A14 CAMBRIDGE TO HUNTINGDON, CAMBRIDGESHIRE

2 ALCONBURY CHARCOAL

national highways

MOLA HEADLAND INFRASTRUCTURE

MOLA HEADLAND ARCHAEOLOGY

with

COPA PCA

REGISTERED ORGANISATION CIfA

commissioned by A14 Integrated Delivery Team (IDT)
on behalf of National Highways

March 2024

A14 CAMBRIDGE TO HUNTINGDON, CAMBRIDGESHIRE

2 ALCONBURY CHARCOAL

commissioned by A14 Integrated Delivery Team (IDT)
on behalf of National Highways

March 2024

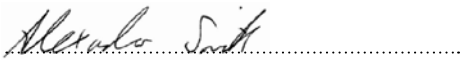
This report adheres to the quality standard of ISO 9001:2015

PROJECT INFO:

MHI Project Code **AFRM16** / ECB No **4844, 4845, 4846, 5160** / NGR **TL 519214, 273283** / Local Authority **Cambridgeshire County Council** / Fieldwork Date **Oct 2016 - Jan 2018** / OASIS Ref. **molahead1-349390, molahead1-502666, molahead1-502670, molahead1-349397** / Archive Repository **Cambridgeshire County Council**

PROJECT TEAM:

Project Manager **Alex Smith and David Bowsher**

Approved by **Alex Smith** 

MOLA HEADLAND INFRASTRUCTURE

MOLA HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

MOLA HEADLAND INFRASTRUCTURE

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ALCONBURY CHARCOAL

Authors: Laura Bailey

INTRODUCTION

A total of 307 samples from Alconbury were assessed. Seventy samples were from TEAs 2–4 and 237 samples were assessed from TEA 5. The TEA 2–4 sites were interconnected and the samples were thus assessed and discussed together.

Assessment of the Alconbury samples identified 214 contexts that contained charcoal. Thirty-one of the samples contained abundant charcoal, but most features contained only occasional, heavily fragmented, charcoal which was unsuitable for analysis. Following assessment, thirteen samples comprising a total of 142 charcoal fragments were chosen for charcoal analysis to consider selection, management and exploitation of woodland resources at Alconbury. The features related to four periods of activity, dating from Neolithic to the middle Saxon period. (Table 1).

RESULTS

The condition of charcoal varied from firm and well preserved to friable and, in some cases, the charcoal was partially vitrified, due to exposure to temperatures in excess of 800°C (Prior and Alvin 1983). Many of the fragments were heavily impregnated with mineral deposits.

In some cases, particularly with the Rosaceae subfamily, pomoideae, the taxa are anatomically very similar so one or more taxa may be present. The pomaceous fruitwoods display very little variation in their anatomy, so it is not possible to distinguish the species anatomically. The group includes hawthorn (*Crataegus* sp.), apple (*Malus* sp.), pear (*Pyrus* spp.), rowan (*Sorbus* spp.) (Schweingruber 1978).

Similarly, prunoideae, which includes cherry (*Prunus avium*), bird cherry (*Prunus padus*), blackthorn (*Prunus spinosa)* are anatomically similar. Although the ray type allows the taxa to be identified it is not always a reliable indicator, particularly in juvenile wood (Gale and Cutler 2000, 2).

TABLE 1: NUMBER OF SAMPLES (AND NUMBER OF FRAGMENTS IN PARENTHESIS) ANALYSED BY PERIOD AND SETTLEMENT

PERIOD	Settlement 2	Settlement 3	Settlement 4	Settlement 5	Non-settlement	TOTAL
Period 3–4.2: Neolithic-early Bronze Age						
3–4.2: Neolithic-early Bronze Age	-	-	-	-	3 (17)	3 (17)
Period 5: Iron Age						
5.2–5.3: Middle-late Iron Age	2 (20)	-	-	-	-	2 (20)
Period 6: Roman						
6.3: Middle Roman	-	1 (10)	-	-	2 (24)	3 (34)
6.4: Late Roman	-	-	1 (10)	-	-	1 (10)
Period 7: Anglo-Saxon						
7.2: Early-middle Saxon	-	-	-	4 (42)	-	4 (42)
7.3: Middle Saxon	-	-	-	-	1 (10)	1 (10)
TOTAL	2 (20)	1 (10)	1 (10)	4 (42)	6 (51)	14 (133)

PREHISTORIC

Late Neolithic – Early Bronze Age (Periods 3.5–4.2)

Monument 1 (Period 3: Neolithic) TEA 2

A late Neolithic henge was located on a low-lying valley at the confluence of tributaries of the River Great Ouse (Alconbury brook) in TEA 2. A fragment of roundwood hazel charcoal from the basal fill (20078) of the henge ditch returned a date of 1880–1620 cal BC (SUERC-85531), although this is likely intrusive. Charcoal inclusions present in the upper fills of the ditches may have derived from burning activity associated with the henge. Only 12 fragments of charcoal were of a suitable size (>4mm) for analysis. Cherry-type (Prunoideae) charcoal and charcoal of the hawthorn/sorbus group (pomaceous fruitwood) from narrow roundwood were identified together with a small number of heavily fragmented oak (Quercus sp.), from mature heart or trunk wood (Figure 1). The oak charcoal displayed fungal hyphae, suggesting that dead or decaying oak wood had been selected as fuel. It is likely that the charcoal related to burning activity within or in the environs of the henge (Pullen 2024). Although the henge monument was constructed in the Neolithic, the fills accumulated into the early Bronze Age associated with evidence for surrounding Bronze Age activity. This charcoal may have derived from windblown material from pyres as a cremation burial lay in the vicinity of the henge.

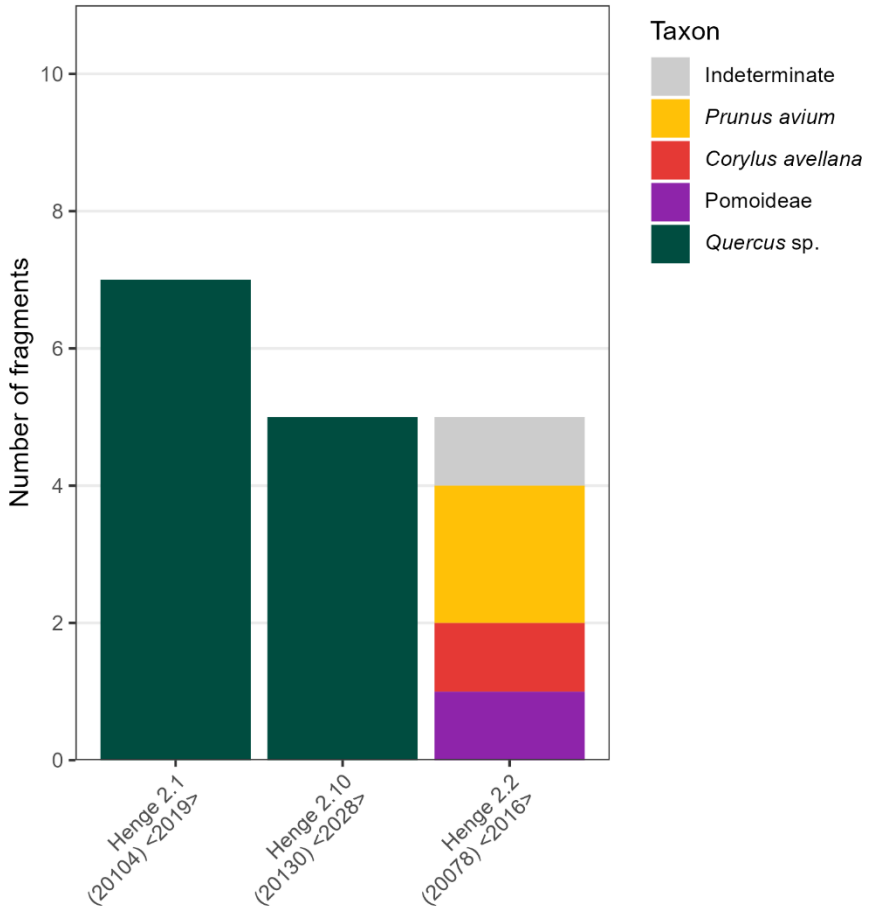
Cremation burials 2.10 and Pit 2.9 (Period 4.2: early Bronze Age) TEA 2

Two pits thought to be cremation burials, 2.9 and 2.10, were located 4m south-east of Monument 1, although analysis of Pit 2.9 did not identify any human bone. Radiocarbon dating of human bone from Cremation Burial 2.10 returned a date range of 2030–1880 cal BC (SUERC-91510). Analysis of charcoal from the fill (20130) of Pit 2.9 identified highly fragmented oak heartwood (10 fragments, 0.1 g). The

charcoal was partially vitrified, suggesting that it had been heated to temperatures in excess of 800°C (Prior and Alvin 1983).

No charcoal was recovered from the fill (20128) of Cremation Burial 2.10, suggesting that the bone and pyre material may have been separated prior to burial, and perhaps was deposited in Pit 2.9.

FIGURE 1: CHARCOAL FROM NEOLITHIC - BRONZE AGE FEATURES



Middle-Late Iron Age (Period 5.2)

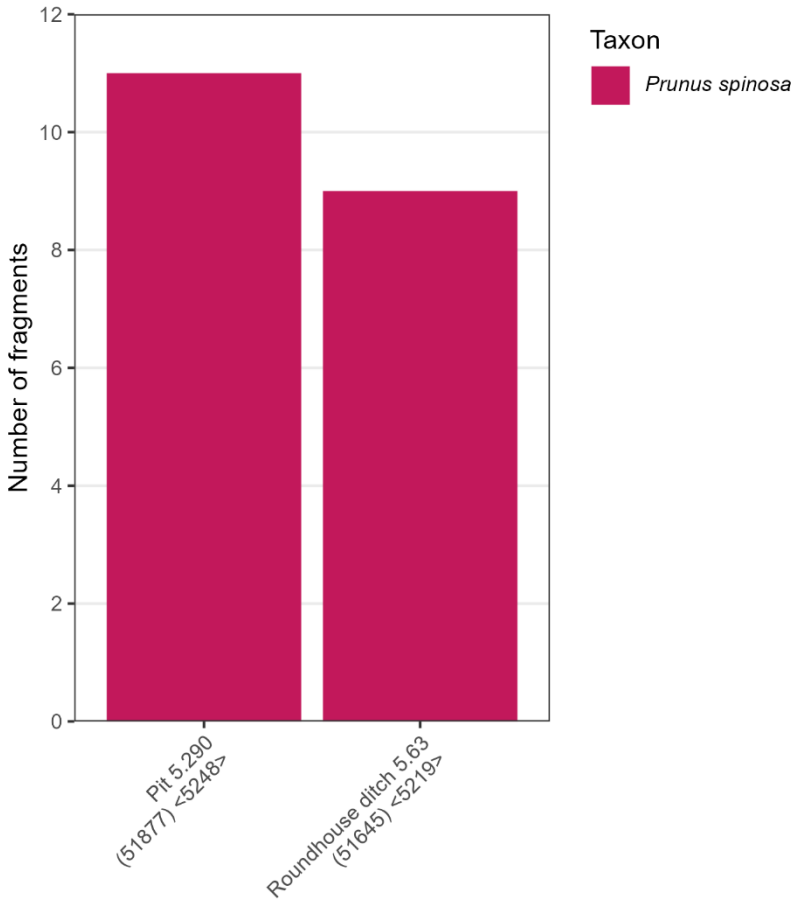
Roundhouse 5.63 ditch [51647], Enclosure 3, TEA 5 (Settlement 2)

Ten charcoal fragments (1.1g) recovered from fill (51645) of Roundhouse 5.63 in Enclosure 3, was identified as blackthorn (*Prunus spinosa*) roundwood (Figure 2). Many of the fragments displayed orange mineral concretions, suggesting that the charcoal had been subjected to periodic waterlogging or fluctuating water levels within the feature. It is likely the charcoal was derived from domestic fuel debris, linked to activities within or close to the structure.

Pit [51882] 5.290, Enclosure 3, TEA 5 (Settlement 2)

Pit [51882] of Pit group 5.290 in Enclosure 3, contained abundant charcoal and burnt bone with evidence for in situ burning and was interpreted as a possible roasting pit. Ten fragments of charcoal from fill (51877) of Pit [51882] were analysed. The charcoal consisted of unabraded, small diameter (5mm) blackthorn roundwood charcoal. Many of the fragments were partially vitrified.

FIGURE 2: CHARCOAL FROM IRON AGE FEATURES



ROMAN

Middle Roman (Period 6.3) TEA 5

Enclosure ditch 5.151 [53181], Enclosure 7, Settlement 3

Charcoal fragments were analysed from the penultimate fill (53184) of Ditch 5.151, which formed the western side of Enclosure 7. Blackthorn (*Prunus spinosa*) charcoal recovered from this deposit returned a date of cal AD 120–240 (SUERC-91049). Both oak and willow (*Salix* sp.) charcoal were identified.

Cremation 5.279 [50236] TEA 5

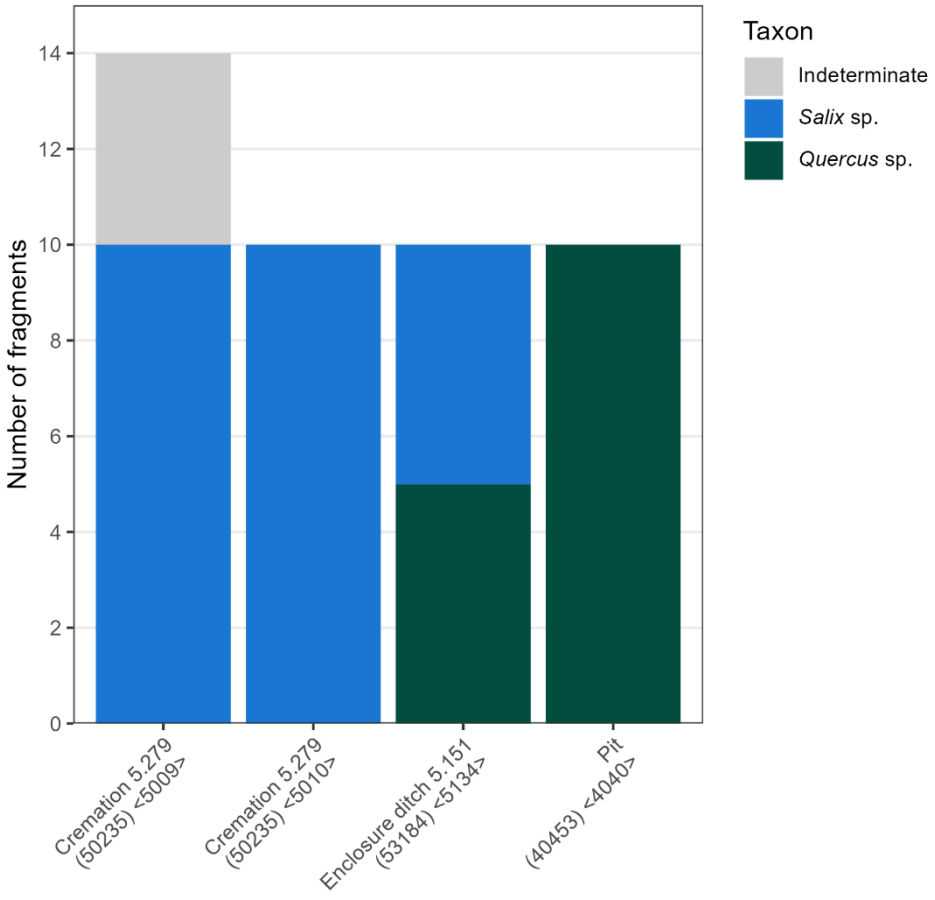
Human bone recovered from Cremation 5.279 returned a date of cal AD 120–320 (SUERC-97750). Twenty-four charcoal fragments recovered from two samples taken from the fill of the cremation were of a suitable size for analysis. Many of the fragments were highly vitrified and impregnated with mineral concretions which obscured the internal structure. Twenty fragments which could be identified to species and were of willow/ poplar roundwood (1.30g) (Figure 3). The cremation and the enclosure ditch, from TEA 5, were of note as they were the only features in Alconbury to contain willow charcoal.

Late Roman (Period 6.4)

Pit [40454], Settlement 4

The largest amount of charcoal (50ml, 21.46g) recovered from features dating to the Roman period in TEA 4 was from the fill (40453) of Pit [40454] located to the south-east of Ditch 4.35 in Settlement 4. The charcoal was all unabraded oak heart or trunk wood., suggesting that the deposit may have derived from the in situ burning of a post.

FIGURE 3 CHARCOAL FROM ROMAN FEATURES



ANGLO-SAXON

Charcoal was analysed from five Anglo-Saxon features, all in TEA 2, including cremation pits and fills from a sunken-floored building (SFB) (Figure 4). This provides valuable information on the types of fuel wood used for different purposes during the Anglo-Saxon period.

Early-Middle Saxon: Period 7.1-2 (AD 410-AD 850). Settlement 5 (TEA 2)

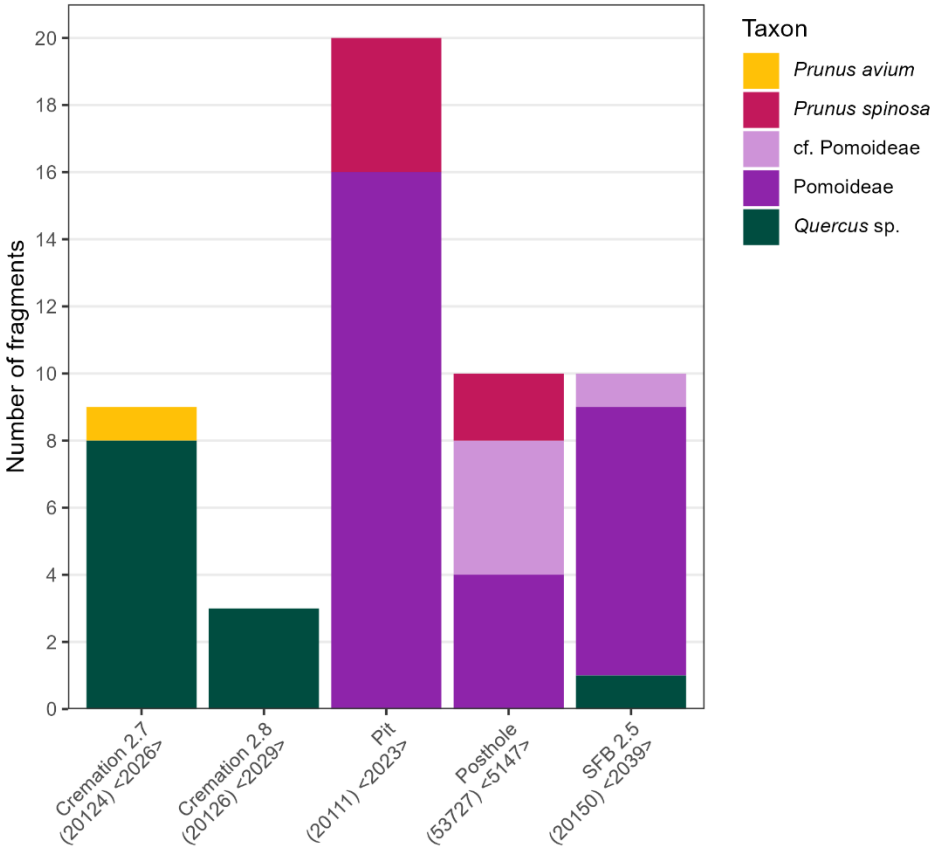
Sunken-featured building 2.5 ,

Sunken-featured Building (SFB) 2.5 was located in the north-eastern corner of TEA 2 to the north-west of the late Neolithic henge (Monument 1). Charcoal recovered from the fill (20150) of a posthole [20152] on the northern side of SFB 2.5 was analysed. Most of the charcoal was found to be small diameter Sorbus-type (2.4g) wood, with strongly curved rings, suggesting small branches were used. A single fragment of oak (0.1g) with weakly curved growth rings was also recovered suggesting that larger oak branches or trunk wood had been burnt. All fragments had been impregnated with minerals and some of the sorbus-type charcoal was partially vitrified.

Cooking pit [20113]

A fire/cooking pit [20113] containing burnt cobbles and large quantities of charcoal was located to the south-east of SFB 2.5 in Settlement 5, TEA 2. The feature contained 4 litres of charcoal, the largest amount of charcoal recovered from Alconbury. The charcoal was in excellent, unabraded, condition, suggesting that it had been burnt in situ. The depth of burnt debris in the feature suggests that it may have been used several times. Charcoal consisted of large (up to 30mm in diameter) roundwood fragments to small (5mm in diameter) twigs. The sample was dominated by hawthorn/*Sorbus* roundwood stems (36.78g). The pomoideae growth rings were very close together, suggesting that they were fast-grown. It is possible that the pomaceous fruitwood fuel was obtained from hedgerows that had been regularly cropped. Blackthorn twigs were also present in the deposit and many were partially vitrified suggesting a high burning temperature. Several fragments, of both pomaceous fruitwood and blackthorn, had evidence of fungal hyphae, suggesting that dead or decaying wood had been gathered, probably for use as fuelwood.

FIGURE 4: CHARCOAL FROM ANGLO-SAXON FEATURES



Middle Saxon (AD 700–850). Period 7.2

Cremation burials 2.7 [20125] and 2.8 [20127], Settlement 5 (TEA 2)

Charcoal was analysed from two cremation burials 2.7 [20125] and 2.8 [20127], located c 8m to the south-east of SFB 2.5. A fragment of blackthorn (*Prunus spinosa*) charcoal recovered from the fill of Cremation Burial 2.7 produced a date of 760-410 cal BC (SUERC-91044), which is likely residual as human bone from the neighbouring Cremation Burial 2.8 returned a date of cal AD 770–950 (SUERC-91506). Oak was the dominant taxon in the fills (20124) and (20126) of both cremation burials, and a single fragment of wild cherry (*Prunus avium*) was also recovered from Cremation Burial 2.7.

Post-hole [53726], TEA 5

Charcoal was analysed from the charcoal-rich fill of isolated Post-hole [53726] in TEA 5 to determine whether the material derived from the in situ burning of the post. A fragment of blackthorn charcoal returned a date of cal AD 670–780 (SUERC-91045). The feature contained heavily fragmented charcoal and small twigs of pomoideae (1.2g) and blackthorn (0.1g) suggesting that the deposit did not derive

from the in situ burning of a post and more likely came from secondary deposition, perhaps of hearth waste.

DISCUSSION

Charcoal was examined from a variety of contexts dating from the Neolithic to the Saxon period at Alconbury. It is likely that all charcoal derived from fuel wood. The samples from the Bronze Age, Roman and Saxon cremation burials and the Iron age pit with evidence of in situ burning provide the clearest indication of this use. It is likely that the material within the ditches, gullies and sunken floor buildings is the result of redeposited fire-debris.

Taxonomic diversity was generally low in all periods. The Neolithic henge ditch was the most taxonomically diverse assemblage with three species - hazel, pomaceous fruitwood and *Prunus*-type - represented, albeit in small quantities. The charcoal was likely to derive from activity within the feature. The presence of fungal hyphae suggests that deadwood was gathered for use as fuel. Oak charcoal featured in all periods and was the abundant taxon in two of the three cremations analysed and almost exclusively, with the exception of a single *Prunus* sp. fragment in the Anglo-Saxon cremation, used in both. Oak was commonly used in cremation pyres (Ashbee 1960, 38, O'Donnell 2015) due to the long hot burn which dense oak heartwood provides (Barnett 2011, 114). It is also thought to have been commonly used during the cremation process as spars to support a body due to its strength (Cressey 2012).

Significantly, willow was the only taxon present in the third cremation, 5.279, which dates to the middle Roman period. The presence of willow/poplar within the cremation is interesting because the normally preferred and superior fuel wood of oak is known to have been available. This is evidenced by the presence of oak charcoal in nearby contemporary Roman features: an enclosure ditch, in TEA 5, and a pit fill, in TEA 4. There was no evidence of willow in any of the other periods at Alconbury. In Roman cremation ceremonies, smells were carefully managed using selected woods, perfume and incense (Toynbee, 1971; Williams, 2004, 276). It is plausible that aromatic willow was deliberately selected for use in this cremation, perhaps driven by the desire to create a distinctive smell (Barnett 2011).

The two features containing willow (Ditch 5.151 and Cremation 5.279) were both located in TEA 5, in relatively close proximity to Alconbury Brook, although it is acknowledged that the course of the river will have changed over time. Willow typically grows in damp or wet habitats and may have grown along the banks of local streams. The overall paucity of willow in the Alconbury assemblage suggests either that the ecological conditions which allow willow to flourish were potentially restricted. This may indicate that the Alconbury Brook and associated watercourses were kept clear of woody vegetation, or alternatively that willow was not considered suitable (Austin 2011), or was less desirable than other species, for exploitation.

Blackthorn and pomaceous fruitwood (eg hawthorn, whitebeam etc) formed the remaining component of the charcoal assemblage. All of the charcoal derived from small stem branch wood. Blackthorn was particularly abundant in the Iron Age deposits and Saxon Pit [20113]. The high occurrence of blackthorn and hawthorn may reflect some form of resource control or landscape maintenance (Austin 2011, 16).

Due to their thorny properties, blackthorn in particular, and hawthorn to a lesser extent, were frequently used in forming stock-proof hedgerows or fencing (Gale 2008). Pomaceous fruit woods burn slow and steady and provide excellent heat with minimal smoke (Gale and Cutler 2000). It is unclear whether, the charcoal resulted from hedge clippings or scrubby taxa growing around the site, but they certainly would have provided a good fuel source.

Overall, the charcoal assemblage from Alconbury suggests that from the Neolithic-early Bronze Age the landscape was open and lightly wooded with wood from few mature trees reaching the settlement. Scrubby taxa including blackthorn and perhaps hawthorn dominated the assemblage. It is likely that the scrubby taxa was either growing in marginal areas or formed hedgerows. Oak appears to have been favoured for cremation purposes and possibly structural purposes, and scrubby taxa, often deadwood was selected for use as fuel wood. Interestingly, with the exception of willow, no taxa commonly found in Fenland, on low lying ground near watercourses were recovered from the Alconbury charcoal assemblage.

Pollen evidence for Alconbury derives from an undated palaeochannel located in the northern area of TEA 5. The pollen assemblage accords with the plant and charcoal assemblage for Alconbury, which indicate that Alconbury was largely an open environment, with oak, hazel-type, sorbus (cherries and whitebeam) and alder buckthorn, which indicate small areas of local scrub (Grant 2024a).

The charcoal assemblage at Alconbury is very similar to the those recovered from various sites excavated in advance of the A428 Caxton Common to Hardwick Improvement Scheme (Abrams & Ingham 2008) and at Eaton Socon, in Cambridgeshire (Gale 2005) which were dominated by oak, blackthorn and the hawthorn (pomaceous fruitwoods).

REFERENCES

Abrams J and Ingham D 2008 *Farming on the Edge: Archaeological evidence from the clay uplands to the West of Cambridge*. East Anglian Archaeology Report No.123. Albion Archaeology

Ashbee P 1960 *The Bronze Age Round barrow in Britain*. London

Austin P 2011 'Charcoal macro-fossils' in Jones P, Marples N 'Excavations at North Park Farm, Bletchingley, Surrey The Medieval and Later Archaeology'. Surrey County Archaeology Unit. https://www.surreycc.gov.uk/__data/assets/pdf_file/0007/195694/2_Area-A-NPF-05-medieval-compressed_compressed.pdf

Barnett C 2011 'Wood charcoal' in Barnett C, McKinley JI, Stafford E, Grimm JM and Stevens CJ *Settling the Ebbsfleet Valley. High Speed 1 Excavations on Springhead and Northfleet, Kent. The Late Iron Age, Roman, Saxon, and Medieval Landscape. Vol 3: Late Iron Age to Roman Human remains and Environmental reports*. Oxford/Salisbury

Cressey M 2012 'Charcoal' in Johnson M and Cameron K *An Early Bronze Age Cremation Cemetery and Mesolithic pit at Skillmafilly, near Maud, Aberdeenshire*. Scottish Archaeological Internet Report 53, 2012

https://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-310-1/dissemination/pdf/sair53.pdf

Gale RA and Cutler D 2000 *Plants in Archaeology: Identification manual of artefacts of plant origin from Europe and the Mediterranean*. Westbury and the Royal Botanic Gardens Kew

Gale RA 2005 Romano-British rural site at Eaton Socon, Cambridgeshire. *Proceedings of the Cambridge Antiquarian Society 94*. Vol 94, 21–38

Gale, RA 2008 'Appendix 16: Charcoal' in Abrams, J and Ingham, D *Farming on the Edge: Archaeological evidence from the clay uplands to the West of Cambridge*. East Anglian Archaeology Report No.123. Albion Archaeology.

Grant M 2024a *A14 Cambridge to Huntingdon, Cambridgeshire: Alconbury pollen*. MOLA Headland Infrastructure. DOI

O'Donnell L 2015 'The power of the pyre-A holistic study of cremation focusing on charcoal remains'. *Journal of Archaeological Science* 65, 161–171

Prior J and Alvin K L (1983) Structural changes on charring woods of Dichrostachys and Salix from southern Africa. IAWA Bull.n.s.4:197–206.

Pullen A 2024 *A14 Cambridge to Huntingdon, Cambridgeshire: Alconbury Landscape Block Analysis Report*. MOLA Headland Infrastructure. DOI

Schweingruber FH 1990 *Microscopic Wood Anatomy* (3rd edn). Stuttgard: Paul Hupt Berne and Stuttgard Publishers

MOLA London
Mortimer Wheeler House | 46 Eagle Wharf Rd
London N1 7ED

MOLA Northampton
Bolton House | Wootton Hall Park
Northampton NN4 8BN

MOLA Birmingham
Ground Floor | One Victoria Square
Birmingham B1 1BD

MOLA Basingstoke
Unit 2 Chineham Point | Crockford Lane
Basingstoke RG24 8NA

Headland Archaeology South & East
Building 68C | Wrest Park | Silsoe
Bedfordshire MK45 4HS

Headland Archaeology Midlands & West
Unit 1 | Clearview Court | Twyford Rd
Hereford HR2 6JR

Headland Archaeology Yorkshire & North
Units 23–25 & 15 | Acorn Business Centre | Balme Road
Cleckheaton BD19 4EZ

Headland Archaeology Scotland
13 Jane St
Edinburgh EH6 5HE

Headland Archaeology North West
Fourways House | 57 Hilton Street
Manchester M1 2EJ

www.molaheadland.com