

Centre for Archaeology Report 18/2002

**Tree-Ring Analysis of Oak Timbers from the Abbey Farm Barn  
and Cottage, Thetford, Norfolk - Revisited**

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ISSN 1473-9224

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## **Tree-Ring Analysis of Oak Timbers from the Abbey Farm Barn and Cottage, Thetford, Norfolk - Revisited**

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### **Summary**

This report summaries the reanalysis of a series of fifteen samples from the Abbey Farm barn and cottage originally studied in AD 1992. The reanalysis was undertaken following the completion of an extensive dendrochronological study commissioned by English Heritage in AD 1999. In addition to the three samples successfully dated previously from the eastern half of the barn, a further six samples, one from the western half of the barn and five from the cottage, were dated. These are clearly contemporaneous with the fifteenth-century felling phases identified for the western half of the barn and the cottage during the more extensive study.

### **Keywords**

Dendrochronology  
Standing Building

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**TREE-RING ANALYSIS OF OAK TIMBERS FROM THE ABBEY FARM BARN AND COTTAGE,  
THETFORD, NORFOLK – REVISED REPORT**

**Introduction**

This document is a technical archive report on the dendrochronological analysis of timbers from the barn and cottage, Abbey Farm, Thetford (TL865835), and is a component part of a comprehensive study of the building. It is beyond the dendrochronological brief to describe the building in detail or to undertake the production of detailed drawings. As part of a multidisciplinary study of the building, elements of this report may be combined with detailed descriptions, drawings, and other technical reports to form a comprehensive publication on the building. The conclusions presented here may therefore have to be modified in the light of subsequent work.

In AD 1992 a very limited dendrochronological analysis was undertaken on behalf of English Heritage on the barn and cottage at Abbey Farm (Groves and Hillam 1993). This resulted in the dating of only three timbers, all tiebeams, from the eastern half of the barn. These tiebeams were felled just pre-dissolution and hence did not appear to support the post-dissolution mid sixteenth-century date proposed on architectural evidence. The report concluded that an extensive dendrochronological programme, preferably carried out in conjunction with a detailed structural survey, was required in order to elucidate the potentially complex development of the barn and cottage.

In late AD 1999 English Heritage commissioned a survey which was to incorporate additional dendrochronological analysis. Sadly due to other commitments the author was unable to undertake this additional dendrochronological work but Nottingham University Tree-Ring Dating Laboratory (NUTRDL) stepped into the breach. Following the completion of the AD 2000 study it was decided that the AD 1992 material should be reanalysed to determine whether some of the previously undated timbers could now be dated. The description of the locations of the AD 1992 samples have been revised so that they are compatible with that utilised in Howard *et al* (2000). This report replaces the Ancient Monuments Laboratory Report 34/93 (Groves and Hillam 1993).

The results from the recent analysis (Howard *et al* 2000) indicate that the cottage and the western end of the barn were both likely to have been constructed in the first half of the fifteenth century. The felling date range for the timbers from the cottage is AD 1405-30, whilst that from the western end of the barn is AD 1414-39. The cottage may actually pre-date the western end of the barn by a few years. The cottage also contains an inserted timber felled sometime after AD 1445. The eastern end of the barn appears to be built primarily using timbers felled in the period AD 1533-6. There is also some re-used timber associated with the initial phase of construction of the eastern end of the barn which was probably felled in the first half of the fifteenth century and is thus potentially contemporary with the

erection of the cottage and western end of the barn. A construction date shortly after felling in AD 1628 is indicated for the replacement roof at the east gable end of the barn.

### **Methodology**

Professional practice at the Sheffield Dendrochronology Laboratory follows that described in English Heritage (1998). The methodological details used for the dendrochronological analysis of the cores from the barn and cottage are given in Groves and Hillam (1993). The computer programs used for the reanalysis were written by Tyers (1999).

### **Results and Interpretation**

Details of the samples and their locations are given in Figures 1-4 and Table 1. The ring sequences from all the individual samples analysed in AD 1992 were compared with both the new site master chronologies, THTASQ01 and THTASQ02, as well as all the ring sequences from the individual samples analysed in AD 2000 (Howard *et al* 2000).

The three previously dated samples B1, B2, and B3 match the group one site master chronology, THTASQ01 (Fig 5; Tables 1 and 2). Not surprisingly they also match very well both visually and statistically with the AD 2000 samples THT-A04 and THT-A05 (Table 3). The central section of the truss 5 tiebeam (Fig 1) appears to have been cut away. The northern section provided samples B3 and THT-A04, whereas THT-A05 was obtained from the southern section. These five dated samples therefore represent three tiebeams (trusses 5, 7, and 8) associated with the eastern half of the barn. It was suggested in Groves and Hillam (1993) that the felling of these tiebeams occurred during the period AD 1532-c40 and it now seems likely that they were contemporary with the major phase of felling activity associated with the eastern end of the barn in the period AD 1533-6 (Howard *et al* 2000).

The ring sequence from B4, the tiebeam from truss 3 in the western half of the barn, matches the group two site master chronology, THTASQ02, and therefore spans the period AD 1306-98 (Fig 5; Tables 1 and 2). It shows particularly high similarity with THT-A25, THT-A26, and THT-A27, which are braces to the crown-posts of trusses 2 and 3 (Table 4), suggesting that these timbers may have been derived from the same tree. B4 is likely to be contemporary with the AD 1414-39 felling date indicated for the western half of the barn in Howard *et al* (2000).

Five timbers from the cottage (C1-C5) can also now be dated by comparison with the AD 2000 material (Fig 5; Tables 1 and 2). They appear likely to be contemporary with the AD 1405-30 felling activity associated with the cottage (Howard *et al* 2000). Samples C3 and THT-A77 are both from the

north arcade post of cross-frame 2 (ie the central aisle truss), whilst the south lower arcade plate provided samples C5 and THT-A78.

Samples C6 and THT-A79 are also both obtained from the south upper arcade plate. However this and the other samples from the AD 1992 analysis remain undated.

### **Discussion**

The dates of all timbers from both analyses is summarised in Figure 5. This diagram shows the felling date obtained for each individual sample using the 15-40 range generally applied by NUTRDL (Howard *et al* 2000).

It is apparent from Figure 5 that the timber used in the cottage tends to be derived from shorter-lived trees than those used in either end of the barn, with the possible exception of the seventeenth-century replacement roof material. This difference is further highlighted in Figure 6 which shows that not only are the cottage timbers derived from shorter-lived trees but that they also tend to be faster grown trees. This implies that the cottage timbers were likely to have been obtained from a relatively open environment for tree growth. In contrast the bulk of the material used in the early to mid fifteenth-century western end of the barn and the immediately pre-dissolution eastern end of the barn appears to be derived from slower grown, longer-lived trees which have grown in a more dense woodland environment.

The dating evidence presented in Howard *et al* (2000) implies that all of the timbers are from a local source. The two types of material used in the first half of the fifteenth-century appear to form a coherent group and it may simply be that the cottage material was obtained from the edge of the same woodland source as the material used in the western end of the barn. The sixteenth-century material, although clearly local, does not crossmatch the fifteenth-century material particularly well ( $t = 3.37$ , overlap 97 years), suggesting that it may have been derived from a different woodland source within the area.

The felling dates of AD 1533, AD 1534, and AD 1536 produced for the eastern end of the barn implies that it was constructed just pre-dissolution but apparently using some short-term stockpiled material. However it is perhaps worth considering whether this variation in the precise felling dates and the clear implication for stockpiling may actually allow the construction to be pushed slightly later, possibly immediately post-dissolution.

### Conclusion

This reanalysis has been successful in that it has provided dating evidence for several additional timbers, the dating of which has only been made possible with the extended sampling programme instigated at the barn and cottage. Although the dating of these few extra timbers has not altered the overall interpretation of the dendrochronological dating evidence presented in Howard *et al* (2000) it has ensured that the AD 1992 work has now been updated and made available for incorporation into any future investigation of the buildings.

### Acknowledgements

The analysis was funded by English Heritage. I would like to thank Robert Howard of Nottingham University Tree-Ring Dating Laboratory for making the raw data available and also both Alex Bayliss and Richard Bond of English Heritage for comments on an earlier draft of this report.

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Table 1: Details of the samples from the barn and cottage, Abbey Farm, Thetford, sampled for dendrochronological analysis

Number of rings - total number of measured; + – indicates unmeasured rings; ARW - average ring width in millimetres per year; cross-section dimensions - maximum dimensions of the cross-section in millimetres

Sample	Timber function/location	Total number of rings	Sapwood	ARW	Date of measured ring sequence	Comment
<u>Barn</u>						
B1	truss 8, tiebeam	62+	9	2.25	AD 1461-1522	+6-8 sapwood rings
B2	truss 7, tiebeam	61+	16	2.07	AD 1470-1530	+2 sapwood rings
B3	truss 5, tiebeam (north section)	53+	4	2.14	AD 1464-1516	+15-25 sapwood rings to bark edge
B4	truss 3, tiebeam	92		1.27	AD 1306-1398	-
B5	truss 2, tiebeam	-		-	-	rejected
B6	truss 6, south wall post	46		3.38	-	-
B7a	truss 5-6, south wall plate	-		-	-	rejected
B7b	truss 5-6, south wall plate	-		-	-	rejected
<u>Cottage</u>						
C1	bay 3, north lower arcade plate (east section)	47+		2.12	AD 1345-1391	+10 rings
C2	bay 3, north lower arcade plate (west section)	60		2.22	AD 1319-1378	
C3	cross-frame 2, north arcade post	40+		2.22	AD 1328-1367	+20-25 rings
C4	cross-frame 2, tiebeam	54	hs	2.13	AD 1336-1389	full sapwood present but not sampled due to poor condition
C5	bay 3, south lower arcade plate	59	?hs	1.99	AD 1336-1394	full sapwood present but not sampled due to poor condition
C6	bay 3, south upper arcade plate	58	?hs	1.64	-	full sapwood present but not sampled due to poor condition
C7	cross-frame 2, south queen post	-		-	-	rejected; core fragmented
C8	cross-frame 2, dragon tie linking north upper arcade plate to tiebeam	57		1.47	-	-

Table 2: Matrix showing the *t* values obtained between the dated samples from the AD 1992 analysis (B1-4; C1-5) and the site master chronologies and dated samples from the AD 2000 analysis (tht-ann). \ = overlap < 15 years; - = *t* values less than 3.50

Sample	B1	B2	B3	B4	C1	C2	C3	C4	C5
THTASQ01									
tht-a01	5.16	4.11	-	\	\	\	\	\	\
tht-a02	4.31	3.64	-	\	\	\	\	\	\
tht-a04	14.29	13.08	17.73	\	\	\	\	\	\
tht-a05	4.53	5.94	10.13	\	\	\	\	\	\
tht-a08	-	-	-	-	4.35	-	-	-	-
tht-a09	4.99	-	3.80	\	\	\	\	\	\
tht-a13	\	\	\	3.67	-	-	-	-	3.85
tht-a17	4.95	3.67	-	\	\	\	\	\	\
tht-a34	-	-	-	-	\	\	\	\	4.54
tht-a35	3.59	5.18	3.51	-	\	\	\	\	\
tht-a37	-	4.75	4.30	-	5.49	\	\	-	5.73
tht-a40	-	3.97	-	\	\	\	\	\	\
tht-a49	3.52	4.81	-	\	\	\	\	\	\
tht-a50	3.85	3.88	-	\	\	\	\	\	\
tht-a52	-	-	-	-	-	-	-	-	3.56
tht-a54	\	\	\	-	4.77	-	\	-	6.15
tht-a60	4.62	4.85	4.40	\	\	\	\	\	\
tht-a71	\	\	\	3.64	-	\	\	-	-
THTASQ02									
tht-a11	\	\	\	4.80	-	-	-	-	-
tht-a12	\	\	\	4.83	\	-	\	\	\
tht-a21	\	\	\	4.36	\	-	-	\	\
tht-a22	\	\	\	3.81	\	-	\	\	\
tht-a23	\	\	\	4.47	-	-	-	-	-
tht-a24	\	\	\	4.78	-	-	-	-	-
tht-a25	\	\	\	12.89	-	5.12	4.23	-	-
tht-a26	\	\	\	11.70	-	4.63	-	-	-
tht-a27	\	\	\	10.20	-	5.14	-	-	-
tht-a28	\	\	\	4.17	-	-	-	-	-
tht-a29	\	\	\	7.77	-	5.67	-	-	-
tht-a30	\	\	\	6.07	5.27	3.70	-	-	4.36
tht-a31	\	\	\	5.60	-	6.35	-	6.63	-
tht-a32	\	\	\	-	4.17	-	-	-	-
tht-a41	\	\	\	3.99	-	3.66	-	-	-
tht-a42	\	\	\	9.04	-	4.70	-	-	-
tht-a43	\	\	\	4.84	-	3.83	-	-	-
tht-a44	\	\	\	9.30	-	4.27	-	-	-
tht-a45	\	\	\	4.90	-	3.73	-	-	-
tht-a46	\	\	\	7.29	-	4.63	-	-	-
tht-a47	\	\	\	6.38	\	-	\	\	\
tht-a48	\	\	\	4.85	-	-	-	-	-
tht-a55	\	\	\	3.52	-	4.43	-	5.18	-
tht-a69	\	\	\	-	7.02	-	-	-	5.44
tht-a75	\	\	\	5.10	4.10	4.84	-	3.69	3.93
tht-a76	\	\	\	-	5.48	5.00	3.65	5.42	4.64
tht-a77	\	\	\	-	4.48	4.19	11.48	5.56	5.63
tht-a78	\	\	\	4.20	-	-	4.48	3.89	6.90
tht-a80	\	\	\	5.65	5.37	4.36	4.66	6.58	7.01
tht-a81	\	\	\	4.08	-	-	-	-	4.19



Table 3: Matrix showing the  $t$  values obtained between the five dated samples from the tiebeams from trusses 5, 7, and 8 in the eastern end of the barn

Sample	B2	B3	tht-a04	tht-a05
B1	10.10	10.35	14.29	4.53
B2		9.69	13.08	5.94
B3			17.73	10.13
tht-a04				5.63

Table 4: Matrix showing the  $t$  values obtained between the four dated samples from the truss 3 tiebeam and the braces from trusses 2 and 3 in the western end of the barn

Sample	tht-a26	tht-a27	B4
tht-a25	11.57	8.42	12.89
tht-a26		13.73	11.70
tht-a27			10.20

Figure 1: Plan of Abbey Farm barn showing the position of the trusses and the approximate location of the samples

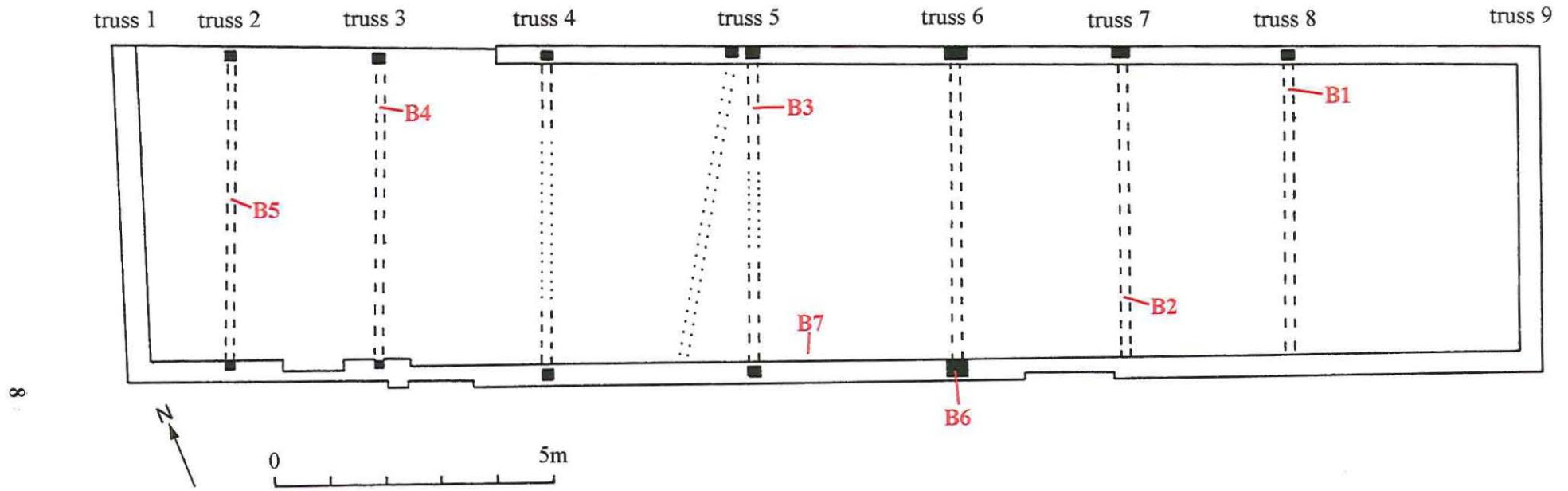


Figure 2: Plan of Abbey Farm cottage showing the position of the trusses

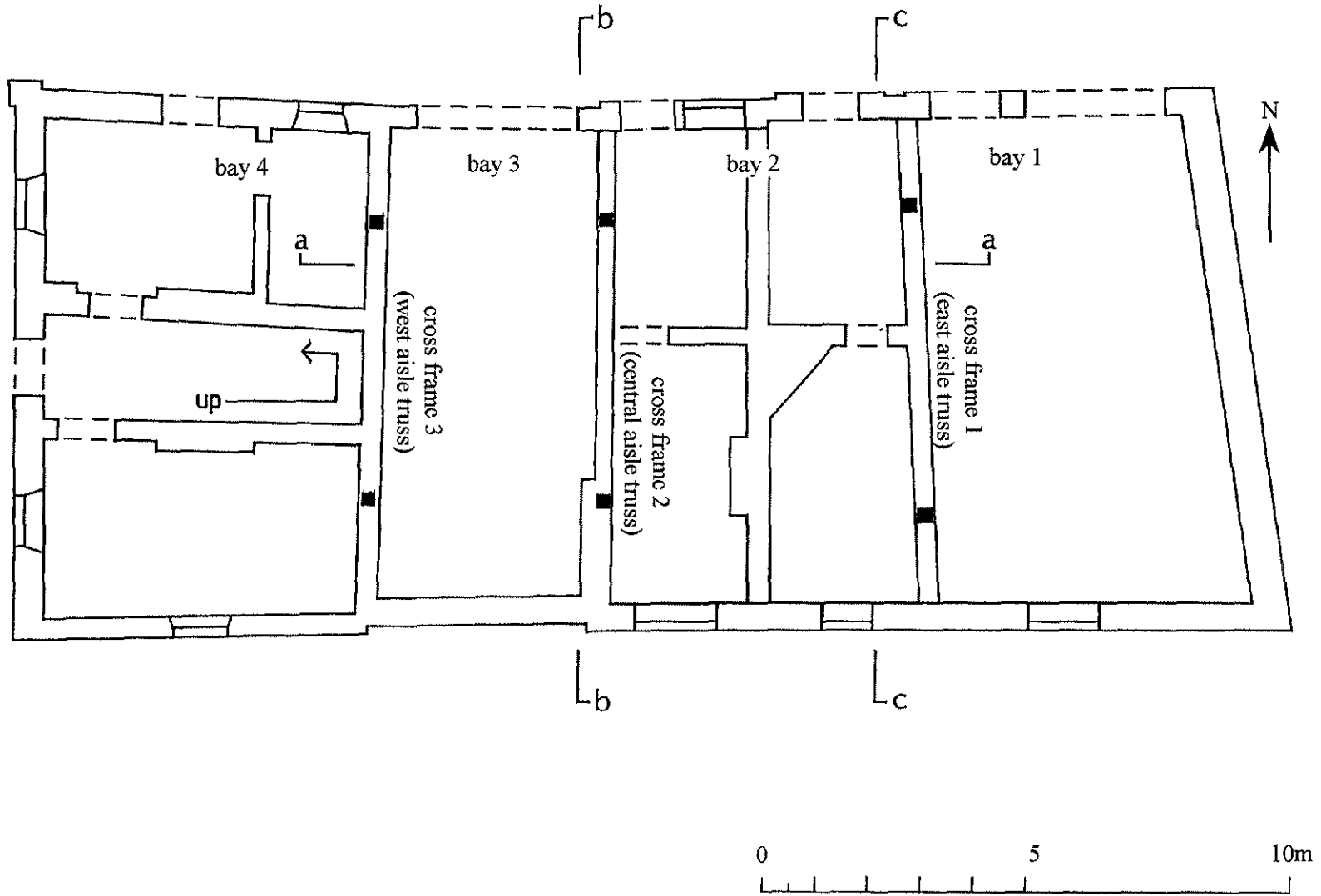


Figure 3: Diagram showing cross-frame 2 (central aisle truss) viewed from the west, section b-b, Abbey Farm cottage, showing the location of the samples

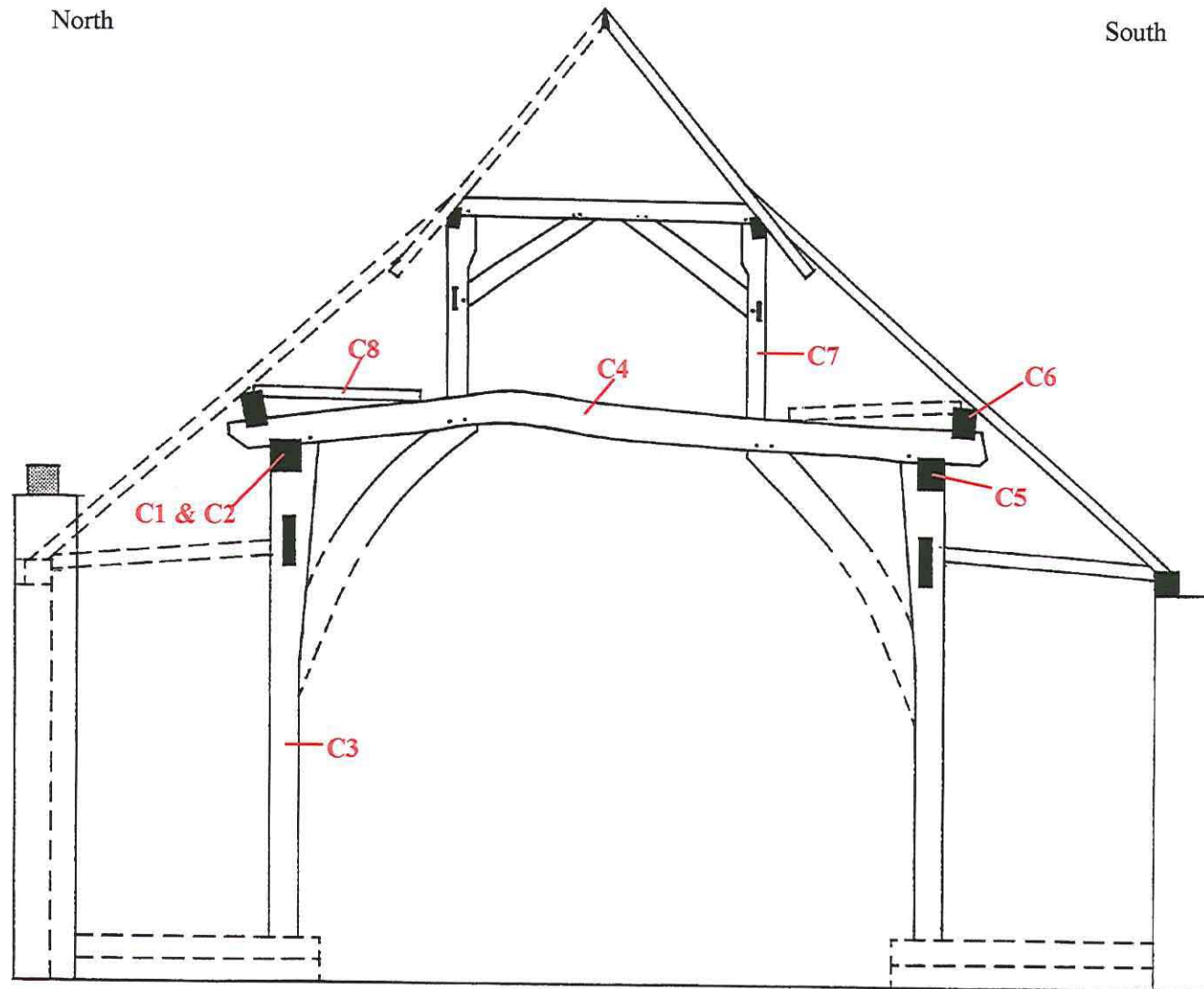


Figure 4: Diagram showing the long section a-a of Abbey Farm cottage, viewed from the south, showing the location of the samples

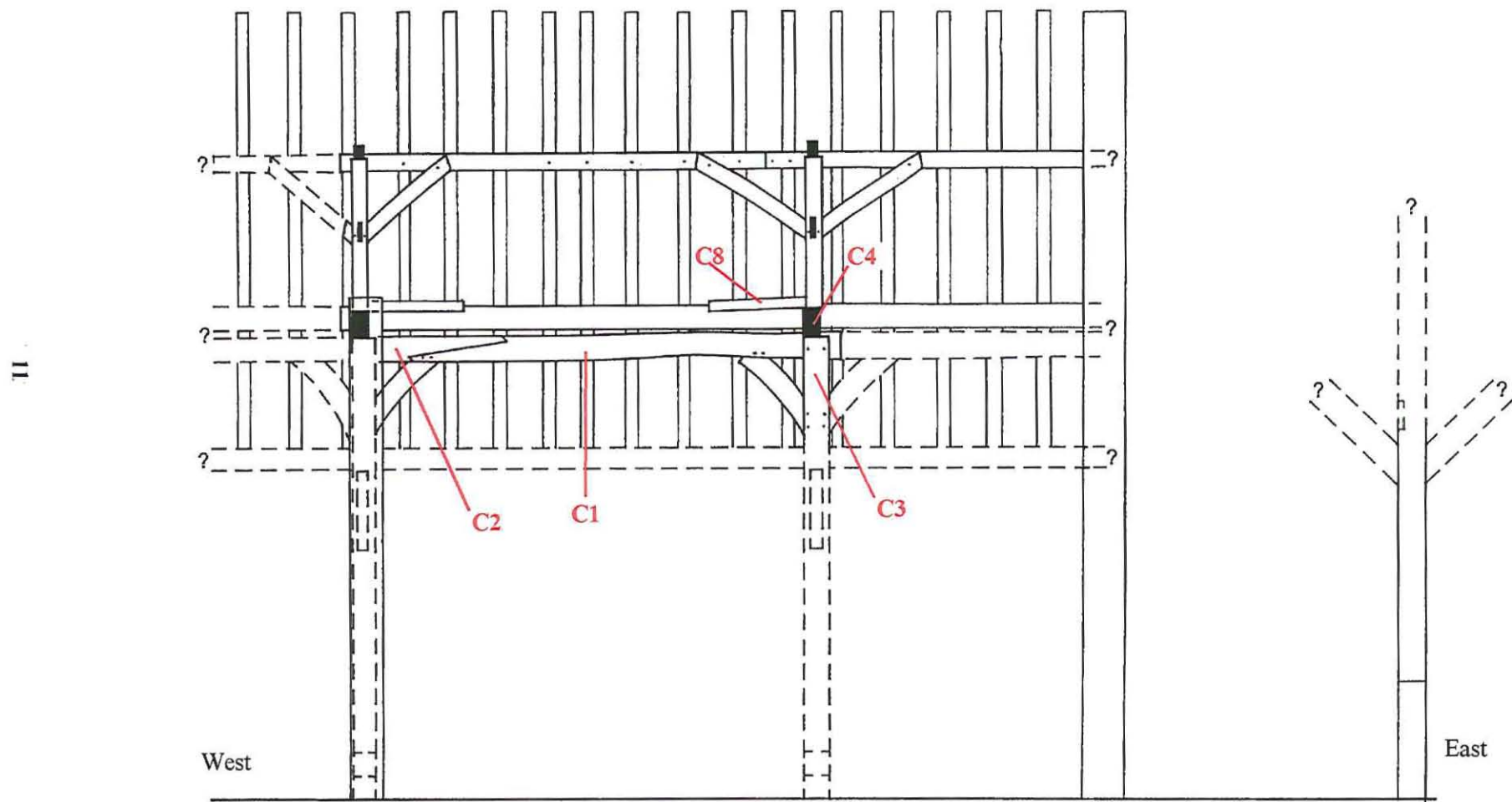
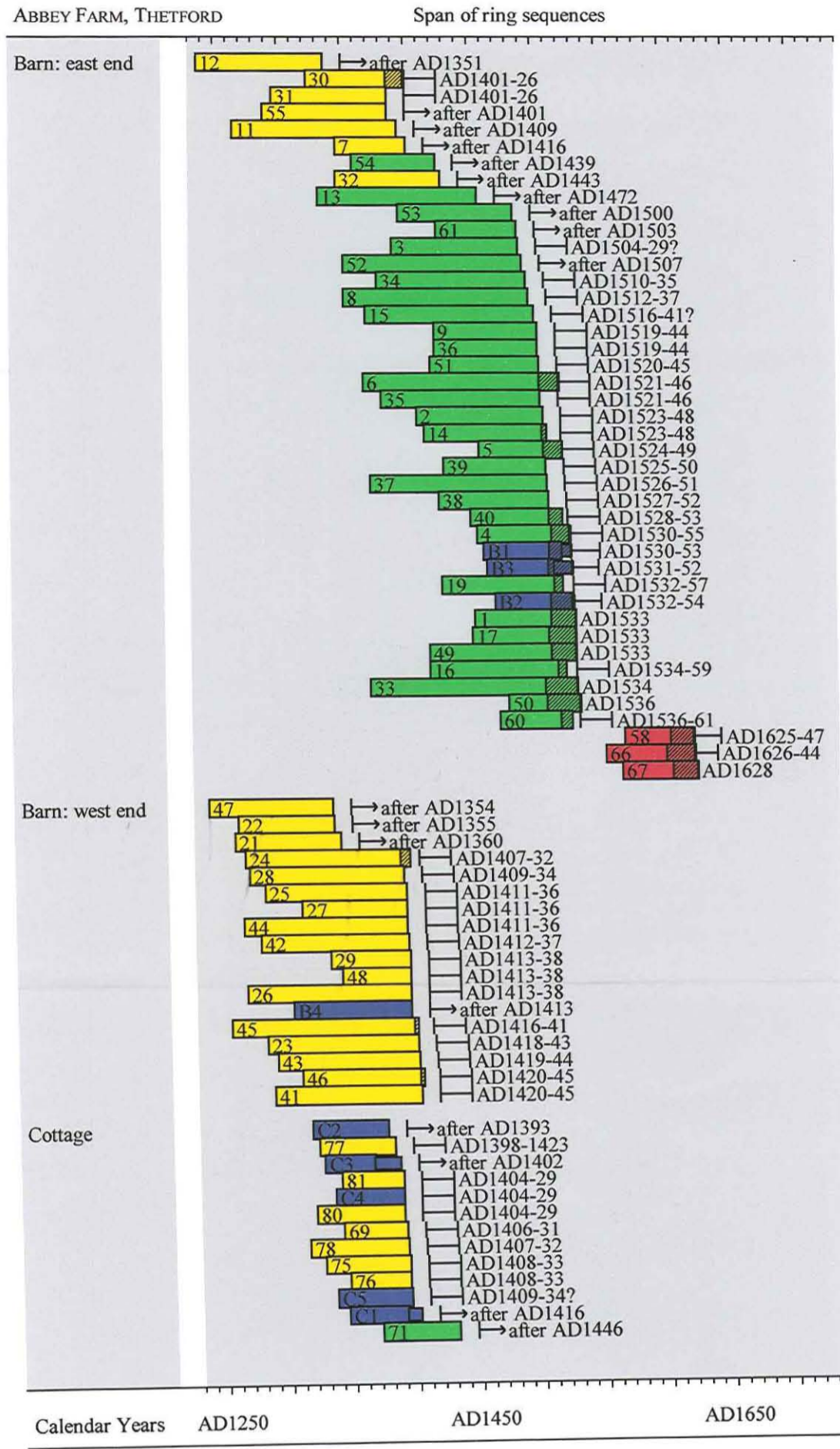


Figure 5: Bar diagram showing all dated ring sequences, and their individual felling dates, from the barn and cottage, Abbey Farm, Thetford. ■ - AD 1992 samples; ■ - AD 2000 samples included in THTASQ01; ■ - AD 2000 samples included in THTASQ02, ■ AD 2000 samples included in THTASQ03



Key

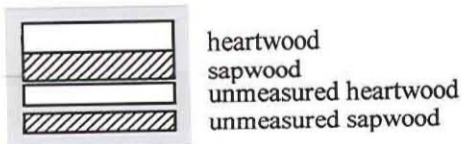


Figure 6: Diagram comparing the ring sequence length and average ring widths of the timbers from the cottage, barn west end, and barn east end. Note that the ring sequence length is generally an under estimate of tree age

