.5 Archive

- 11.5.1 The struck flints are stored individually within plastic bags marked with a permanent black marker. The flintwork is adequately boxed and bagged for long-term storage and curation.

12 PREHISTORIC POTTERY

By Ian Rowlandson

12.1 Introduction

- 12.1.1 The prehistoric pottery assemblage amounts to three sherds (43g) from two prehistoric vessels. Ian Rowlandson, Project Pottery Specialist, attended site on 8th August 2012 and oversaw recovery and processing of samples. The assemblage is assessed below according to Trench/Test Pit context, with appropriate methodologies adopted for recording and assessment detailed accordingly.
- 12.1.2 The assemblage was quantified by three measures: number of sherds, weight and vessel count within each context. Fabric identification was undertaken by x20 binocular microscope. The ceramic data was entered on an Access database using fabric codenames with the data presented in this report text. Recording of the assemblage was in accordance with the guidelines laid out by the Prehistoric Ceramics Research Group (PCRG 1997). The specific objective of this work was to 'assess the preservation of these samples using appropriate palaeoenvironmental and archaeological techniques' (Objective 2.2) and 'assess these data in association with the results from previous investigations at Flag Fen' (Objective 2.3).

12.2 Results

Trench 1

- 12.2.1 A single hard, dark brown-grey un-oxidised sherd (8g, 7mm thick) in good condition with a burnished external surface was retrieved from an unstratified deposit in Trench 1. The fabric is poorly mixed and dominated by common medium sized grog or clay pellets with rare quartz/rock fragments up to 2mm. This fabric is similar to that described for second Millennium BC vessel forms such as Beakers, Collared Urns and also Grooved Ware from Fengate (Evans 2009, 156-7). Little can more can be said about this sherd as the form type is uncertain: a second Millennium BC date is likely.

Test Pit 1

- 12.2.2 Two joining sherds (35g) from the same vessel were recovered from context (3020) in Test Pit 1. The sherds are in good condition and were fired to a light orange, oxidised colour, deriving from a large, handmade and relatively thin walled (7-8mm) vessel. The fabric has a common quartz sand and sparse

fossil shell and rare fragments of calcareous rock- probably limestone. This fabric equates to the Fengate fabric QS2 (Evans 2009, 188) and similar fabrics are recorded from other Fengate assemblages (Hawkes 1943). Dating this sherd is difficult as no diagnostic features are present. Even with more substantial sherds it has been recognised that close dating of Late Bronze Age to Early Iron Age assemblages can be problematic (Evans 2009, 189). The best date range that can be given for this sherd is to attribute it to the first Millennium BC.

12.3 Recommendations

- 12.3.1 This is a small group of pottery of prehistoric date. Significant groups of pottery have been retrieved from the occupation sites at Fengate throughout the 20th century (Hawkes 1943; Evans 2009) but this group of pottery from Flag Fen regrettably offers little to advance our understanding of the date and function of the activity on the site given the small number of sherds present unless one considers the relative absence of pottery as significant in itself.

12.4 Archive

- 12.4.1 The assemblage should be kept for future study, especially as part of any further characterisation of local fabrics.

13 POST-ROMAN POTTERY

By Jane Young

13.1 Introduction

- 13.1.1 A small assemblage of seven sherds, representing four vessels in total, was submitted for examination. The pottery was recovered from two deposits in Test Pit 1. The assemblage was quantified by three measures: number of sherds, weight and vessel count within each context. Fabric identification was undertaken by x20 binocular microscope. The ceramic data was entered on an Access database using fabric codenames. Recording of the assemblage was in accordance with the guidelines laid out in Slowikowski, *et al.* (2001).

13.2 Results

Condition

- 13.2.1 The pottery is in a very abraded to fairly fresh condition. Sherd size falls into the small to medium size range (below 20 grams) and two vessels are represented by more than one sherd.

Overall Chronology and Source

- 13.2.2 Three pottery ware types were recognised including local and regional types. The material ranges in date from the medieval to late medieval to early post-medieval periods.

Codename	Full name	Earliest date	Latest date	Total sherds	Total vessels
BOU	Late Medieval to Early Post-medieval Bourne ware (Fabric D)	1350	1650	1	1
ELY	Ely-type ware	1175	1350	2	1
PAHSW	Peterborough Area Hard Sandy ware	1200	1350	4	2

Table 5: Pottery types with total quantities by sherd and vessel count

Overall Chronology and Source

13.2.3 Deposit (3019) produced six sherds representing two jugs and a jar of medieval date. One thin-walled jug with a thin patchy splashed-type glaze is of medieval Ely-type (ELY). This ware was produced in Ely and possibly at other centres in Cambridgeshire between the 12th and 14th centuries with a late medieval type being produced into the 15th century (Spoerry 2008). The two jug sherds from this site are in a fairly fresh condition suggesting little post-deposition movement and most probably date to the 13th century.

13.2.4 Two other jug sherds come from a decorated example in a hard-fired reduced sandy fabric with a brown external surface. This type was recognised during excavations at the Still, Peterborough (Spoerry and Hinman 1998) and has here been termed Peterborough Area Hard Sandy ware (PAHSW). The two jug sherds from this site have a thick dark green reduced glaze and applied smeared strips in a white clay giving a contrasting decorative element. The sherds are again in a fairly fresh condition and although the type can at present only be generally dated to between the 13th and mid 14th centuries are most likely to be of 13th century date. Two further small sherds in this fabric appear to come from a thin-walled jar of similar date.

Late medieval to early-post medieval

13.2.5 A single sherd from a late medieval to early post-medieval Bourne ware jug (BOU) was recovered from deposit (3020). The sherd is very abraded and could date to between the mid 15th and 16th centuries.

13.3 Recommendations

13.3.1 This is a small group of pottery of medieval to early-post medieval date. The assemblage suggests activity in the area from at least the 13th century but is not large enough to infer the status of the medieval occupation.

13.4 Archive

13.4.1 The assemblage should be kept for future study, especially as part of any further characterisation of local fabrics.

14 DISCUSSION

14.1 Introduction

14.1.1 The project was designed as a small-scale evaluation to provide the site custodians with baseline information on the Flag Fen Scheduled Ancient

Monument. The results are presented with a high degree of confidence that archaeological features or significant deposits within the trenches and test pits were recognised and recorded where present.

- 14.1.2 Drawing on the specialist recommendations in each of the section headings above, the results are discussed in relation to each project aim below, and will be synthesised into an Updated Project Design assessing the potential of the data to achieve the aims and objectives of the project. The project archive was prepared in accordance with the guidelines outlined project archive was prepared in accordance with the guidelines outlined in Appendix 1, P1 of MoRPHE PPN 3 (English Heritage 2011) and in accordance with the *Guidelines for the preparation of excavation archives for long term storage* (UKIC 1990; Walker 1990).

14.2 Project Aim 1

- 14.2.1 The two evaluation trenches and three test pits were positioned in different locations on the waterlogged structures and dryland/wetland margin of the Site, with the principle purpose to 'redefine and establish the precise physical extent of the site' (Aim 1). Given the proximity of the Test Pits to the known position of the waterlogged structures, few surprises were expected from these interventions. In the event, however, the largest structure on site (the waterlogged timber platform) remained elusive, despite a grid pattern of 15 boreholes being placed across its postulated edge. A marked absence of extensive sub-fossil wood was observed in all 15 of the Auger boreholes, meaning that Objective 1.1 (define the edge of the Flag Fen timber platform within the landscape incorporating the results of previous excavations) could not be achieved.
- 14.2.2 Initial suspicions on site concerned the effectiveness of the methodology of borehole excavation to identify the extent of the archaeological horizon. Given that this technique was used to identify the previous extent of the platform (Pryor 2001, 165) and that no further archaeological wood was observed in Test Pit 1, this was ruled out. On the basis of these results, the platform may not extend far to the west of the Mustdyke, or at least be characterised as a relatively discontinuous structure.
- 14.2.3 The principal issue is one of sample size, and what can reasonably be extrapolated about the character platform from a 1.5 metre test pit – but also the original excavations in Area 6, which still represent a small percentage of the overall two-hectare sized platform. Wood free areas were identified in all the sub areas, in particular the 'poolside' area in 6D that was edged by oak planks, and contained a number of placed objects including a concentration of dog bones and a sword scabbard (Pryor 2001, 162). A wood free area was also observed in Area 8, beneath the current Preservation Hall, with a potential watercourse bridged by timbers (*ibid*).
- 14.2.4 The original Flag Fen report notes that the 'nature of the platform is hard to establish from so little evidence,' continuing '...if water played an important part in contemporary ritual practices... it would not be illogical to expect a 'little Venice of pools, creeks and relict streams, where rites could take place in privacy and safety, and be witnessed by an audience' (Pryor 2001, 165). This project has identified that there are still basic gaps in our knowledge of

the platform, and this will have major implications for its management in the future.

- 14.2.5 Trenches 1 and 2 on the wetland/dryland margin successfully identified a continuation of earlier features pre-dating the post alignment, in pursuance of Objective 1.2 (determine the nature of the pre-peat landscape and the stratigraphy of the overlying sediments) and Objective 1.3 (investigate any features within the research areas). Previous excavations in trenches NT1 and NT2 had identified a number of earlier finds and features that continued into Trench 1 and 2. This included ditch D1, truncated by the post alignment and recorded in Trench 1 as feature [1070], and a continuation of early Bronze Age pits identified in Trench 2, the most significant of which was recorded as [2028].
- 14.2.6 A further similarity with previous results was the number of struck flint implements recovered from a palaeosoil (1003 and 2006) in both Trenches 1 and 2. The assemblage was characteristic of later Neolithic or early Bronze Age flake-orientated industries, and a small Neolithic axe head recovered from Trench 1. This featured two episodes of reworking as a flake core, indicating that it was deposited when it was of considerable antiquity.
- 14.2.7 With no significant structural remains, further clarity on this activity or the character early Bronze Age settlement evidence identified in Trench NT1 could not be recovered from Trench 2. Ditch feature [1070] did not produce any datable artefacts, however, a secure *terminus ante quem* predating the post alignment suggests that it formed part of the earlier Bronze Age Northey field system, similar in character to those found on the western landfall (Pryor 2010, 140) and at Bradley Fen (Gibson and Knight 2006). These feature groups and wider associations have been discussed at length in the most recent Flag Fen publication (Britchfield 2010, 64), and those conclusions remain supported by this investigation, with further definition on their geographic extent.

14.3 Project Aim 2

- 14.3.1 The palaeoenvironmental and archaeological sampling strategy was devised to 'establish the current state of preservation of the in situ archaeological and palaeoenvironmental material across the site' (Aim2 – Objective 2.1). This included waterlogged wood (for condition assessment), continuous monolith, and bulk samples from Test Pits and Trenches. This material was investigated using 'appropriate archaeological and palaeoenvironmental techniques' (Objective 2.2) to assess the Site's potential for yielding high quality archaeological information in the face of current challenges to the preservation environment.
- 14.3.2 General biological assessment of the samples, including pollen, plant macrofossils and insect remains has demonstrated that an adequate level of preservation exists for the retrieval of organic remains, and that further analysis offers the potential to challenge and add to current understanding of the Flag Fen basin. Of the samples retrieved during this work, insect assessment has been particularly productive, with evidence for 'woodworms' and 'dung beetles' providing tell-tale signatures for use and

activity on the waterlogged structures that was hitherto lacking in previous studies (Robinson 2001; and Section 8.5.6).

- 14.3.3 In spite of this potential, the rate of degradation of the technological and organic archaeological resource at Flag Fen remains unknown, and will require further detailed analysis to establish (Objective 2.3). Two forms of assessment have been used to classify timber preservation – microscopic analyses of the wood (Section 8) and a grading system for the analytical potential of the surface of the timber (Van de Noort *et al* 1995, and Section 7).
- 14.3.4 In terms of the analytical potential of the waterlogged wood assessed, 60% achieved a 'moderately well preserved' condition score of '3', and 30% achieved a poorly preserved score of '2'. This represents a general decline from previous investigations, however, further comparison of these proxy indicators (particularly with reference to height above ordnance datum for the tops of posts) with the results from previous investigations will be required to indicate the rate of change in the preservation environment (Meadows 2007).
- 14.3.5 Microscopic analyses of the waterlogged wood have added to this picture considerably, and until this project this technique had never been undertaken at Flag Fen, aside from recent developer-funded projects to the north of the timber project alignment (Meadows 2007). Techniques applied to a range of samples from Trench 1 and all Test Pits included maximum water content (U_{max}); Scanning electron microscopy (SEM); Fourier Transform Infrared Spectroscopy (FT-IR); and pyrolysis – Gas Chromatography (py-GC). All of the samples that were examined in this study had undergone severe deterioration. Trench 1 samples were highly degraded, predominantly Class III, and any timber remains in this area are highly unlikely to still survive in five years time. Wood from the other three test pits can be considered to be in a slightly better state of preservation, with a higher percentage of samples assigned to Class II than to Class III in all three Test Pits.
- 14.3.6 Samples extracted from the lowest levels of the Test Pits (e.g. the base of the stake D0128) appear to be marginally less decayed than samples from the upper horizons, and these results indicate a highly fluctuating water table. This would be symptomatic of a dynamic burial environment, with conditions in the upper levels fluctuating between highly reducing and less reducing, whereas much deeper sediments remain highly reducing for most of the time. To adequately address the challenges facing the preservation at Flag Fen, a programme of water table monitoring is urgently required to understand fluctuations in the water table.
- 14.3.7 There are two active groundwater systems in the Flag Fen basin: a lower aquifer confined to the basement gravels and an upper system within the peat and alluvial fill (Smart 2008). Timbers set into the basement drift geology (generally -0.2 to -0.5m OD) will be in a relatively waterlogged condition, but the vast majority of the Bronze Age structures will be contained within the upper system (between +0.5 and -0.2m OD) and be under significant risk of dewatering and fluctuation. In conjunction with the results from this phase of fieldwork, further water table monitoring should aim to understand the local

variation caused by artificial features, such as the negative impact of the Mustdyke or the positive drawdown effect of the Mere.

14.4 Project Aim 3

- 14.4.1 Given that no metal work finds were identified during the course of works, the objectives associated with Aim 3 – ‘to appraise the research potential of these finds in the light of new ideas and recent discoveries’ – could not be achieved. However, the research potential of the extant archive was assessed by the specialist team, and the scope to re-evaluate the finds in light of multiple new questions, new approaches, techniques and similar finds from Bradley Fen and Must Farm was thoroughly scoped. Should further investigations be undertaken at Flag Fen, this should be included in the project design.

14.5 Review Point 3 – Updated Project Design

- 14.5.1 The evaluation has been successful in collating the data from Aims 1 -3 (Objective 4.1) and has entered into a Review Point cycle. All assessment report findings will be formulated into an Update Project Design (Aim 4) to be applied to the next stage of Execution. Central to this will be recommendations for further archaeological and palaeoenvironmental study (Objective 4.3) in light of attritional threats to the preservation environment (Objective 4.2). Given the high profile of Flag Fen and recent debate concerning appropriate methods of investigation at similar wetland sites, a Flag Fen academic advisory group has been formed to seek views and comments about the future management and research of the site.
- 14.5.2 In December 2012, DigVentures and English Heritage invited the advisory group, with wider stakeholders and Project Executive and Sponsor (the Client), to a seminar review of the preliminary results. This was followed by a wide-ranging discussion chaired by Dr. Will Fletcher. The minutes from this meeting are presented in Appendix 10, with key action points discussed including the development of a future research strategy, commissioning of a Hydrology baseline study, and the drafting of a management agreement to ring-fence forthcoming Section 17 funds from the PREL energy development on the western boundary of Flag Fen Archaeology Park. The Updated Project Design will be developed within this broader context, and all achievable action points tabled by the academic advisory group should be incorporated into the next stage of Execution.

15 BIBLIOGRAPHY

ACAO, 1993. Model briefs and specifications for archaeological assessments and field evaluations, Association of County Archaeological Officers

Appleby, G. 2005. Bradley Fen: the metalwork in context. Unpublished MPhil dissertation, University of Cambridge.

Arthur, J.R.B. 1978. The plant remains, pp. 171–3, in F. Pryor (ed.) Excavation at Fengate, Peterborough, England: The Second Report. Royal Ontario Museum Monograph 5. Toronto: Royal Ontario Museum.

Ayton, G, Baker, P, Revill, M and Worley, F 2011 *The English Heritage Vertebrate Skeleton Reference Collection Description and Database Metadata*. Research Department Report Series 77-2011. Portsmouth: English Heritage

BADLG, 1986. Code of Practice, British Archaeologists and Developers Liaison Group
Bamford, H. 1985 *Briar Hill: excavation 1974-1978*. Northampton, Northampton Development Corporation.

Bamford, H. 1985 *Briar Hill: excavation 1974-1978*. Northampton, Northampton Development Corporation.

Bamforth, M., 2007. *Archaeological evaluation report for Flag Fen Research Facility, Peterborough*. L – P : Archaeology, unpublished archive report LP0549L.

Bamforth, M., 2010. Aspects of wood, timber and woodworking at Flag Fen, 1995-2005. In: F. M. M. Pryor and M. Bamforth (eds.) *Flag Fen, Peterborough, Excavation and Research 1995-2007*. Oxbow, Oxford.

Binks, G., Dyke, J and Dagnell, P. 1988. *Visitors Welcome: A Manuel on the Presentation and Interpretation of Archaeological Excavations*. London: HMSO.

Bradley, P. 1999 Worked flint. Excavations at Barrow Hills, Radley, Oxfordshire. Volume 1: The Neolithic and Bronze Age monument complex. A. Barclay and C. Halpin. Oxford, Oxford Archaeology 211-227.

Britchfield, D., 2010. Excavations towards the Northey Landfall. In: FMM Pryor and M Bamforth (eds), *Flag Fen, Peterborough, Excavation and Research 1995-2007*. Oxbow, Oxford.

British Geological Survey, accessed 10/01/12: <http://www.bgs.ac.uk/GeolIndex/>

Brittain, M., 2010. Preservation and Degradation of the Wood. In: FMM Pryor and M Bamforth (eds), *Flag Fen, Peterborough, Excavation and Research 1995-2007*. Oxbow, Oxford.

Brown, N. and Glazebrook, J. 2000, *Research and Archaeology: A Framework for the Eastern Counties: 2 Research Agenda and Strategy*. East Anglian Archaeology Occasional Paper 8, Norwich: Scole Archaeological Committee.

Brown, N. and Murphy, P. 2000: Neolithic and Bronze Age, in N. Brown and J. Glazebrook (eds.), *Research and Archaeology: A Framework for the Eastern Counties 2: Research Agenda and Strategy*, East Anglian Archaeology. Occasional Paper 8, Norwich: Scole Archaeological Committee.

Bunning, R., 2010. *Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood*. English Heritage, London.

Bryant, S. 1997: Iron Age, in J. Glazebrook (ed.), *Research and Archaeology: a Framework for the Eastern Counties 1: Resource Assessment*, East Anglian Archaeology Occasional Paper 3, Norwich: Scole Archaeological Committee: 23-34

Bryant, S. 2000: The Iron Age, in N. Brown and J. Glazebrook (eds.), *Research and Archaeology: A Framework for the Eastern Counties 2: Research Agenda and Strategy*, East Anglian Archaeology. Occasional Paper 8, Norwich: Scole Archaeological Committee: 14-18

Butler, C. 2005 *Prehistoric flintwork*. Stroud, Tempus.

Coles, J. 1984. *The Archaeology of Wetlands*. Edinburgh University Press.

Cook C. & Grattan D.W., 1990. 'A method for calculating the concentration of PEG for freeze-drying waterlogged wood' in Hoffman P. (Ed) *Proceedings of the 4th ICOM Group on Wet Organic Archaeological Materials conference*, Bremerhaven.

Coombs, D. (1992). Flag Fen platform and Fengate Power post alignment – the metalwork. *Antiquity* 66, 504-17.

de Jong J. 1977. 'Conservation Techniques for Old Waterlogged Wood from Shipwrecks found in the Netherlands' in A.H. Walters (Ed.) *Biodeterioration Investigation Techniques*. London

Department of the Environment, 1990. *Planning Policy Guidance 16, Archaeology and Planning*

Dinwoodie, J.W., 1989. *Wood: Nature's cellular polymeric fibre –composite*. The Institute of Metals.

Duff, A.G. 2012 *Beetles of Britain and Ireland, Volume 1: Sphaeriusidae to Silphidae*. Norfolk: A.G. Duff Publishing.

Eaton, R., A. and Hale, M., D., C., 1993. *Wood: Decay, pests and protection*. Chapman and Hall, London, UK.

English Heritage, 1991. *Exploring our Past. Strategies for the Archaeology of England*, English Heritage

English Heritage, 1991. *Management of Archaeological Projects (MAP2)*

English Heritage, 1997. *Sustaining the historic environment: new perspectives on the future*

English Heritage, 1998. *Guidelines on producing and interpreting Dendrochronological dates*.
Ancient Monuments Laboratory, Conservation and Technology,

English Heritage, 2001. *Centre for Archaeology Guidelines: Archaeometallurgy*

English Heritage, 2002. *Centre for Archaeology Guidelines: Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation*.

English Heritage, 2004. *Centre for Archaeology Guidelines: Human bones from archaeological sites: guidelines for producing assessment documents and analytical reports*

English Heritage, 2006. Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide

English Heritage, 2008. SHAPE: Strategic framework for the Historic Environment: Activities and Programmes in English Heritage

English Heritage, 2012 Management of Research projects in the Historic Environment. PPN 3: Archaeological Excavation – Annual Report May 2011-March 2012

Evans, C., 2009, Fengate Revised: Further Fen-edge Excavations, Bronze Age Fieldsystems & Settlement and the Wyman Abbott/Leeds Archives, CAU Landscape Archives: Historiography and Fieldwork (1)

Foster, G.N. and Friday, L.E. 2011. *Keys to Adults of the Water Beetles of Britain and Ireland (Part 1)*. Handbooks for the Identification of British Insects 4/05). London: Royal Entomological Society of London.

Gaffney, V., V. Thompson, K. and Fitch, S. 2007. *Mapping Doggerland: The Mesolithic Landscapes of the Southern North Sea*. Archaeopress. Oxford.

Gale, R. and Cutler, D., 2000. *Plants in Archaeology*. Westbury Publishing, Otley, UK.

Gearey, B. R., P. Marshall, D. Hamilton (2009) Correlating Archaeological and Palaeoenvironmental Records using a Bayesian Approach: A Case Study from Sutton Common, South Yorkshire, England. *Journal of Archaeological Science* 36, 1477-1487.

Gearey, B. G., Chapman, H. P., Krawiec, K., Bamforth, M., Hopla, E., and Griffiths, C., (In Press) Triple post alignments in the Waveney Valley, Suffolk: Excavations at Barsham Marshes. *Journal of Wetland Archaeology*.

Gerloff, S. (2007). Reinecke's ABC and the chronology of the British Bronze Age. In C. Burgess, P. Topping, F. Lynch (ed.) *Beyond Stonehenge: essays on the Bronze Age in Honour of Colin Burgess*, 117-161. Oxford: Oxbow.

Glazebrook, J. (ed.) 1997, *Research and Archaeology: A Framework for the Eastern Counties: 1 Resource Assessment*. East Anglian Archaeology, Occasional Paper 3.

Habermehl, K. 1975. *Die Alterbestimmung bei Haus-und Labortieren*. Berlin: Hamburg

Hall, A. and Fisher, C. 1986. Plant macrofossil remains from the 1984-5 excavations at Flag Fen, Cambridgeshire. Ancient Monumental Laboratory Reports New Series 49/86. London: English Heritage.

Hansen, M. 1987. *The Hydrophilidae (Coleoptera) of Fennoscandia and Denmark Fauna* (Fauna Entomologica Scandinavica 18). Leiden: Scandinavian Science Press.

Harcourt, R 1974 'The dog in prehistoric and early historic Britain' *Journal of Archaeological Sciences* 1(2): 151-175

Hawkes, C.F.C., 1943, The Early Iron Age Settlement at Fengate, Peterborough, The Archaeology Journal, 100, 188-223

Healy, F. 1988 The Anglo-Saxon cemetery at Spong Hill, North Elmham. Part VI: Occupation in the seventh to second millennia BC. Gressenhall, Norfolk Archaeological Unit.

Jessop, L. 1986. *Coleoptera: Scarabaeidae*. (Handbooks for the Identification of British Insects 5/11). London: Royal Entomological Society of London.

Jones, J., Tinsley, H. and Brunning, R. 2007 Methodologies for assessment of the state of preservation of pollen and plant macrofossil remains in waterlogged deposits. *Environmental Archaeology* 12(1): 71–86

Kenward H.K., Engleman C., Robertson A. and Large F. 1985. Rapid scanning of urban archaeological deposits for insect remains. *Circaea* 3, 163–72

Kenward H. K., Hall A.R., and Jones A.K.G. 1980. A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits. *Scientific Archaeology* 22, 3–15.

Kenward H. K. and Hall A.R. 1995. *Biological Evidence from Anglo-Scandinavian Deposits at 16-22 Coppergate*. The Archaeology of York 14/7, London: Council for British Archaeology.

Koch, K. 1992. *Die Käfer Mitteleuropas* (Ökologie Band 3). Krefeld: Goecke and Evers.

Knight, M. 2012. Must Farm: must read. CAU download: <http://www.mustfarm.com/wp/wp-content/uploads/MustRead-June2012.pdf> (accessed 1/9/2013)

Knight, M. and Murrell, K. 2012. Must Farm and Bradley Fen. *British Archaeology*. 123, 15–21.

Lillie, M. and Cheetham, J., 2002. Water Table Monitoring at Flag Fen, Peterborough. Wetland Archaeology and Environments Research Centre, University of Hull Report No. SAS-FF/02-01

Lucht, W.H. 1987. *Die Käfer Mitteleuropas*. Katalog. Krefeld: Goecke and Evers.

Luff, M. 2007. *Coleoptera: Carabidae* (Handbooks for the Identification of British Insects 4/2 –Second Edition). London: Royal Entomological Society of London.

Margary, I. D., 1967. *Roman Roads in Britain*. Revised Edition. John Baker Publishers, UK.

Martingell, H. and Saville, A. 1988 *The illustration of lithic artefacts: a guide to drawing stone tools for specialist reports*. Cardiff, Association of Archaeological Illustrators & Surveyors; Lithic Studies Society.

Nilsson, A.N. and Holmen, M. 1995. *The Aquatic Adephaga (Coleoptera) of Fennoscandia and Denmark II. Dytiscidae* (Fauna Entomologica Scandinavica Vol. 35). Leiden: E. J. Brill.

Olivier, A. and Van de Noort, R. 2002: English Heritage Strategy for Wetlands, London: English Heritage www.english-heritage.org.uk/upload/pdf/wetlands_strategy.pdf.

Panter, I. & Spriggs J. 1996 'Condition Assessments and Conservation Strategies for Waterlogged Wood Assemblages' in Hoffman P. et al (Eds) Proceedings of the 6th ICOM Group on Wet Organic Archaeological Materials Conference, York

PCRG, 1997, The Study of Later Prehistoric Pottery: General Policies and Guidelines for analysis and Publications, Prehistoric Ceramic Research Group, Occasional Paper No1 and No2, Revised 1997

Powell, K., 1999. The impact of recent changes within subsurface environment upon the integrity of buried wood: implications for the in situ preservation of archaeological timbers. Unpublished PhD thesis, University of Surrey.

Pryor, F. M. M., 1991. *Flag Fen Prehistoric Fenland Centre*. Batsford, London

Pryor, F. M. M., 1998. *Farmers in Prehistoric Britain*. Tempus, Stroud.

Pryor F, 2001. *The Flag Fen Basin: Archaeology and environment of a Fenland Landscape*. English Heritage, UK.

Rackham, O., 1977. Neolithic woodland management in the Somerset Levels: Garvin's, Walton Heath & Rowland's Tracks. *Somerset Levels Papers* 3: 65-71

Robinson, M. 1991. 'late Bronze Age Coleoptera from Flag Fen' pp. 384-389 in Pryor, F. (ed) *The Flag Fen Basin: Archaeology and Environment of a Fenland Basin*. London: English Heritage.

Robinson, M. 1992. The Coleoptera from Flag Fen. *Antiquity* 66. 467-9.

Scaife, R. G. 2001 Flag Fen: The vegetation and environment, pp. 351–81, in F. Pryor (ed.) *The Flag Fen Basin: Archaeology and Environment of a Fenland Landscape*. Swindon: English Heritage.

Schofield, J. 2011. *Great Excavations: Shaping the Archaeological Profession*. Oxbow.

Seaby, D., 1991 'Gravimetric Density Determination of Wood using the DDD200 Wood Decay Detecting Drill' unpublished report from the Department of Agriculture for Northern Ireland.

Serjeantson, D 1996 'The Animal Bones', in Needham, S and Spence, T (eds) *Runnymede Bridge Research Excavations. Vol. 2 Refuse and Disposal at Area 16 East, Runnymede*. London: British Museum, 194–223

Shennan, I. 1982. Problems of correlating Flandrian sea-level changes and climate, in A. F. Harding (ed.) *Climate Change in Later Prehistory*, 52-67. Edinburgh.

Slowikowski, A. Nenck, B. and Pearce, J. 2001. *Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics*. Medieval Pottery Research Group, Occasional Paper 2.

Smith, D.N. 2008. 'Fengate 1998: Third Drove: Insect Assessment'. Report to Birmingham University Field Archaeology Unit.

Society of Museum Archaeologists, 1993. *Selection, Retention and Dispersal of Archaeological Collections: guidelines for use in England, Wales and Northern Ireland* (1st edition).

Spence, C., 1994 (ed.). *Archaeological Site Manual* (3rd edition). Museum of London, London.

Spoerry, P. and Hinman, M. 1998. *The Still, Peterborough: Medieval Remains Between Cumbergate and Westgate*. Cambridgeshire Archaeological Field Unit Monograph No 1.

Spoerry, P. 2008 *Ely Wares*. East Anglian Archaeology 112.

Stace, C. 2010. (third edition) *New Flora of the British Isles*. Cambridge: Cambridge University Press.

Standing Conference of Archaeological Unit Managers, (1991 rev. 1997) *Health and Safety in Field Archaeology, Manual*

Taylor, M., 2001. The Wood. In: F. M. M. Pryor (ed.) 2001. *The Flag Fen Basin: Archaeology and Environment of a Fenland Landscape*. English Heritage Archaeological Reports, London, pp 167-228.

Van de Noort, R. 2001: *Heritage Management of England's Wetlands Over Arching Project Design* PNUM 3225, Exeter: University of Exeter.

Von den Driesch, A E 1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Cambridge, Massachusetts: Peabody Museum of Archaeology and Ethnology, Harvard University Bulletin 1

Walker, K. 1990 *Guidelines for the preparation of excavation archives for long-term storage*, Archaeology Section of the United Kingdom Institute for Conservation.

Waller, M. 1994. *The Fenland Project, No 9: Flandrian Environmental Change in Fenland*. East Anglian Archaeology 70. Cambridge.

Waller, M. and Hall, D., 1991. *The Flandrian deposits and archaeology of the south-central Fens*. Central East Anglia and the Fen Basin. Quaternary Research Association Field Guide, UK

Watkinson, D. and Neal, V. 1998 *First Aid for Finds* (3rd edition), RESCUE and the Archaeology Section of the United Kingdom Institute for Conservation.

Westcott Wilkins, L. 2013. *Flag Fen Lives: Public Archaeology Evaluation*. DigVentures Unpublished Report.

Wilkins, B., Britchfield, D. and Bamforth, M., 2012. Flag Fen Lives, Project Design for an Archaeological Evaluation. Dig Ventures, unpublished archive report, London.

Wilson, D. G. 1984. A report on the plant macrofossils from Fengate, p. 259 and Fiche 242–4, in F. Pryor (ed.) Excavations at Fengate, Peterborough, England: The Fourth Report. (Royal Ontario Museum Archaeological Monograph 7/ Northamptonshire Archaeological Society Monograph 2. Toronto and Northampton: Royal Ontario Museums/ Northamptonshire Archaeological Society.

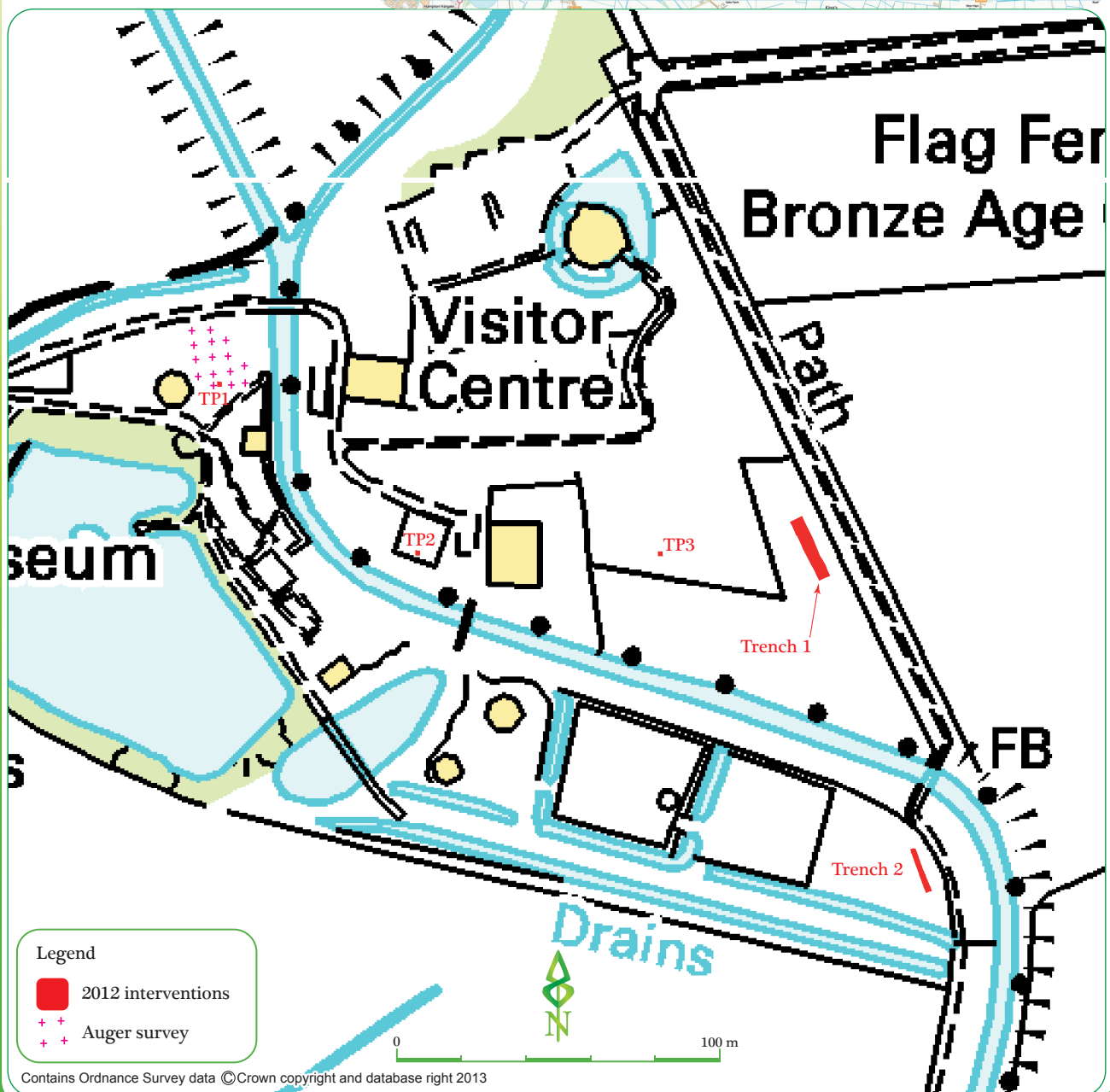
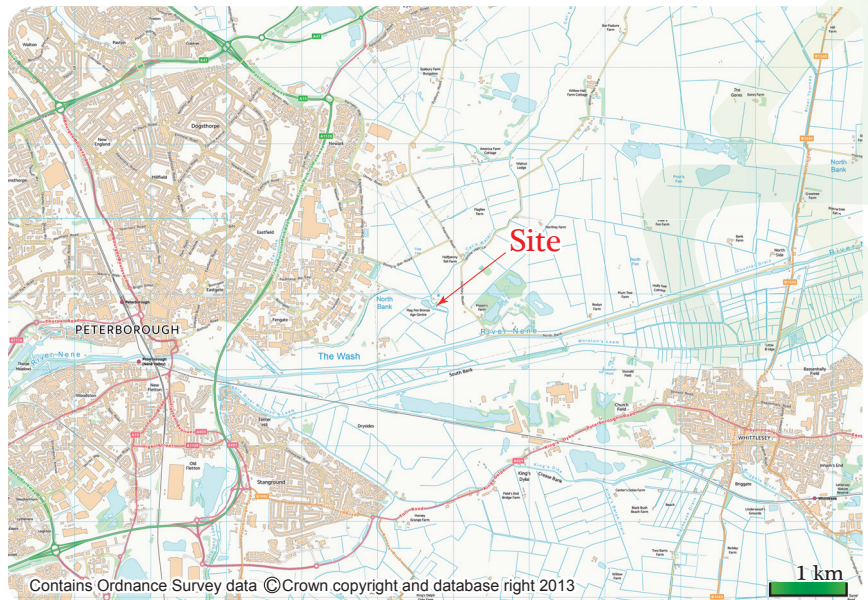
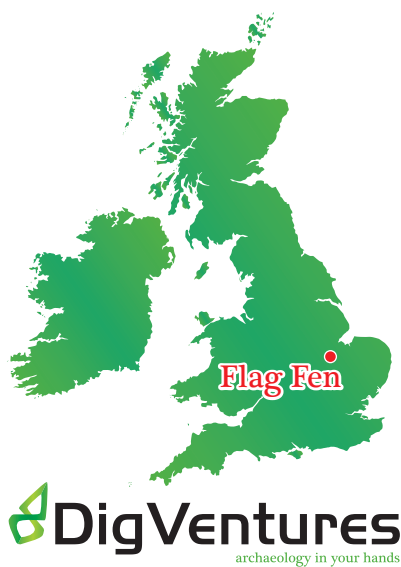


Figure 1 - Flag Fen site location, showing position of the trenches, test pits and auger survey points marked in red.

Figure 2 - The Flag Fen Scheduled Ancient Monument (indicated in red), including the Bronze Age post alignment, timber platform and associated Bronze Age and later field systems (indicated by overlaid cropmarks).

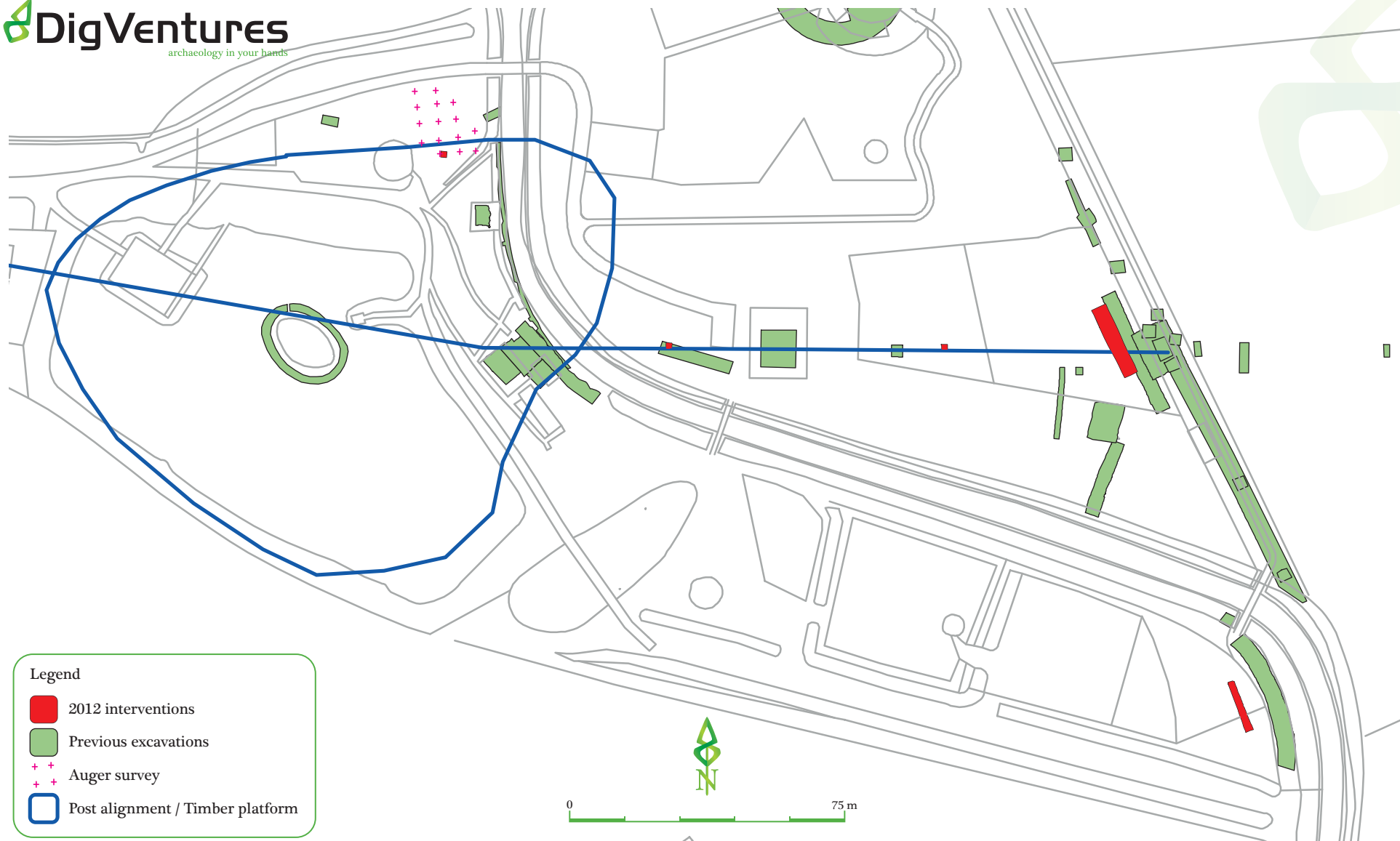


Figure 3 - The Flag Fen Flag Fen site plan, showing position of the trenches, test pits and auger survey points marked in red, and location of post alignment and timber platform in blue.

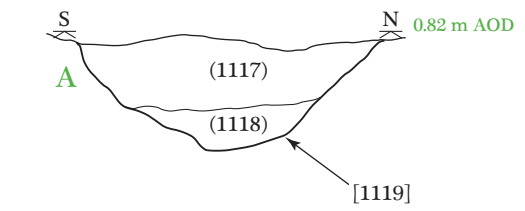
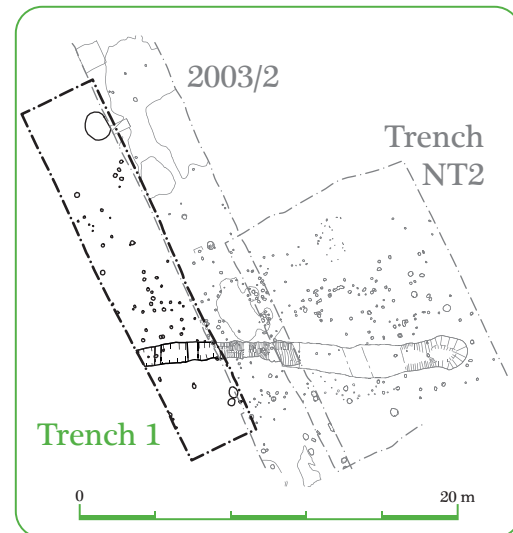


Plate 4.1 – Posthole feature [1023] Mid-Excavation

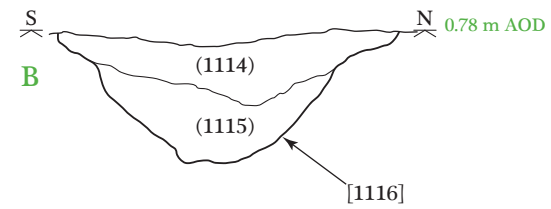


Plate 4.2 – Posthole feature [1029] Mid-Excavation

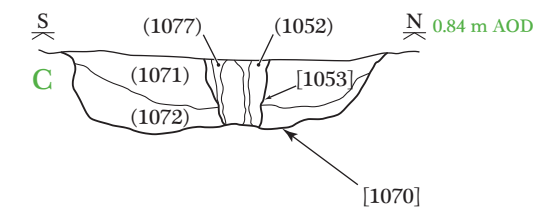


Plate 4.3 – E-W Ditch feature [1116] Slot 3

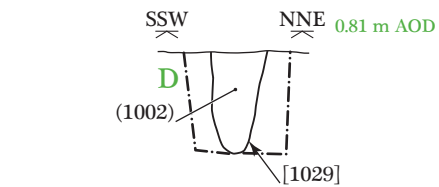


Plate 4.4 – E-W Ditch feature [1159] Mid-Excavation

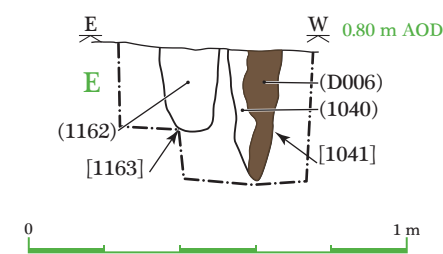


Plate 4.5 – Posthole features [1163] and [1041] with box section

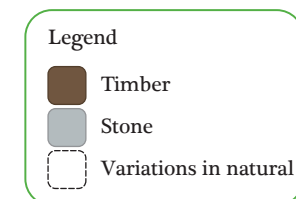


Plate 4.6 – Posthole feature [1051] with box section

Figure 4 - Plan, Sections and Photographs of Trench 1

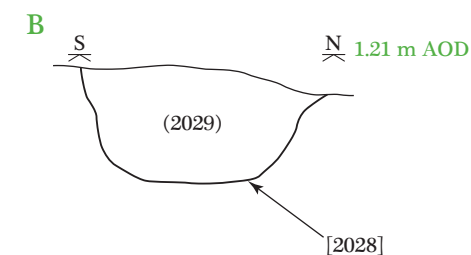
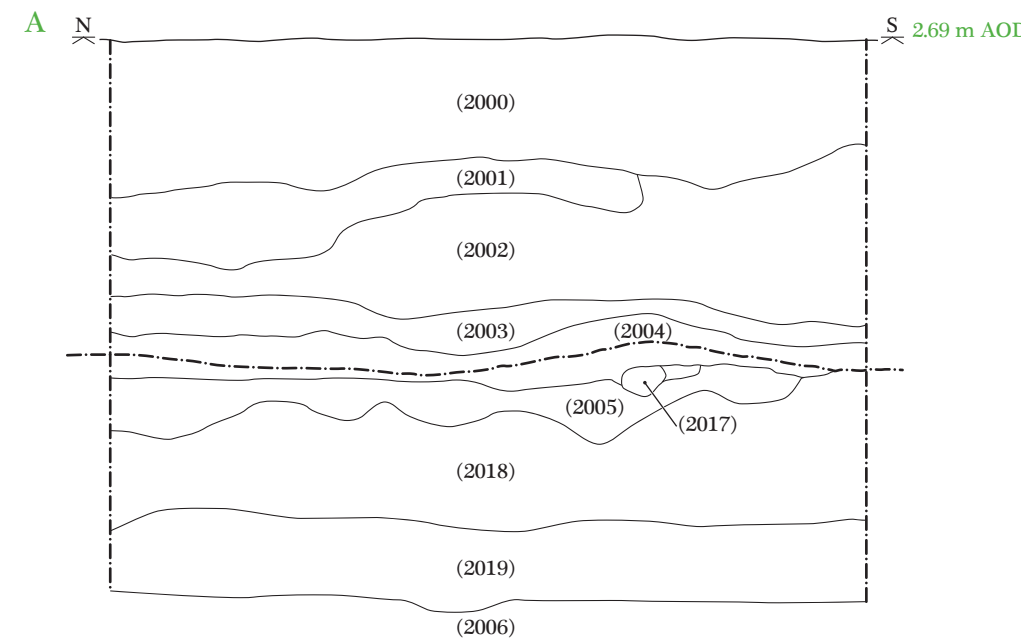


Plate 5.1 - Trench 2 machining



Plate 5.2 - Trench 2 East facing section



Plate 5.3 - Pit feature [2028] Mid Excavation



Plate 5.4 - Pit feature [2028] Post-Excavation



Plate 5.5 - Trench 2 Palaeosol (2006) facing north

Figure 5 - Plan, Sections and Photographs of Trench 2

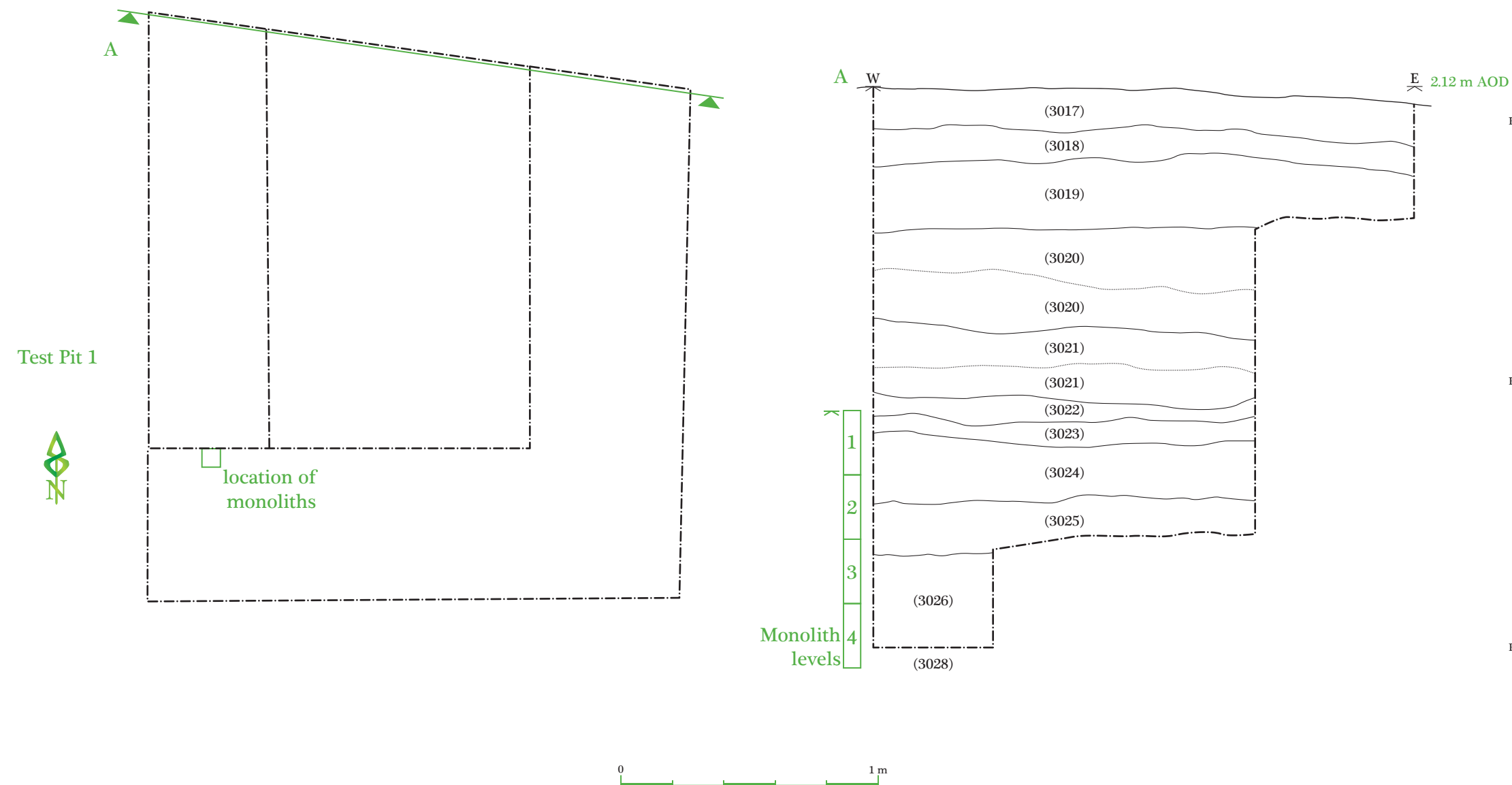


Plate 6.1 – Test Pit 1, west facing section showing made ground



Plate 6.2 – Test Pit 1 north facing section upper sequence



Plate 6.3 – Test Pit 1 north facing section to limit of excavation



Plate 6.4 – Test Pit 1 monolith samples

Figure 6 - Plan, Sections and Photographs of Test Pit 1

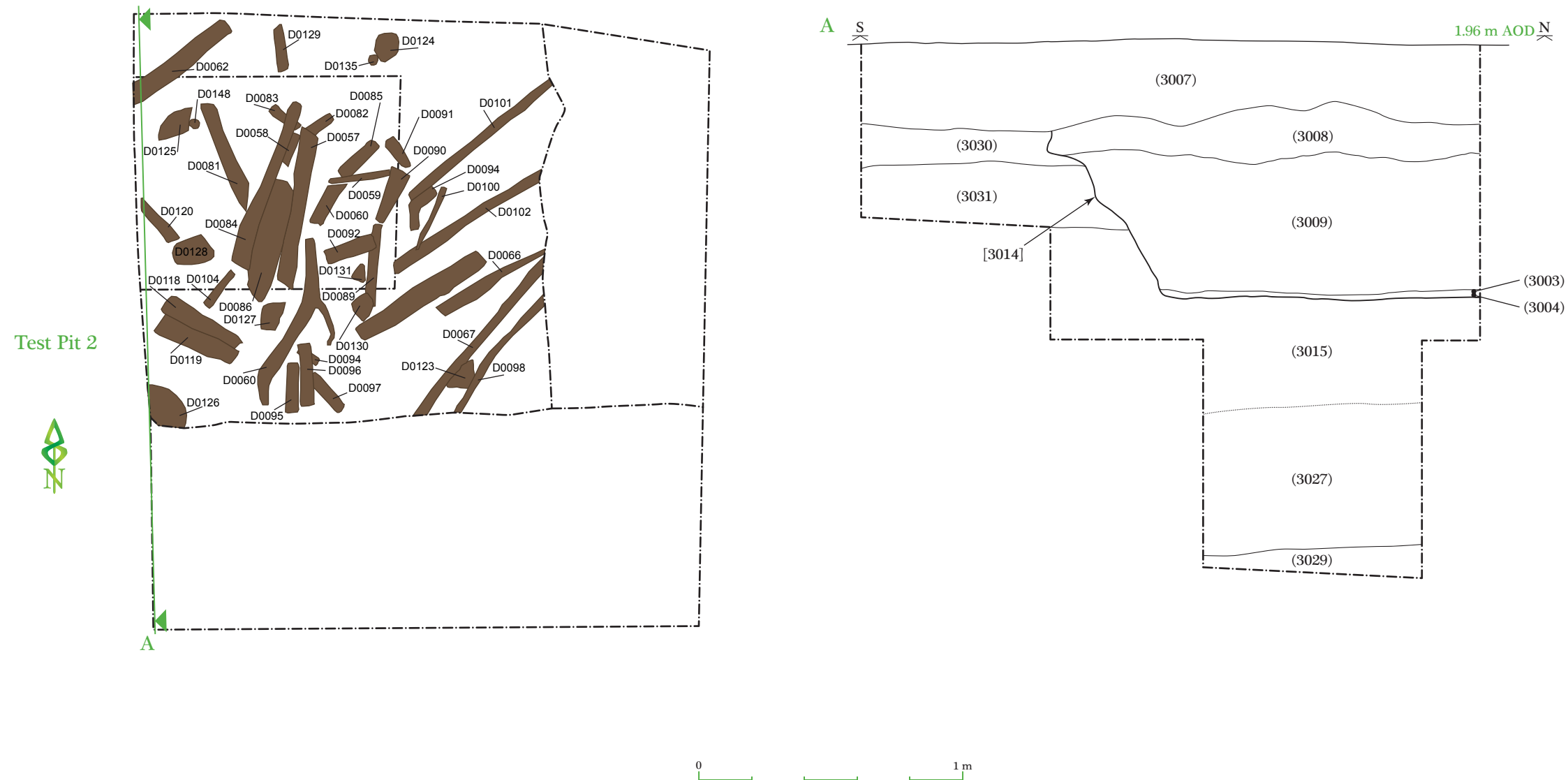


Plate 7.1 – Test Pit 2 evidence of previous investigation



Plate 7.2 – Test Pit 2 upright posts and trench surface from 1990 excavation



Plate 7.3 – Test Pit 2 east facing section to limit of excavation



Plate 7.4 – Test Pit 2 wood sample D0125

Figure 7 - Plan, Sections and Photographs of Test Pit 2

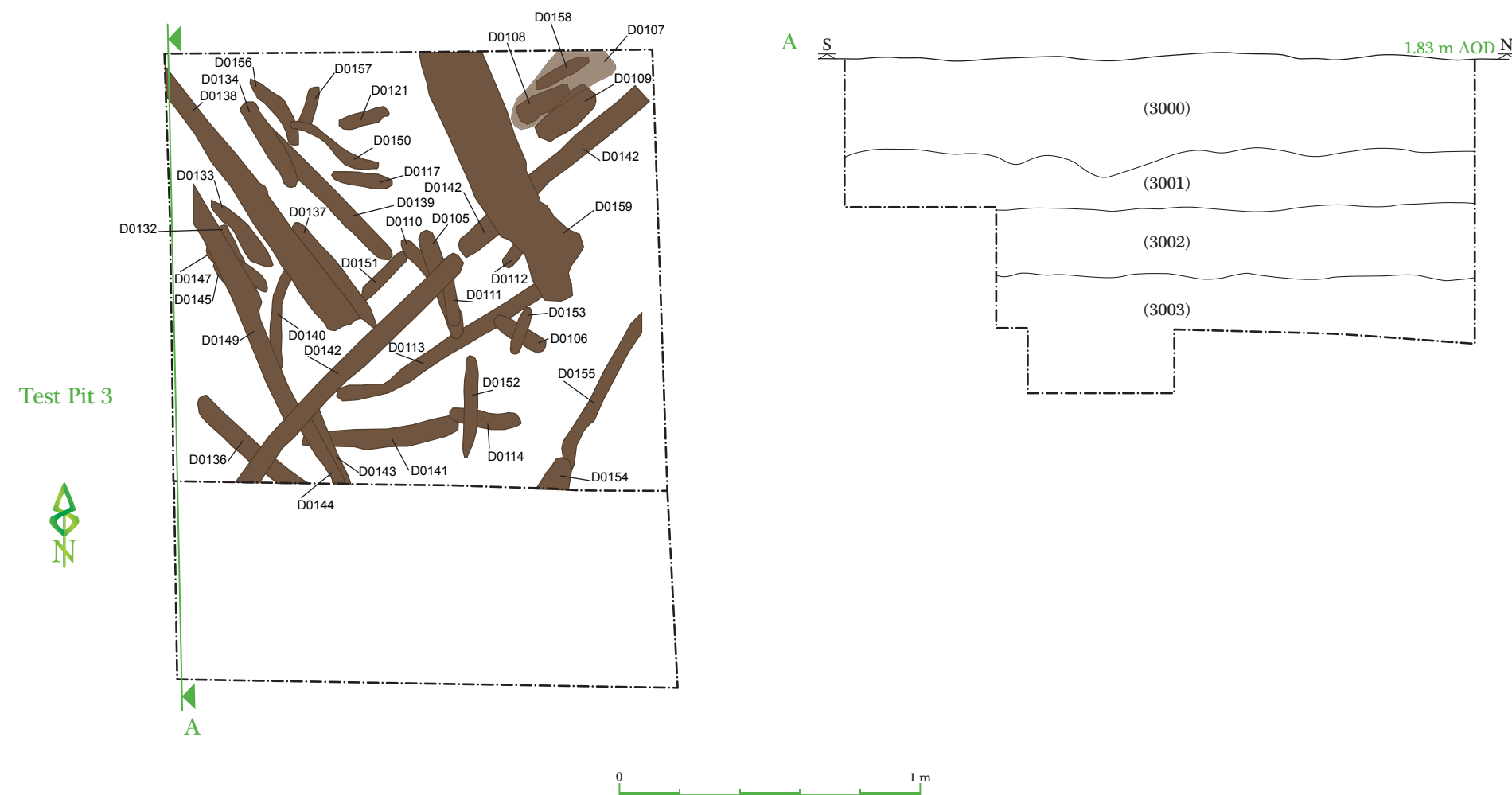


Plate 8.1 – Test Pit 3 facing north, first layer of exposed wood



Plate 8.2 – Test Pit facing north, second layer of exposed wood

Figure 8 - Plan, Sections and Photographs of Test Pit 3



Plate 9.1 – Fieldschool manager Raksha Dave demonstrates troweling techniques to Mathew Lee, Deputy Leader of Peterborough City Council



Plate 9.2 – Project Director Brendon Wilkins explains the dig to local school children, filmed by BBC Look East and the Peterborough Telegraph



Plate 9.3 – Managing Director Lisa Westcott Wilkins fielding interview questions from TV, print and radio



Plate 9.4 – Budding archaeologists helping to identify finds from Trench 1

Figure 9 - Flag Fen Lives Community Engagement

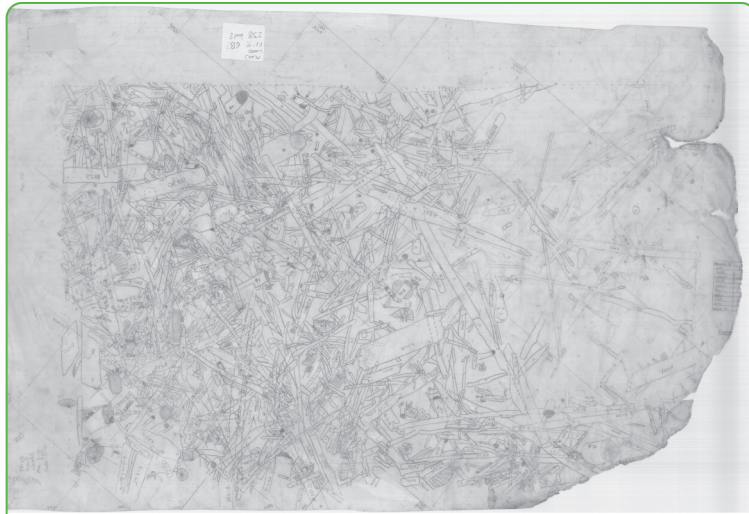


Plate 10.1 – Scan of surviving plan from fire damaged archive



Plate 10.2 – Preservation Hall, showing rows of post alignment



Plate 10.3 – Waterlogged wood in the preservation hall



Plate 10.4 – Reconstructed Iron Age Round House at Flag Fen

Figure 10 - Flag Fen in retrospect.

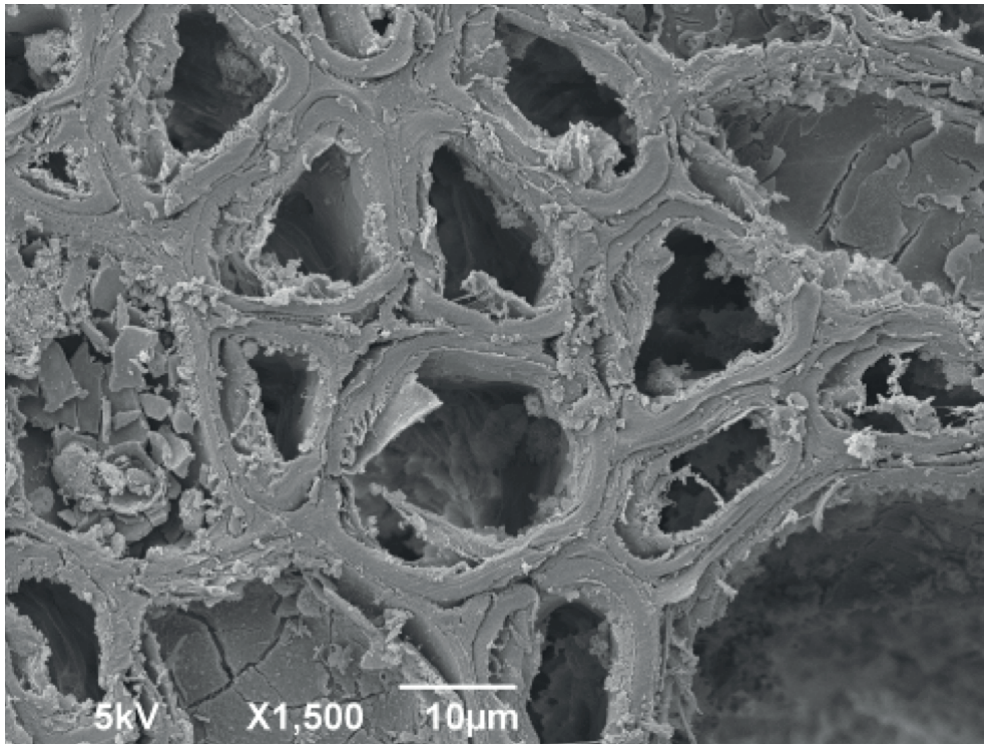


Plate 1 - Example of well preserved Oak

An example of well preserved wood is shown in Plate 1, (an oak stake from the Newport ship at x1500 magnification). The secondary cell walls are, in the main, very well preserved with little rupturing or swelling, nor detachment from the lignin-rich middle lamella.

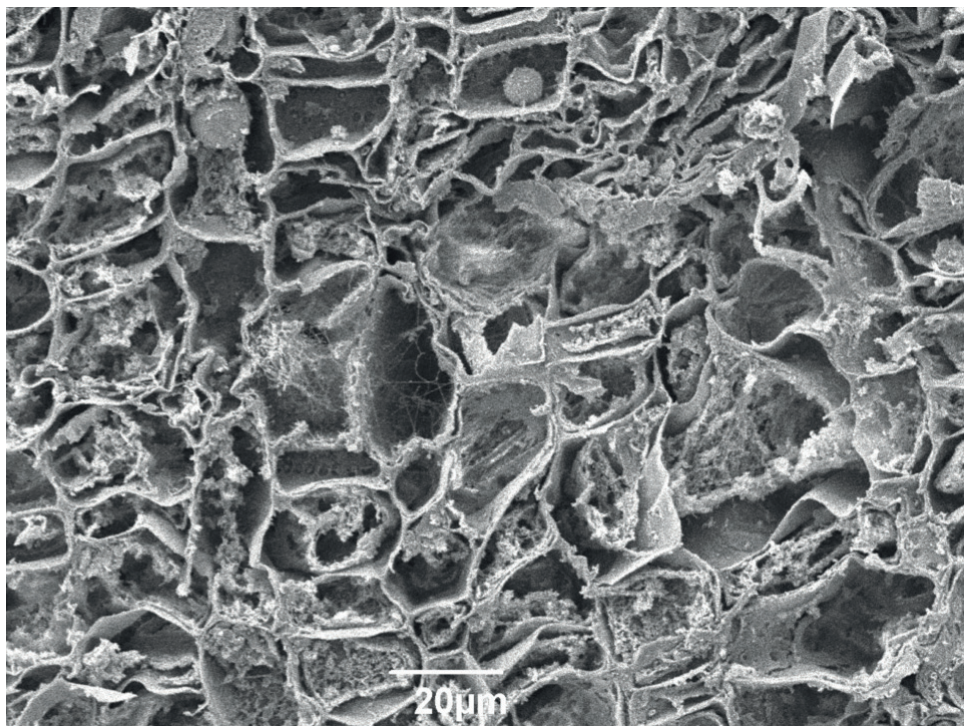
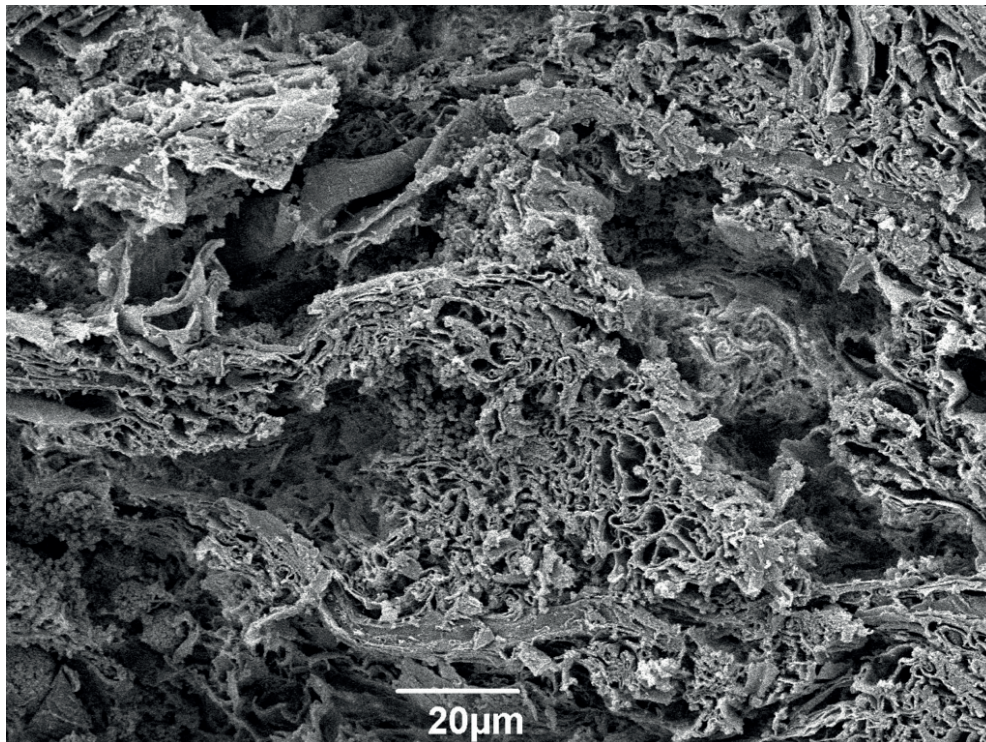


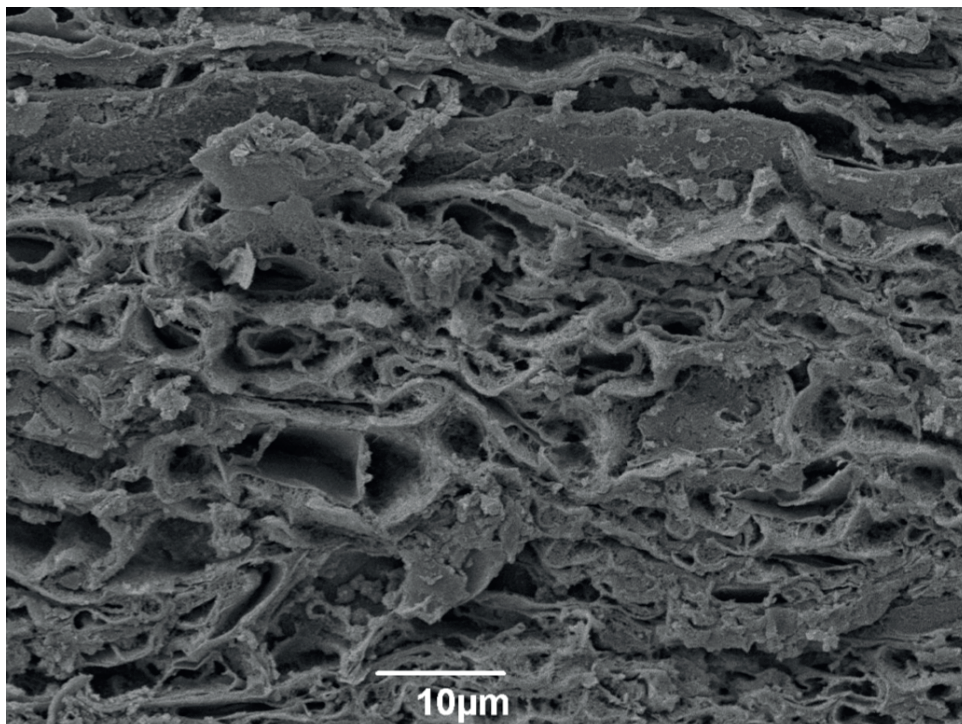
Plate 2 - Woodsample D0053 (x750 Magnification)

When compared with the image in Plate 1, it is clear that very little of the secondary cell walls remain, apart from a cluster of cells, bottom left. Here the secondary cell walls are detached from the middle lamella and appear very degraded. Mineral deposits, probably iron also visible, as are fungal hyphae, a recent infestation.



Severely degraded structure, no secondary cell walls survive, only the lignin-rich middle lamella "skeleton" which has deformed during the acetone dehydration process.

Plate 3 - Woodsample D0122 (x750 Magnification)



Very degraded and ruptured secondary cell walls present, although many cells have lost their cellulose component. Mineral contamination present too.

Plate 4 - Woodsample D0128 (x1700 Magnification)

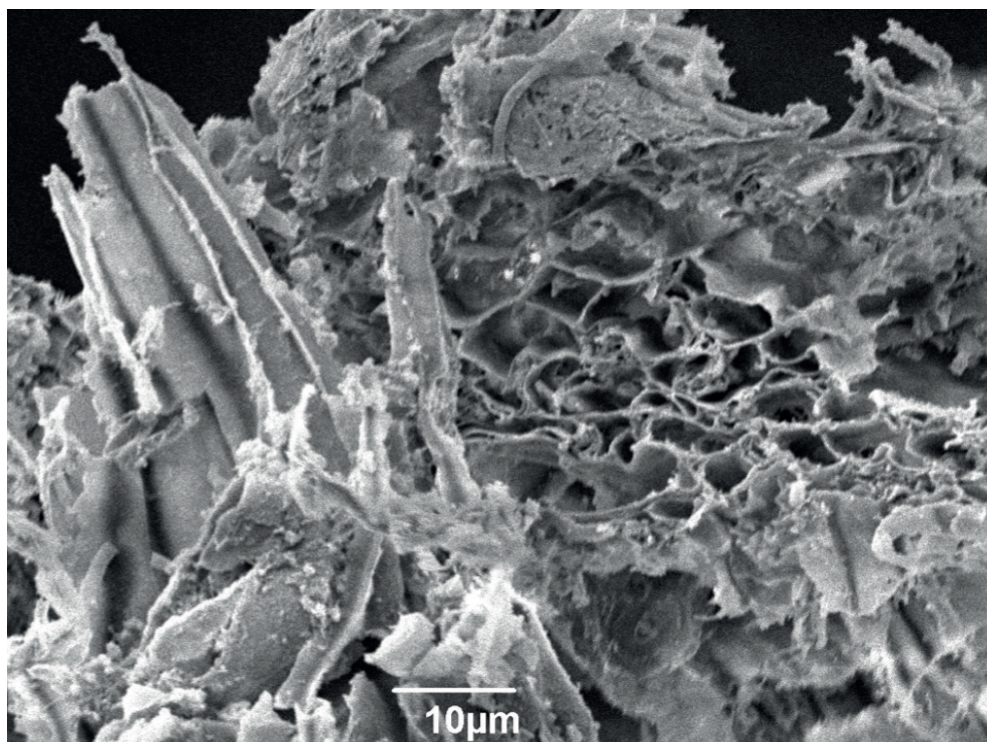
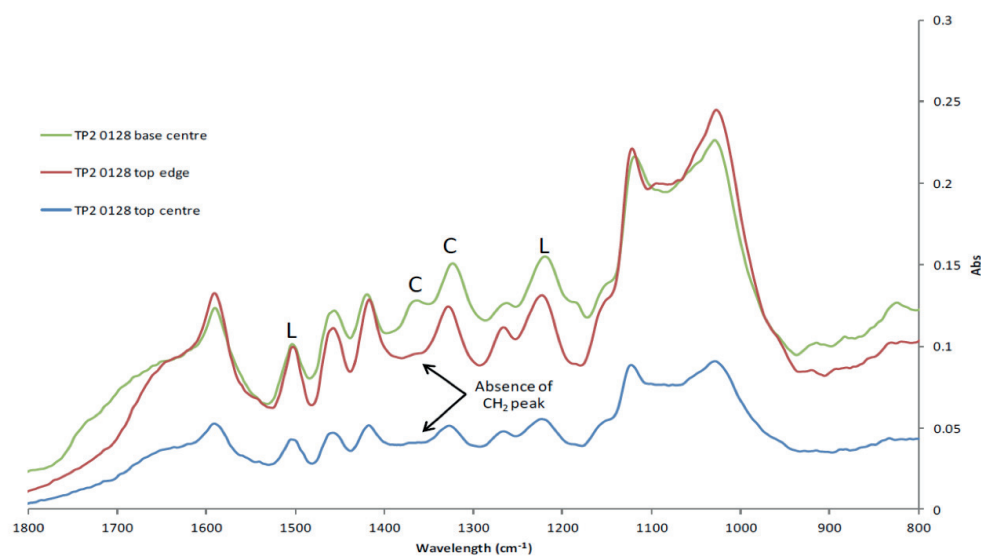


Plate 5 - Woodsample D0155 (x1600 Magnification)

This section proved difficult to cut, due to the severely degraded nature of the wood. No secondary cell walls survive in this section, only the lignin-rich middle lamella.



Dried samples were analysed using a Vertex 70 FT-IR spectrometer (Bruker) using an attenuated total reflectance unit. Each sample was scanned between 800 and 3600cm⁻¹ using an averaged 16 scans at a 4cm⁻¹ resolution. The resulting spectra for D0128 is shown here.

Plate 6 - Spectra for Woodsample D0128

16 APPENDICIES

APPENDIX 1 – TRENCH & TEST PIT CONTEXT DESCRIPTIONS

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1001	Brown silty clay with occasional small sub-rounded/sub-angular stones.	Topsoil	0.00-0.32
1001	Dark grey black desiccated peat layer, with orange mottled patches towards top of deposit.	Deposit	0.32-0.45
1002	Mid orange brown silty clay with some grey/brown mottling. Occasional small-moderate sub-rounded/sub-angular stones.	Deposit	0.45-0.58
1003	Dark grey brown silty clay, palaeo land surface observed in the central section of trench, approximately 0.12m thick, excavated by hand.	Deposit	0.58-0.75
1004	Fill of posthole [1005] . Brown grey silty clay with flecks of orange throughout and occasional sub-rounded stones.	Fill of Posthole [1005]	Width 0.22m Depth 0.19m Length 0.06m
1005	Cut of Posthole. Sub-circular shape, with a sharp break of slope (top) giving way to a gradual concave base. Filled by (1004)	Cut of Posthole	Width 0.22m Depth 0.19m Length 0.06m
1006	Fill of Posthole [1007] . Dark orangey-brown clay silt, moderately compact with sub-angular pebble inclusions.	Fill of a Posthole [1007]	Width 0.20m Length 0.29m Depth 0.04m
1007	Cut of Posthole. Moderate, Concave, Sub-circular in plan, with moderately steep sides, and a concave base. Filled by (1006)	Cut of a Posthole	Width 0.20m Length 0.29m Depth 0.04m
1008	Fill of Posthole [1009] . Mid grey brown clay silt, with occasional sub-rounded pebble inclusions.	Fill of Posthole [1009]	Width 0.29m Length 0.28m Depth 0.08m
1009	Cut of Posthole. Circular shape, with a sharp break of slope, vertical sides and a flat base. Filled by (1008)	Cut of Posthole	Width 0.29m Length 0.28m Depth 0.08m
1010	Fill of Posthole [1011] . Loose, Dark Orangish Brown clay silt, with Dark Orangish Brown decomposed Stake remains, wood no: D1001	Fill of Stakehole [1011]	Width 0.10 Length 0.09 m Depth 0.19 m
1011	Cut of Posthole filled by (1010) Square shape in plan with Vertical sides which tapers in at base. Preserved post in situ: wood no. D1001	Cut of Stakehole	Width 0.10 m Length 0.09 m Depth 0.19 m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1012	Fill of Stakehole [1013] . Dark Orangey – Brown, Clayey – Silt with occasional small sub angular pebbles and with some decayed wood inclusions.	Fill of Stakehole [1013]	Width 0.13m Length 0.11m Depth 0.03m
1013	Cut of Stakehole, circular in plan with moderate to gentle sloping sides. Filled with (1012) .	Cut of Stakehole	Width 0.13m Length 0.11m Depth 0.03m
1014	Fill of Stakehole [1015] . Dark Orangish Brown with clay-silt occasional flecks of decayed wood.	Fill of Stakehole [1015]	Width 0.15m Length 0.14m Depth 0.06m
1015	Cut of Stakehole with vertical sides and uneven base. Filled with (1014) .	Cut of Stakehole	Width 0.15m Length 0.14m Depth 0.06m
1016	Fill of Posthole [1017] . Filled with mid grey brown, silty clay with small sub-angular pebble inclusions.	Fill of Posthole [1017]	Width 0.18m Length 0.20m Depth 0.40m
1017	Cut of Posthole circular in shape with sharp almost vertical sides and tapered to a point at the base. Post preserved in situ: wood no D0162 . Filled with (1016) .	Cut of Posthole	Width 0.18m Length 0.20m Depth 0.40m
1020	Fill of Posthole [1021] . Filled with Brown-grey, Clay – silt.	Fill of Posthole [1021]	Width 0.12m Length 0.11m Depth 0.25m
1021	Cut of Posthole circular shape in plan with vertical sides. Post preserved in situ: wood no D004/D0169 . Filled with (1020) .	Cut of Posthole	Width 0.12m Length 0.11m Depth 0.25m
1022	Fill of Posthole [1023] . Filled with Brown-grey, clay silt with small sub-angular pebble inclusions.	Fill of Posthole [1023]	Width 0.13m Length 0.12m Depth 0.60m
1023	Cut of Posthole Circular shape in plan with steep vertical sides. Post preserved in situ at base: wood no D003 .	Cut of Posthole	Width 0.13m Length 0.12m Depth 0.60m
1024	Fill of Posthole [1025]. Filled with Grey/brown, Clay-silt with some small sub-rounded pebble inclusions.	Fill of Posthole [1025]	Width 0.17m Length 0.22m Depth 0.25m
1025	Cut of Posthole oval on shape with sharp steep sides and a rounded base. Filled with (1024) Post preserved in situ: wood no D007 . adjacent to (but not truncating) Stakehole [1039] .	Cut of Posthole	Width: 0.17m Length: 0.22m Depth: 0.25m
1026	Fill of Posthole [1027] . Brown-grey, clay silt with some inclusions of small sub-rounded pebbles.	Fill of Posthole [1027]	N-S: 0.17m E-W: 0.18m Depth: 0.25m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1027	Cut of Posthole with vertical steep sides. Base unknown as post driven into base but tapering to a point. Wood number D005 . Filled with (1026)	Cut of Posthole	N-S: 0.17m E-W: 0.18m Depth: 0.25m
1028	Fill of Posthole [1029]. Dark grey-brown clay silt. Post preserved in situ at the base: wood no. D002	Fill of Posthole [1029]	Width 0.20m Length 0.15m Depth 0.50m
1029	Cut of Posthole. Circular in shape with sharp steep vertical sides and tapering to a point. Post in situ: wood No D002 . Filled with (1028) .	Cut of Posthole	Width 0.20m Length 0.15m Depth 0.50m
1030	Fill of Posthole [1031] . Dark blackish-brown, Clay silt no inclusions but evidence of some root action.	Fill of Posthole [1031]	Width 0.12m Length 0.25m Depth 0.04m
1031	Cut of Posthole. Shape roughly circular with gentle sloping sides and gentle break of slope to an Irregular base. Filled with (1030) .	Cut of Posthole	Width 0.12m Length 0.25m Depth 0.04m
1032	Cut of posthole. Oval and irregular in shape. Sides uneven to east sides are vertical and to north of the feature irregular undulating sides breaking to uneven base. Filled with (1033) .	Cut of Posthole	Width 0.46m Length 0.41m Depth - 0.21m
1033	Fill of Posthole [1032] . Mixed fill, which varies from firm to loose, Mottled grey-brown-orange silt. Small pieces (flecks) of wood and a few rounded pebbles and two unworked flint pebble inclusions.	Fill of Posthole [1032] or natural feature	Width 0.46m Length 0.41m Depth 0.21m
1034	Fill of Posthole [1035] . Mid blackish brown clay silt, with inclusions of small frequent fragments of wood.	Fill of Posthole [1035]	Width 0.23m Length 0.17m Depth 0.12m
1035	Cut of Posthole, circular in shape with moderately steep sides. Base is slightly concave which then tapers to a point. Filled with (1034) , feature truncates E-W ditch feature [1070] .	Cut of Posthole	Width 0.23m Length 0.17m Depth 0.12m
1036	Fill of Posthole [1037] . Moderately loose, mid orange-brown, sandy silt with inclusions of occasional small sub-rounded pebbles.	Fill of Posthole [1037]	Width 0.25m Length 0.16m Depth 0.09m
1037	Cut of Posthole circular in shape. Sides are slightly concave breaking into a gradual flat base. Filled with (1036) , feature adjacent to E-W ditch feature [1070] .	Cut of Posthole	Width 0.25m Length 0.16m Depth 0.09m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1038	Fill of Stakehole [1039] . Moderately compacted grey/brown, clay/silt with Occasional round pebbles.	Fill of Stakehole [1039]	Width 0.06m Length 0.13m Depth 0.09m
1039	Cut of Stakehole rectangular in shape with Concave sides stepped on the west side. Gradually sloping to a vertical base. Filled with (1038) , adjacent to (but not truncating) Posthole [1025] .	Cut of Stakehole	Width 0.06m Length 0.13m Depth 0.09m
1040	Fill of Posthole [1041] . Mid brown/grey sandy silt with some inclusions of wood fragments. Post still in situ: wood No D006.	Fill of Posthole [1041]	Width 0.15m Length 0.33m Depth 0.52
1041	Cut of Posthole sub –circular in shape with vertical sides tapering to a base. Post in situ: wood No D006 . Filled with (1040) , adjacent to Posthole [1163] .	Cut of Posthole	Width 0.15m Length 0.33m Depth 0.52
1042	Fill of Posthole [1043] . Moderately compacted mid-brown, clay –silt.	Fill of Posthole [1043]	Width 0.18m Length 0.10m Depth 0.24m
1043	Cut of Posthole circular in shape with Steep sides tapering to a point. Filled with (1042) .	Cut of Posthole	Width 0.18m Length 0.10m Depth 0.24m
1044	Fill of Posthole [1045] . Moderately compact mid-brown, clay-silt with inclusions of small sub-rounded pebbles.	Fill of Posthole [1045]	Width 0.10m Length 0.14m Depth 0.05m
1045	Cut of Posthole sub-circular in shape with steep almost vertical sides with a rounded base. Filled with (1044) .	Cut of Posthole	Width 0.10m Length 0.14m Depth 0.05m
1046	Fill of Posthole [1047] . Moderately compacted mid- brown, clay-silt with occasional sub-rounded pebbles.	Fill of Posthole [1047]	Width 0.14m Length 0.10m Depth 0.35m
1047	Cut of Posthole circular in shape with vertical sharp sides, which tapers to a point. Filled with (1046) .	Cut of Posthole	Width 0.14m Length 0.10m Depth 0.35m
1048	Fill of Posthole [1049] . Moderately compacted brown/grey, clay silt. Post still in situ: wood No D008 .	Fill of Posthole [1049]	Width 0.13m Length 0.13m Depth 0.48m
1049	Cut of Posthole. Circular in shape with vertical sides tapering to a point. Post preserved in situ: wood No D008 . Filled with (1048) .	Cut of Posthole	Width 0.13m Length 0.13m Depth 0.48m
1050	Fill of Posthole [1051] . Moderately compact brown-grey, clay-silt.	Fill of Posthole [1051]	Width 0.20m Length 0.16m Depth: 0.44m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1051	Cut of Posthole. Circular in shape with vertical sides and sharp tapered point at the base. Preserved post still in situ: wood No D0167 . Filled with (1050) .	Cut of Posthole	Width 0.20m Length 0.16m Depth: 0.44m
1052	Fill of Posthole [1053] . Moderately compact with black/brown and orange silt.	Fill of Posthole [1053]	Width 0.23m Length 0.23m Depth 0.17m
1053	Cut of Posthole. Circular in shape with vertical sides and a flat base. Filled with (1052) and (1077) , and truncating E-W ditch feature [1070] .	Cut of Posthole	Width 0.23m Length 0.23m Depth 0.17m
1054	Fill of Stakehole [1055] . Grey brown silty clay, moderately compact, with occasional pebbles.	Fill of Stakehole	Width 0.11m Length 0.12m Depth 0.17m
1055	Cut of Posthole. Sharp, Vertical, Vertical sides, filled by (1054) .	Cut of Posthole. Wood in situ	Width 0.11m Length 0.12m Depth 0.17m
1056	Fill of Stakehole [1057] . Loose to moderate brown-grey, clay silt with inclusions of small sub-rounded pebbles.	Fill of Stakehole [1057]	Width 0.11m Length 0.12m Depth 0.40m
1057	Cut of Stakehole. Circular in shape with sharp vertical sides which rounds to a concave base. Filled with (1056) .	Cut of Stakehole	Width 0.11m Length 0.12m Depth 0.40m
1058	Fill of Posthole [1059] . Moderately compact brown-grey, clay silt. No inclusions.	Fill of Posthole [1059]	Width 0.23m Length 0.22m Depth 0.15
1059	Cut of Stakehole. Oblong in shape with rounded corners. Concave sides with a gentle break of slope and a flat base. Filled with (1058) .	Cut of Stakehole	Width 0.23m Length 0.22m Depth 0.15
1060	Fill of Stakehole [1061] . Moderately compact mid grey –brown silt. No inclusions.	Fill of Stakehole [1061]	Width 0.11m Length 0.06m Depth 0.15
1061	Cut of Stakehole. Circular in shape with concave sides and a sharp break of slope. Filled with (1060) . Adjacent to (but not truncating) Posthole feature [1005] .	Cut of Stakehole	Width 0.11m Length 0.06m Depth 0.15
1062	Fill of Stakehole [1063] . Moderately compact mid-grey, brown silt. Some charcoal flecks and small sub-angular pebble inclusions.	Fill of Stakehole [1063]	Width 0.08m Length 0.06m Depth 0.05m
1063	Cut of Stakehole. Circular in shape with sharp, vertical sides and rounded base. Filled with (1062) . Adjacent to (but not truncating) Posthole feature [1041] .	Cut of Stakehole	Width 0.08m Length 0.06m Depth 0.05m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1064	Fill of Posthole [1065] . Moderately compact mid orange-brown, clay silt.	Fill of Posthole [1065]	Width 0.19m Length 0.19m Depth 0.17m
1065	Cut of Posthole. Circular in shape with steep, vertical sides. In situ wooden post: wood No. D0163 Filled with (1064) .	Cut of Posthole	Width 0.19m Length 0.19m Depth 0.17m
1066	Fill of Posthole [1067] . Moderately compact mid-brown, clay silt with occasional sub-rounded pebbles.	Fill of Posthole [1067]	Width 0.24m Length 0.22m Depth 0.07m
1067	Cut of Posthole. Circular in shape and very shallow very gently sloping with undulating base. Post preserved in situ: wood No. D0171 . Filled by (1066) .	Cut of Posthole	Width 0.24m Length 0.22m Depth 0.07m
1068	Fill of Posthole [1069] . Mid brown clay silt, with occasional sub-rounded pebbles.	Fill of Posthole [1069]	Width 0.40m Length 0.41m Depth 0.21m
1069	Cut of Posthole. Circular in shape, with vertical sides and a flat based. Preserved post in situ: wood No. D0168 .	Cut of Posthole	Width 0.40m Length 0.41m Depth 0.21m
1070	Cut of East-West running ditch. Linear feature with concave sharp sides and with an uneven base. Not fully excavated, partially excavated in slots. Filled with (1071) and (1072) , and truncated by Postholes [1035] , [1021] and [1053] .	Cut of Ditch Slot D1	Width 0.80m Length 0.70m (slot length) Depth 0.20m
1071	Secondary Fill of East-West linear ditch [1070] comprising relatively loose, dark grey brown silty clay, including occasional stones. This deposit recorded in Slot 1 and is the same as [1114] , [1117] , [1118]	Secondary Fill of Ditch Slot D1 [1070]	Width 0.80m Length 0.70m (slot length) Depth 0.12m
1072	Primary Fill of East-West linear ditch [1070] comprising relatively very light orange grey mottled silty clay. This deposit was recorded in Slot 1 and is the same as [1119] and [1115] .	Fill of Ditch Slot 1 [1070]	Width 0.80m Length 0.70m (slot length) Depth 0.12m-0.04m
1073	Fill of Pit [1074] . Mid grey, with orange mottling, silty clay, with occasional sub-rounded pebbles.	Fill of Pit [1074]	Width 1.40m Length 1.41m Depth 0.15m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1074	Cut of large shallow pit, circular in shape with gradually sloping sides, and a flat base. The feature was adjacent to the limit of excavation on the eastern side of the trench, and had been truncated by a test pit associated with earlier investigations. Filled by (1073) .	Cut of Pit	Width 1.40m Length 1.41m Depth 0.15m
1075	Fill of Posthole [1076] . Dark black brown clay silt. Occasional gravel, charcoal.	Fill of Posthole [1076]	Width 0.31m Length 0.31m Depth 0.15m
1076	Sharp sides, and a sharp break of slope.	Cut of Posthole	Width 0.31m Length 0.31m Depth 0.15m
1077	Secondary deposit filling Posthole [1053] . Mid Brown, poorly humified deposit, likely to be the result of a partially decayed post.	Fill of Posthole [1053]	Width 0.06m Length 0.08m Depth 0.17m
1078	Fill of Posthole [1079] . Loose Dark/Medium Black-Brown silt with the Occasional Remains of Wood and charcoal flecks.	Fill of Posthole [1079]	Width 0.21m Length 0.20m Depth 0.15m
1079	Cut of Posthole. Circular in shape with sharp concave sides and a rounded base. Filled with (1078) .	Cut of Posthole	Width 0.21m Length 0.20m Depth 0.15m
1080	Fill of Stakehole [1081] . Mid brown- grey, silty clay. No inclusions.	Fill of Stakehole [1081] .	Width 0.04m Length 0.04m Depth 0.08m
1081	Cut of Stakehole. Circular in shape, sharp break of slope with a concave base tapered to a point. Filled with (1080) .	Cut of Stakehole	Width 0.04m Length 0.04m Depth 0.10m
1082	Fill of Stakehole [1083] . Mid brown- grey, silty clay. No inclusions.	Fill of Stakehole [1083]	Width 0.02m Length 0.03m Depth 0.05m
1083	Cut of Stakehole. Circular in shape, sharp break of slope with steep sides and a concave base tapered to a point. Filled with (1082) .	Cut of Stakehole	Width 0.02m Length 0.03m Depth 0.05m
1084	Fill of Stakehole [1085] . Mid grey- brown, silty clay. No inclusions.	Fill of Stakehole [1085]	Width 0.06m Length 0.06m Depth 0.13m
1085	Cut of Stakehole. Circular in shape with steep sides and tapered to a point. Filled with [1085] .	Cut of Stakehole	Width 0.06m Length 0.06m Depth 0.13m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1088	Fill of Stakehole [1089] , Soft, medium brown silty clay	Fill of Stakehole [1089]	Width 0.11m Length 0.12m Depth 0.09m
1089	Sharp break of slope. Tapered to a point.	Cut of Stakehole	Width 0.11m Length 0.12m Depth 0.09m
1090	Cut of Posthole. Circular in shape gentle concave sides with a rounded base. Filled with (1091) .	Cut of Posthole	Width 0.17m Length 0.18m Depth 0.20m
1091	Fill of Posthole [1090] . Mid Brown-grey clay silt with inclusions of charcoal flecks and sub-rounded pebbles.	Fill of Posthole [1090]	Width 0.17m Length 0.18m Depth 0.20m
1092	Fill of Stakehole [1093] . Moderate compaction grey mid-brown sandy silt, with flint and pebble inclusions.	Fill of Stakehole [1093]	Width 0.11m Length 0.11m Depth 0.07m
1093	Cut of Stakehole. Circular in shape with steep, sharp concave sides and a rounded base. Filled with (1092) .	Cut of Stakehole	Width 0.11m Length 0.11m Depth 0.07m
1094	Fill of Posthole [1095] . Loose compaction of medium to dark grey sandy silt. Some charcoal flecks and occasional small rounded pebbles.	Fill of Posthole [1095]	Width 0.15m Length 0.15m Depth 0.08m
1095	Cut of Posthole. Circular in shape with vertical sides and a curved base. Filled with (1094) .	Cut of Posthole	Width 0.15m Length 0.15m Depth 0.08m
1096	Fill of Posthole [1097] . Moderately compact dark brown, silty clay.	Fill of Posthole [1097]	Width 0.15m Length 0.20m Depth 0.15m
1097	Cut of Posthole. Circular in shape with vertical sides. Flat base and curved break of slope. Filled with (1096) .	Cut of Posthole	Width 0.15m Length 0.20m Depth 0.15m
1098	Fill of posthole [1099] . Loose brown silty sand. Very occasional small sub-rounded pebbles.	Fill of Posthole [1099]	Width 0.20m Length 0.15m Depth 0.11m
1099	Cut of Posthole. Sub circular in shape. The sides vary with north-side sloping 30 degrees with vertical sides on the south. Rounded at the base. Preserved post in situ: wood No. D0166 . Filled with (1098) .	Cut of Posthole	Width 0.20m Length 0.15m Depth 0.11m
1100	Fill of Posthole [1101] . Moderate compaction of mid blackish- brown, silt clay. With very occasional fragments of decayed wood.	Fill of Posthole [1101]	Width 0.12m Length 0.12m Depth 0.20m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1101	Cut of Posthole. Circular in shape with steep concave sides and rounded base. Filled with (1100) .	Cut of Posthole	Width 0.12m Length 0.12m Depth 0.20m
1102	Fill of Posthole [1103] . Moderately compact mid black- brown, silt clay. Moderate charcoal flecks.	Fill of Posthole [1003]	Width 0.09m Length 0.25m Depth 0.04m
1103	Cut of Posthole. Sub-circular in shape with gradually sloping sides and a gentle break of slope to a flat base. Filled with (1002) .	Cut of Posthole	Width 0.09m Length 0.25m Depth 0.04m
1106	Fill of Posthole [1107] . Firm dark-brown, silty clay. Occasional charcoal flecks.	Fill of Posthole [1107]	Width 0.19m Length 0.19m Depth 0.14m
1107	Cut of Posthole. Circular in shape with sharp vertical sides and a tapered base. Filled with (1106) , and truncated by test pit from earlier investigation.	Cut of Posthole	Width 0.19m Length 0.19m Depth 0.14m
1108	Fill of Stakehole [1109] . Firm medium grey- brown, silty clay. Inclined post in situ: wood No D0122 .	Fill of Posthole [1109]	Width 0.06m Length 0.09m Depth 0.12m
1109	Cut of Stakehole. Sub-circular in shape with sharp sides and sharp break of slope. Inclined post preserved in situ: wood No D0122 . Filled with (1108) .	Cut of Posthole	Width 0.06m Length 0.09m Depth 0.12m
1110	Fill of Posthole [1111] . Loose dark brown fibrous organic material (decayed wood) with orange, sandy material at base.	Fill of Posthole [1111]	Width 0.22m Length 0.23m Depth 0.20m
1111	Cut of Posthole. Circular shaped in plan but becoming rhomboid leading to a point. SE side concave with NW side sharp tapering to a pointed base. Filled with (1110) .	Cut of Posthole	Width 0.22m Length 0.23m Depth 0.20m
1112	Fill of Posthole [1113] . Soft dark brown decayed wood fragments leading to moderately compact grey silty-clay.	Fill of Posthole [1113]	Width 0.16m Length 0.14m Depth 0.06m
1113	Cut of Posthole. Circular in shape with steep vertical sides and rounded base. Filled with (1112) .	Cut of Posthole	Width 0.16m Length 0.14m Depth 0.06m
1114	Secondary Fill of Linear East -West Ditch in slot 3 [1116] . Dark grey-brown, silty clay. Moderate charcoal and rounded pebbles with occasional fragments of desiccated organic material. Upper fill of ditch (Slot 3) recorded as [1116] , [1119] and [1071] .	Secondary Fill of ditch slot 3 [1116]	Width 0.72m Length 0.89m Depth 0.17m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1115	Primary Fill of Linear East-West ditch (slot 3) recorded as cut [1111] . Mid grey-brown silt with occasional charcoal, moderate organic matter, occasional stones and gravel.	Primary Fill of ditch slot 3 [1116]	Width 0.72m Length 0.59m Depth 0.21m
1116	Cut of Ditch slot 3 in Linear East-West ditch. Truncation of this feature by posts and postholes associated with the post alignment. Rough profiles may be a result of animal intrusion and burrows. Filled with (1114) and (1115) .	Cut of ditch (slot 3)	Width 0.72m Length 0.89m Depth 0.36m
1117	Upper Fill of ditch [1119] (slot 3). Recorded in east facing section following removal of backfill from 2003 excavation. Moderately compact dark grey-brown, silty clay.	Fill of ditch [1119]	Width 0.78m Depth 0.22m
1118	Secondary Fill of ditch [1119] (slot 2) exposed following removal of backfill from 2003 excavations. Moderately compact dark-grey/black, silty clay. Occasional charcoal, gravel and organics	Fill of ditch [1119]	Width 0.77m Depth 0.11m
1119	Second slot in Ditch D1 (slot 2) recorded following removal of backfill from 2003 excavation. Therefore exposing previous excavations in 2003 and re-recording profile. Cut is gradual in places and sharp in others with an undulating base. Filled with (1117) and (1118) .	Cut of ditch (slot 2)	Width 0.8m Depth 0.32m
1122	Fill of posthole [1123] . Compact light brown, silty clay. Infrequent small pebbles.	Fill of Posthole [1123]	Width 0.19m Length 0.14m Depth 0.08m
1123	Cut of Posthole. Oval/sub-circular in shape with gradual sloping sides with flat horizontal base. Filled with (1122) .	Cut of posthole	Width 0.19m Length 0.14m Depth 0.08m
1124	Fill of Posthole [1125] . Shape of the fill excavated suggests that a post could have been pulled out diagonally or that the feature could possibly be an animal burrow. Moderate to loose mid grey-brown silt. Inclusions of small rounded pebbles and organic plant material.	Fill of posthole [1125]	Width 0.06m Length 0.08m Depth 0.28m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1125	Cut of Posthole. The cut also suggests that an extant post could have been removed at an angle or may also be an animal burrow. Steep almost vertical sides gradually becoming more concave at the base. Filled with (1124) .	Cut of Posthole	Width 0.06m Length 0.08m Depth 0.28m
1128	Fill of Posthole [1129] . Firm mid grey, silty clay with occasional small rounded pebbles.	Fill of Posthole [1129]	Width 0.15m Length 0.15m Depth 0.17m
1129	Cut of Posthole. Oval in shape with sharp sides and an angular rounded base. Filled by (1128) .	Cut of Posthole	Width 0.15m Length 0.15m Depth 0.17m
1130	Fill of Posthole [1131] . Moderate to firm mid grey-brown, silty clay.	Fill of Posthole [1131]	Width 0.15m Length 0.15m Depth 0.07m
1131	Cut of Posthole. Circular in shape with steep vertical sides and a flat base. Filled with (1130) .	Cut of Posthole	Width 0.15m Length 0.15m Depth 0.07m
1132	Fill of Posthole [1133] . Moderately compact mid grey-brown, silty clay with occasional charcoal flecks.	Fill of Posthole [1133]	Width 0.32m Length 0.17m Depth 0.11m
1133	Cut of Posthole. Irregular shape in plan and profile – undulating sides and base suggesting that a post may have been replaced or removed in antiquity. Filled with (1132) .	Cut of Posthole	Width 0.32m Length 0.17m Depth 0.11m
1134	Fill of Posthole [1135] . Not fully Excavated extent not reached. Compact dark grey-brown, silty clay. Inclusions of occasional charcoal and small rounded stones.	Fill of Posthole [1135]	Width 0.13m Length 0.12m Depth 0.25m (max)
1135	Cut of Posthole. Circular in shape with vertical sides and tapered to a point at the base. Preserved post in situ: wood No. D0165 . Filled with (1134) .	Cut of Posthole	Width 0.13m Length 0.12m Depth 0.25m
1136	Fill of Posthole [1137] . Compact mid grey-brown, silty clay. No inclusions.	Fill of Posthole [1137]	Width 0.13m Length 0.12m Depth 0.25m
1137	Cut of Posthole. Circular in shape with vertical sides and sharp break of slope and flat base. Filled with (1136) .	Cut of Posthole	Width 0.13m Length 0.12m Depth 0.25m
1138	Fill of feature [1139] . Moderately compact mid-brown, sandy silt. Some bioturbation and occasional sub-rounded pebbles.	Fill of natural feature [1138] .	Width 0.12m Length 0.15m Depth 0.12m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1139	Possible cut of posthole. During excavation it was evident from irregular and undulating sides and base that this was a naturally formed feature.	Natural feature	Width 0.12m Length 0.15m Depth 0.12m
1140	Fill of Stakehole [1141]. Compact mid grey-brown, silty clay.	Fill of Stakehole [1141]	Width 0.08m Length 0.08m Depth 0.18m
1141	Cut of Stakehole. Circular in plan with sharp vertical sides. Base is unknown due to full extent not reached during excavation. Filled with (1140).	Cut of Stakehole	Width 0.08m Length 0.08m Depth 0.18m
1142	Fill of Posthole [1143]. Firm mid grey-brown, silty clay with occasional inclusions of charcoal flecks and moderate flint pebbles.	Fill of Posthole [1143]	Width 0.17m Length 0.17m Depth 0.23m
1143	Cut of circular posthole with sharp vertical sides with base tapered to a point. Filled with (1142).	Cut of Posthole	Width 0.17m Length 0.17m Depth 0.23m
1144	Fill of Stakehole [1145]. Compact mid grey-brown, silty clay with inclusions of occasional charcoal flecks and sub-angular pebbles.	Fill of Stakehole [1145]	Width 0.06m Length 0.07m Depth 0.05m
1145	Cut of Stakehole. Sub-oval in shape with sharp break at top, vertical sides a concave break of slope with a flat base. Filled with (1145).	Cut of Stakehole	Width 0.06m Length 0.07m Depth 0.05m
1146	Fill of Stakehole [1147]. Mid brown sandy silt, occasional charcoal flecks.	Fill of Posthole [1147]	Width 0.11m Length 0.13m Depth 0.07m
1147	Cut of Stakehole. Circular in plan, with steep concave sides with a rounded base. Filled with (1146).	Cut of Stakehole	Width 0.11m Length 0.13m Depth 0.07m
1148	Cut of Posthole. Circular in plan with gradually sloping concave sides and rounded at the base. Filled with (1149).	Cut of Posthole	Width 0.25m Length 0.23m Depth 0.13m
1149	Fill of Posthole [1148]. Moderately compact dark brown- yellow, sandy silt. With inclusions of occasional flint and wood fragments.	Fill of Posthole [1148]	Width 0.25m Length 0.23m Depth 0.13m
1150	Fill of Posthole [1151]. Moderate to loose mid brown, sandy silt with inclusions of occasional charcoal flecks.	Fill of Posthole [1151]	Width 0.17m Length 0.15m Depth 0.42m

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1151	Cut of Posthole. Circular in shape with concave sides and, sharp break of slope with a rounded base. Filled with (1150) .	Cut of Posthole	Width 0.27m Length 0.15m Depth 0.42m
1152	Fill of Posthole [1153] . Loose mid black-brown, sandy silt. In situ decomposed post still present however fragments of the wood are very fragile and degraded.	Fill of Posthole [1153]	Width 0.18m Length 0.17m Depth 0.18
1153	Cut of Posthole. Circular shape in plan with vertical sides tapering to the base. Base is unknown as unable to fully excavate due to steep incline of axis. Filled with (1152) . Preserved post in situ: wood no. D0164	Cut of Posthole	Width 0.18m Length 0.17m Depth 0.18
1156	Fill of Posthole [1157] . Moderate mid brown, sandy silt. With inclusions of occasional charcoal flecks and sub-angular pebbles.	Fill of Posthole [1157]	Width 0.16m Length 0.17m Depth 0.40m
1157	Cut of Posthole. Sub-circular in plan with sharp vertical sides and tapering to a point at the base. Filled with (1156) .	Cut of Posthole	Width 0.16m Length 0.17m Depth 0.40m
1158	Primary Fill of ditch [1159] recorded in slot 4. Moderately compact dark brown, silty sand with charcoal deposits and inclusions of small sub-angular to rounded pebbles.	Primary Fill of Ditch [1159] in slot 2	Width 0.70m Length 0.90m Depth 0.30m
1159	Cut of E-W linear ditch recorded in slot 2. Profile of cut gently sloping north, mirroring the southern part of the feature, with gradual sloping concave sides. Sharp break of slope to a flat horizontal base. Filled with (1158) , and (1160) . Context same as [1070] , [1116] and [1119]	Cut of ditch in slot 2	Width 0.70m Length 0.90m Depth 0.30m
1160	Secondary Fill of East-West linear ditch [1070] comprising relatively loose, dark grey brown silty clay, including occasional stones. This deposit recorded in Slot 2 and is the [1071] , [1114] , [1117] , [1118]	Secondary Fill of Ditch [1159] in slot 2	Width 0.70m Length 0.90m Depth 0.10m
1161	Fill of Posthole [1167] . Moderate to loose grey-brown, sandy silt.	Fill of Posthole	Width 0.19m Length 0.19m Depth 0.14

Trench 1	Dimensions: 20m x 4m / Max. Depth 0.60m+ (0.7m AOD)		
	Orientation: NW-SE		
	Reason for Trench: to define archaeological features on the Northey fen edge		
Context	Description	Interpretation/ Process of deposition	Dimensions (m)
1163	Fill of Posthole [1164] . Moderate to loose grey-brown, sandy silt. Degraded and fragile wood post found in situ.	Fill of Posthole	Width 0.22m Length 0.18m Depth 0.20m
1164	Cut of Posthole. Circular in shape with sharp vertical sides and rounded to a point at the base. Filled with (1163) . Feature truncates [1041] .	Cut of Posthole	Width 0.22m Length 0.18m Depth 0.20m
1165	Cut of Posthole. Sub-circular in plan, with steep vertical sides with a sharp break of slope into a v-shaped base. Filled with (1166) .	Cut of Posthole	Width 0.23m Length 0.26m Depth 0.24m
1166	Fill of Posthole [1165]. Moderately compact, mid grey-brown, silty clay. No inclusions.	Fill of Posthole [1165]	Width 0.23m Length 0.26m Depth 0.24m
1167	Cut of Posthole. Circular in shape, steep concave sides with a sharp break of slope. Base not fully reached due to steep tapering and wood post found in Situ - DO170 .	Cut of Posthole	Width 0.19m Length 0.19m Depth 0.14
1168	Moderate to firm compaction. A mid brown – grey, sandy silt mottled with yellow flecks. Possible up-cast earthen bank created alongside ditch [1070] , however, has not been excavated by hand only picked up in section.	Up-cast Bank associated with ditch [1070]	Width unknown Length 1.80m (N-S) Depth 0.20m Only recorded in section not fully excavated.
1169	Deposit of dark brown-black, silty sand with frequent charcoal and wood fragments. Deposit unknown in function due to the fact that it was not hand excavated and only picked up in section during recording. Truncated by ditch [1070] .	Charcoal Rich Deposit	Width unknown Length 1.80m (N-S) Depth 0.15m Only recorded in section not fully excavated.

Trench 2	Dimensions: 15m x 2m (base)/Max. Depth 0.80m (1.2m AOD)		
	Orientation: NW-SE		
	Reason for Trench: define the extent of archaeological activity predating the post alignment		
Context	Description	Interpretation/Process of deposition	Dimensions (m)
2000	Mid brown, coarse sandy silt, with a loose compaction, and occasional inclusions of small stones.	Top Soil	0.0-0.40m
2001	Mid orange, medium sand, firm and compacted. Most probably re-deposited gravel during the cleaning of the adjacent Mustdyke, and recent in origin.	Deposit	0.40-0.60m
2002	Deposit of Mid / Dark Brown, medium coarsen sand, with occasional small stone and gravel inclusions. 30 cm Alluvial Clay. Re-deposited Alluvial Clay - Deposited during cleaning of the adjacent Mustdyke.	Deposit	0.40-0.70m
2003	Re-deposited Gravel. Light orange yellow, medium sand, frequent small stones. 10cm. Re-deposited Gravel, deposited during mechanical excavation of the adjacent Mustdyke.	Deposit	0.70-0.80m
2004	Palaeosol, comprising a former topsoil layer preserved by burial underneath re-deposited gravel and alluvium during the scouring of the adjacent Mustdyke. Deposit consists of compact and desiccated, dark brown coarse silty sand.	Deposit	0.75-0.95m
2005	Desiccated Peat deposit. Firm black-brown desiccated peat. Very dry.	Deposit	0.9-1.10m
2006	Palaeosol, comprising a former land surface observed in other parts of the Northey and Fengate 'shoreline', formed in situ immediately prior to the on-set of peat formation and accumulated organic deposits. Deposit excavated in grids and coarse sieved for artefacts, consisting of firm dark grey-brown, sandy silt with frequent gravel inclusions. The Upper horizon truncated by possible trample marks [2016].	Deposit	1.5m+
2007	Deposit of mid grey, silty clay. Inclusions of moderate charcoal flecks and gravel.	Fill of [2008]	Width 0.13 Length 0.13 Depth 0.04m
2008	Cut of shallow pit feature in palaeosol deposit (2006), could be a natural feature, no finds recovered, and filled by deposit (2007).	Cut of Pit	Width 0.13m Length 0.13m Depth 0.04m

Trench 2	Dimensions: 15m x 2m (base)/Max. Depth 0.80m (1.2m AOD)		
	Orientation: NW-SE		
	Reason for Trench: define the extent of archaeological activity predating the post alignment		
Context	Description	Interpretation/Process of deposition	Dimensions (m)
2009	Fill of Pit [2010] . Compact mid grey, silty clay. Moderate Gravel inclusions and occasional charcoal flecks/fragments.	Fill of Pit	Width 0.19m Length 0.19m Depth 0.05m
2010	Cut of Pit. Impression within ancient soil horizon (2006) forming possible rotting or trample marks. Filled with (2009).	Cut of Pit	Width 0.19m Length 0.19m Depth 0.05m
2011	Fill of [2012] . Mid grey silt clay with moderate gravel inclusions.	Fill of Pit [2012]	Width 0.18m Length 0.21m Depth 0.05m (100% excavated)
2012	Cut of Pit. Irregular sub- oval in shape. Gradual break of slope top, gentle concaved side to a rounded base. Truncates (2006). Filled with (2011) .	Cut of Pit	Width 0.18m Length 0.18m Depth 0.05m
2013	Fill of [2014] . Firm mid grey, silty clay. No inclusions.	Fill of Pit [2014]	Width 0.17m Length 0.20m Depth 0.07m
2014	Cut of shallow Pit. 'Trample'. Irregular in shape with rounded corners. Sides are steep and sharp sloping towards the south. Filled with (2013) .	Cut of Pit	Width 0.17m Length 0.20m Depth 0.07m
2015	Fill of [2016] . Mid grey silty clay. With moderate gravel and charcoal inclusions.	Fill of Pit [2016]	Width 0.19m Length 0.11m Depth 0.06m
2016	Cut of shallow Pit with irregular undulating sides and base. Filled with (2015) .	Cut of Pit	Width 0.19m Length 0.11m Depth 0.06m
2017	Deposit of Desiccated Peat localised to one are within section. Firm compaction, dark-mid orange in colour. Deposit could be the same as (2018) , with only slight colour difference to separate the two. Decreases in size to the south. Excavated by machine and recorded in section.	Deposit	Width Unknown Length 0.24m (N-S) Depth 0.08m
2018	Deposit of Desiccated Peat. Firm compaction, dark orange in colour, extending across the full length of the trench and visible in all sections. Excavated by Machine and recorded in section.	Deposit	1.1-1.3m

Trench 2	Dimensions: 15m x 2m (base)/Max. Depth 0.80m (1.2m AOD)		
	Orientation: NW-SE		
	Reason for Trench: define the extent of archaeological activity predating the post alignment		
Context	Description	Interpretation/Process of deposition	Dimensions (m)
2019	Deposit of Desiccated Peat. Firm compact dark grey peat, with inclusions of occasional small stones and charcoal flecks. Extending across the full length of the trench, this deposit was excavated by Machine and recorded in all sections.	Deposit	1.3-1.5m
2020	Cut of Posthole. Circular in shape with sharp sides and a concave pointed base. Filled with (2021) .	Cut of Posthole	Width 0.16m Length 0.15m Depth 0.04m
2021	Fill of Posthole [2020] . Loose Soft, mid grey-brown, sandy silt. No inclusions.	Fill of Posthole [2020]	Width 0.16m Length 0.15m Depth 0.04m
2022	Cut of Posthole. Circular in shape with vertical sides and sharp break of slope. Base tapers to a point. Filled with (2023) .	Cut of Posthole	Width 0.10m Length 0.14m Depth 0.38m
2023	Fill of Posthole [2022] . Moderately compact brown-black, clay silt. Inclusions of charcoal flecks.	Fill of Posthole [2022]	Width 0.10m Length 0.14m Depth 0.38m
2024	Cut of Pit. Small irregular shaped pit, edges are not clearly defined. Sharp incline at Northern end and gradually sloping at East end. Base is irregular. Filled with (2025) .	Cut of Pit	Width 0.28m Length 0.36m Depth 0.06m
2025	Fill of [2024]. Dark brown silt with inclusions of small rounded pebbles and charcoal fragments.	Fill of Pit [2024]	Width 0.28m Length 0.36m Depth 0.06m
2026	Cut of shallow Posthole. Circular in shape, concave sides with a gradual break of slope and rounded at the base. Filled with (2027) .	Cut of Posthole	Width 0.13m Length 0.13m Depth 0.02m
2027	Fill of Posthole [2026] . Loose black-grey sand. No inclusions.	Fill of Posthole [2027]	Width 0.13m Length 0.13m Depth 0.02m
2028	Cut of Pit. Circular in shape, with concave sharp sides and a flat base. Filled with (2029) , containing eleven struck flints.	Cut of Pit	Width 0.20m Length 0.46m Depth 0.26m
2029	Fill of Pit [2028] . Loose mid grey-brown, silty gravel.	Fill of Pit [2028]	Width 0.20m Length 0.46m Depth 0.26m
2030	Cut of Posthole. Circular in shape with vertical sides, sharp break of slope and flat base. Filled by (2031) .	Cut of Posthole	Width 0.13m Length 0.15m Depth 0.04m

Trench 2	Dimensions: 15m x 2m (base)/Max. Depth 0.80m (1.2m AOD)		
	Orientation: NW-SE		
	Reason for Trench: define the extent of archaeological activity predating the post alignment		
Context	Description	Interpretation/Process of deposition	Dimensions (m)
2031	Fill of [2030]. Dark grey, sandy silt with inclusions of sub angular flint.	Fill of Posthole [2030]	Width 0.13m Length 0.15m Depth 0.04m
2032	Cut of Stakehole. Circular in shape, sharp sides and sharp break of slope to a flat base. Filled with (2033).	Cut of Stakehole	Width 0.12m Length 0.11m Depth 0.13m
2033	Fill of Stakehole [2032]. Loose dark grey, silty sand with inclusions of Sub-angular pebbles.	Fill of Stakehole [2032]	Width 0.12m Length 0.11m Depth 0.13m
2034	Cut of Stakehole. Circular in shape, vertical sides breaking slope to a flat base. Filled with (2035).	Cut of Stakehole	Width 0.06m Length 0.07m Depth 0.08m
2035	Fill of Stakehole [2034]. Loose dark grey, silty sand with inclusions of sub-angular pebbles.	Fill of Stakehole [2034]	Width 0.06m Length 0.07m Depth 0.08m
2036	Cut of Posthole. Irregular in shape with sharp break at slope top, vertical sides and a rounded base. Filled with (2037).	Cut of Posthole	Width 0.19m Length 0.17m Depth 0.25m
2037	Fill of [2036]. Moderately loose, mid yellow- brown, grey silty sand.	Fill of Posthole [2036]	Width 0.19m Length 0.17m Depth 0.25m
2038	Cut of Posthole. Circular in shape, rounded corners, sharp break of slope top, concave sides and a rounded base. Filled with (2039).	Cut of Posthole	Width 0.05m Length 0.16m Depth 0.08m
2039	Fill of Posthole [2038]. Loose grey silty sand. No inclusions.	Fill of Posthole	Width 0.05m Length 0.16m Depth 0.08m

Test Pit 1	Dimensions: 1.5m x 1.5m/Max. Depth 2.20m		
	Orientation: N/A		
	Reason for Test Pit: Assess preservation and presence or otherwise of Flag Fen platform		
Context	Description	Interpretation/Processes of deposition	Depth (m)
3017	Test Pit 1 – Topsoil – dark brown silty clay with occasional sand and small pebbles. Extends across whole test pit, and overlies (3018).	Topsoil	0-0.18m

Test Pit 1	Dimensions: 1.5m x 1.5m/Max. Depth 2.20m		
	Orientation: N/A		
	Reason for Test Pit: Assess preservation and presence or otherwise of Flag Fen platform		
Context	Description	Interpretation/Processes of deposition	Depth (m)
3018	Test Pit 1 - Gravel Deposit 'Made Ground'. Light yellow sandy gravel. Sand and gravel layer laid down over 'made ground' probably for drainage. Part of landscaping, layers of construction for the archaeology park and visitors centre. Extends across whole test pit, and overlies (3019) .	Deposit	0.18-0.28m
3019	Test Pit 1 - 'Made Ground' Deposit. Mixed grey -brown, orange gritty silty clay. No inclusions. Extends across whole test pit, and overlies (3020) .	Deposit	0.28-0.55m
3020	Test Pit 1 - Clay Alluvial Deposit. Light bluish grey, silty clay mottled with orange. Organic inclusions within half of the deposit include moderately small (10mm) snail shells; (30mm) Oyster shells Possibly Post-Roman with oxidization at the base of deposit. Extends across whole test pit, and overlies (3021) .	Deposit	0.55-0.93m
3021	Test Pit 1 - Shelly Clay Deposit. Loose orange brown, coarse sandy silt with frequent shells; molluscs and bi-valves. Possible channel material or high-energy event. Extends across whole test pit, and overlies (3022) .	Deposit	0.93-1.25m
3022	Test Pit 1 - Layer of silt clay overlies natural wood. Moderate red-grey brown, silt clay. Occasional sand and charcoal inclusions with occasional charcoal and animal bone (rodent) fragments. Extends across whole test pit, and overlies (3023) .	Deposit	1.25-1.34m
3023	Test Pit 1 - Possible Alder tree root Deposit. Compressed brown-black wood organics. Extends across whole test pit, and overlies (3024) .	Deposit	1.34-1.41m
3024	Test Pit 1 - Silty Clayey Peat. Mid brownish- grey organic peat –mixed clay silt. Inclusions of occasional small round wood diameter of c.10-20mms, which is seen throughout test pit. Extends across whole test pit, and overlies (3025) with a relatively diffuse horizon.	Deposit	1.41-1.59m

Test Pit 1	Dimensions: 1.5m x 1.5m/Max. Depth 2.20m		
	Orientation: N/A		
	Reason for Test Pit: Assess preservation and presence or otherwise of Flag Fen platform		
Context	Description	Interpretation/Processes of deposition	Depth (m)
3025	Test Pit 1 - Woody Peat Deposit. Dry and compact dark brown-black, Rooty woody silt matrix. May represent drying out of basin so that trees colonise area. Extends across whole test pit, and overlies (3026) .	Deposit	1.59-1.82m
3026	Test Pit 1 - Reedy Peat Deposit. Green brown poorly humified organic silt. Soft lower fen silts, with visible macros, frequent beetles, leaves and reeds. Below the water table. Extends across whole test pit, and overlies (3027) .	Deposit	1.82-2.20m
3028	Test Pit - 1 Blue-grey silty clay. Forming bottom of the Flag Fen basin overlain by reedy silt (3026) .	Deposit	2.20m+

Test Pit 2	Dimensions: 1.5m x 1.5m X m/Max. Depth 1.80m+		
	Orientation: N/A		
	Reason for Test Pit: Assess preservation off platform, adjacent to Must Dyke		
Context	Description	Interpretation/Processes of deposition	Dimensions (m)
3007	Mid-grey, silty clay topsoil, with frequent roots and occasional sub-rounded gravel.	Topsoil	0.00-0.22m
3008	Test Pit 2 - Backfill from previous excavation. In-fill within trench cut [3014]. Possible dyke up-cast or possible spoil from previous archaeological excavation of the Roman Road. Consists of orange, sandy gravel, extending over area of trench defined by previous trench cut [3014] .	Deposit	0.22-0.40m
3009	Test Pit 2 - Backfill from previous excavation trench [3014] . Deposit comprises firm, mid brown grey silt, peat and clay mixture. Mixture of surrounding contexts (3007) , (3030) , (3031) and (3015) .	Deposit	0.40-0.94m

Test Pit 2	Dimensions: 1.5m x 1.5m X m/Max. Depth 1.80m+		
	Orientation: N/A		
	Reason for Test Pit: Assess preservation off platform, adjacent to Must Dyke		
Context	Description	Interpretation/Processes of deposition	Dimensions (m)
3003	Test Pit 2 - Plastic sheet covering the top of previously uncovered posts in earlier excavations to assist with backfill of cut [3014] Area 7 – 1990 excavations. Placed in base of trench before it was backfilled, held down by brick.	Deposit	0.94m
3004	Test Pit 2 - Mid grey-brown, silt clay peat; trample deposit on surface of previous excavation trench. Watering Can from original excavations found on this layer.	Deposit	0.94m
3012	Test Pit 2 - Plastic sheeting. Clear plastic sheeting covering the top of a wooden post (C78)	Deposit	0.94m
3013	Test Pit 2 - Plastic sheeting. Clear plastic sheeting covering the top of a wooden upright post (C77)	Deposit	0.94m
3014	Test Pit 2 - Cut of previous trench excavation 'Area 7' extending beyond the limit of excavation.	Cut	0.8m+
3030	Test Pit 2 - Mid grey, silty clay subsoil deposit with occasional medium sub-angular pebbles.	Deposit	0.38-0.48m
3031	Test Pit 2 - Light grey, silty clay. Grey Alluvium, with occasional roots.	Deposit	0.48-0.64m
3015	Test Pit 2 - Loose dark-brown, silty clay. Occasional inclusions of modern roots. Desiccated Peat.	Deposit	0.94-1.40m
3027	Test Pit 2 – Mid-brown oxidising to dark brown, woody reedy peat with occasional silt. Humic peat waterlogged deposit.	Deposit	1.40-1.80
3029	Test Pit 2 - Blue Silt Clay. Natural clay deposit.	Deposit	1.80m+

Test Pit 3	Dimensions: m x m/Max. Depth 1.1m+		
	Orientation: N/A		
	Reason for Test Pit: Assess preservation of post alignment towards Northey Fen Edge		
Context	Description	Interpretation/Processes of deposition	Dimensions (m)
3000	Test Pit 3 –Topsoil deposit. Light Grey-Brown, clay-silt with occasional small sub-rounded pebbles.	Deposit	0-0.32m
3001	Test Pit 3 – Subsoil deposit. Mid grey-brown, silty clay with inclusions of occasional small pebbles and fragments of mottled amber coloured desiccated slate. Alluvial clay with desiccated slate overlying peat deposits. Sample <1> taken at 0.40m	Deposit	0.32-0.51m
3002	Test Pit 3 - Dark brown peat with some silt. Desiccated peat deposit in top of Test Pit 3 sequence. Sample <2> taken at 0.60m of test pit.	Deposit	0.51-0.73m
3016	Test Pit 3 - Mid brown oxidizing to dark brown, silty, humic, woody, reedy peat. Inclusions of occasional modern roots. Two levels of wood lifted from this context. Two spits of material recovered for decay analysis.	Deposit	0.73-1.1m+

APPENDIX 2 – BOREHOLE DESCRIPTIONS

Borehole	Top (m)	Base (m)	Description
C1	0.00	0.45	Topsoil
C1	0.45	0.70	Grey silty clay with occasional coarse gravels
C1	0.70	1.50	Stiff mid-grey-brown clayey silt, very stiff and oxidized
C1	1.50	2.03	Damp peaty silt with organic detritus including small roundwood fragments
C1	2.03	2.60	Pale brown organic mud
C1	2.60	2.73	Mid grey soft clayey silt

Borehole	Top (m)	Base (m)	Description
C2	0.00	0.40	Topsoil
C2	0.40	0.75	Yellow-orange sand and coarse gravels
C2	0.75	1.00	Mid brown grey very dry silt
C2	1.00	1.72	Coarse sand (re-deposit – services trench)

Borehole	Top (m)	Base (m)	Description
C3	0.00	0.40	Topsoil
C3	0.40	1.31	Stiff grey mottled silty clay, dry with small molluscs to base
C3	1.31	2.25	Smooth organic mud with occasional rootlets trending into detrital peat at base
C3	2.25	2.65	Blue-grey silt

Borehole	Top (m)	Base (m)	Description
C4	0.00	0.40	Topsoil
C4	0.40	1.50	Stiff mottled grey clay silt, with molluscs and humified organics to base
C4	1.50	2.00	Sub-fossil wood, non- <i>Quercus</i>

Borehole	Top (m)	Base (m)	Description
C5	0.00	0.45	Topsoil
C5	0.45	0.75	Grey orange mottled clay, mollusc rich
C5	0.75	1.10	Red orange coarse sand
C5	1.10	1.35	Grey orange mottled clay
C5	1.35	1.70	Red orange coarse sand
C5	1.70	2.05	Dark brown peaty silt, with detrital organics and small roundwood fragments
C5	2.05	2.60	Smooth brown organic mud

Borehole	Top (m)	Base (m)	Description
C6	0.00	0.40	Topsoil
C6	0.40	0.65	Orange yellow gravelly sand
C6	0.65	1.27	Stiff dry grey-brown clay
C6	1.27	1.70	Smooth dark brown organic silt-clay trending into organic silt
C6	1.70	1.75	Dry stiff light brown clay, erosive upper and lower contacts
C6	1.75	2.67	Dry humified peat, damper at depth, occasional small diameter roundwoods
C6	2.67	3.00	Blue grey silt

Borehole	Top (m)	Base (m)	Description
C7	0.00	0.20	Topsoil
C7	0.20	0.40	Orange yellow gravelly sand
C7	0.40	1.41	Brown orange mottled silty clay
C7	1.41	2.11	Dark brown black silty mud, peaty with depth and occasional sub-fossil wood
C7	2.11	2.70	Dry stiff light brown clay, erosive upper and lower contacts
C7	2.70 +		Dry humified peat, damper at depth, occasional small diameter roundwoods

Borehole	Top (m)	Base (m)	Description
C8	0.00	0.20	Topsoil
C8	0.20	0.29	Orange yellow sand and gravel
C8	0.29	1.99	Mottled orange brown silty clay, dry and mollusc rich to base
C8	1.99	2.35	Organic mud with occasional <i>Phragmites</i> remains, erosive lower boundary
C8	2.35	2.45	Blue grey silt with monocot remains
C8	2.45	2.64	Organic mud, occasional <i>Phragmites</i> remains
C8	2.64 +		Blue grey silt

Borehole	Top (m)	Base (m)	Description
C9	0.00	0.53	Topsoil
C9	0.53	0.62	Sand and gravel
C9	0.62	0.82	Mixed oxidized grey clay with brick (? backfill)
C9	0.82	1.20	Very dry stiff grey orange mottled silty clay with molluscs to base
C9	1.20	1.91	Dry organic mud, well humified and minerogenic, sub-fossil wood @1.44m and frequent non- <i>Quercus</i> round wood @1.44 and 1.91
C9	1.91	2.54	Organic silt, with frequent pale rootlets and monocot

Borehole	Top (m)	Base (m)	Description
			remains
C9	2.54	2.88	Blue grey silt with occasional monocot remains and sub-fossil wood, sandy to base

Borehole	Top (m)	Base (m)	Description
C10	0.00	0.40	Topsoil
C10	0.40	1.70	Grey silty clay
C10	1.70	1.90	Desiccated organic silt with small sub-fossil wood remains
C10	1.90	2.26	Grey silts, with thin laminae to base
C10	2.26	2.40	Blue grey silts with occasional monocot remains to base.91

Borehole	Top (m)	Base (m)	Description
C11	0.00	1.00	Topsoil/Made Ground
C11	1.00	1.35	Grey orange mottled silty clay
C11	1.35	1.45	Desiccated organic silt with small sub-fossil wood remains
C11	1.45	2.35	Organic silt, with frequent pale rootlets and monocot remains, sub-fossil round wood @1.45m, trending into <i>gyttja</i> at depth
C11	2.35	2.40	Grey silt with coarse sand and charcoal fragments
C11	2.40 +		Blue grey silts

Borehole	Top (m)	Base (m)	Description
C12	0.00	0.75	Topsoil/Made Ground
C12	0.75	1.30	Grey orange mottled silty clay
C12	1.30	1.55	Desiccated organic silt
C12	1.55	2.40	Dark brown organic mud/ <i>gyttja</i>
C12	2.40 +		Coarse sand with rounded pebbles

Borehole	Top (m)	Base (m)	Description
C13	0.00	0.45	Topsoil/Made Ground
C13	0.45	0.86	Made ground
C13	0.86	1.20	Grey silty clay
C13	1.20 +		Organic brown silt with abundant sub-fossil wood remains

Borehole	Top (m)	Base (m)	Description
C14	0.00	0.40	Topsoil

Borehole	Top (m)	Base (m)	Description
C14	0.40	1.20	Grey orange mottled silty clay
C14	1.20	1.90	Desiccated organic silt
C14	1.90	2.25	Dark brown organic mud/ <i>gyttja</i>
C14	2.25	2.40	Blue grey silt

Borehole	Top (m)	Base (m)	Description
C15	0.00	0.20	Topsoil
C15	0.20	0.25	Sand and gravel
C15	0.25	1.45	Grey orange mottled silty clay
C15	1.45	2.57	Dark brown <i>gyttja</i> trending into organic silts
C15	2.57	2.65	Blue grey silt
C15	2.65	2.70	Dark brown organic silt with occ. sub-fossil wood fragments

APPENDIX 3 – MONOLITH SEQUENCES (TEST PITS)

Test Pit	Top (m)	Base (m)	Description
Test Pit 1	1.27	1.85	Dark brown-black very well humified homogeneous peat, rare monocot fragments. Sh4 Ag +, 5YR 2.5/1
Test Pit 1	1.85	2.18	Trending into grey brown (oxidizing to black) organic mud/ <i>gyttja</i> Ld4 Ag+, 5YR 2.5/1
Test Pit 1	2.18	2.27	Trending into grey brown silty organic mid, lenses of pale grey silt @2.24m, Ld4, Ag+, 5YR 2.5/1

Test Pit	Top (m)	Base (m)	Description
Test Pit 2	1.04	1.38	Very dry organic mud with well humified organic detritus and pale rootlets. Ld4 Dh +, 5YR 2.5/1
Test Pit 2	1.38	1.50	Sub-fossil wood fragment within a silty, sand rich peat matrix
Test Pit 2	1.50	1.79	Trending into well humified organic mud, with sub-fossil wood fragments @1.59 and 1.65; ? <i>Phragmites</i> layer @1.77m, Ld 4, DI +, 5YR 2.5/

Test Pit	Top (m)	Base (m)	Description
Test Pit 3	0.70	1.10	Dark brown-black very well humified dry silty peat. Frequent round woods @0.85 and 1.10m, pale rootlets to base, Ld4, Dh+, 5YR 2.5/1

APPENDIX 4 - WATERLOGGED WOOD TABLES

CONDITION SCORE	MUSEUM CONSERVATION	TECHNOLOGY ANALYSIS	WOODLAND MANAGEMENT	DENDRO-CHRONOLOGY	SPECIES IDENTIFICATION
5 excellent	+	+	+	+	+
4 good	-	+	+	+	+
3 moderate	-	+/-	+	+	+
2 poor	-	+/-	+/-	+/-	+
1 very poor	-	-	-	-	+/-
0 non-viable	-	-	-	-	-

Table 4.1: Condition scale

	Test pit 1		Test pit 2		Test pit 3		Trench 1		Total assemblage	
CONDITION SCORE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
5 excellent	0	0	0	0	0	0	0	0	0	0
4 good	4	36	5	8	3	4	0	0	12	8
3 moderate	4	36	49	82	38	57	3	17	94	60
2 poor	2	18	6	10	25	37	10	56	43	28
1 very poor	1	9	0	0	1	1	5	28	7	4
0 non-viable	0	0	0	0	0	0	0	0	0	0
unscored	0	0	0	0	0	0	0	0	0	0
total	11	100	60	100	67	100	18	100	156	100

Table 4.2: Condition score of discrete items

	Upper spit – Plan 60		Lower spit – Plan 111		Test Pit 3	
CONDITION SCORE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
5 excellent	0	0	0	0	0	0
4 good	1	3	2	6	3	4
3 moderate	9	29	29	81	38	57
2 poor	20	65	5	14	25	37
1 very poor	1	3	0	0	1	1
0 non-viable	0	0	0	0	0	0
unscored	0	0	0	0	0	0
<i>total</i>	<i>31</i>	<i>100</i>	<i>36</i>	<i>100</i>	<i>67</i>	<i>100</i>

Table 4.3: Test Pit 3 - Condition score of discrete items

	Upper spit – Plan 167		Lower spit – Plan 77		Test Pit 2	
CONDITION SCORE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
5 excellent	0	0	0	0	0	0
4 good	0	0	0	0	5	8
3 moderate	2	40	41	98	49	82
2 poor	3	60	1	2	6	10
1 very poor	0	0	0	0	0	0
0 non-viable	0	0	0	0	0	0
unscored	0	0	0	0	0	0
<i>total</i>	<i>5</i>	<i>100</i>	<i>42</i>	<i>100</i>	<i>60</i>	<i>100</i>

Table 4.4: Test Pit 2 - Condition score of discrete items

	2012 Trench 1		Trench 2003 / 2	
CONDITION SCORE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
5 excellent	0	0	0	0
4 good	0	0	1	5
3 moderate	3	17	7	37
2 poor	10	56	8	42
1 very poor	5	28	3	16
0 non-viable	0	0	0	0
unscored	0	0	0	0
<i>total</i>	<i>18</i>	<i>100</i>	<i>19</i>	<i>100</i>

Table 4.5: 2012, Trench 1 and Trench 2003 / 2 - Condition score of upright posts

	2012 Trench 1		Trench 2003 / 2	
BARK / SAPWOOD / HEARTWOOD	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
BSH	1	6	1	5
SH	0	0	4	21
H	17	94	14	74
<i>total</i>	<i>18</i>	<i>100</i>	<i>19</i>	<i>100</i>

Table 4.6: Trench 1, 2012 and Trench 2003 / 2 – Bark, Sapwood and Heartwood survival of upright posts

	Test pit 1		Test pit 2		Test pit 3		Trench 1		Total Assemblage	
WOOD CATEGORY	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
artefact	0	0	0	0	0	0	0	0	0	0
debris	0	0	14	23	19	28	2	11	35	22
roundwood	11	100	33	55	43	64	0	0	87	56
timber	0	0	13	22	5	7	16	89	34	22
<i>total</i>	<i>11</i>	<i>100</i>	<i>60</i>	<i>100</i>	<i>67</i>	<i>100</i>	<i>18</i>	<i>100</i>	<i>156</i>	<i>100</i>

Table 4.7: Categories of material

DEBRIS SUB-CATEGORIES	FREQUENCY	% OF ASSEMBLAGE
bark	1	3
debris - unclassified	7	20
roundwood debris	6	17
timber debris	17	49
woodchips	4	11
<i>total</i>	<i>35</i>	<i>100</i>

Table 4.8: Sub – categories of debris

	20012 Trench 1		2003 Trench 2	
LENGTH (mm0	FREQUENCY	% OF ASSEMBLAGE	FREQUENCY	% OF ASSEMBLAGE
0-99	4	22	5	26
100-199	3	17	3	16
200-299	3	17	3	16
300-299	4	22	4	21
400-499	3	17	3	16
500-599	1	6	1	5
<i>total</i>	<i>18</i>	<i>100</i>	<i>19</i>	<i>100</i>

Table 4.9: Trench 1 2012 and trench 2 2003 – length of upright posts

APENDIX 5 – POLLEN ASSESSMENT TABLE

Test Pit / Sample	Main pollen taxa recorded	Ass't count (TLP)	Concentration	Preservation
Test Pit 1				
1.27m	<i>Alnus glutinosa</i> (39%), <i>Salix</i> (27%) <i>Corylus avellana</i> -type (10%) <i>Quercus</i> (7%), herbs include, <i>Plantago lanceolata</i> , Rubiaceae, Poaceae, Cyperaceae, Brassicaceae, <i>Potentilla</i> -type and <i>Lythrum portula</i>	Yes (131)	3/4	1 18 unidentified grains
1.51m	Occasional grains of <i>Alnus glutinosa</i> , <i>Salix</i> , Poaceae, Caryophyllaceae, Brassicaceae and Pteropsida	No (8)	1	2 5 unidentified grains
1.75m	Occasional grains of <i>Corylus avellana</i> -type, <i>Alnus glutinosa</i> , <i>Hedera helix</i> , Rubiaceae and Pteropsida (monolete) indet.	No	1	3 5 unidentified grains
1.99m	Poaceae (46%), Cyperaceae (12%), <i>Alnus glutinosa</i> (19%), <i>Corylus avellana</i> -type (14%), <i>Sparganium</i> indet. (21% TLP+aquatics, Pteropsida (5% TLP+spores). Other species include <i>P.lanceolata</i> , <i>Chenopodium</i> , <i>Salix</i> , <i>Tilia</i> and <i>Betula</i>	Yes (125)	3	3 / 4 17 unidentified grains
2.23m	Occasional grains of <i>Corylus avellana</i> -type, <i>Quercus</i> , <i>Tilia</i> , <i>Alnus glutinosa</i> , <i>Chenopodium</i> , Cyperaceae, Poaceae and <i>Sparganium</i> indet.	No (25)	1	3 3 unidentified grains

Table 5.1: Test Pit 1 - Pollen Assessment Results

Test Pit / Sample	Main pollen taxa recorded	Ass't count (TLP)	Concentration	Preservation
Test Pit 2				
1.36m	Poaceae (52%), Cyperaceae (21%), <i>Quercus</i> (10%), <i>Salix</i> (4%) <i>Sparganium</i> indet. (22% TLP+aquatics) other species include <i>Alnus glutinosa</i> , <i>Corylus avellana</i> -type, <i>Betula</i> , <i>P.lanceolata</i> and Rosaceae	Yes (147)	4	3 / 4 13 unidentified grains
1.52m	Single grains of <i>Quercus</i> , <i>Corylus avellana</i> -type and Cyperaceae	No (3)	1	1

				1 unidentified grain
1.68m	<i>Alnus glutinosa</i> (65%), Poaceae (13%) other species include <i>Quercus</i> , <i>Corylus avellana</i> -type, <i>Betula</i> , <i>Tilia</i> , <i>Hedera helix</i> , <i>Salix</i> , <i>Aster</i> , Rosaceae, Cyperaceae, <i>P.lanceolata</i> , <i>Sparganium</i> indet.	Yes (117)	3	2/3 6 unidentified grains

Table 5.2: Test Pit 2 - Pollen Assessment Results

Test Pit / Sample	Main pollen taxa recorded	Ass't count (TLP)	Concentration	Preservation
Test Pit 3	Pollen Diagram			
0.70m	<i>Alnus glutinosa</i> (35%), Poaceae (15%), Cyperaceae (14%), <i>Corylus avellana</i> -type (9%), <i>Quercus</i> (8%), <i>Salix</i> (7%), Apiaceae (5%)	Yes (159)	4	2/3 15 unidentified grains
0.74m	<i>Alnus glutinosa</i> (35%), Cyperaceae (19%), Poaceae (14%), <i>Salix</i> (7%), <i>Corylus avellana</i> -type (5%), <i>Quercus</i> (5%)	Yes (139)	4	2/3 23 unidentified grains
0.78m	<i>Alnus glutinosa</i> (73%), Cyperaceae (9%), <i>Salix</i> (6%)	Yes (159)	4	3 12 unidentified grains
0.82m	<i>Alnus glutinosa</i> (80%), Poaceae (6%) Cyperaceae (5%)	Yes (173)	4	4 5 unidentified grains
0.88m	Occasional grains of <i>Quercus</i> , <i>Salix</i> , <i>Alnus glutinosa</i> , <i>Betula</i> , <i>Corylus avellana</i> -type, Poaceae, Cyperaceae, <i>Filipendula</i> , <i>Sagittaria sagittifolia</i> , Caryophyllaceae, <i>Sparganium</i> indet. and Pteropsida (monolete) indet.	No (29)	1	2/3 2 unidentified grains
1.00m	<i>Alnus glutinosa</i> (25%), Poaceae (20%), <i>Salix</i> (14%), <i>Quercus</i> (12%), <i>Corylus avellana</i> -type (7%), Cyperaceae (7%), <i>Sparganium</i> indet. (15% TLP+aquatics)	Yes (139)	2	4 17 unidentified grains

Table 5.3: Test Pit 3 - Pollen Assessment Results

Concentration - 0=no pollen, 1=very low, 2 =low, 3=medium, 4=good, 5=very good to excellent;

Preservation - 0=No pollen, 1=very poor, 2=poor, 3=medium, 4=good, 5=very good to excellent

APPENDIX 6 – PLANT MACRO TABLE

Table 6.1: Plant macrofossils and other remains observed in rapid scanning of samples from Test pit 1, Flag Fen

Test Pit	TP 1	TP 1	TP 1	TP 1	TP 1	TP 1		
Sample Number	15	17	19	21	23	25		
Context Number								
Depth Below Ground Surface	1.03- 1.17 m	1.27- 1.37 m	1.47- 1.57 m	1.67- 1.77 m	1.87 - 1.97 m	2.07 - 2.27 m		
Volume	500 ml	500 ml	500 ml	500 ml	500 ml	500 ml		
Proportion Scanned	100%	100%	75%	100%	100%	100%	HABITAT	English Common Name
Latin Binomial								
<i>Ranunculus acris</i> L./ <i>repens</i> L./ <i>bulbosus</i> L. - type	-	1	-	-	-	-	TG/ TM/ TD	meadow/ creeping/ bulbous buttercup
<i>Ranunculus</i> subgenus <i>Ranunculus</i> - indeterminate	-	1	-	-	-	-	-	buttercup
<i>Ranunculus sceleratus</i> L.	+	-	-	-	-	-	D/ M/ Ws/ W	celery-leaved buttercup
<i>Ranunculus</i> subgenus <i>Batrachium</i> (DC.) A Gray	-	-	-	-	-	+	T-D/M/Ws/W	crowfoot
cf. <i>Ranunculus</i> subgenus <i>Batrachium</i> (DC.) A Gray	-	-	-	-	-	-	T-D/M/Ws/W	possible crowfoot
<i>Rubus</i> section <i>Glandulosus</i> Wimm. & Grab. - indeterminate	-	+	-	-	1	-	V	bramble/ blackberry
<i>Urtica dioica</i> L.	-	-	-	-	-	-	T-Wo/F/D/N	common nettle
<i>Alnus glutinosa</i> (L.) Gaertn. - fruit	-	-	-	++	-	-	DW/ Ws	alder
<i>Alnus glutinosa</i> (L.) Gaertn. - involucre	-	-	-	-	-	-	DW/ Ws	alder
<i>Alnus glutinosa</i> (L.) Gaertn. - involucre fragment	-	-	-	+	-	-	DW/ Ws	alder
cf. <i>Alnus glutinosa</i> (L.) Gaertn. - fruit (highly decayed)	-	-	-	+	-	-	DW/ Ws	possible alder
cf. <i>Alnus glutinosa</i> (L.) Gaertn. - bud	-	-	-	-	-	-	DW/ Ws	possible alder

<i>Elatine</i> cf. <i>hexandra</i> (Lapierre) DC	-	-	1	-	-	-	W/ Ws	possible six-stamened waterwort
<i>Polygonum</i> spp.	-	-	-	-	-	-	V	knotgrass
<i>Rumex</i> spp. - perianth fragments	-	-	-	-	+	-	V	dock
<i>Solanum</i> cf. <i>dulcamara</i> L.	-	-	-	1	-	-	Wo/ R/ Ws/ W	bittersweet
<i>Callitriche</i> spp.	-	1	-	-	-	-	TW/ Ws	water-starwort
<i>Mentha</i> spp. - unidentified	-	++	+	1	-	-	-	mint (presumably aquatic)
cf. <i>Onoropordum acanthium</i> L.	-	-	1	-	-	-	W/ Rg	possible cotton thistle
<i>Eupatorium cannabinum</i> L.	+	-	-	-	-	++	D/ Ws	hemp-agrimony
<i>Hydrocotyle vulgaris</i> L.	-	-	-	-	+	-	B/ F/ M/ Ws	marsh pennywort
<i>Oenanthe</i> spp.	-	1	-	-	-	-	T - D/ Ws/ W	water-dropwort

Table 6.1: Plant macrofossils and other remains from Test Pit 1 (continued)

Test Pit	TP 1	TP 1	TP 1	TP 1	TP 1	TP 1		
Sample Number	15	17	19	21	23	25		
Context Number								
Depth Below Ground Surface	1.03- 1.17m	1.27- 1.37 m	1.47- 1.57 m	1.67- 1.77m	1.87 - 1.97m	2.07 - 2.27 m		
Volume	500	500	500	500	500	500		
Proportion Scanned	ml 100%	ml 100%	ml 75%	ml 100%	ml 100%	ml 100%	HABITAT	English Common Name
<i>Apium nodiflorum</i> (L.) Lag.	-	-	-	1	-	-	D/ M/ Ws/ W	fool's-water-cress
APIACEAE - indeterminate	-	-	-	+	1	-	-	Carrot Family
<i>Lemna</i> spp.	1	+	+	+	-	-	W/ T-SfW	duckweed
<i>Sagittaria</i> spp./ <i>Alisma</i> spp.	+	+	-	+	-	+	W/ SfW	arrowhead/ water-plantain
<i>Alisma</i> spp.	+	-	-	-	-	-	W/ SfW	water-plantain
<i>Typha</i> spp.	-	1	-	-	+	-	W/ SfW/ Ws	bulrush
<i>Juncus</i> spp.	1	++	-	-	+	+	T-D/ T-Ws	rush
<i>Eleocharis palustris</i> (L.) Roem. & Schult./ <i>uniglumis</i> (Link) Schult.	-	1	-	-	-	-	TWs/ ?W	spike-rush
<i>Carex</i> spp. - 2-sided	-	1	-	1	-	-	T-D/ T-Ws	sedge
<i>Carex</i> spp. - 3-sided	1	-	-	-	+	+	T-D/ T-Ws	sedge
<i>Carex</i> spp. - indeterminate urticle fragment	-	-	-	1	-	-	T-D/ T-Ws	sedge
<i>Glyceria</i> spp.	-	-	-	-	-	1	T-ShW/ Ws	sweet-grass
<i>Phragmites australis</i> (Cav.) Trin. ex Steud. - leaf fragments	-	-	-	-	++	+	ShW/ Ws/ M/ F/ B	common reed
POACEAE - unidentified, small-sized caryopsis	-	-	-	-	-	-	-	Grass Family
POACEAE - unidentified, medium-sized caryopsis	-	+	-	-	-	-	-	Grass Family
OTHER REMAINS								
Minute (<2mm) herbaceous vegetative fragments	-	+++	+	+++	++++	+++	-	-

Minute (<2mm) unidentified wood fragments	++++ +	++++	-	++++ +	-	-	-	-
Small (2 - 4 mm) unidentified wood fragments	-	-	+++	-	++++ +	-	-	-
Larger (4 - 10 mm) unidentified wood fragments	-	-	-	-	-	-	-	-
Insect fragments	+++	+	-	++	++	++	-	-
Daphnia	+	-	-	+	+	+	Sfw	waterflea
Diptera	1	-	-	-	-	-	-	fly
Worm cases	-	-	-	-	-	-	-	-

Key to semi-quantitative scores are: 1 = only one item observed, + = < 5 items observed, ++ = 5 – 10 items observed, +++ = 10 – 25 items observed, ++++ = 25 – 50 items observed and +++++ = >50 items (for wood and plant fragments this more typically >100 items observed). Key to Habitat Codes: T = Typical, B = Bog, D = Damp ground, DW = Damp woods, F = Fens, M = Marshes, N = nitrogen enriched soils, R = Rough ground, Sfw = slow-flowing water, ShW = shallow water, V = various habitats, W = Water, Wo = Woodland and Ws = Waterside

Table 6.2: Plant macrofossils and other remains observed in rapid scanning of samples from Test pits 2-3, Flag Fen (FF12)

Test Pit	TP 2	TP 2	TP 2	TP 2	TP 3 2 3002	TP 3		
Sample Number								
Context Number								
Depth Below Ground Surface	1.04- 1.24m	1.24 - 1.4m	1.44 - 1.64 Test	1.64 - 1.84m		0.8 - 1.0m		
Volume	1L	500 ml	Pit 2	500 ml	1L	1L		
Proportion Scanned	100%	50%	75%	60%	100%	50%	HABITAT	English Common Name
Latin Binomial								
<i>Ranunculus acris</i> L./ <i>repens</i> L./ <i>bulbosus</i> L. - type	-	-	-	-	-	-	TG/ TM/ TD	meadow/ creeping/ bulbous buttercup
<i>Ranunculus</i> subgenus <i>Ranunculus</i> - indeterminate	-	-	-	-	-	-	-	buttercup
<i>Ranunculus sceleratus</i> L.	-	-	-	-	+	-	D/ M/ Ws/ W	celery-leaved buttercup

<i>Ranunculus</i> subgenus <i>Batrachium</i> (DC.) A Gray	++	-	-	+	-	++	T-D/M/Ws/W	crowfoot
cf. <i>Ranunculus</i> subgenus <i>Batrachium</i> (DC.) A Gray	-	-	-	-	+	-	T-D/M/Ws/W	possible crowfoot
<i>Rubus</i> section <i>Glandulosus</i> Wimm. & Grab. - indeterminate	-	-	-	-	-	+	V	bramble/ blackberry
<i>Urtica dioica</i> L.	+	-	-	-	-	+	T-Wo/F/D/N	common nettle
<i>Alnus glutinosa</i> (L.) Gaertn. - fruit	-	-	+	++	-	-	DW/ Ws	alder
<i>Alnus glutinosa</i> (L.) Gaertn. - involucre	-	-	-	1	-	-	DW/ Ws	alder
<i>Alnus glutinosa</i> (L.) Gaertn. - involucre fragment	-	-	-	-	-	-	DW/ Ws	alder
cf. <i>Alnus glutinosa</i> (L.) Gaertn. - fruit (highly decayed)	-	-	-	-	-	-	DW/ Ws	possible alder
cf. <i>Alnus glutinosa</i> (L.) Gaertn. - bud	-	-	-	1	-	1	DW/ Ws	possible alder
<i>Elatine</i> cf. <i>hexandra</i> (Lapierre) DC	-	-	-	-	-	-	W/ Ws	possible six-stamened waterwort
<i>Polygonum</i> spp.	-	-	+	-	-	+	V	knotgrass
<i>Rumex</i> spp. - perianth fragments	-	-	-	-	-	-	V	dock
<i>Solanum</i> cf. <i>dulcamara</i> L.	-	-	-	-	-	-	Wo/ R/ Ws/ W	bittersweet
<i>Callitriche</i> spp.	-	-	-	-	1	-	TW/ Ws	water-starwort
<i>Mentha</i> spp. - unidentified	-	-	-	-	-	+	-	mint (presumably aquatic)
cf. <i>Onoropordum acanthium</i> L.	-	-	-	-	-	-	W/ Rg	possible cotton thistle
<i>Eupatorium cannabinum</i> L.	-	-	-	-	-	-	D/ Ws	hemp-agrimony

Key to semi-quantitative scores are: 1 = only one item observed, + = < 5 items observed, ++ = 5 – 10 items observed, +++ = 10 – 25 items observed, ++++ = 25 – 50 items observed and +++++ = >50 items (for wood and plant fragments this more typically >100 items observed). Key to Habitat Codes: T = Typical, B = Bog, D = Damp ground, DW = Damp woods, F = Fens, M = Marshes, N = nitrogen enriched soils, R = Rough ground, SfW = slow-flowing water, ShW = shallow water, V = various habitats, W = Water, Wo – Woodland and Ws = Waterside

Table 6.2: Plant Macrofossils and other remains from Test Pits 2-3 (continued)

Test Pit Sample Number Context Number	TP 2 1.04- 1.24m	TP 2 1.24 - 1.4m 500	TP 2 1.44 - 1.64 TP 2 75%	TP 2 1.64 - 1.84m 500	TP 3 2 3002 1L 100%	TP 3 0.8 - 1.0m 1L 50%	HABITAT	English Common Name
<i>Hydrocotyle vulgaris</i> L.	-	-	-	-	-	-	B/ F/ M/ Ws	marsh pennywort
<i>Oenanthe</i> spp.	-	-	-	+	-	-	T - D/ Ws/ W	water-dropwort
<i>Apium nodiflorum</i> (L.) Lag.	-	-	-	-	-	-	D/ M/ Ws/ W	fool's-water-cress
APIACEAE - indeterminate	+	+	-	-	+	-	-	Carrot Family
<i>Lemna</i> spp.	-	-	-	-	-	-	W/ T-SfW	duckweed
<i>Sagittaria</i> spp./ <i>Alisma</i> spp.	-	+	-	-	++	+	W/ SfW	arrowhead/ water-plantain
<i>Alisma</i> spp.	-	-	-	-	-	-	W/ SfW	water-plantain
<i>Typha</i> spp.	-	-	-	-	-	-	W/ SfW/ Ws	bulrush
<i>Juncus</i> spp.	-	-	-	-	+	-	T-D/ T-Ws	rush
<i>Eleocharis palustris</i> (L.) Roem. & Schult./ <i>uniglumis</i> (Link) Schult.	-	-	-	-	-	-	TWs/ ?W	spike-rush
<i>Carex</i> spp. - 2-sided	-	-	-	-	-	-	T-D/ T-Ws	sedge
<i>Carex</i> spp. - 3-sided	-	-	+	-	+	+	T-D/ T-Ws	sedge
<i>Carex</i> spp. - indeterminate urticle fragment	-	-	-	-	-	-	T-D/ T-Ws	sedge
<i>Glyceria</i> spp.	-	-	-	-	-	-	T-ShW/ Ws	sweet-grass
<i>Phragmites australis</i> (Cav.) Trin. ex Steud. - leaf fragments	-	-	++++	+	-	-	ShW/ Ws/ M/ F/ B	common reed
POACEAE - unidentified, small-sized caryopsis	-	-	-	-	+	-		Grass Family
POACEAE - unidentified, medium-sized caryopsis	-	-	-	-	-	-	-	Grass Family
OTHER REMAINS								
Minute (<2mm) herbaceous vegetative	-	-	-	-	-	-	-	

fragments								
Minute (<2mm) unidentified wood fragments	+++++	+++++	+++++	++++	++++	+++++	-	-
Small (2 - 4 mm) unidentified wood fragments	-	-	-	-	-	++	-	-
Larger (4 - 10 mm) unidentified wood fragments	-	-	-	-	+	-	-	-
Insect fragments	-	+	+	++	++	++	-	-
Daphnia	-	+	-	++	+	+	Sfw	waterflea
Diptera	-	-	-	-	-	-	-	fly
Worm cases	-	-	-	+	-	+	-	-

APPENDIX 7 – INSECT TABLES

Table 7.1: Insect faunas recovered from Flag Fen

[illegible]

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
<i>Bembidion</i> spp.		+						+	++	++	+		+	++	++	+++	+
<i>Pterostichus</i> spp.	++	++		+	+	++	++	++	+	+		+		++	++	+++	
<i>Agonum</i> spp.	+	++		+			+++	+				+			++		+
<i>Amara</i> spp.		+															+
<i>Odacantha melanura</i> (L.)	+																
<i>Dromius</i> spp.									+								
Halipilidae																	
<i>Halipilus</i> spp.												+					
Dytiscidae																	
<i>Coelambus</i> spp.		+															
<i>Hygrotus</i> spp.		+				+		+							+++++		
<i>Hydroporus</i> spp.		++	+				+	+	+	++					++	+	
<i>Agabus</i> spp.			+			+	+				+		+		+	++	+
<i>Rhantus</i> spp.			+												+		+
<i>Acilius</i> spp.	+																
Hydrophilidae																	

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
<i>Coelostoma orbiculare</i> (F.)	+	++		+					+								
<i>Laccobius</i> spp.							+	+	+						++		
<i>Cercyon</i> spp.	++	++	+		++	++	+++	+			++	+	++			++	+
<i>Enochrus</i> spp.				+	+				+						+	+	
<i>Hydrobius fuscipes</i> (L.)	+								+	+		+			++		+
<i>Chaetarthria seminulum</i> (Hbst.)		+							+	+						+	
Gyrinidae																	
<i>Gyrinus</i> spp.	++	++						+						+	++	++	
Hydraenidae																	
<i>Ochthebius</i> spp.	+++	+++	+	+			+++	++++	+++++	+++++	+++++	+++	++	++	+++++	++++	+++
<i>Hydraena</i> spp.	+++	+++			+		++			+							
<i>Limnebius</i> spp.									+							++	
<i>Helophorus</i> spp.		+							++		++					++	

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
Histeridae																	
<i>Hister</i> spp.			+														
<i>Onthophilus</i> spp.																+	
Catopidae																	
<i>Catops</i> spp.										+							
Orthoperidae																	
<i>Corylophus cassidoides</i> (Marsh.)	++						+		+++	+		++		+	+		
<i>Orthoperus</i> spp.	++																
Staphylinidae																	
<i>Olophrum</i> spp.	+					+	+	+		+			+			++	
<i>Lesteva</i> spp.	++		+					++	+	++						++	
<i>Oxytelus</i> spp.	++													+	+		
<i>Platystethus</i> spp.	+									+							
<i>Stenus</i> spp.	+++					+	+	++	+			++	+	+		+++	
<i>Xantholinus</i> spp.									+		+			+		+	

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
<i>Paederus</i> spp.										+							
<i>Lathrobium</i> spp.	+		+	++	++	+		+	++	++	+				+	+++	+
<i>Philonthus</i> spp.	++									++	++			++	+	+	++
<i>Tachyporus</i> spp.																+	
<i>Tachinus</i> spp.							+	+									
Aleocharinidae Gen. & spp. indet.									+								
Pselaphidae																	
Pselaphidae Gen. & spp. indet		+					+		+	+						+	
Cantharidae																	
<i>Silis ruficollis</i> (F.)								+	+	+							
Elateridae																	
Elateridae Gen. & spp. indet.				+		+		+++		++					+		+

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
Eucnemidae																	
Melasis <i>buprestoides</i> (L.)													+			+	
Helodidae																	
Helodidae Gen. & spp. Indet.	++++	++		++	++	++	++	+++++	++++	++++		++	++		+++	+++	
Dryopidae																	
<i>Dryops</i> spp.	+++	++		+		++	+	++	+	+	+	++	+		++	+	+
Byrrhidae																	
<i>Byrrhus</i> spp.		+															
Cryptophagidae																	
<i>Cryptophagus</i> spp.							+	+									
<i>Atomaria</i> spp.		+					+					++				+	

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
Phalacridae																	
<i>Phalacrus</i> spp.			+				++	++			+		+	+	+	+	
Lathridiidae																	
<i>Lathridius minutus</i> (group)							+	+		+				+			
Coccinellidae																	
<i>Halyzia sedecimguttata</i> (L.)						+											
Anobiidae																	
<i>Grynobius planus</i> (F.)				+				+					+				
<i>Anobium punctatum</i> (Geer)			+	++	+			+				+	+	+	+		+
Scarabaeidae																	

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
<i>Onthophagus</i> spp.															+		
<i>Aphodius</i> spp.		+	+	++	+		+		+		+	+	+++	++	++	++	
<i>Phyllopertha</i> <i>horticola</i> (L.)									+				+			+	
Chrysomelidae																	
<i>Plateumaris</i> or <i>Donacia</i> spp.	++++	++++	+		+	+	++	++++	++++	++++	++++	+	+	+++	+++++	++++	++
<i>Prasocuris</i> <i>phellandrii</i> (L.)	+			+			+	+		+		+	+			++	
<i>Agelastica alni</i> (L.)								+			+						
<i>Chaetocnema</i> <i>concinna</i> (Marsh.)	+	+						++					+		++		
Scolytidae																	
Scolytidae Gen. & spp. indent.							++	+									

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
Curculionidae																	
Apion spp.	+	+		+		+	+		+					+	+	+	+
Otiorhynchus spp.											+						
Sitona spp.									+		+						
Bagous spp.		++	++	+	++	++		++	+	++		++	+++	++	+++	+	++
Tanysphyrus lemnae (Payk.)	++	+	++	++++	+++	+++	+	+++	++	+	++	+	+++++	++	+++	++++	++++
Notaris acridulus (L.)				+							+	++				+	++
Thyrogenes spp.	+												+				
Limnobaris spp.								+	+	+						++	
Curculio spp.											+						
Ceutorhynchus spp.		++						+	+				++			+++	
Micrelus ericae (Gyll.)																	
Mecinus pyrastrer (Hbst.)	+					+											

	Test Pit 1											Test Pit 3				Test Pit 3	
Sample number	15	16	17	18	19	20	21	22	23	24	25	0-20 below polythene	20-40 below polythene	40-60 below polythene	60-80 below polythene		3002
Depth below ground surface (cm)	1.03- 1.17	1.17- 1.27	1.27- 1.37	1.37- 1.47	1.47- 1.57	1.57- 1.67	1.67- 1.77	1.77- 1.87	1.87- 1.97	1.97- 2.07	2.07- 2.27	1.04-1.24	1.24-1.44	1.44-1.64	1.64-1.84	0.8-1.00	2
Sample Weight (Kg)	6	4	3.6	3	2.8	2.7	2.6	2.8	2.9	2.9	2.5	4.1	5.75	2.75	4.2		4.3
Sample volume (L)	7	5	4	4	3.5	3	3	3	3	3	2.5	6.5	5.5	4	6		5
<i>Rhynchaenus</i> spp.						+											
<i>Gymnetron</i> spp.							+								+		

Table 7.2. Summary of the nature of the insect faunas from Flag Fen

Sample number	Degree of preservation	Comparative size of faunas	Water conditions	Landscape	Overall potential of sample
Test Pit 1 15	Very good	Medium / large	Slow flowing or stagnant water suggested by <i>Acilius</i> , <i>Gyrinus</i> , <i>Ochthebius</i> , <i>Hydraena</i> , <i>Coelostoma orbiculare</i> , <i>Helodidae</i> and <i>Dryops</i>	Dense stands of waterside reed bed and vegetation suggested by <i>Donacia / Plateumaris</i> and <i>Thyrogenes</i> . <i>Odacantha melanura</i> lives on water reed. <i>Tanysphyrus lemnae</i> indicated duck weed (<i>Lemna</i> spp.)	high
Test Pit 1 16	Very good	medium	Slow flowing or stagnant water suggested by <i>Hydroporus</i> , <i>Gyrinus</i> , <i>Ochthebius</i> , <i>Hydraena</i> , <i>Coelostoma orbiculare</i> , <i>Helodidae</i> and <i>Dryops</i>	Dense stands of water side reed bed and vegetation suggested by <i>Donacia / Plateumaris</i> and <i>Notaris acridulus</i> . <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Aphodius</i> may suggest pasture.	high
Test Pit 1 17	Moderate/ good	medium	Slow flowing or stagnant water suggested by <i>Hydroporus</i> , <i>Agabus</i> , <i>Rhantus</i> , <i>Ochthebius</i> and <i>Bagous</i> spp.	<i>Phalacrus</i> spp. and <i>Donacia / Plateumaris</i> suggest some limited waterside vegetation. <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Aphodius</i> may suggest pasture.	good
Test Pit 1 18	Moderate	Small / medium	Slow flowing or stagnant water suggested by <i>Ochthebius</i> , <i>Coelostoma orbiculare</i> , <i>Enochrus</i> , <i>Helodidae</i> and <i>Dryops</i>	<i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Notaris</i> may suggests limited stands of waterside vegetation. <i>Aphodius</i> may suggest pasture. <i>Grynobius planus</i> and <i>Anobium punctatum</i> suggest some dead wood.	good
Test Pit 1 19	Moderate	Small / medium	Slow flowing or stagnant water suggested by <i>Hydraena</i> ., <i>Enochrus</i> and	<i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Aphodius</i> may suggest pasture. <i>Anobium punctatum</i>	good

Sample number	Degree of preservation	Comparative size of faunas	Water conditions	Landscape	Overall potential of sample
			Helodidae and <i>Bagous</i> .	suggest some dead wood.	
Test Pit 1 20	Moderate	Small / medium	Slow flowing or stagnant water suggested by <i>Hygrotus</i> , <i>Helodidae</i> , <i>Dryops</i> and <i>Bagous</i> .	<i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Rhynchaenus</i> indicates tree leaf and <i>Mecinus pyrae</i> grassland.	good
Test Pit 1 21	Good	medium/ large	Slow flowing or stagnant water suggested by <i>Hydroporus</i> , <i>Agabus</i> , <i>Ochthebius</i> , <i>Hydraena</i> , <i>Coelostoma orbiculare</i> , <i>Helodidae</i> and <i>Dryops</i>	Stands of water side reed bed and vegetation suggested by <i>Donacia</i> / <i>Plateumaris</i> . <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Scolytidae</i> species suggest dead wood.	high
Test Pit 1 22	Good	Large	Slow flowing or stagnant water suggested by <i>Hygrotus</i> , <i>Hydroporus</i> , <i>Gyrinus</i> , <i>Ochthebius</i> and <i>Laccobius</i> <i>Helodidae</i> and <i>Dryops</i>	Stands of water side reed bed and vegetation suggested by <i>Donacia</i> / <i>Plateumaris</i> and <i>Limnobaris</i> . <i>Silis ruficornis</i> is associated with water reed. <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Grynobius planus</i> and <i>Anobium punctatum</i> and <i>Scolytidae</i> species suggest dead wood.	high
Test Pit 1 23	Good	Large	Slow flowing or stagnant water suggested by <i>Hydroporus</i> , <i>Ochthebius</i> , <i>Limnebius</i> , <i>Hydraena</i> , <i>Helodidae</i> and <i>Dryops</i> .	Stands of water side reed bed and vegetation suggested by <i>Donacia</i> / <i>Plateumaris</i> and <i>Limnobaris</i> . <i>Silis ruficornis</i> is associated with water reed. <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Aphodius</i> and <i>Phyllopertha horticola</i> may suggest pasture.	high

Sample number	Degree of preservation	Comparative size of faunas	Water conditions	Landscape	Overall potential of sample
Test Pit 1 24	Good	Large	Slow flowing or stagnant water suggested by <i>Hydroporus</i> , <i>Ochthebius</i> , <i>Hydraena</i> , <i>Chaetarthria seminulum</i> , <i>Helodidae</i> and <i>Dryops</i> .	Stands of water side reed bed and vegetation suggested by <i>Donacia</i> / <i>Plateumaris</i> and <i>Limnobaris</i> . <i>Silis ruficornis</i> is associated with water reed. <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.).	high
Test Pit 1 25	Good	Medium / large	Slow flowing water suggested by <i>Ochthebius</i> , <i>Hydraena</i> and <i>Dryops</i> .	Stands of water side reed bed and vegetation suggested by <i>Donacia</i> / <i>Plateumaris</i> , <i>Phalacrus</i> and <i>Notaris acridulus</i> . <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). <i>Curculio</i> suggests trees and <i>Aphodius</i> pasture.	high
Test Pit 2 0-20cm	Good	Medium / large	Slow flowing water suggested by <i>Ochthebius</i> , <i>Helodidae</i> , <i>Dryops</i> and <i>Bagous</i> .	Stand of water side vegetation suggested by <i>Notaris acridulus</i> and <i>Donacia</i> / <i>Plateumaris</i> but not to extents seen in Trench 1. <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.).	high
Test Pit 2 20-40	Good	Medium / large	Slow flowing water suggested by <i>Ochthebius</i> , <i>Helodidae</i> , <i>Dryops</i> and <i>Bagous</i> .	Stand of water side vegetation suggested by <i>Notaris acridulus</i> , <i>Phalacrus</i> and <i>Donacia</i> / <i>Plateumaris</i> but not to extents seen in Trench 1. <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). Grassland and pasture is indicated by <i>Aphodius</i> , which occurs in some numbers, and by <i>Phyllopertha horticola</i> . Dead wood is indicated by <i>Melasis buprestoides</i> ,	high

Sample number	Degree of preservation	Comparative size of faunas	Water conditions	Landscape	Overall potential of sample
				<i>Grynobius planus</i> , and <i>Anobium punctatum</i> .	
Test Pit 2 40-60	Good	Medium / Large	Slow flowing water suggested by <i>Gyrinus</i> , <i>Ochthebius</i> and <i>Bagous</i> .	Stand of water side vegetation suggested by <i>Phalacrus</i> and <i>Donacia/ Plateumaris</i> . <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). Grassland and pasture is indicated by <i>Aphodius</i> , which occurs in some numbers.	high
Test Pit 2 60-80	Good	Large	Slow flowing water indicated by large numbers of <i>Hygrotus</i> , <i>Hydroporus</i> , <i>Ochthebius</i> , <i>Helodidae</i> , <i>Dryops</i> and <i>Bagous</i> .	Dense stand of water side vegetation suggested by <i>Phalacrus</i> and large numbers of <i>Donacia/ Plateumaris</i> . <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.). Grassland and pasture is indicated by <i>Aphodius</i> and <i>Onthophagus</i> , which occur in some numbers. <i>Curclio</i> indicated some woodland.	high
Test Pit 3 0.8-1.00	Good	Large	Slow flowing water indicated by large numbers of <i>Agabus</i> , <i>Hydroporus</i> , <i>Gyrinus</i> , <i>Limnebius</i> , <i>Hydraena</i> , <i>Ochthebius</i> , <i>Helodidae</i> , <i>Dryops</i> and <i>Bagous</i> .	Dense stands of waterside vegetation suggested by <i>Phalacrus</i> and large numbers of <i>Donacia/ Plateumaris</i> and <i>Limnobaris</i> . <i>Tanysphyrus lemnae</i> indicates duck weed (<i>Lemna</i> spp.).	high
Test Pit 3	Good	Medium / large	Slow flowing water indicated by <i>Agabus</i> , <i>Rhantus</i> , <i>Ochthebius</i> and <i>Dryops</i> and <i>Bagous</i>	Stands of waterside vegetation suggested by small numbers of <i>Donacia Plateumaris</i> and <i>Notaris acridulus</i> . <i>Tanysphyrus lemnae</i>	high

Sample number	Degree of preservation	Comparative size of faunas	Water conditions	Landscape	Overall potential of sample
				indicates duck weed (<i>Lemna</i> spp.). Dead wood suggested by single <i>Anobium punctatum</i> .	

APPENDIX 8 – FAUNAL TABLE

Table 8.1: Faunal Remains Biological Data

Item	Taxon	Element	Side	Parts present	Ageing data	Comments
<i>Trench 1, topsoil (1000)</i>						
n/a	equid	tibia	right	3-8*	distal fused/fusing	Fusion line opening up on posterior side, but closed and not visible on anterior. Possibly taphonomic, perhaps recently fused. Probable plaque of new bone formation in Z8 on posterior side, but difficult to see given condition.
n/a	cattle	tibia	left	5-8*	distal fused	
1-17	medium mammal	rib	n/a	3-7*	n/a	fox/badger sized
1-18	dog	pelvis	left	2-5*, 7*	fused acetabulum	
1-19	medium mammal	Long bone	n/a	n/a	n/a	sheep size long bone fragment, may be dog distal tibia
1-20	cattle	humerus	right	6-8*	distal fused	
1-21	dog	radius	left	1-8*	proximal and distal fused	
1-29	large mammal	Indet.	n/a	n/a	n/a	n/a
1-39	dog	mandible	left	Complete	Adult dentition fully erupted.	Incisors, p1 and m3 erupted but missing.
1-40	dog	tibia	right	3-6*	n/a	
<i>Test Pit 1, layer (3022)</i>						
3-23	sheep/goat	maxilla	left	premolar region	n/a	refits with 3-31
3-24	medium mammal	Indet.	n/a	n/a	n/a	sheep/goat size, refits with 3-26
3-25	duck cf	carpometac	right	proximal	n/a	n/a

Item	Taxon	Element	Side	Parts present	Ageing data	Comments
	<i>Anas platyrhynchos</i>	arpus		half		
3-26	medium mammal	Indet.	n/a	n/a	n/a	sheep/goat size, refits with 3-24
3-27	small mammal	incisor	n/a	n/a	n/a	may also be water vole
3-28	small mammal	tibia	left	5-8*	n/a	small water vole size
3-29	medium mammal	cranial	n/a	n/a	n/a	may be sheep/goat skull
3-30	water vole	mandible	right	complete	n/a	n/a
3-31	sheep/goat	maxilla	n/a	n/a	n/a	Refits with 3-23
3-32	indeterminate	Indet.	n/a	n/a	n/a	n/a
Test Pit 1, layer (3002)						
3-33	Pig	mandible	both	Mandibular symphysis and anterior body	<20mths*	Female. 3-33, 3-36 & 3-37 refit and may be pair with 3-35. Includes sockets for incisors, canines, right P1 & P2. Canines & P2 present.
3-34	medium mammal	rib	n/a	5-6*	n/a	n/a
3-35	Pig	mandible	right	hinge, angle & m3	M3) erupting	may be from same bone as other mandible fragments, but joining section of body missing
3-36	Pig	mandible	left	angle & hinge	n/a	3-33, 3-36 & 3-37 refit and may be pair with 3-35
3-37	Pig	mandible	left	body &	p4) b; M1) l; M2) e;	3-33, 3-36 & 3-37 refit and may be pair with 3-35

Item	Taxon	Element	Side	Parts present	Ageing data	Comments
				cheek tooth row	M3) erupting	

*following Habermehl (1975) illustrations for canines.

Table 8.2: Faunal Remains Osteometric Data (all context 1000)

Item	Taxon	Element	Side	Measurements in mm (Following von den Driesch 1976).	Comments
1-18	dog	pelvis	left	SH 18.8; LAR c. 22.4	LAR measurement to broken edge, but probably not significantly wrong
1-21	dog	radius	left	Bp 15.7; SD 10.5; Bd21.1; GL 134.8 (withers = 45cm following Harcourt 1974)	Similar in size to modern collie breeds
1-39	dog	mandible	left	1) 123.7; 2) 124.9; 3) 118.9; 18) 46.9; M1L) 20.9; M1B) 8.9; M2L) 9.3; M2B) 6.9; 10) 34.8; 11) 36.27) 72.9; 19) 21.3	Similar in size to modern collie breed

Table 8.3: Faunal Remains Taphonomic and Cultural Data

Item	Condition	Preservation comments	Butchery comments
<i>Trench 1, topsoil (1000)</i>			
n/a	moderate	some longitudinal cracking and some surface lost. Possible gnawing at proximal end. Open fusion line -may be taphonomic.	Modern scrape marks and associated polish down entire length of the medial diaphysis
n/a	moderate	most bone surface lost, rounded fracture edges	diaphysis broken through in antiquity
1-17	very good	n/a	n/a
1-18	moderate	much surface lost	n/a
1-19	poor	most surface extremely eroded	
1-20	moderate	much bone surface lost	diaphysis broken when fresh, possible chop n posterior suggesting disarticulation of elbow
1-21	very good	small scrape and associated polish on distal posterior diaphysis probably modern damage	none

Item	Condition	Preservation comments	Butchery comments
1-29	n/a	n/a	n/a
1-39	very good	several teeth loose in jaw	very fine diagonal cuts on lateral body below p4 and m1
1-40	poor	surface erosion and open longitudinal cracks	n/a
<i>Test Pit 1, layer (3022)</i>			
3-23	good	spiky fracture edges	n/a
3-24	good	spiky fracture edges	n/a
3-25	very good	spiky fracture edges	n/a
3-26	good	spiky fracture edges	n/a
3-27	good	n/a	n/a
3-28	good	spiky fracture edges	n/a
3-29	good	spiky fracture edges	n/a
3-30	very good	n/a	n/a
3-31	good	spiky fracture edges	n/a
3-32	good	spiky fracture edges	n/a
<i>Test Pit 1, layer (3020)</i>			
3-33	good	sharp fracture edges	n/a
3-34	very good	sharp fracture edges	n/a
3-35	good	sharp fracture edges.	n/a
3-36	good	sharp fracture edges.	n/a
3-37	good	sharp fracture edges.	n/a

APPENDIX 9 – STRUCK FLINT TABLE

Trench No	Context	Square No	Small Find No	CATEGORY	CATEGORY TYPE	Weight	Comments	Utilised?
1	0		31	1	Flake	7.3	Gravel flint flake. U/S	Yes
1	1003		13	47	Serrated blade	4.3	Good use damage and slight silica gloss. Manufactured on parallel-sided blade from a single platform blade core. Mesolithic-Early Neolithic	Yes
1	1003		14	40	Thumbnail scraper	4.6	Roughly d-shaped thumbnail scraper. 19.5mm long by 26.3mm wide by 7.7mm thick. Regular retouch. Probably pressure flaked. EBA	Yes
1	1003		15	1	Flake	2.7	Chalk flint?	No
1	1003		16	1	Flake	2	Thin squat flake	No
1	1003		17	66	Natural		Unworked fragment of flint	No
1	1003		18	1	Flake	1.5	Similar flint to SF16, possibly from the same core	No
1	1003		19	60	Polished axe	68.6	Small partly polished flint axe-head. Polished only one very edge of blade. lenticular cross-section. Survives 90.8mm long, 41.4mm wide and max 18.1 mm thick. Three different types of cortication present on the artefacts surface: the axe surface is corti	No
2	2006	7	1	1	Flake	0.4	Small residual flake.	No
2	2006	5	2	1	Flake	2.8	Utilised flake. Thin and regular. Chalk flint, grey-white unabraded cortex. Mid brown flint	Yes
2	2006	5	3	10	Rejuvenation flake tablet	8.1	Use damage or possibly very slight edge retouch. Good tablet. Mesolithic-Early Neo	Yes

Trench No	Context	Square No	Small Find No	CATEGORY	CATEGORY TYPE	Weight	Comments	Utilised?
2	2006	5	4	1	Flake	1	Platform edge abrasion. Dorsal blade scars. Meso/EN	Yes
2	2006	3	5	1	Flake	0.6	Light yellowish brown	No
2	2006	3	6	8	Burin spall	2.1	Stuck from the end of a flake. Probably Mesolithic	No
2	2006	6	7	49	Denticulate	23.6	Manufactured from derived gravel flint with a water worn cortex. Five teeth spaced c13mm apart. Probably M-LBA	No
2	2006	6	8	1	Flake	5.2	Water worn cortex	No
2	2006	6	9	66	Natural	101.9	Water worn flint pebble with thermal frost fractured. Natural.	No
2	2006	5	10	3	Bladelet	1.1	Dorsal blade scars. Platform edge abrasion. Mesolithic-early Neolithic	Yes
2	2006	8	11	1	Flake	2.4	GS8ext. Squat flake	No
2	2006	5	12	1	Flake	0.8		No
2	2006	6	32	3	Bladelet	1.4	Possibly slight iron staining. Worn gravel flint cortex. Mesolithic-EN	No
2	2006		33	1	Flake	6.6	Bullhead bed flint. Classic green cortex and underlying band.	Yes
2	2029		20	1	Flake	9.5	Broad flake. N-EBA?	Yes
2	2029		21	36	End scraper	17.9	Dark brown chalk flint. Some flaking/re-flaking of proximal end. Neolithic-Bronze Age	No
2	2029		22	1	Flake	1.7	Thin	No

Trench No	Context	Square No	Small Find No	CATEGORY	CATEGORY TYPE	Weight	Comments	Utilised?
2	2029		23	1	Flake	14	Light yellowish brown gravel flint. Broad flake	No
2	2029		24	40	Thumbnail scraper	7.2	Broken oval thumbnail scraper. fine scalar pressure flaking. Early Bronze Age. 29.7mm+ long, 25.3mm wide and 8.3mm thick.	No
2	2029		25	2	Blade	3	50mm long, 13.8mm wide. On light brown flint. From single platform blade core. Exhibits platform edge abrasion. Slightly plunging. Probably Mesolithic, but may be EN.	No
2	2029		26	38	End and side scraper	8.5	On gravel flint flake. Small, almost thumbnail sized. 27.8mm long by 29.9mm wide and 11.6mm thick. Probably EBA?	No
2	2029		27	36	End scraper	8.6	Well-manufactured small horseshoe shaped scraper. 39.5mm long 24.7mm wide by 7.8mm thick. On a mid brown gravel flint with pitted water worn surface. Retouch probably from pressure flaking. EBA?	No
2	2029		28	40	Thumbnail scraper	3.7	Mid brown gravel flint. 18.5mm long, 23.5mm wide by 7mm thick. D-Shaped. EBA. Possible unretouch natural spur left on proximal LHS	No
2	2029		29	1	Flake	7.1	Broad and squat	No
2	2029		30	19	Tested nodule/bashed lump	25.1	Small frost shattered fragment of gravel flint with one flake removal and a few incipient cones.	No

APPENDIX 10 – FLAG FEN RESEARCH MEETING MINUTES

Flag Fen Research Meeting - Minutes

14th December 2012

English Heritage

24 Brooklands Ave, Cambridge CB2 8BU



ENGLISH HERITAGE

New investigations were initiated at Flag Fen in July 2012, funded and undertaken by DigVentures Ltd under the terms of Scheduled Monument Consent. The project was designed as a small-scale evaluation to provide the site custodians with baseline information on the Flag Fen Scheduled Ancient Monument. Its objectives were to redefine the physical extent of the waterlogged Bronze Age platform; assess the physical condition of the post alignment and platform; define the extent and character of Bronze Age settlement features on the dryland margin of Northey Island; and prepare an Updated project Design with recommendations for further work.

Given the high profile of Flag Fen and recent debate concerning appropriate methods of investigation at similar wetland sites, a Flag Fen academic advisory group has been formed to seek views and comments about the future management and research of the site. This group of invited experts and stakeholders met at English Heritage's offices in December 2012, where preliminary results of the recent excavations as well as some of the background and context to this work were presented, followed by a wide-ranging discussion chaired by Dr. Will Fletcher.

Notes of the session detailed below were taken by Alice Kershaw and include slides of the presentations and minutes of the following discussion.

Attendees:

Brendon Wilkins, Lisa Westcott Wilkins, Raksha Dave, Mike Bamforth - DigVentures
Francis Pryor - Freelance
Ben Gearey – University of Cork
Charley French – University of Cambridge
Kasia Gdaniec – Cambridgeshire County Council
Sarah Stannage - Director, Flag Fen/Must Farm Development Project (Seconded from Head of Heritage, Vivacity)
Mark Knight – Cambridge Archaeological Unit
Ian Panter - York Archaeological Trust
Rebecca Casa -Hatton- Archaeologist, Peterborough City Council
Tony Brown - University of Southampton
Stuart Orme, Sarah Wilson, Jennie Sutherland Clothier - Heritage Officers, Vivacity
Alice Kershaw - Heritage Development Officer, Opportunity Peterborough and Peterborough City Council
Seren Griffiths – freelance archaeological dating specialist

English Heritage:

Will Fletcher - IAM
Helen Chappell- Regional Science Advisor

Jim Williams - Regional Science Advisor (East Mids)
Jen Heathcoat – Environment Intelligence Analyst (Environment Impacts)
Jon Last – Landscape Strategy Manager
David Kenny – Historic Environment Field Officer

Introduction (Will Fletcher):

The aim of today's meeting is to understand how we move forward with Flag Fen – to collectively establish our direction of travel. Flag Fen was designated in 2010 and immediately went on the At Risk register. Part of the problem stems from our lack of knowledge:

- What condition it is in, whether this is deteriorating, how long it has left.
- What is the potential of the site and how do we realise that?
- Wetland sites deteriorate over time, but at what rate is Flag Fen deteriorating - as quickly as Star Carr, or do we have longer to act?
- In light of these questions do we need to re-assess Flag Fen's importance?
- Is this Flag Fen's 'Star Carr moment'?

Presentation 1: Flag Fen Lives: background, approach and initial results (Brendon Wilkins)

Flag Fen was name checked in the EH National Heritage Protection Plan, alongside Star Carr. The Star Carr project team held a very similar seminar such as this one in 2008, asking almost exactly the same questions as we are today. Through a concerted and coordinated effort in answering these questions they were recently granted over €1million from the European Research Council.

Work this summer was managed under the MoRPHE framework, and a joint collaborative research methodology was developed with a multi-partner research agreement. Flag Fen is a site with lots published on it but no archive, and the full extent of the archaeology is still unknown. Work this year therefore focused on taking stock of the current situation. Preliminary results:

- Trench 1 - located next to the 2003 excavation. Layers of topsoil, peat then palaeo-landscape above gravel. Evidence of a ditch, which pre-dates the post alignment.
- Trench 2 – located south of the Mustdyke. Palaeo-land surface identified, excavated in checker pattern to reveal 9 discrete features, some with charcoal and flint working.
- Test pit 3 – located east of Preservation Hall in area of significant cracking, excavated by hand.
- Test pit 2 – located between Preservation Hall and Must Dyke.
- Test pit 1 - hoped to find the NW side of platform but no waterlogged wood found here.

These were very small interventions so difficult to characterise across the site, so Test pit 1 could lie on a pool or site of waterways. There are clearly gaps in our knowledge of the scale or character of the platform, in addition to questions regarding the burial environment. Post-excavation work is on going, and monolith samples taken from the test pits are currently being assessed.

Presentation 2: Waterlogged wood and initial assessment (Mike Bamforth)

The methodology used for assessing the condition of the surviving physical wood samples at Flag Fen was based on one developed for the Humber Wetland Project, where 5 = excellent and 0 = non viable. The A series strategy was used recording all wood found (rather than a sub-sample) – more than originally hoped for. Overall the smaller pieces of wood tend to survive in better condition, and preservation increases with depth. Results:

Trench 1 - vertical posts pass through the preservation horizon. Rotted at the top. In 2003 trench 19 posts were measured and were marked 2, 3 and some 4 for condition, in 2012 18 posts scored 1, 2 and 3. The condition has dropped a notch and you can no longer understand woodworking from it. The drop is despite being down a slope. Lack of faceting and lack of sapwood survival.

Test pit 3 - This was located east of 1999 Time Team trenches, and contained fen deposits and wet peat. Wood identified in the upper spit was given 2 or less for condition, 10-15 cm up to 3 or more for condition, and more tool marks were recorded. The grain of data increases with depth.

Test pit 2 - Upper spit - desiccated peat containing wood recoded at condition 2 or lower. Uprights show intensive radial cracking right through sapwood. The tips of uprights were recorded at 4, extending into the base of the test pit.

Test pit 1 - in situ deposits at base of alluvial sequence, alder car - 2.

Presentation 3: Condition assessment and initial findings (Ian Panter)

Ian began by colourfully describing the poor condition of the wood. The methodology for condition analysis has been developed by Dutch scientists, specializing in *in situ* preservation, based on the following scale: 60-140% = healthy, up to 600% = moderate decay, above 600% = serious decay. All samples recovered so far have been taken to York for assessment, and these are the preliminary results.

An example of a stake bottom shows sapwood decay was 450-600% - this could be described a very soft, like a 'hot knife through butter' when cutting it. The water table at the site is fluctuating so it's difficult to know if desiccation is as a result of water table changes of earlier excavations. The cell structures show little surviving cellulose, also issues around lignin. There will always be on-going decay due to age. Used to believe lignin was preserved in anaerobic conditions but now less certain.

Next week the samples are undergoing a form of gas chromatography mass spectrometry. Looking at both cellulose and lignin. Also looking at the Preservation Hall and comparing it to the test pits. Pres Hall has fluctuating water and air exposure so up to 700 %. Not much difference in Pres Hall and Test Pits 2 and 3. Indicates a fluctuating water table.

Presentation 4: Palaeoenvironmental Initial Results and next steps (Ben Gearey)

Unfortunately there is some slippage in the palaeoenvironmental programme due to Birmingham archaeology department closing. Work is still progressing however, and

we have initial results on pollen, and are awaiting plant macro and insect assessment, before proceeding with our dating programme.

Preservation of pollen so far is patchy; the top of test pit 2 shows no pollen. Question of how this preservation has varied between test pits. A cross comparison with Beccles pot alignment shows that there is a lot we don't understand about preservation *in situ* - found little variation in insect decay but lots of variation in pollen. At Flag Fen we will be looking for key indicators of a reducing environment, signs of oxidation and agrichemicals.

Finish up by saying that wetland sites are like icebergs, they have so many aspects to evaluate. Expense can quickly run away, and upfront excavation costs are only a small part of what is required for a full analysis.

Presentation 5: Metal Work potential (Ben Roberts – presented by Matt Juddery)

Whereas the majority of recent metalwork finds (largely coming to us through metal detecting and the PAS) are the consequence of stray finds or hoards, the *in situ* context at Flag Fen is what makes the archive so significant. Where is metalwork deposited in the landscape and what relation does this have to other activities. Rather than a single 'event', Flag Fen shows us a sequence of deposition, and the range and resolution of data from surveys is high. In recent years a number of advances in metal work analysis including:

- Finer typography and chronology
- New finds sites in the environs
- New finds since the Treasure Act
- New publications and new comparisons

Recent work by Bray on metal composition, circulation, recycling and deposition has relevance for Flag Fen, and could be used to assess international connections (the biography of objects prior to deposition). A reassessment of the Flag Fen archive would be of great value. The following initiatives have been proposed for the Flag fen metal work archive:

- BA and MA research at Durham and Cambridge into use, fragmentation and landscape deposition.
- An AHRC collaborative award has been submitted, to create a database of bronze.
- Re-assessment of metal compositions in relation to broader patterns of metal circulation.

Presentation 6: Must Farm Development Project (Sarah Stannage)

Beginning with a personal story of why she became involved with this Flag Fen and took the job as Head of Heritage for Vivacity. As a young person I was a volunteer at Flag Fen, and I fell in love with the archaeology and became engrossed in conservation.

Having worked in many other roles in the heritage sector, took the job at Vivacity in November 2011 because of this personal connection to Flag Fen. Returning to site it was a very different place – problems were visible in Preservation Hall; visitor numbers

in decline; concerns over the preservation environment; the site had lost the community of interested specialists and become all but forgotten.

The 'Flag Fen Lives' project was commissioned on this basis, and was initiated at the same time the boat discoveries were being made at Must Farm. This presented both a challenge and an opportunity to revitalise Flag Fen. The two sites are intimately related, and Flag Fen represents a natural home for the Must Farm archive. It was clear that Vivacity management would not have confidence in housing the Must Farm archive until financial arrangements were in place. £300,000 has been raised from various parties in three months to ensure this happens.

In answer to one of the questions raised at the outset: this is Flag Fen's Starr Carr moment. We have so far drawn on a collaborative approach – and if we continue in this vein, pioneering new approaches and pushing the boundaries, the public cannot fail to benefit.

Discussion

(Shelagh Smith, Chair of the Vivacity board, joined the seminar for the discussion and was welcomed and introduced by Will Fletcher).

Defining the site – unanswered questions

WF- what's the strategy for the site, what do we in EH take as a strategy, leave at high risk or do something about it? What don't we know?

CF- what is the nature of the platform? Is it as big as originally Auger surveyed? Are there Mesolithic sites underneath? Is it a palimpsest site?

MK- what lies beneath FF is there a terrestrial pre- causeway surface.

CF- there is a good chance there is a terrestrial surface.

FP- there was a Neolithic ditch below the PowerStation

CF- what is the exit of the FF basin to the NE?

Huge dendritic system, marine/fresh/dry. FF may have been a barrier.

KG- the DV work has thrown up ambiguities such as the silt in Test Pit 1, is it inundation or a bank over another phase. The location is complex and ill defined.

Potential prospection techniques at Flag Fen – can they work?

FP- DV work - was shocked by the state of the wood, was noticeably drier. There may be more to the N of the Must Dyke. Bore hole surveys required. Big gap between FP and CF trench and the lake, the lake may have helped preserve this area.

CF- Geophysics has shown nothing

BW- new equipment can work

TB- electric conductivity work has been done in Norfolk. Rapid profiling been done near Venice lagoon.

MB- be good to survey natural features such as waterways and banks to give an understanding of where the post alignment sits in the landscape. Maybe Lidar?

Further excavation at Flag Fen?

BG- loads can do with FF and need to know how much we understand and what the timescale of the site is?

MB- should some be dug? Will take maybe 50 years.
WF- what is the significance of the site? What will we lose first?
CF- take a level off the Pres Hall
WF- have this as part of public display
SSt- need a better visual impact, lighting etc., has to be cutting edge.
WF- how much work needs to be done?

The Preservation Hall – potential site for further excavation?

MB- is the Preservation Hall actually least at risk?
WF- part of the significance of the site is that you can see Bronze Age wood.
LWW- in terms of public engagement it's an easy sell, can be a discrete project to keep baseline knowledge generation going. DV could do more crowdfunding.
IP- doing an Options Appraisal of Preservation Hall for Vivacity. Ramifications for other preservation in situ monuments.
WF- Preservation in situ debate starting to move on, especially with Wetland, as you lose first what is most significant about the site.
BG- costs money – concerns as to where the finances will come to support this further investigation.

What is the wider significance of Flag Fen?

MK- FF at edge of Fen basin and close to the surface, the first of its kind in Fenland. Is the Gateway to the Fens. Hugely important for Fenland Archaeology as a whole.
KG- huge amount of site, what is it like a generation on from its discovery?
FP- need to look at other side of the dyke. See if platform is there and how well preserved it is.
IP- best preservation may be in the Preservation Hall.

What is Vivacity's commitment to further investigation at Flag Fen and how does this fit with their priorities?

LWW- we can all agree to all manner of things in this room today, but if this doesn't fit with Vivacity's strategic priorities for the site then no progress can be made. How does Kevin Tighe (Vivacity CEO) feel about the site? How does this approach work for Vivacity?
WF - what about PREL and section 106 agreement?
Shelagh Smith – The section 106 agreement is drafted, and money from this will absolutely be ring-fenced for Flag Fen. Kevin Tighe sits on one of the PREL groups to keep this alive.
SO- There is a wider will and political focus on heritage.
BW – coming back to the iceberg analogy, it's clear that significant sums are required to undertake further investigation work at Flag Fen. There have been some really positive comments from Vivacity today in support of this, particularly with regard to ring fencing section 106 agreement. This should be formalised with English Heritage as soon as possible, with a date for that meeting put in the diary today.

What other funding options are available?

TB – ERC funding is extremely difficult to obtain unless you are a grandee close to retirement.

JL – HLF could be an option if the project was to retain such a strong public programme.

LWW – perhaps we should approach this a larger landscape partnership, including all the partners in a much broader study.

To round up, what would you like to happen at Flag Fen this year?

SW- need to ensure research ties into public outcomes.

SSt- we need a management agreement for the site with English Heritage.

WF- will tie in a section 17 management agreement.

FP- need a charismatic figurehead for FF

Updated Project Design and Future Work

MB- is there a value to doing this annually

JL- need a research strategy, project design felt like was re-energising site first, work secondary, and needs to be other way around.

WF- needs proper baseline study. Need key areas and questions.

BG- so much we don't know. Relationship to environmental change. Can't do on the cheap.

SO- need to be able to share info from dig with public.

FP- links of wet to dry very important, the context and setting are the basis of the research framework.

-ENDS-

