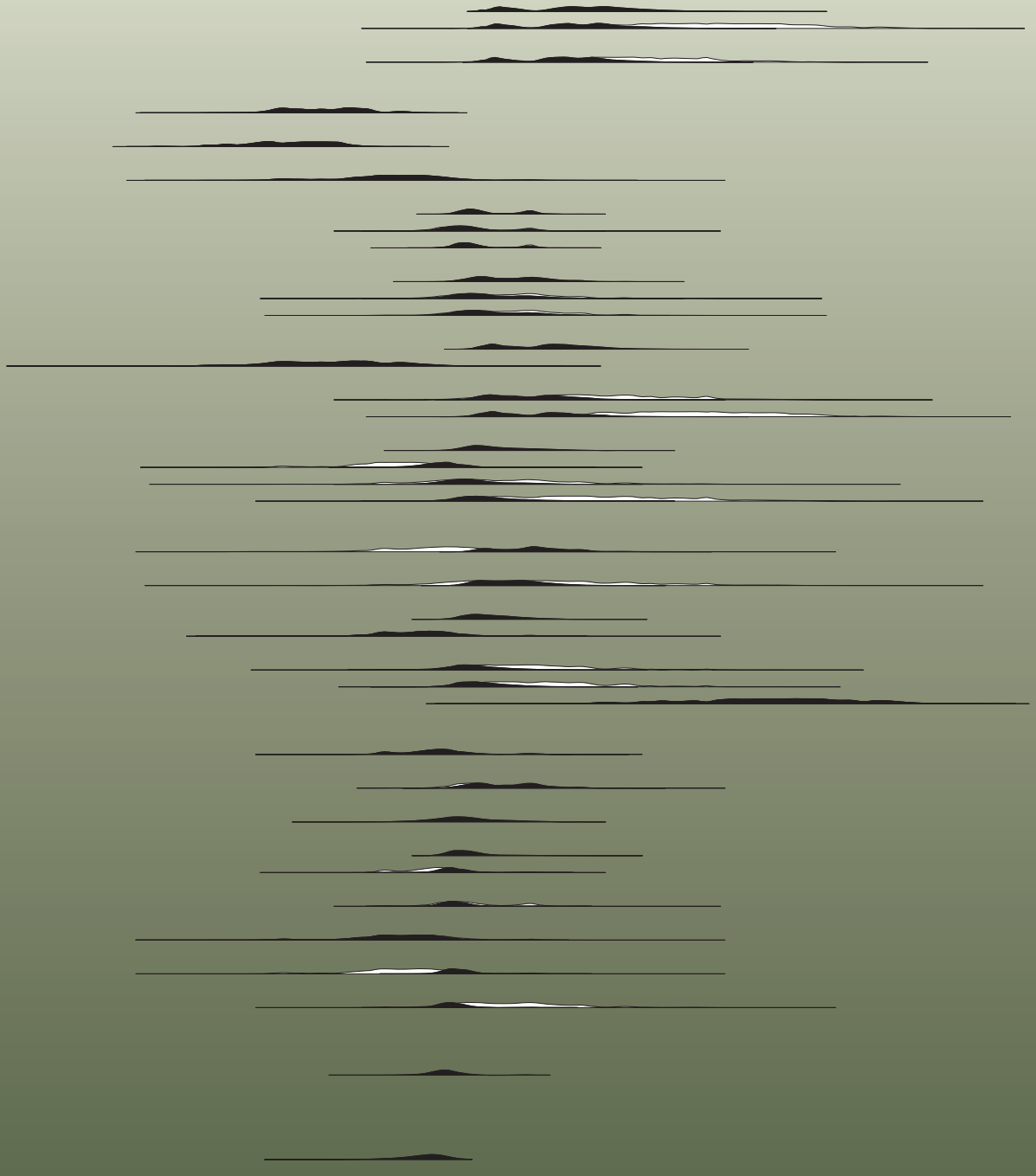
Landscape Evolution in the Middle Thames Valley
Heathrow Terminal 5 Excavations Volume 2

Absolute Dating

(Section 20)



by Frances Healy et al.

SECTION 20

ABSOLUTE DATING

by Frances Healy, Nancy Beavan Athfield, Gordon Cook, Nick Debenham, Alan Hogg, Christine Prior, Christopher Bronk Ramsey, Edward J. Rhodes, Jean-Luc Schwenninger

Introduction

Ten thermoluminescence (TL) dates, 23 optically stimulated luminescence (OSL) dates and 82 radiocarbon dates have been obtained from Perry Oaks and Terminal 5. They are listed and provenanced in Tables 1 (TL), 2 (OSL), 3 (radiocarbon dates in laboratory number order) and 4 (radiocarbon dates grouped contextually, in the order in which they appear in the figures).

This section attempts to model them in a Bayesian framework with a view to refining the chronology of the Holocene occupation of the area. The samples were initially selected with a view to dating particular contexts or objects, rather than as part of an overall strategy. This imposes limitations on the modelling, notably in the frequency of isolated measurements. The accuracy of these cannot be checked against other measurements from the same or related contexts and, where they do not form part of sequences, their probability distributions cannot be constrained by their stratigraphic relation to other measurements.

Dating Methods

Thermoluminescence

The TL measurements, all on burnt flint, were made by Dr N.C. Debenham of Quaternary TL Surveys using the methods described at http://www.users.globalnet.co.uk/~qtls/flint.htm. The underlying principles are described by Duller (2008 and references therein).

Optically stimulated luminescence

The OSL measurements were made by Drs E.J. Rhodes and J.-L. Schwenninger of the Oxford University Research Laboratory for Archaeology and the History of Art by the methods described by Rhodes (2004). One was measured on polymineral grains from a sherd, the remainder on sand-sized quartz grains from sediments,. While the underlying principles are the same as for TL (Duller 2008), the method relies on exposure to sunlight prior to burial, rather than heating by fire, to set the sample's luminescence 'clock' to zero. This being a gentler and more protracted process than firing, zeroing may not be total. Furthermore, since samples are made up of mineral grains, the mobility of individual grains, for example in the course of bioturbation, may lead to the presence in a sample of grains exposed to sunlight at different times.

Radiocarbon

Five of the samples were cremated human bone, one was unburnt human bone, six were charcoal, 21 were charred plant macrofossils, eight were waterlogged plant macrofossils, one was waterlogged rope, 33 were waterlogged wood, one was of mineral-preserved wood and four were of sediment. Bone and bone collagen were badly preserved: six further animal bone samples and one further human bone sample were submitted but failed to date. In one case dating was abandoned because a nitrogen yield of less than 0.1% was below the threshold of 0.76% for a collagen yield adequate for radiocarbon dating (Brock *et al.* 2007).

HAR-4823, from an excavation pre-dating the Framework Archaeology projects, was prepared by the methods described by Otlet (1977) and dated by Liquid Scintillation Counting (LSC), as described by Otlet (1979), at the Isotope Measurements Laboratory, Harwell. Thirteen samples (Wk-9367, -10023 to -10027, -10029, -10030, -10032, -10035, -10036, -11712, -11773) were dated by LSC at The University of Waikato laboratory, Hamilton, New Zealand, using the methods described by Higham and Hogg (1997).

The remainder were dated by Accelerator Mass Spectrometry (AMS). Of the eight samples submitted to the Oxford Radiocarbon Accelerator Unit, OxA-15595, -17822 and -17823 were prepared and dated according to the procedures described by Hedges

et al. (1989) and Bronk Ramsey *et al.* (2004); and those for OxA-16126, -16127, -16320, -18031 and -18032, all cremated bone, were prepared as described by Lanting *et al.* (2001) and measured as outlined by Bronk Ramsey *et al.* (2004). Samples NZA-14901 to -14907 were prepared as described at htpp://www.gns.cri.nz/nic/rafterradiocarbon/samprep.htm and dated at the Rafter Radiocarbon Laboratory at the Institute of Geological and Nuclear Sciences Ltd, Lower Hutt, New Zealand by the methods described by Zondervan *et al.* (2007). Wk-9371, -9373 to -9377, -10028, -10031, -10033, -10034, -11473, -12279, -18456, -18457, -18459 to -18466, -18573 to -18581, -19326 to -19343 and -21695 were prepared and graphitised at Waikato using methods described by Petchey and Higham (2000) and Slota *et al*. (1987), and measured at the Rafter Laboratory as described by Zondervan *et al*. (2007). SUERC-11569 to -11571, submitted to the Scottish Universities Environmental Research Centre Radiocarbon Laboratory, were graphitised as described by Slota *et al.* (1987) and measured at the SUERC AMS Laboratory as described by Xu *et al.* (2004).

All these laboratories maintain continual programmes of quality assurance procedures, in addition to participation in international inter-comparisons (Scott 2003). These tests indicate no laboratory offsets and demonstrate the validity of the precision quoted.

The results reported in Tables 3 and 4 are conventional radiocarbon ages (Stuiver and Polach 1977), quoted according to the standards established by the Trondheim convention (Stuiver and Kra 1986). The calibrated date ranges (95% confidence intervals) were calculated by the maximum intercept method (Stuiver and Reimer 1986) and rounded outwards to the nearest 10 years, following Mook (1986). The probability distributions of the calibrated dates shown in the graphs were calculated by the probability method (Stuiver and Reimer 1993). Calibration and modelling were undertaken using OxCal v4.1 (Bronk Ramsey 1995; 1998; 2001; in press) and the IntCal04 dataset (Reimer *et al.* 2004).

Bayesian modelling

The Bayesian approach to the interpretation of archaeological chronologies has been described by Buck *et al.* (1996). It proceeds from the principle that, although the calibrated age ranges of radiocarbon measurements accurately estimate the calendar ages of the samples themselves, it is the dates of archaeological events associated with those samples that are important. Its basis is Bayes' theorem (Bayes 1763). This means that new data collected about a problem (the 'standardised likelihoods') are analysed in the context of existing experience and knowledge about that problem (the 'prior beliefs'), leading to a new understanding of the problem which incorporates both (the 'posterior belief'). A posterior belief can in turn become a prior belief, informing the collection of new data and their interpretation as the cycle repeats.

In terms of dating an archaeological site (Bayliss and Bronk Ramsey 2004), radiocarbon or other scientific dates are the 'standardised likelihoods' component of the chronological model. These dates are interpreted within the framework of understanding of the site, the taphonomy of the dated samples, and the stratigraphic relationships of the deposits from which they were recovered. This additional information forms the 'prior beliefs' component of the model. Together, these strands of evidence make it possible to suggest dates for when the site was in use. These are the 'posterior beliefs' that are the outputs of the model.

In practice the most commonly employed prior information consists of stratigraphic relationships: if sample B was stratified above sample A and both were contemporary with their contexts then B must be later than A. The second most commonly employed prior information is the assumption that the events concerned occurred within a bounded phase, in other words that they started, continued uniformly, and ended, and that the samples are randomly distributed throughout that phase. The boundaries of such a phase counteract the scatter derived from the errors attached to radiocarbon dates, an effect of which is that, within any group of dates relating to a period of activity, a proportion of the probability distributions will fall earlier or later than its actual span, making it appear to start earlier and finish later than it actually did (Steier and Rom 2000; Bronk Ramsey 2000). In practice, the uniform assumption is elastic, applicable to sites continuously inhabited, used for a week once a year or used

once by each generation. A quantified illustration of just how wrong this assumption has to be before the outputs of a model are misleading is provided by Bayliss *et al.* (2007).

An OxCal model specifies the known or assumed relative ages of the radiocarbon samples. The program calculates the probability distributions of the individual calibrated radiocarbon results, then attempts to reconcile these distributions with the relative ages of the samples, by repeatedly sampling each distribution to build up the set of solutions consistent with the structure of the model. This process produces a posterior density estimate of each sample's calendar age, which occupies only part of the calibrated probability distribution (the prior distribution of the sample's calendar age). The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal v4.1 (http://c14.arch.ox.ac.uk/). Details of the algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001; in press). The posterior distribution is then compared to the prior distribution and an index of agreement is calculated that reflects the consistency of the two distributions. If the posterior distribution is situated in a high-probability region of the prior distribution, the index of agreement is high (sometimes 100 or more). If the index of agreement falls below 60 (a threshold value analogous to the 0.05 significance level in a χ^2 test) the radiocarbon result is regarded as inconsistent with the sample's calendar age, if the latter is consistent with the sample's age relative to the other dated samples. Sometimes this merely indicates that the radiocarbon result is a statistical outlier (more than two standard deviations from the sample's true radiocarbon age), but a very low index of agreement may mean that the sample is redeposited or intrusive (i.e. that its calendar age is different to that implied by its stratigraphic position).

An overall index of agreement ($A_{overall}$) calculated from the individual agreement indices, provides a measure of the consistency between the archaeological phasing and the radiocarbon results. A further index of agreement (A_{model}) indicates whether the model as a whole is likely, given the data. Both of these have a threshold value of 60. It is also possible to calculate distributions for the dates of events that have not been dated directly, such as the beginning and end of a continuous phase of activity (which is represented by several radiocarbon results), and for the durations of phases

of activity or hiatuses between such phases. Another estimated parameter which is used here is provided by the Last function, which returns the last event in a stratigraphic group represented by more than one measurement (e.g. Fig. 6: *Last end 527085*). It is employed on the grounds that the latest object in a context will be closest in age to its formation.

Posterior density estimates are cited in italics, e.g. '*WK-10024'* or *'1450–1370 cal BC (95% probability'*, to distinguish them from dates based on independent scientific information alone. In the figures which accompany this report these are shown solid, with the unmodelled probability distributions shown in outline. A question mark following the name of a distribution (e.g. Fig. 11: SUERC-11569?) shows that it has been excluded from the model, for reasons given in the text, and hence does not contribute to the overall results, although it is still shown on the figure. In these cases no posterior density estimates are calculated, and the entire probability distribution is shown solid.

The structure of the models is defined by the square brackets at the left hand margins of the graphs. In the case of a poplar wood bowl (sf 12045) on which more than one measurement has been made, a weighted mean (Ward and Wilson 1978) was taken of the results before calibration so that the same event did not contribute disproportionately to the overall result. The results of χ^2 tests are expressed in the form 'T'=x; T'(5%)=y; ν=z', where T' is the χ^2 value calculated, T'(5%) is the figure above which T' should not rise if the values examined are statistically consistent at 95% confidence, and ν is the degrees of freedom.

Samples and their contexts

The results cannot be correct unless the dates employed have been measured on samples which were contemporary with, or at least very close in age to, their contexts when incorporated. Articulated bone provides ideal samples, because it must still have been connected by soft tissue and hence not long dead when it reached its context (Mant 1987). Objects of short-lived material in direct functional relation to their contexts are also valuable, a classic example being antler picks from the bases of

earthwork ditches. Another case in point, where waterlogged wooden structures are present, as in the wells and waterholes at T5, are fragments of roundwood, sapwood, or more substantial timbers from short-lived taxa where these have been used to build linings or revetments. Other potential samples are single charred grains or nuts or single fragments of charcoal from short-lived taxa from coherent deposits like hearths of dumps of charred material. The single fragments eliminate the risk of combining material of different ages in the same sample (Ashmore 1999), and the dating of more than one sample from the same context made it possible to check against the inclusion of stray fragments of older and/or younger material using a χ^2 test (Ward and Wilson 1978).

Many finds of organic material pre-date their contexts, having been introduced into them some time after leaving the carbon cycle. Obvious instances are mature timbers (since, for example, only the outermost sapwood ring of an oak tree will be contemporary with its felling) and disarticulated bone which, in many burial environments, can last for millennia and can be redeposited from its original context to a later one. There is a further complication in the case of the bulk samples. If a sample is made up of several charcoal fragments or several disarticulated bone fragments all of the components may be of different ages, making the result a mean of all of them and the age of none. Such results can be treated only as *termini post quos* for their contexts unless there are solid grounds for believing otherwise.

At T5, problematic measurements were made on humic acids from sediments in Bronze Age features (Table 3: SUERC-11569 to -11571). Each of these three results has an individual index of agreement of less than 60 if modelled as more recent than the sample stratified below it. A fourth sediment sample, Table 3: NZA-14902, yielded a date which must also have been older than its context. The sample came from the upper silts of a pit cutting the C1 cursus ditch and yielding pollen indicative of mixed deciduous woodland with small areas of grass and herbs and some arable (Framework Archaeology 2006, 61–5) and is dated to 4350–4050 cal BC (95% confidence). All four results are excluded from the model.

Single grains, nuts, and seeds that are not part of larger deposits can be problematic because their small size make them particular liable to movement through deposits via bioturbation, small natural voids (including cracks formed by the drying out of water-

retaining deposits), or both. Examples include two recent grape pips from Neolithic contexts, one from the soil underlying the Hazleton long cairn, Gloucestershire (Saville 1990, 235–7), the other from the Flagstones enclosure, Dorchester, Dorset (Smith *et al.* 1997, 38). At T5, three out of seven measurements on waterlogged seeds proved problematic (Table 3: Wk-9374, -9375, -19331). For these seeds to have survived uncharred, they must have been waterlogged from their season of growth or soon afterwards, yet they do not seem contemporary with their contexts, as discussed case-by-case below. Could a fluctuating water table have exacerbated the inherent potential for movement of such small objects? Two of the three were for bulk samples, so that, in those cases, only a single intrusive or redeposited seed could have affected the outcome.

Artefacts lacking a functional relation to their contexts are a special case because, even if made of material which had freshly left the carbon cycle at the time of manufacture, an object may have had a use-life, or even have been curated, before burial. Furthermore, composite artefacts can have been repaired: a spear, for example, could be reshafted or an axe rehafted before burial. A date measured on an artefact made of short-life organic material dates the manufacture of that artefact or that part of that artefact. It may be a *terminus post quem* for its context unless there is evidence to the contrary.

Results

Hunter-gatherers

Four thermoluminescence dates have already been published in volume 1 for burnt flint from three pits in the area of the C1 cursus (Table 1: POH21, POH22, POH151, POH 202; Framework Archaeology 2006, 39–44; Allen and Gardiner 2002). These can now be modelled with four further TL measurements on burnt flint from four of a group of six similar pits 20 m to the north-east (Table 1: PO442, PO452, PO482, PO521). Some 675 m west of the first group of dated pits, a radiocarbon date (Table 3: Wk-11773) provides a *terminus post quem* for a waterlogged post of unidentified

timber which survived in one of a row of three postholes found in tufa deposits during the Bedfont Court evaluation among a network of palaeochannels

Seven of the eight TL measurements are statistically consistent (T'=3.1; T'(5%)=12.6; ν=6). The eighth, from pit 524220 (Fig. 1: POH442?), seems to have resulted from a separate episode of activity, in 5590–3470 BC (95% confidence), and is therefore excluded from the model. The other measurements show good agreement when modelled in a single bounded phase (Fig. 1, A_{model}=120.9, $A_{overall}$=119.1). Regardless of location, they indicate activity between 8540–*6150 and 6300–4850 cal BC (95% probability)*, probably between *7760–6610 and 6190–5640 cal BC (68% probability*; Fig. 1: *start Mesolithic activity, end Mesolithic activity*), spanning a period of *69–2120 years (95% probability)*, probably of *410–1430 years (68% probability*; distribution not shown*).*

The C1 Cursus and other Neolithic features

The difficulty of dating features generated between the Mesolithic episode and the establishment of the Bronze Age land divisions (Framework Archaeology 2006, 49–52, 74–77, 82–85) has not diminished. A late fifth millennium cal BC date for sediment from the upper silts of a pit cutting the C1 cursus ditch has already been mentioned above (Table 3: NZA-14902). Shallow features and fine sediments made for problems of intrusion and redeposition. Among the radiocarbon dates, intrusion is evidenced by a medieval date for charred cereal from a pit containing Grooved Ware (Framework Archaeology 2006, 82–83; Table 3: WK-9377); by another, of AD 1180–1280 (95% confidence), for a charred wheat grain from a gully cut by the east ditch of the C1 cursus (Table 3: Wk-18580) and by a postmedieval date, of cal AD 1670–1940 (95% confidence), for charred seeds stratified beneath an inhumation in a waterhole in the area of Farmstead 11 (Table 3: Wk-19340). An instance of redeposition is a late fourth to early third millennium cal BC date for charred *Arrhenatherum elatius* tubers from a cremation burial containing burnt copper alloy fragments, unless the metal was intrusive (Framework Archaeology 2006, 84; Table 3: Wk-9377). Since this measurement was made on a bulk sample it may reflect the inclusion of a stray fragment of older material.

Such problems were compounded by a dearth of samples suitable for radiocarbon dating from the C1 cursus. This prompted a series of Optically Stimulated Luminescence measurements, one on fine-grained polymineral grains from a sherd in a basal deposit in the west cursus ditch, 12 on sand-sized quartz grains from the fills of the cursus ditches, and 4 on sand-sized quartz grains from the fills of features in stratigraphic relation to them (Rhodes and Schwenniger 2003). The measurements were made on 12 multi-grain single aliquots from each sample. The problems of incomplete zeroing, bioturbation, and the estimation of both water content and overburden over time, detailed by the authors, are illustrated by the results for samples from the cursus ditches, which range from 5930±510 BC for a secondary fill of the east ditch (Table 2: OxL-1461) to 1150±290 BC (Table 2: OxL-1463) for the sherd from the base of the west ditch. By modelling two local sequences (537124/537136 and 527200/527201, 11 m apart in the east ditch) and a series of five measurements from a single context at a third location (527109, in the west ditch 22 m south of 527200/527201) separately it is possible to achieve internally consistent, but disparate, results for each (Fig. 2). In 537124/537136 the estimated construction date would be *10660–3890 cal BC (95% probability)*, probably *6530–4350 cal BC (68% probability;* Fig. 2: *build C1 cursus in 537124).* In 527200/527201 it would be *2850–2120 cal BC (95% probability)*, probably *2660–2290 cal BC (68% probability*; Fig. 2: *build C1 cursus in 527201).* In 527107 it would be *6430–4020 cal BC (95% probability)*, probably *5350–4320 cal BC (68% probability*; Fig. 2*: build C1 cursus in 527107*). The internal consistency of the local sequences suggests that the variation is due to the immediate circumstances of each sampling location. Other, unsequenced, measurements are plotted in Figure 2 as 'scattered'.

Variably incomplete zeroing may have been the chief reasons for the disparate measurements. Rhodes and Schwenniger also made OSL measurements on individual sand grains from the samples for OxL-1447 and OxL-1462 in order to determine whether a significant number of grains had been incompletely zeroed at the time of deposition. The results suggested that this might indeed have been the case. They also produced different results from the original ones. A broad peak for the measurable grains of OxL-1447 (originally 5010 ± 450 BC), indicated an age of 3300±1140 BC. The higher of two low peaks for the measurable grains of OxL-1462 (originally 5630 ± 540 BC), indicated an age of 4630±680 BC, the lower one an age of 1860±600 BC.

Variable degrees of bioturbation and varying depths of overburden may also have been significant. The calculations incorporated an effective overburden value of 0.50 m beyond the remaining sediment, set lower than a mean of 0.70 m of removed sediment thickness from the site to allow for the increased cosmic dose rate to which the samples would have been exposed during gradual overburden build-up. The Truncation Model (Framework Archaeology 2006, fig. 1.6) indicates overburden losses of 0.50 to 0.75 m for all the sampled locations except that of OxL-1463, where the modelled overburden loss is 1.00 to 1.25 m. This is the most recent of all the measurements from the cursus, *2000–1180 cal BC (95% confidence*; Fig. 2) and was made on a probably early Neolithic flint-tempered body sherd. The under-estimated depth of overburden may have contributed to the anomalously young result.

The dating of cursus monuments remains problematic because they are characteristically clean. A late fifth to mid fourth millennium BC estimate for a cursus at Eynesbury, Cambridgeshire, based on a series of consistent OSL measurements was calculated on the premise that 'a relatively high water content (15±5%) has been assumed for the age calculations, reflecting the location of the samples close to the present water table in the vicinity of the Great Ouse. If the samples had been drier in the past, the ages would get slightly younger (approximately 1% younger per 1% drier). . . . We note, however, that the base of the deeper Neolithic ditches of the long barrow were waterlogged in the Neolithic and have remained so until today.' (Rhodes 2004, 61). However, all the waterlogged material from the long barrow ditch which is reported in the publication (Robinson 2004; Clapham 2004) came from recuts, suggesting that the ditch may not initially have been waterlogged. Furthermore, the only dated recut was made in the late third millennium cal BC (2335–1960 cal BC (95% confidence); 3737±60 BP; NZA-14285), leaving open the possibility that the others may have been equally late. Indeed, if the date for an antler on the base of the ditch of the atypical long barrow is accurate, the ditch itself was not dug until the third millennium cal BC (2835–2350 cal BC (95% confidence); 4004±55 BP; NZA-14465; Allen *et al.* 2004). The cursus ditches, if they were first dug at some time in the fourth millennium, could have been dry for centuries, so that they could be of more recent date than the present calculations based on the OSL measurements suggest.

There remains the inference that the C1 cursus/bank barrow was built within the span of other such monuments in Britain, from *3640–3380 to 3260–2920 cal BC (95% probability*; Barclay and Bayliss 1999, 25), based on modelling an admittedly inadequate collection of 54 radiocarbon dates from 15 sites. Thomas' conclusion (2006) that earthwork cursus monuments were preceded by post-built forms, at present mainly identified in Scotland, is questionable. Most of the 20 early fourth millennium cal BC dates on which the hypothesis is built were measured on oak charcoal, generally from quite substantial posts, some of it actually identified as mature or heartwood. The statement that, at Holm Farm, Dumfriesshire, 'efforts were made to choose samples that were not heartwood and had no tyloses' (Thomas 2006, 230) records laudable intentions, but three of the five samples are listed as possibly from large split timbers and the other two simply as 'oak charcoal' (Ashmore 2007, 307). Ashmore is cautious as to the early fourth millennium date of these structures, adducing other Scottish sites where very early fourth millennium dates on oak charcoal contrast with rather later dates on shorter-lived samples from comparable contexts (2007, 249–50).

Beyond the monuments at T5, a TL date of 3230±600 BC (4430–2030 BC at 95% confidence; Fig. 3: POH323) is not inconsistent with the late Neolithic character of the associated flint industry in pit 129109. Rather later activity is evidenced by a further TL date of 2090±610 BC (3310–870 BC at 95% confidence; Fig. 3: POH331) from feature 129086.

Bronze Age land division

The overall structure of the model for this episode and for later activity is shown in Figure 4 (A_{model}=95.4, $A_{overall}$=90.1). It estimates starts and ends for the better-dated elements, such as Farmstead 3, as well as for the complex as a whole. Forty-three of the 68 radiocarbon dates from this phase were measured on samples from wells or waterholes, 9 from cremation burials, 8 from ditches and 8 from other contexts. There is thus a bias in favour of waterholes, with their good organic preservation. 31 are from Farmstead 3 and 9 from Farmstead 1, with the remainder distributed in smaller numbers among the other Farmsteads. There are also three OSL dates, from waterhole 563060 in Farmstead 2 and ditches 512005 in Farmstead 1 and 526249 in Farmstead 2

(Table 2: OxL-1452 to -1454). Given the problems outlined above, these are not employed in the model.

Farmstead by farmstead

In Farmstead 3 it is possible to estimate *termini ante quos* for the construction of the inner D-shaped enclosure and the cutting of with west ditch of trackway 11, which were both cut by dated features (Fig. 5). The inner enclosure was cut by three dated waterholes, 110107, 641097 and 559328, to which may be added a fourth, 159200 in the berm area, which is unlikely to have been sunk until the enclosure bank was denuded. Since 159200 was cut by 110107, the whole of this sequence is taken as post-dating the enclosure. There are two successive samples from 159200. The first date is one of *1450–1370 cal BC (95% probability)* for a willow roundwood stake *in situ* in the initial wattle lining. With a diameter of less than 60 mm and coming from a short-lived taxon, this should not be many years older than the construction of the waterhole (Fig. 5: *Wk-10024*). The next is a date of *1450–1370 cal BC (94% probability)* for another willow roundwood stake, this time from the revetment which formed part of a remodelling of the feature (Fig. 5: *Wk-10025*). These stakes were rather larger, up to 90 mm in diameter, and may have been a little more mature. A *terminus post quem* for waterhole 110107, which cut 159200, is provided by a measurement on a fragment of oak board in which no sapwood or roundwood remained (Fig. 5: Wk-10027). In 559328 a stray alder chip from a lower fill may have been accidentally included rubbish rather than part of any structure; it is nonetheless in agreement with the model (Fig. 5: *Wk-18460*), as is a date for waterlogged blackthorn seeds from the basal layer of 641097, which should have entered the feature in a fresh state as it began to silt (Fig. 5: *Wk-19329*). The enclosure would have been built before *1470–1320 cal BC (95% probability)*, probably before *1440–1370 cal BC (68% probability;* Fig. 5: *taq for inner D-shaped enclosure*). If, as proposed elsewhere in the text, a palisade surviving inside the southern part of the enclosure ditch replaced the denuded bank, then this new barrier may have been built around or after this date. The enclosure was also cut by waterhole 125233, attributed to Farmstead 4, but the single first millennium cal BC date from this feature (Fig. 8: WK-9373?) is so much later that it would not influence the estimate.

Another feature cut by a waterhole was 526462, a recut of the west ditch of trackway 11, which ran inside the outer D-shaped enclosure. Here, a field maple ard spike from the base of a recut in the waterhole 592359 is treated as contemporary with its context because it is of a short-lived taxon and, like another ard tip from 135071, did not seem to have been used, since it had unsmoothed axe marks and no sign of connection to the complete ard (Framework Archaeology 2006, 145). Its date of *1420–1280 cal BC (95% probability;* Fig. 5: *Wk-19342*) is more recent than the age of humic acids from an overlying deposit, dated to 1500–1320 cal BC (95% confidence). This is excluded from the model, as discussed above (Fig. 5: SUERC-11571?). It can be estimated that the ditch was recut before *1470–1320 cal BC* (*95% probability*), probably before *1440–1370 cal BC (68% probability*; Fig. 5: *taq for W ditch of trackway 11*). The estimate is wider than that for the enclosure because there is less to constrain it.

Away from the enclosure ditches, a sequence of dates from three deposits in waterhole 135071 (Framework Archaeology 2006, 139–45, 155–57) poses problems. Four samples from context 135040, near the base of the feature, are statistically inconsistent ($T'=15.2$; $T'(5\%)=7.8$; $\nu=3$). Of these, an oak heartwood stake offcut provides a *terminus post quem* for the deposit (Fig. 5: Wk-10030). A willow stake offcut from a mass of wood chippings, probably, from their diverse composition, the dumped residue of woodworking rather than part of a collapsed structure (Framework Archaeology 2006, 140), yielded a more recent date and, since such material would probably not have survived long unburied, is treated as contemporary with its context (Fig. 4: *Wk-10035*). An alder wood axe haft (Fig. 5: *NZA-14903*; Framework Archaeology 2006, figs. 3.29, 3.33) had seen use, on the evidence of crushing of the wood at base of the side branch onto which a socketed axehead would have fitted (Allen 2006). Although from a short-lived taxon, it could have been some years old when buried, and an artefact selected for deposition could have been curated; it is, however, in good agreement with the model. Dates for a Maloideae ard tip from the overlying layer (Framework Archaeology 2006, figs 3.29, 3.33; Fig. 5: *NZA-14906*) and for waterlogged chaff from higher up the sequence (Fig. 5: *NZA-14901*) are both in good agreement with the stratigraphy. The ard tip is treated as contemporary with its context for the same reasons as its counterpart from 592384. The problematic date is one of 1260–900 cal BC (95% confidence) for a bulk sample of waterlogged seeds (Fig. 5: Wk-9374?) from the same context as the oak and willow stake offcuts and the

axe haft. This shows low individual agreement (A=9) when modelled as contemporary with its context and is therefore excluded from the model. The anomaly of Wk-9374 is difficult to explain. If its age is the true age of the context, all the other samples would have to have been curated or redeposited. While this is possible for the axe haft and ard tip, it seems improbable for the willow stake offcut and the chaff, especially the chaff, which would not have lasted long unwaterlogged. Intrusion of some or all of the seeds of Wk-9374, perhaps in the course of the excavation of waterhole 135055, may be a possibility, as discussed above. If Wk-9374 is excluded, the date of the 135040 deposit can be estimated as *1420–1310 cal BC (95% probability),* probably *1410–1340 cal BC* (*68% probability*; Fig. 5: *end 135040*).

Near the base of waterhole 156028 (Framework Archaeology 2006, 141–45), a willow stake, a Maloideae ard spike, and an oak axe haft (Framework Archaeology 2006, figs 3.31, 3.33) yielded dates consistent with the sequence (Fig. 5: *Wk-10026, NZA-14905, -14904*). The date of the deposit (155197) is estimated at *1420–1290 cal BC (95% probability)*, probably *1410–1340 cal BC (68% probability*; Fig. 5: *end 155197*). Stratified above this, there are two inconsistent (T'=14.996; T'(5%)= 3.8; ν=1) measurements for oak sapwood chips, both seen as generated during the manufacture of the revetment of the well shaft, which was constructed after the original wattle lining had collapsed. The older of the two is treated as a *terminus post quem* for this event (Fig. 5: Wk-10031). The more recent, *1400–1230 cal BC (95% probability;* Fig. 5: *Wk-10028*), should be the closer in age to the building of the revetment. A date for a bulk sample of waterlogged seeds from the same deposit is in agreement with this (T'=0.8; T'(5%)=3.8; ν=1), despite the misgivings about such samples expressed above (Fig. 5: *Wk-9376*). The date of the context can be estimated as *1400–1230 cal BC (95% probability)*, probably *1390–1350 cal BC (23% probability*) or *1320–11260 cal BC (45% probability*; Fig. 5: *end 156020*).

In 178108 (Framework Archaeology 2006, fig. 3.26), two roundwood stakes of willow and elder, from among five driven into the lowest fills as part of a lining or revetment, yielded dates consistent with each other (T'= 0.0; T'(5%)=3.8; ν=1) and with the model (Fig. 5: *Wk-10029*, *-10032*). The estimated construction date is *1410–1270 cal BC (95% probability)*, probably *1400–1310 cal BC (68% probability*; Fig. 5: *end 178123*).

A worn poplar wood bowl, with evidence of repair in the form of stitch holes on either side of an old break, from the basal fill of 611107 was sampled twice (Table 3: OxA-17822, -17823), and a third sample from the same context, submitted at an early stage in post-excavation analysis (Table 3: Wk-18461), is almost certainly also from this vessel (Rebecca Nicolson pers. comm.) The three measurements are statistically consistent (T'=4.9; T'(5%)=6.0; ν=2) and a weighted mean is incorporated in the model (Fig. 5: *sf 12045; 1430–1370 cal BC (72% probability)* or *1350–1310 cal BC (23% probability* probably *1420–1380 cal BC (58% probability) or 1340–1320 cal BC (10% probability)*). The weighted mean for the bowl is statistically consistent (T'=0.2; T'(5%)=3.8; ν=1) with the date of a chip of 10- to 15-year-old oak branchwood from the same deposit, which was rich in worked and unworked wood (Fig. 5: *Wk-19343*). Since the bowl was not freshly made when deposited, the age of the oak may give some indication of the age of the vessel when placed in the waterhole.

Three further features yielded only single dates, like 641097 and 559328 which have already been dealt with because they cut the inner D-shaped enclosure. With neither stratigraphic sequences nor associated samples, it difficult to judge whether these samples were contemporary with their contexts. Waterlogged seeds from the basal fill of waterhole 136194 were dated to 1620–1320 cal BC (95% confidence; Fig. 5: Wk-9375). This result is implausibly early for the late Bronze Age bowl and cups which were placed in the same deposit, not to mention late Bronze/early Iron Age pottery in the waterhole into which this feature was cut (Framework Archaeology 2006, 148, figs 3.36–37). It has been suggested that the seeds may have derived from the first of the sequence of three intercutting waterholes at this location (ibid. 148). The measurement is therefore modelled as a *terminus post quem* for its context. Its interpretation relates to the wider problems of waterlogged seed samples, discussed above. Similar reservations apply to a date of 1690–1510 cal BC (5% confidence; Fig. 5: Wk-19331) for a waterlogged rose seed from waterhole 646068. This has a low index of agreement (A=46.1) if modelled as contemporary with its context, and is also treated as a *terminus post quem.* The frequency, however, of rose hips and seeds in the deposit, along with were other wild plant remains, suggests that the dated seed may not have been redeposited. If so, this waterhole could be one of the earliest Bronze

Age features in the area. This could be verified only by further measurements on suitable samples to determine whether WK-19331 is a statistical outlier.

The only feature other than a waterhole to be dated in Farmstead 3 was pit 142010, which was retrospectively identified as cutting the HE1 Neolithic enclosure, its limits being only approximately defined (Framework Archaeology 2006, 74, fig. 2.22). The pit contained what seemed to be a dump of burnt material, including sherds in late Bronze Age fabrics; the lithics included some Neolithic material, presumably derived from the enclosure ditch. A date of 1630–1460 cal BC (95% confidence); Fig. 5: Wk-21695) was measured on a single fragment of *Prunus* roundwood charcoal. As with Wk-9375, the date is early for the late Bronze Age pottery from the feature and is therefore treated as a *terminus post quem*.

In waterhole 141024, an alder wood log ladder with its lower end dug into the base and a Maloideae stake in a secondary fill respectively yielded dates of 1390–1050 and 1380–930 cal BC at 95% confidence. These are consistent with the stratigraphy, although the stake was seen as part of a placed deposit, derived from dismantled wattle, and could have been older than its context. The ladder, however, should have been only slightly older than its context, since it would have been used to reach water in the feature, was of a short-lived taxon and of roundwood approximately 155 mm in diameter (Allen 2006). The dates have individual indices of agreement of less than 60 if modelled as part of the same phase of activity as the other measurements from Farmstead 3. When they are modelled as later than the main phase of activity in Farmstead 3 but still as part of the uselife of the Bronze Age land divisions (Fig. 5) they are, however, in good agreement with the model (Fig. 5: *Wk-10036, -9371).* If, on the other hand, they are modelled as part of activity post-dating the uselife of the Bronze Age land divisions, Wk-10036 has poor individual agreement (A=24.3). They are therefore treated as a late element in Farmstead 3.

On this basis, the start date for Farmstead 3, including waterhole 141024, can be estimated as *1510–1390 cal BC* (*95% probability*), probably *1470–1410 cal BC* (*68% probability*; Fig. 5: *start Farmstead 3*); and its estimated end date at *1390–1150 cal BC* (*95% probability*), probably *1380–1340 cal BC* (*16% probability)* or *1310–1210 cal BC (52% probability;* Fig. 5: *end Farmstead 3*). Its uselife can be estimated as *1–*

310 years (*95% probability*), probably *50–90 years* (*13% probability)* or *130–250 years (55% probability*; Fig. 15: *use Farmstead 3*).

In Farmstead 1 there is a sequence of dates from a junction of north-south and east-west ditches, where ditch 512005 and pit 527078 and were both cut by ditch 539096. From 527078 there is a date of *1490–1390 cal BC* (*95% probability*; Fig. 6: *Wk-19336*) on a charred barley grain from a bulk sample which yielded other charred grain and chaff. In 539096, three short-life samples from a single deposit rich in cereal processing waste (context 527085) yielded dates consistent with each other (T'=4.9; T'(5%)=6.0; ν=2) and with their stratigraphic position (Fig. 6: *Wk-18577*, *-18457*, *-18579*), and a charred grain sample from a similar overlying deposit (context 527076; Fig. 6: *Wk-18578*) was also consistent with the stratigraphy, although Wk-18577, -18578 and -18579 were each measured on more than one grain. The date of 527085 can be estimated as *1420–1320 cal BC* (*95% probability*), probably *1410–1360 cal BC* (*68% probability*; Fig. 6: *end 527085*).

An alder wood log ladder resting on the base of waterhole 615008 should, like the ladder in 141024, relate to the use of the feature (Fig. 6: *Wk-18462*). Two single charred cereal grains, were probably contemporary with their contexts: one probably from a concentration of burnt material in the initial fill of ditch 539283 (Fig. 6: *Wk-19338*) and another found with other charred grain and chaff in the basal fill of pit 546202 (Fig. 6: *Wk-19337*). A third, from a lower fill of ditch 583160 where charred material was relatively rare, may have been a stray inclusion; it is, however, in agreement with the model (Fig. 6: *Wk-18575*).

The estimated start date for the excavated part of Farmstead 1 is *1520–1390 cal BC* (*95% probability*), probably *1470–1410 cal BC* (*68% probability*; Fig. 6: *start Farmstead 1*); the estimated end date *1390–1150 cal BC* (*95% probability*), probably *1380–1340 cal BC (16% probability)* or *1310–1210 cal BC (52% probability*; Fig. 6: end Farmstead 1). Its period of use can be estimated as *1–230 years* (*95% probability*), probably *50–170 years* (*68% probability;* Fig. 15: *use Farmstead 1*).

In Farmstead 2, bulk grain samples from two successive deposits, both fairly rich in plant material, in waterhole 563060 yielded radiocarbon dates consistent with the stratigraphy (Fig. 7: *Wk-18573, -19339*). In pit 557027, an exceptionally abundant and well-preserved deposit of caprine and cattle bone just above the base was seen as

directly and deliberately deposited on the evidence of the presence of articulations and the absence of loose teeth (indicators of reworking). This provided a dated medium-sized mammal rib (Fig. 7: *Wk-19326*). Although there is no record that the sample was articulated, it is treated as contemporary with its context because of the nature of the deposit. From the overlying deposit comes an older measurement on humic acids from sediment (Fig. 7: SUERC-11570) which, like other sediment dates, is excluded from the model for the reasons described above. A final measurement was made on three charred barley grains from ditch 515233 which may not have come from a coherent grain deposit, since their context was rich in charcoal, but not in grain; it is, however, consistent with the other measurements from the Farmstead and is treated as contemporary with its context on the grounds that the grain could have been charred on a fire with the wood (Fig. 7: *Wk-18574*).

A start date for Farmstead 2 can be estimated as *1530–1400 cal BC* (*95% probability*), probably *1480–1410 cal BC* (*68%* probability; Fig. 7: *start Farmstead 2*), and the end date as *1440–1230 cal BC* (*95% probability*), probably *1420–1340 cal BC* (*68% probability*; Fig. 7: *end Farmstead 2*). Its period of use can be estimated as *1–270 years* (*95% probability*), probably *1–120 years* (*68% probability*; Fig. 15: *use Farmstead 2*). These estimates are, however, based only four measurements from three features.

The chronology of Farmstead 4, only a small part of which was excavated, is based on only four dates from four features without stratigraphic relation to each other. Willow fibre rope associated with a bucket in the lowest fill of waterhole 517310 would have been contemporary with the use of the feature (Fig. 8: *Wk-18456*). A waterlogged sloe stone (*Wk-19327*), from a fill of waterhole of 553191 could have been derived from waterhole 537201, which was recut by 553191, but leaves in the context of the sample suggest that fruit and leaves from nearby trees and shrubs fell into it as it silted; the measurement is therefore treated as contemporary with its context. A single charred wheat grain came from a ditch fill rich in charcoal, but not in grain, since this was a naturally silted deposit rather than a dumped one, the grain may have been a stray inclusion of uncertain age when buried and is therefore treated as a *terminus post quem* (Fig. 8: WK-18576). The fourth date, a measurement of 840–410 cal BC (95% confidence; Fig. 8: Wk-9373?) on a bulk sample of sloe charcoal from a further

waterhole, 125233, is in poor individual agreement with the model (A=0.1) and may date from a time after the Farmstead had gone out of use. Its context was interpreted as a dump of material made in a shallow depression remaining in the top of the largely infilled feature. By the time it was deposited, it may have included material of various ages. This would accord with the composition of the associated pottery, which is made up of 135 sherds/1551 g of flint-tempered late Bronze Age wares together with respectively 2 sherds/8 g and 1 sherd/2 g of quartz-tempered middle and late Iron Age wares. Unlike the dates from waterhole 141024 in Farmstead 3, Wk-9373 shows good agreement (A=99.4) if modelled with dates from contexts post-dating the uselife of the Bronze Age land divisions. It is therefore excluded from the model.

Farmstead 5, only a small part of which was excavated, yielded two dates, for bulk charred grain samples from two successive features. One was from a charcoal-rich gravel lens near the base of well 543201 (Fig. 9: *Wk-19328*), the other, stratified above it, from the lowest fill of pit 543202, which was cut into the top of the infilled well (Fig. 9: *Wk-18581*). This deposit was rich in charcoal, charred grain and chaff.

In Farmstead 6, three measurements were made on stakes, either of roundwood or of short-lived taxa, from the revetment at the base of waterhole 124100 (Fig. 10: *Wk-10023, -10033, -10034*). These are statistically consistent (T'=0.9; T'(5%)=6; ν=2) and indicate a construction date for the revetment of *1390–1120 cal BC* (*95% probability*), probably *1340–1190 cal BC (66% probability)* or *1140–1130 cal BC (2% probability*; Fig 10: *end 124100*). The remaining date is one of *1310–1000 cal BC* (*95% probability*: Fig 10: *NZA-14907*) for the stub of an ash wood shaft in the socket of a Taunton phase copper alloy side-looped spearhead found in recut 149099 of ditch 111069 (Framework Archaeology 2006, 100–2). Although ash trees can be quite long-lived, the shaft was probably roundwood and hence only a few years old. The spear, however, may have been in circulation for some time before it was placed in the ditch, making the date a possible *terminus post quem* for the recut.

In Farmstead 8, a willow stake driven into in the base of waterhole 510047 before any fills had formed provides a date for its construction or early use of *1530–1420 cal BC* (*95% probability*; Fig. 11: *Wk-18459*). Stratified above it was a diesel-contaminated clayey silt humic acids from which yielded a substantially earlier date of 1940–1745 cal BC (95% confidence; Fig. 11: SUERC-11569). This is excluded from the model

like other sediment dates. A bulk sample of waterlogged buttercup seeds from near the base of waterhole 685032 should provide a date close to the construction of the feature of *1210–980 cal BC* (*95% probability;* Fig.11: *Wk-19333*). Wk-19330, the one date from waterhole 693006, is more problematic. The sample was one of two charred wheat grains recovered from a charcoal lens apparently dumped onto a silt deposit in the secondary fills of the feature. The presence of only two grains among an abundance of charcoal (entirely of oak) could mean that they were charred in the fire in which the wood was burnt. For this reason the date is modelled as contemporary with its context. Alternatively, the grains might have been accidental inclusions, harvested and charred some time before being gathered up with the charcoal, making the date a *terminus post quem*.

Dating in Farmstead 10 was confined to cremated human bone from three scattered burials. 554566 was the earliest, at *1410–1210 cal BC* (*94% probability*; Fig. 12: *OxA-16126*). The dates for 827119 and 830083 are identical: *1220–1040 cal BC* (*90% probability*; Fig. 12: *OxA-18031, -18032*), and the two burials could possibly, although far from certainly, have been contemporary. The three burials were made over a period of *70–540 years (95% probability),* probably *200–430 years (68% probability*; Fig. 15: *bury Farmstead 10 cremations*). Their chronology may bear no relation to that of the Farmstead.

In Farmstead 11 dating was confined to one waterhole and five out of seven or eight cremation burials. A single charred wheat grain was dated from waterhole 711024 (Fig. 13: Wk-19332), where it may have been a random inclusion in a clay deposit forming slowly in wet conditions. It is therefore treated as a *terminus post quem* for the context. The disposition of the cremations on either side of the settlement enclosure and in the location of one group in a cluster of postholes, pits and gullys suggest that they formed part of the use of the farmstead. The dates for four burials (Table 3: WK-18463 to -18465; OxA-16320) are statistically consistent (T'=6.1; T'(5%)=7.8; ν=3). When the fifth is included they are not (T'=46.1; T'(5%)=9.5; ν=4), cremation 699060, dated to 910–800 cal BC (95% confidence), being substantially later than all the other dates (Fig. 13: Wk-18466?). This date also shows low individual agreement if modelled as part of the same phase as the other Farmstead 11 cremations (A=0). This burial may have been unrelated to the others and to the

Farmstead. Like Wk-9373 from waterhole 125233 in Farmstead 4, it shows good agreement if modelled with dates from contexts post-dating the uselife of the Bronze Age land divisions (A=99.7). It is therefore excluded here. A start date for the other cremations can be estimated at *1430–1110 cal BC* (*95% probability*), probably *1270–1140 cal BC* (*68% probability*: Fig. 13: *start Farmstead 11 cremation burials*); and an end at *1200–960 cal BC* (*95% probability*), probably *1130–1010 cal BC* (*68% probability*; Fig. 13: *end Farmstead 11 cremation burials*). The period over which they were buried can be estimated as *1–360 years* (*95% probability*), probably *1–180 years* (*68% probability*; Fig. 15: *bury Farmstead 11 cremations*).

Beyond the Farmsteads, unaccompanied inhumation 595072, found in an area of Saxon settlement, is related to the period of Bronze Age land division by a date of *1420–1260 cal BC* (*95% probability*; Fig. 13: *OxA-15595*), unless the sample suffered from collagen depletion, in which case the true age could have been older.

Starts, ends and durations. Figure 14 and Table 5 summarise the estimated start and end dates of the better-dated elements and the Bronze Age land division as a whole; Figure 15 and Table 6 summarise their estimated durations. The overall estimate for the use of the complex is from *1650–1480 cal BC* (*95% probability*), probably from *1590–1510 cal BC* (*68% probability*; Fig. 14: *start Bronze Age land division*) to *1100–900 cal BC* (*95% probability*), probably to *1060–960 cal BC* (*68% probability*; Fig. 14: *end Bronze Age land division*). The overall estimate for its duration is *410–620 years* (*95% probability*), probably *460–550 years* (*68% probability*; Fig. 15: *use Bronze Age land division*).

Table 7 shows the probability that any one of the more reliable estimates for individual events is earlier than any other. In many cases the relationship is ambiguous. In others it is well defined: it is, for example, over 90% probable that Farmsteads 1, 2 and 3 were established before any burials were made in Farmstead 11 and 99% or 100% probable that they had all ended before those burials ceased to be made.

Waterholes. The Perry Oaks evidence could suggest that ramped waterholes became less infrequent in the period 1150–750 BC than in the preceding centuries (Framework Archaeology 2006, 147, table 3.80). Even with the larger dataset now available, absolute dates can do little to clarify this because, excluding *termini post*

quos, there are far fewer dated ramped waterholes than steep-sided ones. Figure 16 summarises the dating, using either single dates from the stratigraphically earliest dated context in each feature, or, where there is more than one date from such a context, a value calculated using the Last function. On the face of it, both groups seem to occupy the same timespan. The probability that WK-9373 post-dates this phase is discussed above.

Wooden and metal artefacts. The Perry Oaks excavations showed that that some of the waterholes in Farmstead 3 contained wooden ard spikes and axe hafts, unrelated to the construction or use of the features and probably deliberately deposited in them (Framework Archaeology 2006, 142–5). To these may now be added a further ard spike from waterhole 592384 and a bowl from waterhole 611107. The dates for all six of these artefacts are statistically consistent ($T'=6.8$; $T'(5\%)=14.1$; $\nu=7$). They were made from a variety of woods, most of them relatively short-lived (alder, field maple, Maolideae, poplar). The one oak axe haft had been quartered and had a maximum transverse dimension of 44 mm (Allen 2006) , suggesting that it could have come from roundwood as little as *c.* 100 mm in diameter, which would be consistent with the presence of a small side branch onto which the axe would have fitted. Regardless of taxon, all, including the oak axe haft, are in good agreement with other dates from the same features, where available, and with the model as a whole. Despite the wear on and repair to the bowl, and the fact that the two axe hafts had been used, they do not seem to have been kept for detectable periods of time. Their posterior density estimates are shown in Figure 17, together with that for the ash wood shaft of a spearhead from a recut in one of the ditches of Farmstead 6 (*NZA-14907*), with a *terminus post quem* for a spearhead in waterhole 641097 in Farmstead 3, which was stratified above the sample dated by *Wk-19329,* and with the estimated start and end dates for the complex. The dated wooden artefacts deposited in waterholes were made over a period of *10–160 years (95% probability), probably 40–120 years (68% probability*; distribution not shown) and could have been deposited during a comparably restricted horizon. The date of manufacture of the two spearheads remains uncertain.

First millennium cal BC and later activity

Contexts of later periods were sampled less fully. The remaining dates up to the end of the first millennium cal AD are shown in Figure 18. From the 1979–85 excavations to the south, a date of 800–390 cal BC (95% confidence; HAR-4823) was obtained for unspecified waterlogged wood from an unspecified context in waterhole 553 in the area of the first millennium cal BC Farmstead 12 complex (O'Connell 1990, 41, fig. 24). The undated remainder of the sample was identified in 2000 as wood and bark, dried out and structurally collapsed, probably from roundwood of various diameters, probably *Prunus* spp. and/or *Maloideae* (information supplied by Isabelle Parsons, Scientific Dating Team, English Heritage). Despite the contextual uncertainties, the sample may have been contemporary with its context because the surviving fragments are of short life material and because, if it were a *terminus post quem*, it would make the late Bronze Age pottery which occurred at several levels in the feature (O'Connell 1990, 52, fig. 29: 38–57, fig. 30: 58–65) exceptionally late. A comparable date of 780–380 cal BC (95% confidence; Wk-11712) for an *in situ* wattle structure in an evaluation trench to the west of the main T5 excavations will have been measured on short-lived roundwood and points to activity of this period in this area too. Also to the west, a hazel roundwood stake from a pit dates rather later, to 400–200 cal BC (95% confidence; Wk-19341). Of similar age is a charred barley grain from a dump of burnt material in a pit cutting the C1 cursus (390–200 cal BC (95% confidence); Wk-19335). A date of 360–50 cal BC (95% confidence; Wk-19334) for another charred barley grain from a grain-rich sample from pit 539450 is consistent with the predominantly middle Iron Age pottery from the feature. Also consistent with its associations is a date of 170 cal BC–cal AD 210 (95% confidence; Wk-9367) for unspecified animal bone from pit 129112, which yielded a large assemblage of late Iron Age pottery. Although the sample may have been bulked, disarticulated, or both, the fact that it was one of 7 fragments/169 g of animal bone in a layer where there were two at least semi-complete pots and a wooden object suggests that the bone may have formed part of a deliberate deposit. Finally, a date of cal AD 250–380 (95% confidence; OxA-16127) for cremated human bone from burial 591052 relates it to the Romano-British settlement some way to the north.

Conclusions

Despite the lack of a coherent dating strategy, the limitations imposed by the number of samples unconstrained by stratigraphic sequences, the uneven distribution of samples among the Farmsteads, and the occasional absence of identifications for samples, it is possible to estimate the start, end, and duration of the Bronze Age land division with some confidence. It is also possible to say that Farmsteads 1 and 2 were shorter-lived than Farmstead 3 and the complex as a whole, in other words that at least some settlement foci went out of use while others persisted. Farmsteads 4 and 11 may have been established later than these, but there is insufficient dating evidence to clarify their chronology.

Acknowledgements

The T5 team, in the persons of Rebecca Nicholson, John Lewis, Lisa Brown and Matt Leivers, has been unfailingly communicative and helpful. Peter Marshall has commented thoroughly and painstakingly on previous versions of the model and text.

References

Allen, M.J. and Gardiner J. 2002. A sense of time — cultural markers in the Mesolithic of southern England? In B. David and M. Wilson (eds), *Inscribed Landscapes. Marking and Making Place*, 139–53. Honolulu: University of Hawai'i Press

Allen, M.J., Rhodes, E., Beavan, N. and Groves, C. 2004. Absolute dating. In C.J. Ellis, *A prehistoric ritual complex at Eynesbury, Cambridgeshire. Excavation of a multi-period site in the Great Ouse valley, 2000–2001*, 60–7. East Anglian Archaeology Occasional Paper 17. Salisbury: Wessex Archaeological Trust

Allen, S., 2006. The wooden finds from Perry Oaks. In Framework Archaeology, *Landscape Evolution in the Middle Thames Valley. Heathrow Terminal 5 Excavations Volume 1, Perry Oaks*, cd accompanying volume. Oxford and Salisbury: Framework Archaeology

Ashmore, P. 1999. Radiocarbon dating: avoiding errors by avoiding mixed samples. *Antiquity* 73, 124–30

Ashmore, P. 2007. Radiocarbon dates from the Pict's Knowe, Holywood and Holm; *and* Appendix 9. Calibrated radiocarbon determinations from Holm, Holywood and the Pict's Knowe. In J. Thomas, *Place and Memory: Excavations at the Pict's Knowe, Holywood and Holm Farm, Dumfries and Galloway, 1994–8*, 248–59, 307–10. Oxford: Oxbow Books

Barclay, A. and Bayliss, A. 1999. Cursus monuments and the radiocarbon problem. In A. Barclay and J. Harding (eds), *Pathways and Ceremonies. The Cursus Monuments of Britain and Ireland*, 11–29. Oxford and Oakville: Oxbow Books

Bayes, T.R. 1763. An essay towards solving a problem in the doctrine of chances. *Philosophical Transactions of the Royal Society* 53, 370–418

Bayliss, A. and Bronk Ramsey, C. 2004. Pragmatic Bayesians: a decade integrating radiocarbon dates into chronological models. In C.E. Buck and A.R. Millard (eds), *Tools for constructing chronologies: tools for crossing disciplinary boundaries*, 25–41. London: Springer

Bayliss, A., Bronk Ramsey, C., van der Plicht, J. and Whittle, A. 2007. Bradshaw and Bayes: towards a timetable for the Neolithic. *Cambridge Archaeological Journal* 17.1, supplement, 1–28.

Brock, F. Higham, T. and Bronk Ramsey, C. 2007. *Radiocarbon Dating Bone Samples Recovered from Gravel Sites*. English Heritage Research Department Reports Series 30/2007. Portsmouth: English Heritage.

Bronk Ramsey, C. 1995. Radiocarbon calibration and analysis of stratigraphy: the OxCal program, *Radiocarbon*, 37 (2), 425–30.

Bronk Ramsey, C, 1998 Probability and dating, *Radiocarbon*, 40, 461–74

Bronk Ramsey, C., 2001. Development of the radiocarbon calibration program OxCal. *Radiocarbon*, 43 (2A) 355–63

Bronk Ramsey, C, in press Bayesian analysis of radiocarbon dates, *Radiocarbon*

Bronk Ramsey, C., 2008. https://c14.arch.ox.ac.uk/oxcal/

Bronk Ramsey, C., Higham, T. and Leach, P. 2004. Towards high precision AMS: progress and limitations. *Radiocarbon* 46, 17–24

Clapham, A.J. 2004. Waterlogged plant macrofossils. In C.J. Ellis, *A prehistoric ritual complex at Eynesbury, Cambridgeshire. Excavation of a multi-period site in the Great Ouse valley, 2000–2001*, 81–7. East Anglian Archaeology Occasional Paper 17. Salisbury: Trust for Wessex Archaeology Ltd

Duller, G.A.T. 2008. *Luminescence Dating. Guidelines on Using Luminescence Dating in Archaeology*. Swindon: English Heritage.

Framework Archaeology 2003. Excavations at Mayfield Farm, East Bedfont, London Borough of Hounslow by Framework Archaeology. *Transactions of the London and Middlesex Archaeological Society* 54, 9–21

Framework Archaeology 2006. *Landscape Evolution in the Middle Thames Valley. Heathrow Terminal 5 Excavations Volume 1, Perry Oaks*. Oxford and Salisbury: Framework Archaeology

Higham, T. F.G. and Hogg, A. G. 1997. Evidence for late Polynesian colonisation of New Zealand: University of Waikato radiocarbon measurements. Radiocarbon 39, 149–92. Check for Waikato LSC methods

Hedges, R.E.M., Bronk, C.R. and Housley, R.A. 1989. The Oxford Accelerator Mass Spectrometry facility: technical developments in routine dating. *Archaeometry* 31(2), 99–114

Lanting, J., Aerts-Bijma, A.T. and van der Plicht, J., 2001. Dating of cremated bones. *Radiocarbon* 43(2A), 249–54

Mant, A.K., 1987. Knowledge acquired from post-War exhumations. In A. Boddington, A.N. Garland and R.C. Janaway (eds), *Death, Decay, and Reconstruction. Approaches to Archaeology and Forensic Science*, 65–80. Manchester: Manchester University Press

Mook, W.G. and Waterbolk, H.T. 1985. *Radiocarbon Dating. Handbooks for archaeologists 3*. Strasbourg: European Science Foundation

Mook, W.G. 1986. Business Meeting: recommendations/resolutions adopted by the twelfth international radiocarbon conference. *Radiocarbon* **28**, 799

O'Connell, M. 1990. Excavations during 1979–1985 of a multi-period site at Stanwell, with a contribution on Moor Lane, Harmondsworth, by Jonathan Cotton. *Surrey Archaeological Collections* 80, 1–62

Otlet, R.L., 1977. Harwell radiocarbon measurements II. *Radiocarbon* 19, 400–23

Otlet, R.L., 1979. An assessment of laboratory errors in liquid scintillation methods of ^{14}C dating. In R. Berger and H.E. Suess (eds), *Proceedings of the Ninth International Radiocarbon Conference*, 256–67. Berkley: University of California Press

Petchey, F. and Higham, T.F.C., 2000. Bone diagenesis and radiocarbon dating of fish bones at the Shag River Mouth site, New Zealand. *Journal of Archaeological Science* 276, 135–50

Rhodes, E. 2004. OSL methods and measurement. In C.J. Ellis, *A prehistoric ritual complex at Eynesbury, Cambridgeshire. Excavation of a multi-period site in the Great Ouse valley, 2000–2001*, 61–62. East Anglian Archaeology Occasional Paper 17. Salisbury: Trust for Wessex Archaeology Ltd

Rhodes, E.J. and Schwenninger, J.-L. 2003. P125 — Perry Oaks Heathrow Terminal 5. Unpublished report on optically stimulated luminescence dating of sediments from T5. Oxford: Oxford University Research Laboratory for Archaeology and the History of Art

Reimer P.J., Baillie M.G.L., Bard, E., Bayliss, A., Beck, J.W., Bertrand, C., Blackwell, P.G., Buck, C.E., Burr, G., Cutler, K.B, Damon, P.E., Edwards, R.L., Fairbanks, R.G., Friedrich, M., Guilderson, T.P., Hughen, K.A., Kromer, B., McCormac, F.G., Manning, S., Bronk Ramsey, C., Reimer, R.W., Remmele, S., Southon, J.R., Stuiver, M., Talamo, S., Taylor, F.W., van der Plicht, J. and Weyhenmeyer C.E. 2004. Intcal04 terrestrial radiocarbon age calibration, 0–26 cal. kyr BP. *Radiocarbon* 46, 1029–58.

Robinson, M. 2004. Insect remains from Neolithic long barrow 2589. In C.J. Ellis, *A prehistoric ritual complex at Eynesbury, Cambridgeshire. Excavation of a multi-period site in the Great Ouse valley, 2000–2001*, 79–80. East Anglian Archaeology Occasional Paper 17. Salisbury: Trust for Wessex Archaeology Ltd.

Saville, A. 1990. *Hazleton North, Gloucestershire, 1979–82: the excavation of a Neolithic long cairn of the Cotswold-Severn group*. London: Historic Buildings and Monuments Commission for England

Scott, E.M. 2003. The third international radiocarbon intercomparison (TIRI) and the fourth international radiocarbon intercomparison (FIRI) 1990–2002: results, analyses, and conclusions. *Radiocarbon* 45(2), 135–408.

Slota Jnr, P.J., Jull, A.J.T, Lirick, T.W. and Toolin, L.J. 1987. Preparation of small samples for ^{14}C accelerator targets by catalytic reduction of CO. *Radiocarbon* 29, 303–6.

Smith, R.J.C., Healy, F., Allen, M.J., Morris, E.L., Barnes, I. and Woodward, P.J. 1997. *Excavations along the route of the Dorchester by-pass, Dorset, 1986–8*. Salisbury: Wessex Archaeology.

Southon, J.,Santos, G., Druffel-Rodriguez, K., Druffel, E., Trumbore, S. Xu, X., Griffin, S. Ali, S. and Mazoni, M., 2004. The Keck Carbon Cycle AMS Laboratory, University Of California, Irvine: initial operation and a background surprise. *Radiocarbon* 46 (2), 41–50

Steier, P. and Rom, W. 2000. The use of Bayesian statistics for 14C dates of chronologically ordered samples: a critical analysis. *Radiocarbon* 42(2), 183–98

Stuiver, M. and Kra, R.S. 1986. Editorial comment. *Radiocarbon* 28(2B), ii.

Stuiver, M., and Polach, H. A. 1977. Reporting of ^{14}C data. *Radiocarbon* 19, 355–63

Thomas, J. 2006. On the origins and development of cursus monuments in Britain. *Proceedings of the Prehistoric Society* 72, 229–41

Thomas, J., 2007. *Place and Memory: Excavations at the Pict's Knowe, Holywood and Holm Farm, Dumfries and Galloway, 1994–8* Oxford: Oxbow Books

Ward, G.K. and Wilson, S.R. 1978. Procedures for comparing and combining radiocarbon age determinations: a critique. *Archaeometry* 20, 19–31

Xu, S., Anderson, R., Bryant, C., Cook, G.T., Dougans, A., Freeman, S., Naysmith, P., Schnabel, C. and Scott, E.M. 2004. Capabilities of the new SUERC 5MV AMS facility for ^{14}C dating. *Radiocarbon* 46, 59

Zondervan, A., Poletti, M., Purcell, C., and Sparks, R.J. 2007. Accelerator and beamline upgrades at the AMS facility of GNS Science, New Zealand. *Instruments and Methods in Physics Research B*, 259, 47–9

Table 1. Thermoluminescence (TL) dates

Feature	Context	Laboratory number	BC	Material	Sample reference	Stratigraphic details	*Posterior density estimate BC (95%)*
165005	165011	POH22	6750±580	Burnt flint		Main fill of pit between ditches of C1 cursus (Framework Archaeology 2006, 39–44), containing much burnt flint and stone and a small amount of undiagnostic struck flint.	*7470–5810*
165005	165011	POH21	6210±630	Burnt flint		from the same context as POH22	*7250–5580*
165007	165008	POH151	7180±630	Burnt flint		Single fill of pit between ditches of C1 cursus, containing much burnt flint and a small amount of undiagnostic struck flint. Date attributed to pit 165009 in 2006 publication (Framework Archaeology 2006, 39–44)	*7690–5900*
165009	165010	POH202	6480±700	Burnt flint		Single fill of pit between ditches of C1 cursus, containing much burnt flint and a small amount of undiagnostic struck flint. Date attributed to pit 165007 in 2006 publication, and quoted as 6460±700 (Framework Archaeology 2006, 39–44).	*7420–5650*
524218	524219	POH452	7347±840	Burnt flint		Single fill of pit E of cursus, containing much burnt flint and charcoal and a small amount of undiagnostic struck flint	*7780–5790*
524224	524225	POH482	6057±690	Burnt flint		Topmost surviving fill of pit cutting pit 578138, E of C1 cursus, containing much burnt flint	*7240–5510*
555536		POH521	7157±760	Burnt flint		Fill of pit cutting pit 555539, E of C1 cursus, containing much burnt flint, also charcoal	*7710–5810*
524220		POH442	4527±530	Burnt flint		Fill of pit E of C1 cursus, containing much burnt flint, also charcoal	
129109	129104	POH323	3230±600	Burnt flint	C4 129104	Upper surviving fill of truncated pit. Associated with flint industry of late Neolithic technology, including a fragment and a flake from a ground flint axehead and single flakes from two others, also much burnt flint, pollen of grass and weeds (Framework Archaeology 2006, 84–5)	
129086	129087	POH331	2090±610	Burnt	C3	A fill (129087) of an	

Table 1. Thermoluminescence (TL) dates							
Feature	Context	Laboratory number	BC	Material	Sample reference	Stratigraphic details	*Posterior density estimate BC (95%)*
				flint	129087	unmapped feature (129086)	

Table 2. Optically Stimulated Luminescence Dates

All measured on sand-sized quarts grains except for OxL-1463, which was measured on polymineral grains from a sherd

Feature	Context	Age estimate code	Age BC	Field code	Lab. code	D_e (Gy)	Dose rate (mGy/a)	Stratigraphic details	*Posterior density estimate BC (unless otherwise specified) (95%)*
Geological samples									
		OxL-1475	20,700 ± 2,500	OSL01	X1071	42.0 ± 4.2	1.85 ± 0.07	Brickearth	
	555311	OxL-1450	13,100 ± 900	OSL16	X1177	25.3 ± 0.7	1.67 ± 0.08	Alluvium	
C1 cursus and related features									
512070, intervention 537124	537128	OxL-1447	5010 ± 450	OSL11	X1172	12.8 ± 0.4	1.83 ± 0.10	Secondary fill of E ditch of C1 cursus. Stratified below OxL-1445	*5710–3920*
512070, intervention 537124	537128	OxL-1446	3770 ± 350	OSL10	X1171	11.3 ± 0.3	1.96 ± 0.11	from the same context as OxL-1447	*4540–3400*
512070, intervention 537124	537133	OxL-1445	3760 ± 340	OSL09	X1170	10.4 ± 0.3	1.81 ± 0.09	Secondary fill of E ditch of C1 cursus. Stratified above OxL-1446–7 and below OxL-1444	*4130–3000*
512070, intervention 537124	537129	OxL-1444	1830 ± 230	OSL08	X1169	7.39 ± 0.23	0.93 ± 0.10	Secondary fill of E ditch of C1 cursus. Stratified above OxL-1445 and below OxL-1443	*2370–1430*
537136	537139	OxL-1443	930 ± 190	OSL07	X1168	4.26 ± 0.13	1.45 ± 0.08	Upper fill of post-removal pit at NW corner of possible early medieval building, cutting E ditch of C1 cursus, stratified above OxL-1444	*AD 550–1310*
527200	527206	OxL-1458	2370 ± 280	OSL26	X1199	8.01 ± 0.22	1.83 ± 0.11	A fill of pit 527200, cut by E ditch of C1 cursus. Stratified below OxL-1457	*3030–2260*
527200	527191	OxL-1457	2980 ± 300	OSL25	X1198	10.0 ± 0.31	2.01 ± 0.11	A fill of pit 527200, cut by E ditch of C1 cursus. Stratified above OxL-1458 and below OxL-1456	*2940–2230*
512070, intervention 527201	527212	OxL-1456	2340 ± 290	OSL24	X1197	8.59 ± 0.36	1.98 ± 0.10	A secondary fill of E ditch of C1 cursus, stratified above OxL-1457 and below OxL-1455	*2700–2030*
512070, intervention 527201	527205	OxL-1455	2210 ± 250	OSL23	X1196	8.34 ± 0.34	1.98 ± 0.10	A fill of E ditch of C1 cursus, stratified above OxL-1455	*2640–1860*
512071, intervention 527107	527109	OxL-1448	4310 ± 450	OSL14	X1175	9.17 ± 0.42	1.45 ± 0.08	Secondary fill of W ditch of C1 cursus	*5020–3690*
512071, intervention 527107	527109	OxL-1449	4080 ± 450	OSL15	X1176	10.0 ± 0.5	1.65 ± 0.10	From the same context as OxL-1448, -1451, -1459, -1460	*4930–3570*
512071, intervention 527107	527109	OxL-1451	3800 ± 460	OSL19	X1206	10.6 ± 0.6	1.83 ± 0.11	From the same context as OxL-1448, -1449, -1459, -1460	*4860–3420*
512071, intervention 527107	527109	OxL-1459	5080 ± 810	OSL27	X1200	14.7 ± 0.4	2.08 ± 0.23	From the same context as OxL-1448, -1449, -1451, -1460	*5540–3680*
512071, intervention 527107	527109	OxL-1460	4970 ± 400	OSL28	X1201	14.5 ± 0.4	2.08 ± 0.11	From the same context as OxL-1448, -1449, -1451, -1459	*5350–3970*

Table 2. Optically Stimulated Luminescence Dates
All measured on sand-sized quarts grains except for OxL-1463, which was measured on polymineral grains from a sherd

Feature	Context	Age estimate code	Age BC	Field code	Lab. code	D_e (Gy)	Dose rate (mGy/a)	Stratigraphic details	*Posterior density estimate BC (unless otherwise specified) (95%)*
512070, intervention 570076	570080	OxL-1461	5930 ± 510	OSL29	X1202	16.3 ± 0.5	2.06 ± 0.12	Secondary fill of E ditch of C1 cursus	*6960–4910*
512071, intervention 585002	585005	OxL-1462	5630 ± 540	OSL30	X1203	13.8 ± 0.6	1.81 ± 0.10	Secondary fill of W ditch of C1 cursus	*6720–4550*
529311, intervention 529188	529190	OxL-1463	1150 ± 290	P01	X1207	6.83 ± 0.20	2.16 ± 0.19	Flint-tempered body sherd from basal fill of W C1 cursus ditch	*2000–1180*
Other contexts									
526249	526179	OxL-1453	1720 ± 240	OSL21	X1193	7.38 ± 0.20	1.98 ± 0.11	Secondary fill of recut of M/LBA ditch in Farmstead 2, cutting C1 cursus	
512005	526191	OxL-1452	2890 ± 330	OSL20	X1192	8.50 ± 0.34	1.74 ± 0.10	Fill immediately above thin skin of primary silt in M/LBA ditch in Farmstead 1	
563060	563058	OxL-1454	420 ± 170	OSL22	X1195	4.49 ± 0.20	1.85 ± 0.10	A soft clayey peat fill of MBA waterhole cutting ditch 563066 in Farmstead 2, stratified below contexts of charred grain which formed samples for radiocarbon dates Wk-18573 and Wk-19339, both older than this measurement	
		OxL-1476	2220 ± 560	OSL05	X1075	5.56 ± 0.69	1.32 ± 0.06	Fill of unspecified posthole	

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
HAR-4823		Undated remainder of sample identified 2000 as wood and bark, dried out and structurally collapsed, probably from roundwood of various diameters, probably *Prunus* spp. and/or Maloideae	1979–1985 Stanwell excavations, Farmstead 12, area 1B, waterhole 553. Waterhole with well-preserved waterlogged wood fragments including ?ladder portion (O'Connell 1990, 41, fig. 24). Pottery from various levels in the feature appears late Bronze Age (O'Connell 1990, 52, fig. 29: 38–57, fig. 30: 58–65). Location of sample uncertain	2440±70		800–390	760–400		-	-
NZA-14901	1140	Several fragments waterlogged cereal chaff, not further identified.	Farmstead 3, feature 135071, context 135034. Organic fill in waterhole 135071, cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified above 135041. Described as very organic fill probably derived mainly from plant matter blown into pit. MBA pottery in under- and overlying layers. S.g. 135062, position in feature 11 (Framework Archaeology 2006, 139–45, 155–57)	3135±65	-28.94	1610–1210	1500–1310		*1400–1260*	*1390–1360 (17%), 1350–1290 (51%)*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
NZA-14902		'Selected fragments of black sediment. Ground in mortar and pestle, treated with acid/alkali/acid process. Dried in vacuum oven. Fraction dated — treated sediment'. Humin fraction?	Site WPR98, feature 150011, context 150012. Upper silts of pit cutting C1 cursus ditch and yielding pollen indicative of mixed deciduous woodland with small areas of grass and herbs and some arable (Framework Archaeology 2006, 61–5)	5392±60	-25.7	4350–4050	4340–4080		-	-
NZA-14903	sf 88	1 fragment *Alnus* sp. roundwood from handle of socketed axe	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery	3071±55	-27.54	1460–1130	1420–1270		*1440–1310*	*1420–1360*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
NZA-14904	sf 207	1 fragment *Quercus* sp. wood from handle of socketed axe. Not roundwood or sapwood. Object 206 was roundwod from same artefact, but object 207 was part of main trunk — assume heartwood (OA comment)	Farmstead 3, feature 156028, context 155197. Waterlogged silting, stratified below 156020 (Framework Archaeology 2006, 142–45). LBA and 1 sherd MIA pottery from overlying layers	3103±65	-26.48	1520–1130	1450–1290		*1460–1300*	*1440–1360*
NZA-14905	sf 208	1 fragment Maloideae wood from ard tip	Farmstead 3, feature 156028, context 155197. Waterlogged silting stratified below 156020 (Framework Archaeology 2006, 142–45). LBA and 1 sherd MIA pottery from overlying layers	3019±65	-24.63	1420–1050	1390–1130		*1440–1290*	*1420–1350*
NZA-14906	sf 323	1 fragment Maloideae wood from ard tip	Farmstead 3, feature 135071, context 135041. Stratified immediately above 13540 and below 135034 (Framework Archaeology 2006, 139–45, 155–57)	3065±75	-26.74	1500–1120	1430–1220		*1410–1280*	*1400–1320*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
NZA-14907	sf 25	1 fragment *Fraxinus* wood from socket of Taunton phase copper alloy side-looped spearhead (Framework Archaeology 2006, 100–2)	Farmstead 6, feature 149099, context 149042. Recut of ditch 111069 (Framework Archaeology 2006, fig. 3.6)	2932±55	-21.78	1320–970	1260–1050		*1310–1000*	*1260–1240 (4%), 1220–1060 (64%)*
OxA-15595		Human femur	Site PSH02, feature 595072, context 595073. Unaccompanied crouched inhumation.	3077±31	-20.4	1420–1270	1410–1310		*1420–1260*	*1410–1310*
OxA-16126		Human cremated bone	Farmstead 10, feature 554566, context 554568. Pit containing unurned cremation, cut by small posthole 554570	3060±28	-24.5	1410–1260	1390–1300		*1410–1210 (94%), 1140–1130 (1%)*	*1360–1260*
OxA-16127		Human cremated bone	Site PSH02, feature 591052, context 591053. Cremation burial including iron	1733±25	-22.1	AD 250–380	AD 260–340		-	-
OxA-16320		Human cremated bone	Farmstead 11, feature 699046, context 699047. Unurned cremation burial. Single fill	2891±30	-22.8	1210–980	1120–1020		*1220–1040*	*1200–1080*
OxA-17822	sf 12045	1 fragment *Populus* sp. from worn, broken and repaired wooden bowl. Replicate of OxA-17823, probably of Wk-18461	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100. 1 MBA sherd and 1 LBA sherd in 611100	3056±26	-28.11	1410–1260	1390–1300	3102±16 (T'=4.9; T'(5%)=6.0; ν=2; with OxA-17823, Wk-18461)	for weighted mean: *1430–1370 (72%), 1350–1310 (23%)*	for weighted mean: *1420–1380 (58%), 1340–1320 (10%)*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
OxA-17823	sf 12045	1 fragment *Populus* sp. from worn, broken and repaired wooden bowl. Replicate of OxA-17822, probably of Wk-18461	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100. 1 MBA sherd and 1 LBA sherd in 611100	3132±27	-28.55	1500–1310	1440–1390	3102±16 (T'=4.9; T'(5%)=6.0; ν=2; with OxA-17823, Wk-18461)	for weighted mean: *1430–1370 (72%), 1350–1310 (23%)*	for weighted mean: *1420–1380 (58%), 1340–1320 (10%)*
OxA-18031	29078	Human cremated bone	Farmstead 10, feature 827119, context 827140. Cremation burial, undisturbed, with, but not contained in, LBA pottery	2906±30	-23.86	1220–1000	1160–1020		*1260–1240 (5%), 1220–1040 (90%)*	*1200–1070*
OxA-18032	29079	Human cremated bone	Farmstead 10, feature 830083, context 830084. Unurned cremation burial	2905±30	-20.67	1220–1000	1130–1020		*1260–1230 (5%), 1220–1040 (90%)*	*1200–1140 (32%), 1130–1070 (36%)*
SUERC-11569	16048	Humic acids	Farmstead 8, feature 510047, context 562038. From upper part (9–10 cm) of pollen monolith through basal silts of feature, stratified above 558056. A diesel-contaminated clayey silt. MBA pottery	3520±35	-28.6	1940–1740	1900–1770		-	-
SUERC-11570	16512	Humic acids	Farmstead 2, feature 557027, context 557039. From pollen monolith taken from peat layer overlying 557029 in pit. MBA pottery and much animal bone	3305±35	-29.9	1690–1500	1620–1520		-	-

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
SUERC-11571	18377	Humic acids	Farmstead 3, feature 592384, context 592364. From lower part (63–64 cm) of pollen monolith through lower fills of waterhole (re) cutting waterhole 592359 which in turn cut ditch 526462, stratified above 592388. 526462 formed part of the west ditch of trackway 11	3150±35	-28.2	1500–1320	1500–1390		-	-
Wk-9367		Animal bone, unspecified	Farmstead 3, feature 129112, context 129113. A waterlogged fill overlying the initial silt of a pit. Sample one of 7 fragments/169 g of animal bone in a deposit where two at least semi-complete LIA pots and a wooden object. Cut pit 167099	1972±62	-24	170 BC–AD 210	50 BC–AD 120		-	-
Wk-9371		1 fragment Maloideae from sails	Farmstead 3, feature 141024, context 121047. Seen as part of placed wood deposit within secondary fills. MBA, LBA and MIA pottery in overlying deposits	2928±66	-27.6	1380–930	1260–1020		*1390–1170*	*1380–1340 (15%), 1310–1230 (53%)*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-9373	897	4 fragments *Prunus spinosa* charcoal	Farmstead 4, feature 125233, context 125228. A charcoal- and artefact-rich upper fill of waterhole cutting earlier waterhole 125247 and outer D-shaped enclosure of Farmstead 3. Much LBA pottery, 2 sherds MIA, 1 sherd LIA	2569±62	-25.3	840–410	810–550		-	-
Wk-9374	1141	Waterlogged seeds of *Malus* sp., *Prunus spinosa* and *Acer campestre*	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery. Date previously attributed to chaff from sample 1140 in context 135034 (Framework Archaeology 2006, 155)	2876±59	-27.5	1260–900	1190–940		-	-
Wk-9375	1317	Waterlogged seeds of *Prunus spinosa*, *Bryonia cretica*, *Glyceria* sp. and *Chenopodium polyspermum*	Farmstead 3, feature 136194, context 136193. Waterlogged basal layer of shaft cut into waterhole 103038, in turn cut into waterhole 10340. Complete LBA pots (Framework Archaeology 2006, 136, 148–9)	3197±57	-26.2	1620–1320	1520–1410		-	-

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-9376	1150	Waterlogged seeds of *Crataegus monogyna*, *Rhamnus cathartica* and *Prunus spinosa*, from the initial silting of the shaft	Farmstead 3, feature 156031, context 156020. Waterlogged basal fill of well shaft within 156028, stratified above 155197. MBA pottery, LBA in overlying layers (Framework Archaeology 2006, 128, 141–5)	3015±56	-26.2	1420–1050	1380–1130		*1400–1240*	*1390–1340 (38%), 1330–1280 (30%)*
Wk-9377	5017	Charred cereal grain, 3 fragments (?=3 grains)	Site GAI99, feature 216121, context 216011. A secondary fill within intervention 216009 in pit containing Grooved Ware pottery (Framework Archaeology 2006, 82–83)	727±63	-22.4	AD 1170–1400	AD 1230–1380		-	-
Wk-10023	506	1 fragment from *Salix* sp. stake	Farmstead 6, feature 124100, context 123048. Structural stake from revetment, in basal layer of waterhole. Waterhole cut by ditch 107088 (Framework Archaeology 2006, 145–7, 157–59)	3029±51	-26.8	1420–1120	1390–1210		*1420–1120*	*1390–1250 (60%), 1240–1210 (8%)*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10024		1 fragment from *Salix* sp. sails, probably part of wattle lining	Farmstead 3, feature 159200, context 159207. 1 of 4 upright sails of wattle lining of well, described collectively as 50-58 mm in diameter. Cut by waterholes 157243, 110107, pit 125034. MBA pottery in overlying layers. Located in berm area of inner D-shaped enclosure and hence probably post-dating it.	3086±51	-26.5	1500–1210	1420–1300		*1450–1370*	*1430–1390*
Wk-10025		1 fragment from *Salix* sp. sails, probably part of wattle lining	Farmstead 3, feature 159200, context 159210. 1 of 6 upright sails forming part of revetment in waterhole remodelled from original well, described collectively as 52–90 mm in diameter. Cut by waterholes 157243 and 110107, pit 125034. MBA pottery in overlying layers. Located in berm area of inner D-shaped enclosure and hence probably post-dating it.	3187±54	-26.1	1610–1320	1510–1410		*1450–1370 (94%), 1340–1320 (1%)*	*1430–1390*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10026		1 fragment from *Salix* sp. roundwood stake	Farmstead 3, feature 156028, context 155197. Waterlogged silting, stratified below 156020 (Framework Archaeology 2006, 142-45). LBA and 1 sherd MIA pottery from overlying layers	3204±46	-26	1610–1400	1520–1430		*1490–1370*	*1450–1400*
Wk-10027	sf 274	1 fragment from *Quercus* sp. board, possibly used as a stake. Not roundwood or sapwood (OA comment)	Farmstead 3, feature 110107, context 161198. Spongy, rich organic fill of twigs, leaves, etc. near base of waterhole cutting waterhole 159200 and ditch of inner D-shaped enclosure. MBA and a little LBA pottery in overlying deposits	3184±55	-26	1610–1310	1520–1410		-	-
Wk-10028	sf 75	1 fragment? from *Quercus* sapwood chips, interpreted as generated during the manufacture of the revetment	Farmstead 3, feature 156031, context 156020. Waterlogged basal fill of well shaft 156021 within 156028, stratified above 155197. MBA pottery, LBA in overlying layers (Framework Archaeology 2006, 128, 141–5)	2942±59	-25.4	1380–980	1260–1050		*1400–1230*	*1390–1340 (35%), 1320–1270 (33%)*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10029	sf 2588	1 fragment from *Salix* sp. roundwood stake	Farmstead 3, feature 178108, context 178123. One of 5 stakes driven into lowest fills of waterhole cut by pit 178122. MBA pottery, MBA and LBA pottery in overlying layers (Framework Archaeology 2006, fig.3.26)	3089±47	-28.1	1490–1210	1420–1310		*1440–1280*	*1420–1350 (56%), 1340–1320 (12%)*
Wk-10030	sf 547	1 fragment from *Quercus* sp. stake offcut. Object no. refers to heartwood, though sapwood available (OA comment)	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery	3168±46	-27.1	1530–1310	1500–1410		-	-
Wk-10031	sf 73	1 fragment from *Quercus* sp. sapwood chips, interpreted as generated during the manufacture of the revetment	Farmstead 3, feature 156031, context 156020. Waterlogged basal fill of well shaft within 156028, stratified above 155197. MBA pottery, LBA in overlying layers (Framework Archaeology 2006, 128, 141–5)	3260±57	-25.9	1690–1420	1620–1460		-	-

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10032	sf 2585	1 fragment from *Sambucus nigra* roundwood stake	Farmstead 3, feature 178108, context 178123. One of 5 stakes driven into lowest fills of waterhole cut by pit 178122. MBA pottery, MBA and LBA pottery in overlying layers (Framework Archaeology 2006, fig.3.26)	3082±46	-26.1	1450–1210	1420–1300		*1440–1280*	*1420–1320*
Wk-10033		1 fragment from *Quercus* roundwood stake	Farmstead 6, feature 124100, context 124193. Structural stake from revetment, in basal layer of waterhole. Waterhole cut by ditch 107088 (Framework Archaeology 2006, 145–7, 157–59)	3097±74	-25.8	1520–1130	1450–1260		*1510–1190 (93%), 1180–1130 (2%),*	*1440–1260*
Wk-10034		1 fragment from *Quercus* or *Alnus* roundwood stake. Without an object number there is no way of distinguishing which species was submitted	Farmstead 6, feature 124100, context 124194. Structural stake from revetment, in basal layer of waterhole. Waterhole cut by ditch 107088 (Framework Archaeology 2006, 145–7, 157-59)	3091±57	-25.9	1500–1210	1430–1300		*1500–1210*	*1430–1300*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10035	sf 546	1 fragment from *Salix* sp. stake offcut	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery	3048±46	-27.4	1430–1130	1390–1260		*1430–1310*	*1420–1360*
Wk-10036		*Alnus* sp. roundwood from log ladder	Farmstead 3, feature 141024, context 108086. 1 of 2 log ladders in feature. Log ladder dug into base of pit, packed around with backfill, extending up through overlying layers. MBA, LBA and MIA pottery in overlying deposits	2984±48	-27.9	1390–1050	1300–1120		*1390–1200*	*1380–1350 (13%), 1320–1240 (55%)*
Wk-11473		Charred *Arrhenatherum elatius* tubers	Farmstead 7, feature 137027, context 137036. Only fill of unurned cremation, inc. burnt Cu alloy fragments (Framework Archaeology 2006, 84)	4314±41	26.5	3080–2880	3010–2880		-	-
Wk-11712		*Alnus* sp.	Site BCU02, feature 803009, context 803009. *In situ* wattle structure in small evaluation trench to west of main excavation	2419±81	-26.6	780–380	750–400		-	-

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-11773	id code 803059	Wooden post (worked), taxon not identified	Site BCU02, feature 807024, context 801075. One of three postholes and a pit within tufa deposits in small trench to west of main excavation.	7264±69	-28.5	6330–6000	6220–6060		-	-
Wk-12279		Wood from peat. Taxon not identified	Site PSH02, feature 586036, context 516145. Peat layer in palaeochannel	3580±49	-27.2±0.2	2120–1770	2030–1880		-	-
Wk-18456		1 fragment *Salix* sp.– twisted rope	Farmstead 4, feature 517310, context 517298. Associated with bucket in lowest layer of waterhole. Much LBA pottery in this and overlying deposits. Cut waterhole 517274	2871±29	-28.6±0.2	1190–930	1120–1000		*1190–1170 (2%), 1160–980 (93%)*	*1120–1020*
Wk-18457	17005	1 fragment *Corylus avellana* charcoal	Farmstead 1, feature 539096, context 527085. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified below 527076. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff. From same bulk sample as sample for Wk-18577.	3135±30	-26.2±0.2	1500–1310	1450–1390		*1450–1370 (94%), 1340–1320 (1%)*	*1430–1390*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18459	18180	1 fragment from *Salix* sp. stake	Farmstead 8, feature 510047, context 558056. Stake upright in waterhole, driven into base and abutted by later deposits. MBA and LBA pottery in overlying layers. Waterhole cut ditch 531053	3215±31	-29.6±0.2	1610–1410	1510–1440		*1530–1420*	*1510–1440*
Wk-18460	15530	1 fragment from chips cf *Alnus* sp.	Farmstead 3, feature 559328, context 559297. Dark silty clay fill of waterhole cutting enclosure ditch 598081, earlier than well-shaft. MBA pottery in same context, MBA and LBA higher up sequence	3153±32	-26.6±0.2	1500–1320	1490–1400		*1450–1380*	*1430–1390*
Wk-18461		1 unidentified wood fragment, almost certainly a further fragment from bowl sf 12045 (Rebecca Nicolson pers. comm.). Probably replicate of OxA-17822, -17823	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100. 1 MBA sherd and 1 LBA sherd in 611100	3124±30	-27.5±0.2	1500–1310	1440–1320	3102±16 (T'=4.9; T'(5%)=6.0; ν=2; with OxA-17822, -17823)	for weighted mean: *1430–1370 (72%), 1350–1310 (23%)*	for weighted mean: *1420–1380 (58%), 1340–1320 (10%)*
Wk-18462	sf 24001	1 fragment from *Alnus* sp. log ladder	Farmstead 1, feature 615008, context 615017. Log ladder resting on bottom of waterhole without intervening fill, and against its side. MBA and LBA pottery in an overlying deposit	3070±32	-28.4±0.2	1420–1260	1400–1310		*1430–1310*	*1420–1350*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18463	27106	1 fragment Maloideae charcoal	Farmstead 11, feature 699001, context 699002. Unurned cremation burial with burnt flint, burnt stone, struck flint. Topmost surviving fill	2989±28	-27.2±0.2	1370–1120	1300–1130		*1300–1110*	*1230–1120*
Wk-18464	27114	1 fragment *Corylus* sp. charcoal	Farmstead 11, feature 699010, context 699013. Unurned cremation burial with burnt flint, burnt stone, struck flint. Bottom fill of 3	2921±30	-24.9±0.2	1260–1010	1200–1050		*1260–1230 (2%), 1220–1050 (93%)*	*1200–1100*
Wk-18465	27166	1 fragment *Alnus* sp. charcoal	Farmstead 11, feature 699044, context 699045. Unurned cremation burial. Single fill	2944±36	-26.9±0.2	1290–1020	1260–1090		*1260–1060*	*1210–1110*
Wk-18466	27241	1 fragment Maloideae charcoal	Farmstead 11, feature 699060, context 699061. Unurned cremation burial cutting undated gully 703039. Single fill	2700±34	-25.2±0.2	910–800	900–810		-	-
Wk-18573	16523	4 grains charred *Hordeum vulgare*	Farmstead 2, feature 563060, context 563056. A waterlogged middle fill of waterhole cutting ditch 563066. 2 MBA and 2 LBA sherds. Stratified immediately below 563055 and above 563058	3149±32	-23.9±0.2	1500–1320	1490–1390		*1490–1480 (1%), 1470–1380 (94%)*	*1440–1400*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18574	16527	3 grains charred *Hordeum vulgare*	Farmstead 2, feature 515233, context 515173. Latest in complex series of recuts of boundary of settlement 2, fill and contents seen as silted rather than dumped. Much MBA pottery. Cut by waterhole 563032, which contained LBA pottery. Cremated bone and charcoal in fill.	3094±31	-25.8±0.2	1440–1270	1420–1310		*1440–1320*	*1430–1380*
Wk-18575	17001	1 grain charred *Triticum dicoccum/spelta*	Farmstead 1, feature 583160, context 529015. A lower fill of ditch cut by pits 529039, 583161, 529011. Charred plant remains fairly sparse. LBA sherds FL1 and FL 11 from under- and overlying deposits	3137±36	-22.3±0.2	1500–1310	1460–1380		*1460–1370 (89%), 1360–1320 (6%)*	*1440–1380*
Wk-18576	15052	1 grain charred *Triticum dicoccum/spelta*	Farmstead 4, feature 581045, context 581027. A secondary fill of ditch (re)cut by ditch 581046. MBA pottery, fired clay, charcoal. Interpreted as naturally formed layer	2980±34	22.5±0.2	1380–1050	1270–1130		-	-

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18577	17005	2 grains charred *Triticum dicoccum/spelta*	Farmstead 1, feature 539096, context 527085. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified below 527076. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff. From same bulk sample as sample for Wk-18457.	3140±34	-24.4±2	1500–1310	1460–1380		*1460–1370 (94%), 1340–1320 (1%)*	*1430–1390*
Wk-18578	17031	4 grains charred *Triticum dicoccum/spelta*, eroded	Farmstead 1, feature 539096, context 527076. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified above 527085. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff.	3074±32	-25.4±0.2	1420–1260	1410–1310		*1410–1300*	*1400–1330*
Wk-18579	17033	Charred *Triticum dicoccum/spelta*. 5 grains submitted; unclear how many dated	Farmstead 1, feature 539096, context 527085. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified below 527076. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff.	3052±31	-23.4±0.2	1420–1210	1390–1290		*1420–1320*	*1410–1360*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18580	17090	1 grain charred *Triticum aestivum*	Site PSH02, feature 527233, context 527224. Fill of gulley cutting treethrow 527229 and cut by E ditch of C1 cursus.	800±29	-23.4±0.2	AD 1180–1280	AD 1220–1260		-	-
Wk-18581	17524	4 grains charred *Triticum dicoccum/spelta*	Farmstead 5, feature 543202, context 543204. Basal fill of pit (re)cutting well 543201. Black, charcoal-rich layer with large pieces of burnt wood and emmer and spelt grain and chaff. MBA pottery. Contents could not be derived from 543212 because there was >1 m of fill between the two deposits	3207±32	-23.4±0.2	1530–1410	1510–1440		*1500–1410*	*1480–1430*
Wk-19326	17076	Rib of medium mammal. C/N 3.30, %C 43.8, %N 15.5	Farmstead 2, feature 557027, context 557029. Waterlogged basal black peaty layer of pit cut by pit 557034, underlying 557039. The lower of two abundant deposits of animal bone without indicators of reworking such as loose teeth, suggesting that deposition into the feature was direct; included a possible partial female adult sheep and parts of a sheep/goat hind limb. MBA pottery	3176±33	-22.6±0.2	1520–1400	1500–1420		*1490–1390*	*1450–1400*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-19327	17117	1 waterlogged seed *Prunus* cf *spinosa*	Farmstead 4, feature 553191, context 553180. A lower waterlogged fill of waterhole cutting waterhole 537201, cut by pit 537202. Layer included stakes (?from wattle lining) and leaves	2859±33	-28.6±0.2	1130–920	1110–940		*1200–970*	*1120–1020*
Wk-19328	17532	2 grains charred *Triticum dicoccum/spelta*	Farmstead 5, feature 543201, context 543212. Band of gravel above bottom fill of well (re)cut by 543202. Rich in charcoal, with some charred grain and chaff. Single Grooved Ware and MBA sherds.	3171±39	-24.2±0.2	1530–1320	1500–1410		*1530–1430*	*1510–1450*
Wk-19329	25037	3 seeds *Prunus spinosa*	Farmstead 3, feature 641097, context 641104. Waterlogged basal layer of waterhole cutting enclosure ditch 639085, twigs in predominantly grit and gravel deposit suggest material falling from surrounding vegetation into silting feature. MBA and 2 sherds/18 g in LBA fabric QU8 in an overlying deposit, Cu alloy spearhead in another. Probably intrusive IA pottery higher up sequence. Cut by IA pits 641098, 641144.	3120±34	-26.8±0.2	1500–1300	1440–1320		*1450–1370*	*1430–1390*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-19330	27042	1 of only 2 grains of charred *Triticum dicoccum/spelta*	Farmstead 8, feature 693006, context 693004. Charcoal lens in waterhole, at surface of 693004, possibly dumped from nearby settlement, after some deposits had formed in base of feature	3303±32	-26.6±0.2	1670–1500	1620–1530		-	-
Wk-19331	26055	1 waterlogged seed *Rosa* sp.	Farmstead 3, feature 646068, context 646069. Waterlogged fill of waterhole cut by IA ring ditch 636149, within D-shaped enclosure. Rose hips and seeds common in deposit, as were other wild plant remains. MBA sherd in gravel lens 646077, stratified above the sample	3315±32	-24.0±0.2	1690–1510	1630–1530		-	-
Wk-19332	27208	1 grain charred *Triticum dicoccum/spelta*	Farmstead 11, feature 711024, context 711026. Waterlogged upper fill of waterhole cutting ditch 725031. MBA and LBA pottery in overlying layers	2917±36	-22.6±0.2	1260–1000	1200–1040		-	-

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-19333	27305	8 waterlogged *Ranunculus* sp. seeds	Farmstead 8, feature 685032, context 685035. Silty fill rich in waterlogged plant material, formed in waterhole after gravel sides had collapsed and some sediment had accumulated. LBA pottery in topmost layer, stratified above sample	2877±39	-26.3±0.2	1210–920	1130–1000		*1210–980*	*1130–1020*
Wk-19334	17153	1 grain charred *Hordeum vulgare*	Site PSH02, feature 539450, context 539451. Single fill of pit with LBA and, mainly, MIA pottery, described as deliberate backfill.	2147±32	-22.1±0.2	360–50	350–110		-	-
Wk-19335	17519	1 grain charred *Hordeum vulgare*	Site PSH02, feature 529306, context 554144. Dump of charcoal and burnt flint in pit cutting E ditch of C1 cursus. Layer of burnt flint and charcoal with a thin layer of gravel (unburnt at the base). Within deposit 554144, apparently dumped while 554144 still forming.	2227±32	-23.6±0.2	390–200	380–210		-	-
Wk-19336	17032	1 grain charred *Hordeum vulgare*	Farmstead 1, feature 527078, context 527081. Waterlogged fill of pit 527078 in settlement 7, with MBA pottery, other charred grain and chaff present. Cutting earlier pit 527069, cut by ditches 539096, 539108.	3185±33	-24.8±0.2	1520–1400	1500–1430		*1490–1390*	*1450–1410*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-19337	16577	1 grain charred *Hordeum vulgare*	Farmstead 1, feature 546202, context 546204. Waterlogged clayey, organic basal fill of pit in settlement 7. Dark grey silty clay with gravel, fairly rich in charred grain and chaff. LBA pottery	3062±32	-23.9±0.2	1420–1260	1400–1300		*1420–1300*	*1410–1350*
Wk-19338	16663	1 grain charred *Triticum dicoccum/spelta*	Farmstead 1, feature 539283, context 539284. Initial waterlogged fill of ditch. 1 LBA sherd, much animal bone. Sample probably from a discrete area of burnt material. Contained much charcoal, some grain. Cut by ditch 963040, a recut of the same boundary which contained purely MBA pottery	3062±39	-23.9±0.2	1430–1210	1400–1290		*1430–1300*	*1420–1350*
Wk-19339	16524	3 grains *Hordeum vulgare*	Farmstead 2, feature 563060, context 563055. A waterlogged middle fill of waterhole cutting ditch 563066. Stratified immediately above 563056. Rich in charred grain and chaff. MBA pottery	3094±33	-23.7±0.2	1440–1270	1420–1310		*1440–1320*	*1430–1380*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-19340	27181	Several charred *Vicia/Lathyrus* sp. seeds	Farmstead 11, feature 726001, context 726006. Waterlogged basal fill of recut in waterhole cutting ditch 717057, in what section suggests may be a recut. Stratified below inhumation burial. Only other finds from feature were animal bone, a possible hammerstone and calcined flint	137±32	-23.7±0.2	AD 1670–1940	AD 1680–1930		-	-
Wk-19341	sf 8201	1 fragment from *Corylus avellana* stake. Section of roundwood with bark, estimated to have been 7 years old when cut (inf. Steve Allan)	Site PSH02, feature 552395, context 552397. Tufaceous, peaty upper fill of otherwise undated pit cut by undated pit 570486, to west of main excavated area	2247±32	-26.0±0.2	400–200	390–230		-	-
Wk-19342	sf 12060	1 fragment from *Acer campestre* ard tip/stake	Farmstead 3, feature 592384, context 592388. At base of waterhole (re) cutting waterhole 592359 which in turn cut ditch 526462, stratified below 592364. 592384 recut in turn by 592385. 526462 formed part of the west ditch of trackway 11	3088±33	-26.9±0.2	1430–1260	1420–1310		*1420–1280*	*1410–1360 (37%), 1350–1310 (31%)*
Wk-19343	sf 12048	Chip of *Quercus* branchwood, 10–15 yrs old	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100, with much other wood. 1 MBA sherd and 1 LBA sherd in 611100	3119±33	-26.5±0.2	1500–1300	1440–1320		*1440–1310*	*1430–1370*

Table 3. Radiocarbon dates in laboratory number order

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-21695	205	1 fragment *Prunus* sp. roundwood charcoal	Farmstead 3, feature 142010, context 107037. Pit cutting HE1 enclosure. Much burnt material, LBA sherds. Limits only retrospectively defined, Neolithic lithics present, presumably derived from HE1 ditch (Framework Archaeology 2006, 74, fig. 2.22).	3270±33	-26.1	1630–1450	1610–1500		-	-

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Pre-Bronze Age activity										
Wk-11773	id code 803059	Wooden post (worked), taxon not identified	Site BCU02, feature 807024, context 801075. One of three postholes and a pit within tufa deposits in small trench to west of main excavation.	7264±69	-28.5	6330–6000	6220–6060		-	-
Wk-19335	17519	1 grain charred *Hordeum vulgare*	Site PSH02, feature 529306, context 554144. Dump of charcoal and burnt flint in pit cutting E ditch of C1 cursus. Layer of burnt flint and charcoal with a thin layer of gravel (unburnt at the base). Within deposit 554144, apparently dumped while 554144 still forming.	2227±32	-23.6±0.2	390–200	380–210		-	-
NZA-14902		'Selected fragments of black sediment. Ground in mortar and pestle, treated with acid/alkali/acid process. Dried in vacuum oven. Fraction dated — treated sediment'. Humin fraction?	Site WPR98, feature 150011, context 150012. Upper silts of pit cutting C1 cursus ditch and yielding pollen indicative of mixed deciduous woodland with small areas of grass and herbs and some arable (Framework Archaeology 2006, 61–5)	5392±60	-25.7	4350–4050	4340–4080		-	-
Farmstead 3										
Wk-10024		1 fragment from *Salix* sp. sails, probably part of wattle lining	Farmstead 3, feature 159200, context 159207. 1 of 4 upright sails of wattle lining of well, described collectively as 50-58 mm in diameter. Cut by waterholes 157243, 110107, pit 125034. MBA pottery in overlying layers. Located in berm area of inner D-shaped enclosure and hence probably post-dating it.	3086±51	-26.5	1500–1210	1420–1300		*1450–1370*	*1430–1390*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10025		1 fragment from *Salix* sp. sails, probably part of wattle lining	Farmstead 3, feature 159200, context 159210. 1 of 6 upright sails forming part of revetment in waterhole remodelled from original well, described collectively as 52–90 mm in diameter. Cut by waterholes 157243 and 110107, pit 125034. MBA pottery in overlying layers. Located in berm area of inner D-shaped enclosure and hence probably post-dating it.	3187±54	-26.1	1610–1320	1510–1410		*1450–1370 (94%), 1340–1320 (1%)*	*1430–1390*
Wk-10027	sf 274	1 fragment from *Quercus* sp. board, possibly used as a stake. Not roundwood or sapwood (OA comment)	Farmstead 3, feature 110107, context 161198. Spongy, rich organic fill of twigs, leaves, etc. near base of waterhole cutting waterhole 159200 and ditch of inner D-shaped enclosure. MBA and a little LBA pottery in overlying deposits	3184±55	-26	1610–1310	1520–1410		-	-
Wk-19329	25037	3 seeds *Prunus spinosa*	Farmstead 3, feature 641097, context 641104. Waterlogged basal layer of waterhole cutting enclosure ditch 639085, twigs in predominantly grit and gravel deposit suggest material falling from surrounding vegetation into silting feature. MBA and 2 sherds/18 g in LBA fabric QU8 in an overlying deposit, Cu alloy spearhead in another. Probably intrusive IA pottery higher up sequence. Cut by IA pits 641098, 641144.	3120±34	-26.8±0.2	1500–1300	1440–1320		*1450–1370*	*1430–1390*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18460	15530	1 fragment from chips of *Alnus* sp.	Farmstead 3, feature 559328, context 559297. Dark silty clay fill of waterhole cutting enclosure ditch 598081, earlier than well-shaft. MBA pottery in same context, MBA and LBA higher up sequence	3153±32	-26.6±0.2	1500–1320	1490–1400		*1450–1380*	*1430–1390*
Wk-19342	sf 12060	1 fragment from *Acer campestre* ard tip/stake	Farmstead 3, feature 592384, context 592388. At base of waterhole (re) cutting waterhole 592359 which in turn cut ditch 526462, stratified below 592364. 592384 recut in turn by 592385. 526462 formed part of the west ditch of trackway 11	3088±33	-26.9±0.2	1430–1260	1420–1310		*1420–1280*	*1410–1360 (37%), 1350–1310 (31%)*
SUERC-11571	18377	Humic acids	Farmstead 3, feature 592384, context 592364. From lower part (63–64 cm) of pollen monolith through lower fills of waterhole (re) cutting waterhole 592359 which in turn cut ditch 526462, stratified above 592388. 526462 formed part of the west ditch of trackway 11	3150±35	-28.2	1500–1320	1500–1390		-	-
Wk-9374	1141	Waterlogged seeds of *Malus* sp., *Prunus spinosa* and *Acer campestre*	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery. Date previously attributed to chaff from sample 1140 in context 135034 (Framework Archaeology 2006, 155)	2876±59	-27.5	1260–900	1190–940		-	-

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10035	sf 546	1 fragment from *Salix* sp. stake offcut	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery	3048±46	-27.4	1430–1130	1390–1260		*1430–1310*	*1420–1360*
NZA-14903	sf 88	1 fragment *Alnus* sp. roundwood from handle of socketed axe	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery	3071±55	-27.54	1460–1130	1420–1270		*1440–1310*	*1420–1360*
Wk-10030	sf 547	1 fragment from *Quercus* sp. stake offcut. Object no. refers to heartwood, though sapwood available (OA comment)	Farmstead 3, feature 135071, context 135040. Waterlogged organic fill close to base of waterhole cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified below 135041 (Framework Archaeology 2006, 139–45, 155–57). MBA pottery	3168±46	-27.1	1530–1310	1500–1410		-	-
NZA-14906	sf 323	1 fragment Maloideae wood from ard tip	Farmstead 3, feature 135071, context 135041. Stratified immediately above 13540 and below 135034 (Framework Archaeology 2006, 139–45, 155–57)	3065±75	-26.74	1500–1120	1430–1220		*1410–1280*	*1400–1320*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
NZA-14901	1140	Several fragments waterlogged cereal chaff, not further identified.	Farmstead 3, feature 135071, context 135034. Organic fill in waterhole 135071, cut by waterhole 135055, cut in turn by R-B pit 135087. Stratified above 135041. Described as very organic fill probably derived mainly from plant matter blown into pit. MBA pottery in under- and overlying layers. S.g. 135062, position in feature 11 (Framework Archaeology 2006, 139–45, 155–57)	3135±65	-28.94	1610–1210	1500–1310		*1400–1260*	*1390–1360 (17%), 1350–1290 (51%)*
NZA-14905	sf 208	1 fragment Maloideae wood from ard tip	Farmstead 3, feature 156028, context 155197. Waterlogged silting stratified below 156020 (Framework Archaeology 2006, 142–45). LBA and 1 sherd MIA pottery from overlying layers	3019±65	-24.63	1420–1050	1390–1130		*1440–1290*	*1420–1350*
NZA-14904	sf 207	1 fragment *Quercus* sp. wood from handle of socketed axe. Not roundwood or sapwood. Object 206 was roundwod from same artefact, but object 207 was part of main trunk — assume heartwood (OA comment)	Farmstead 3, feature 156028, context 155197. Waterlogged silting, stratified below 156020 (Framework Archaeology 2006, 142–45). LBA and 1 sherd MIA pottery from overlying layers	3103±65	-26.48	1520–1130	1450–1290		*1460–1300*	*1440–1360*
Wk-10026		1 fragment from *Salix* sp. roundwood stake	Farmstead 3, feature 156028, context 155197. Waterlogged silting, stratified below 156020 (Framework Archaeology 2006, 142-45). LBA and 1 sherd MIA pottery from overlying layers	3204±46	-26	1610–1400	1520–1430		*1490–1370*	*1450–1400*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10028	sf 75	1 fragment? from *Quercus* sapwood chips, interpreted as generated during the manufacture of the revetment	Farmstead 3, feature 156031, context 156020. Waterlogged basal fill of well shaft 156021 within 156028, stratified above 155197. MBA pottery, LBA in overlying layers (Framework Archaeology 2006, 128, 141–5)	2942±59	-25.4	1380–980	1260–1050		*1400–1230*	*1390–1340 (35%), 1320–1270 (33%)*
Wk-9376	1150	Waterlogged seeds of *Crataegus monogyna*, *Rhamnus cathartica* and *Prunus spinosa*, from the initial silting of the shaft	Farmstead 3, feature 156031, context 156020. Waterlogged basal fill of well shaft within 156028, stratified above 155197. MBA pottery, LBA in overlying layers (Framework Archaeology 2006, 128, 141–5)	3015±56	-26.2	1420–1050	1380–1130		*1400–1240*	*1390–1340 (38%), 1330–1280 (30%)*
Wk-10031	sf 73	1 fragment from *Quercus* sp. sapwood chips, interpreted as generated during the manufacture of the revetment	Farmstead 3, feature 156031, context 156020. Waterlogged basal fill of well shaft within 156028, stratified above 155197. MBA pottery, LBA in overlying layers (Framework Archaeology 2006, 128, 141–5)	3260±57	-25.9	1690–1420	1620–1460		-	-
Wk-10032	sf 2585	1 fragment from *Sambucus nigra* roundwood stake	Farmstead 3, feature 178108, context 178123. One of 5 stakes driven into lowest fills of waterhole cut by pit 178122. MBA pottery, MBA and LBA pottery in overlying layers (Framework Archaeology 2006, fig.3.26)	3082±46	-26.1	1450–1210	1420–1300		*1440–1280*	*1420–1320*
Wk-10029	sf 2588	1 fragment from *Salix* sp. roundwood stake	Farmstead 3, feature 178108, context 178123. One of 5 stakes driven into lowest fills of waterhole cut by pit 178122. MBA pottery, MBA and LBA pottery in overlying layers (Framework Archaeology 2006, fig.3.26)	3089±47	-28.1	1490–1210	1420–1310		*1440–1280*	*1420–1350 (56%), 1340–1320 (12%)*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
OxA-17822	sf 12045	1 fragment *Populus* sp. from worn, broken and repaired wooden bowl. Replicate of OxA-17823, probably of Wk-18461	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100. 1 MBA sherd and 1 LBA sherd in 611100	3056±26	-28.11	1410–1260	1390–1300	3102±16 (T'=4.9; T'(5%)=6.0; v=2; with OxA-17823 and Wk-18461)	For weighted mean: *1430–1370 (72%), 1350–1310 (23%)*	For weighted mean: *1420–1380 (58%), 1340–1320 (10%)*
OxA-17823	sf 12045	1 fragment *Populus* sp. from worn, broken and repaired wooden bowl. Replicate of OxA-17822, probably of Wk-18461	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100. 1 MBA sherd and 1 LBA sherd in 611100	3132±27	-28.55	1500–1310	1440–1390	3102±16 (T'=4.9; T' (5%)=6.0; v=2; with OxA-17822 and Wk-18461)	For weighted mean: *1430–1370 (72%), 1350–1310 (23%)*	For weighted mean: *1420–1380 (58%), 1340–1320 (10%)*
Wk-18461		1 unidentified wood fragment, almost certainly a further fragment from bowl sf 12045 (Rebecca Nicolson pers. comm.). Probably replicate of OxA-17822, -17823	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100. 1 MBA sherd and 1 LBA sherd in 611100	3124±30	-27.5±0.2	1500–1310	1440–1320	3102±16 (T'=4.9; T' (5%)=6.0; v=2; with OxA-17822 and -17823)	For weighted mean: *1430–1370 (72%), 1350–1310 (23%)*	For weighted mean: *1420–1380 (58%), 1340–1320 (10%)*
Wk-19343	sf 12048	Chip of *Quercus* branchwood, 10–15 yrs old	Farmstead 3, feature 611107, context 611101. Basal fill of waterhole (re)cutting waterhole 611100, with much other wood. 1 MBA sherd and 1 LBA sherd in 611100	3119±33	-26.5±0.2	1500–1300	1440–1320		*1440–1310*	*1430–1370*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-9375	1317	Waterlogged seeds of *Prunus spinosa*, *Bryonia cretica*, *Glyceria* sp. and *Chenopodium polyspermum*	Farmstead 3, feature 136194, context 136193. Waterlogged basal layer of shaft cut into waterhole 103038, in turn cut into waterhole 10340. Complete LBA pots (Framework Archaeology 2006, 136, 148–9)	3197±57	-26.2	1620–1320	1520–1410		-	-
Wk-19331	26055	1 waterlogged seed *Rosa* sp.	Farmstead 3, feature 646068, context 646069. Waterlogged fill of waterhole cut by IA ring ditch 636149, within D-shaped enclosure. Rose hips and seeds common in deposit, as were other wild plant remains. MBA sherd in gravel lens 646077, stratified above the sample	3315±32	-24.0±0.2	1690–1510	1630–1530		-	-
Wk-21695	205	1 fragment *Prunus* sp. roundwood charcoal	Farmstead 3, feature 142010, context 107037. Pit cutting HE1 enclosure. Much burnt material, LBA sherds. Limits only retrospectively defined, Neolithic lithics present, presumably derived from HE1 ditch (Framework Archaeology 2006, 74, fig. 2.22).	3270±33	-26.1	1630–1450	1610–1500		-	-
Wk-10036		*Alnus* sp. roundwood from log ladder	Farmstead 3, feature 141024, context 108086. 1 of 2 log ladders in feature. Log ladder dug into base of pit, packed around with backfill, extending up through overlying layers. MBA, LBA and MIA pottery in overlying deposits	2984±48	-27.9	1390–1050	1300–1120		*1390–1200*	*1380–1350 (13%), 1320–1240 (55%)*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-9371		1 fragment Maloideae from sails	Farmstead 3, feature 141024, context 121047. Seen as part of placed wood deposit within secondary fills. MBA, LBA and MIA pottery in overlying deposits	2928±66	-27.6	1380–930	1260–1020		*1390–1170*	*1380–1340 (15%), 1310–1230 (53%)*
Farmstead 1										
Wk-19336	17032	1 grain charred *Hordeum vulgare*	Farmstead 1, feature 527078, context 527081. Waterlogged fill of pit 527078 in settlement 7, with MBA pottery, other charred grain and chaff present. Cutting earlier pit 527069, cut by ditches 539096, 539108.	3185±33	-24.8±0.2	1520–1400	1500–1430		*1490–1390*	*1450–1410*
Wk-18577	17005	2 grains charred *Triticum dicoccum/spelta*	Farmstead 1, feature 539096, context 527085. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified below 527076. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff. From same bulk sample as sample for Wk-18457.	3140±34	-24.4±2	1500–1310	1460–1380		*1460–1370 (94%), 1340–1320 (1%)*	*1430–1390*
Wk-18457	17005	1 fragment *Corylus avellana* charcoal	Farmstead 1, feature 539096, context 527085. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified below 527076. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff. From same bulk sample as sample for Wk-18577.	3135±30	-26.2±0.2	1500–1310	1450–1390		*1450–1370 (94%), 1340–1320 (1%)*	*1430–1390*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18579	17033	Charred *Triticum dicoccum/spelta*. 5 grains submitted; unclear how many dated	Farmstead 1, feature 539096, context 527085. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified below 527076. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff.	3052±31	-23.4±0.2	1420–1210	1390–1290		*1420–1320*	*1410–1360*
Wk-18578	17031	4 grains charred *Triticum dicoccum/spelta*, eroded	Farmstead 1, feature 539096, context 527076. Ditch cutting ditch 512005, pit 527078; cut by ditches 539108, 539107, pit 527069. Stratified above 527085. MBA and LBA pottery in same deposit. Deposit rich in charcoal, grain and chaff.	3074±32	-25.4±0.2	1420–1260	1410–1310		*1410–1300*	*1400–1330*
Wk-19338	16663	1 grain charred *Triticum dicoccum/spelta*	Farmstead 1, feature 539283, context 539284. Initial waterlogged fill of ditch. 1 LBA sherd, much animal bone. Sample probably from a discrete area of burnt material. Contained much charcoal, some grain. Cut by ditch 963040, a recut of the same boundary which contained purely MBA pottery	3062±39	-23.9±0.2	1430–1210	1400–1290		*1430–1300*	*1420–1350*
Wk-19337	16577	1 grain charred *Hordeum vulgare*	Farmstead 1, feature 546202, context 546204. Waterlogged clayey, organic basal fill of pit in settlement 7. Dark grey silty clay with gravel, fairly rich in charred grain and chaff. LBA pottery	3062±32	-23.9±0.2	1420–1260	1400–1300		*1420–1300*	*1410–1350*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18575	17001	1 grain charred *Triticum dicoccum/spelta*	Farmstead 1, feature 583160, context 529015. A lower fill of ditch cut by pits 529039, 583161, 529011. Charred plant remains fairly sparse. LBA sherds FL1 and FL 11 from under- and overlying deposits	3137±36	-22.3±0.2	1500–1310	1460–1380		*1460–1370 (89%), 1360–1320 (6%)*	*1440–1380*
Wk-18462	sf 24001	1 fragment from *Alnus* sp. log ladder	Farmstead 1, feature 615008, context 615017. Log ladder resting on bottom of waterhole without intervening fill, and against its side. MBA and LBA pottery in an overlying deposit	3070±32	-28.4±0.2	1420–1260	1400–1310		*1430–1310*	*1420–1350*
Farmstead 2										
Wk-19326	17076	Rib of medium mammal. C/N 3.30, %C 43.8, %N 15.5	Farmstead 2, feature 557027, context 557029. Waterlogged basal black peaty layer of pit cut by pit 557034, underlying 557039. The lower of two abundant deposits of animal bone without indicators of reworking such as loose teeth, suggesting that deposition into the feature was direct; included a possible partial female adult sheep and parts of a sheep/goat hind limb. MBA pottery	3176±33	-22.6±0.2	1520–1400	1500–1420		*1490–1390*	*1450–1400*
SUERC-11570	16512	Humic acids	Farmstead 2, feature 557027, context 557039. From pollen monolith taken from peat layer overlying 557029 in pit. MBA pottery and much animal bone	3305±35	-29.9	1690–1500	1620–1520		-	-

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18573	16523	4 grains charred *Hordeum vulgare*	Farmstead 2, feature 563060, context 563056. A waterlogged middle fill of waterhole cutting ditch 563066. 2 MBA and 2 LBA sherds. Stratified immediately below 563055 and above 563058	3149±32	-23.9±0.2	1500–1320	1490–1390		*1490–1480 (1%), 1470–1380 (94%)*	*1440–1400*
Wk-19339	16524	3 grains *Hordeum vulgare*	Farmstead 2, feature 563060, context 563055. A waterlogged middle fill of waterhole cutting ditch 563066. Stratified immediately above 563056. Rich in charred grain and chaff. MBA pottery	3094±33	-23.7±0.2	1440–1270	1420–1310		*1440–1320*	*1430–1380*
Wk-18574	16527	3 grains charred *Hordeum vulgare*	Farmstead 2, feature 515233, context 515173. Latest in complex series of recuts of boundary of settlement 2, fill and contents seen as silted rather than dumped. Much MBA pottery. Cut by waterhole 563032, which contained LBA pottery. Cremated bone and charcoal in fill.	3094±31	-25.8±0.2	1440–1270	1420–1310		*1440–1320*	*1430–1380*
Farmstead 4										
Wk-18576	15052	1 grain charred *Triticum dicoccum/spelta*	Farmstead 4, feature 581045, context 581027. A secondary fill of ditch (re)cut by ditch 581046. MBA pottery, fired clay, charcoal. Interpreted as naturally formed layer	2980±34	22.5±0.2	1380–1050	1270–1130		-	-
Wk-19327	17117	1 waterlogged seed *Prunus* cf *spinosa*	Farmstead 4, feature 553191, context 553180. A lower waterlogged fill of waterhole cutting waterhole 537201, cut by pit 537202. Layer included stakes (?from wattle lining) and leaves	2859±33	-28.6±0.2	1130–920	1110–940		*1200–970*	*1120–1020*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-18456		1 fragment *Salix* sp.– twisted rope	Farmstead 4, feature 517310, context 517298. Associated with bucket in lowest layer of waterhole. Much LBA pottery in this and overlying deposits. Cut waterhole 517274	2871±29	-28.6±0.2	1190–930	1120–1000		*1190–1170 (2%), 1160–980 (93%)*	*1120–1020*
Wk-9373	897	4 fragments *Prunus spinosa* charcoal	Farmstead 4, feature 125233, context 125228. A charcoal- and artefact-rich upper fill of waterhole cutting earlier waterhole 125247 and outer D-shaped enclosure of Farmstead 3. Much LBA pottery, 2 sherds MIA, 1 sherd LIA	2569±62	-25.3	840–410	810–550		-	-
Farmstead 5										
Wk-19328	17532	2 grains charred *Triticum dicoccum/spelta*	Farmstead 5, feature 543201, context 543212. Band of gravel above bottom fill of well (re)cut by 543202. Rich in charcoal, with some charred grain and chaff. Single Grooved Ware and MBA sherds.	3171±39	-24.2±0.2	1530–1320	1500–1410		*1530–1430*	*1510–1450*
Wk-18581	17524	4 grains charred *Triticum dicoccum/spelta*	Farmstead 5, feature 543202, context 543204. Basal fill of pit (re)cutting well 543201. Black, charcoal-rich layer with large pieces of burnt wood and emmer and spelt grain and chaff. MBA pottery. Contents could not be derived from 543212 because there was >1 m of fill between the two deposits	3207±32	-23.4±0.2	1530–1410	1510–1440		*1500–1410*	*1480–1430*
Farmstead 6										

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-10023	506	1 fragment from *Salix* sp. stake	Farmstead 6, feature 124100, context 123048. Structural stake from revetment, in basal layer of waterhole. Waterhole cut by ditch 107088 (Framework Archaeology 2006, 145–7, 157–59)	3029±51	-26.8	1420–1120	1390–1210		*1420–1120*	*1390–1250 (60%), 1240–1210 (8%)*
Wk-10033		1 fragment from *Quercus* roundwood stake	Farmstead 6, feature 124100, context 124193. Structural stake from revetment, in basal layer of waterhole. Waterhole cut by ditch 107088 (Framework Archaeology 2006, 145–7, 157–59)	3097±74	-25.8	1520–1130	1450–1260		*1510–1190 (93%), 1180–1130 (2%),*	*1440–1260*
Wk-10034		1 fragment from *Quercus* or *Alnus* roundwood stake. Without an object number there is no way of distinguishing which species was submitted	Farmstead 6, feature 124100, context 124194. Structural stake from revetment, in basal layer of waterhole. Waterhole cut by ditch 107088 (Framework Archaeology 2006, 145–7, 157-59)	3091±57	-25.9	1500–1210	1430–1300		*1500–1210*	*1430–1300*
NZA-14907	sf 25	1 fragment *Fraxinus* wood from socket of Taunton phase copper alloy side-looped spearhead (Framework Archaeology 2006, 100–2)	Farmstead 6, feature 149099, context 149042. Recut of ditch 111069 (Framework Archaeology 2006, fig. 3.6)	2932±55	-21.78	1320–970	1260–1050		*1310–1000*	*1260–1240 (4%), 1220–1060 (64%)*
Farmstead 8										
Wk-18459	18180	1 fragment from *Salix* sp. stake	Farmstead 8, feature 510047, context 558056. Stake upright in waterhole, driven into base and abutted by later deposits. MBA and LBA pottery in overlying layers. Waterhole cut ditch 531053	3215±31	-29.6±0.2	1610–1410	1510–1440		*1530–1420*	*1510–1440*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
SUERC-11569	16048	Humic acids	Farmstead 8, feature 510047, context 562038. From upper part (9–10 cm) of pollen monolith through basal silts of feature, stratified above 558056. A diesel-contaminated clayey silt. MBA pottery	3520±35	-28.6	1940–1740	1900–1770		-	-
Wk-19333	27305	8 waterlogged *Ranunculus* sp. seeds	Farmstead 8, feature 685032, context 685035. Silty fill rich in waterlogged plant material, formed in waterhole after gravel sides had collapsed and some sediment had accumulated. LBA pottery in topmost layer, stratified above sample	2877±39	-26.3±0.2	1210–920	1130–1000		*1210–980*	*1130–1020*
Wk-19330	27042	1 of only 2 grains of charred *Triticum dicoccum/spelta*	Farmstead 8, feature 693006, context 693004. Charcoal lens in waterhole, at surface of 693004, possibly dumped from nearby settlement, after some deposits had formed in base of feature	3303±32	-26.6±0.2	1670–1500	1620–1530		-	-
Farmstead 10 cremation burials										
OxA-16126		Human cremated bone	Farmstead 10, feature 554566, context 554568. Pit containing unurned cremation, cut by small posthole 554570	3060±28	-24.5	1410–1260	1390–1300		*1410–1210 (94%), 1140–1130 (1%)*	*1360–1260*
OxA-18031	29078	Human cremated bone	Farmstead 10, feature 827119, context 827140. Cremation burial, undisturbed, with, but not contained in, LBA pottery	2906±30	-23.86	1220–1000	1160–1020		*1260–1240 (5%), 1220–1040 (90%)*	*1210–1070*

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
OxA-18032	29079	Human cremated bone	Farmstead 10, feature 830083, context 830084. Unurned cremation burial	2905±30	-20.67	1220–1000	1130–1020		*1260–1230 (5%), 1220–1040 (90%)*	*1200–1140 (32%), 1130–1070 (36%)*
Farmstead 11										
Wk-19332	27208	1 grain charred *Triticum dicoccum/spelta*	Farmstead 11, feature 711024, context 711026. Waterlogged upper fill of waterhole cutting ditch 725031. MBA and LBA pottery in overlying layers	2917±36	-22.6±0.2	1260–1000	1200–1040		-	-
Wk-18463	27106	1 fragment Maloideae charcoal	Farmstead 11, feature 699001, context 699002. Unurned cremation burial with burnt flint, burnt stone, struck flint. Topmost surviving fill	2989±28	-27.2±0.2	1370–1120	1300–1130		*1300–1110*	*1230–1120*
Wk-18464	27114	1 fragment *Corylus* sp. charcoal	Farmstead 11, feature 699010, context 699013. Unurned cremation burial with burnt flint, burnt stone, struck flint. Bottom fill of 3	2921±30	-24.9±0.2	1260–1010	1200–1050		*1260–1230 (2%), 1220–1050 (93%)*	*1200–1100*
Wk-18465	27166	1 fragment *Alnus* sp. charcoal	Farmstead 11, feature 699044, context 699045. Unurned cremation burial. Single fill	2944±36	-26.9±0.2	1290–1020	1260–1090		*1260–1060*	*1210–1110*
OxA-16320		Human cremated bone	Farmstead 11, feature 699046, context 699047. Unurned cremation burial. Single fill	2891±30	-22.8	1210–980	1120–1020		*1220–1040*	*1200–1080*
Wk-18466	27241	1 fragment Maloideae charcoal	Farmstead 11, feature 699060, context 699061. Unurned cremation burial cutting undated gully 703039. Single fill	2700±34	-25.2±0.2	910–800	900–810		-	-
Inhumation 595072										
OxA-15595		Human femur	Site PSH02, feature 595072, context 595073. Unaccompanied crouched inhumation.	3077±31	-20.4	1420–1270	1410–1310		*1420–1260*	*1410–1310*
Later activity										

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
HAR-4823		Undated remainder of sample identified 2000 as wood and bark, dried out and structurally collapsed, probably from roundwood of various diameters, probably *Prunus* spp. and/or Maloideae	1979–1985 Stanwell excavations, Farmstead 12, area 1B, waterhole 553. Waterhole with well-preserved waterlogged wood fragments including ?ladder portion (O'Connell 1990, 41, fig. 24). Pottery from various levels in the feature appears late Bronze Age (O'Connell 1990, 52, fig. 29: 38–57, fig. 30: 58–65). Location of sample uncertain	2440±70		800–390	760–400		-	-
Wk-11712		*Alnus* sp.	Site BCU02, feature 803009, context 803009. *In situ* wattle structure in small evaluation trench to west of main excavation	2419±81	-26.6	780–380	750–400		-	-
Wk-19341	sf 8201	1 fragment from *Corylus avellana* stake. Section of roundwood with bark, estimated to have been 7 years old when cut (inf. Steve Allan)	Site PSH02, feature 552395, context 552397. Tufaceous, peaty upper fill of otherwise undated pit cut by undated pit 570486, to west of main excavated area	2247±32	-26.0±0.2	400–200	390–230		-	-
Wk-19335	17519	1 grain charred *Hordeum vulgare*	Site PSH02, feature 529306, context 554144. Dump of charcoal and burnt flint in pit cutting E ditch of C1 cursus. Layer of burnt flint and charcoal with a thin layer of gravel (unburnt at the base). Within deposit 554144, apparently dumped while 554144 still forming.	2227±32	-23.6±0.2	390–200	380–210		-	-
Wk-19334	17153	1 grain charred *Hordeum vulgare*	Site PSH02, feature 539450, context 539451. Single fill of pit with LBA and, mainly, MIA pottery, described as deliberate backfill.	2147±32	-22.1±0.2	360–50	350–110		-	-

Table 4. Radiocarbon dates in the order in which they appear in Figures 1–2, 5–13 and 18

Not all of the dates listed in Table 3 appear here, since a minority of them are not included in the figures

Laboratory number	Sample reference	Identification	Context	BP	$\delta^{13}C$ (‰)	Calibrated (95%)	Calibrated (68%)	Weighted mean (BP)	*Posterior density estimate cal BC (95%)*	*Posterior density estimate cal BC (68%)*
Wk-9367		Animal bone, unspecified	Farmstead 3, feature 129112, context 129113. A waterlogged fill overlying the initial silt of a pit. Sample one of 7 fragments/169 g of animal bone in a deposit where two at least semi-complete LIA pots and a wooden object. Cut pit 167099	1972±62	-24	170 BC–AD 210	50 BC–AD 120		-	-
OxA-16127		Human cremated bone	Site PSH02, feature 591052, context 591053. Cremation burial including iron	1733±25	-22.1	AD 250–380	AD 260–340		-	-

Table 5. Summary of selected parameters		
Event	*cal BC 95% probability*	*cal BC 68% probability*
start Bronze Age land division	*1650–1480*	*1590–1510*
start Farmstead 3	*1510–1390*	*1470–1410*
start Farmstead 2	*1530–1400*	*1480–1410*
start Farmstead 1	*1520–1390*	*1470–1410*
taq for inner D-shaped enclosure	*1470–1380*	*1440–1400*
taq for W ditch of trackway 11	*1470–1320*	*1440–1370*
start Farmstead 10 cremation burials	*1560–1210*	*1460–1280*
end Farmstead 2	*1440–1230*	*1420–1340*
OxA-15595 (inhumation 595072)	*1420–1260*	*1410–1310*
end Farmstead 1	*1410–1250*	*1390–1300*
end Farmstead 3	*1390–1150*	*1380–1340 (16%), 1310–1210 (52%)*
start Farmstead 11 cremation burials	*1430–1110*	*1270–1140*
end Farmstead 11 cremation burials	*1200–960*	*1130–1010*
end Farmstead 10 cremation burials	*1200–960*	*1130–1010*
end Bronze Age land division	*1100–900*	*1060–960*

Table 6. Summary of durations		
Duration	*years (95% probability)*	*years (68% probability*
use Farmstead 3	*1–310*	*50–90 (13%), 130–250 (55%)*
use Farmstead 1	*1–230*	*50–170*
use Farmstead 2	*1–270*	*1–120*
bury Farmstead 10 cremations	*70–540*	*200–430*
bury Farmstead 11cremations	*1–360*	*1–180*
use Bronze Age land division	*410–620*	*460–550*

Table 7. Probabilities of the relative chronology of each pair of better-dated episodes
The cells show the % probability that the event in the first column is earlier than each event in the first row. It is, for example, 70% probable that *end Farmstead 3* occurred before *start Farmstead 11 cremation burials*

Event	*start Farmstead 3*	*start Farmstead 2*	*start Farmstead 1*	*end Farmstead 2*	*end Farmstead 1*	*end Farmstead 3*	*start Farmstead 11 cremation burials*	*end Farmstead 11 cremation burials*
start Farmstead 3	-	*42*	*46*	*98*	*100*	*100*	*97*	*100*
start Farmstead 2	*58*	-	*55*	*100*	*100*	*100*	*98*	*100*
start Farmstead 1	*54*	*45*	-	*98*	*100*	*100*	*97*	*100*
end Farmstead 2	*2*	*0*	*2*	-	*72*	*87*	*89*	*99*
end Farmstead 1	*0*	*0*	*0*	*28*	-	*78*	*87*	*100*
end Farmstead 3	*0*	*0*	*0*	*13*	*22*	-	*70*	*99*
start Farmstead 11 cremation burials	*3*	*2*	*3*	*11*	*13*	*30*	-	*100*
end Farmstead 11 cremation burials	*0*	*0*	*0*	*0*	*0*	*1*	*0*	-

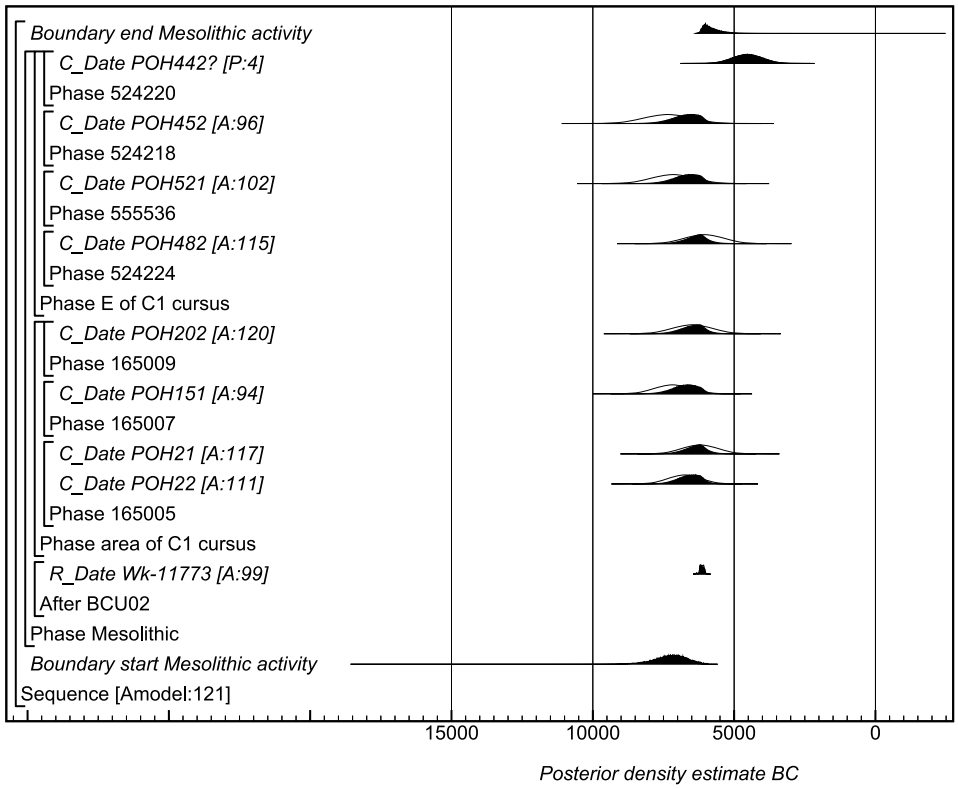


Figure 1. Thermoluminescence (TL) dates from two groups of features containing high concentrations of burnt flint and a radiocarbon date for a waterlogged post to the west of the main excavated area. Where two distributions are plotted for a single measurement that in outline is the entire probability distribution of the measurement and that in black is based on the chronological model. The model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 1, 3 and 4.

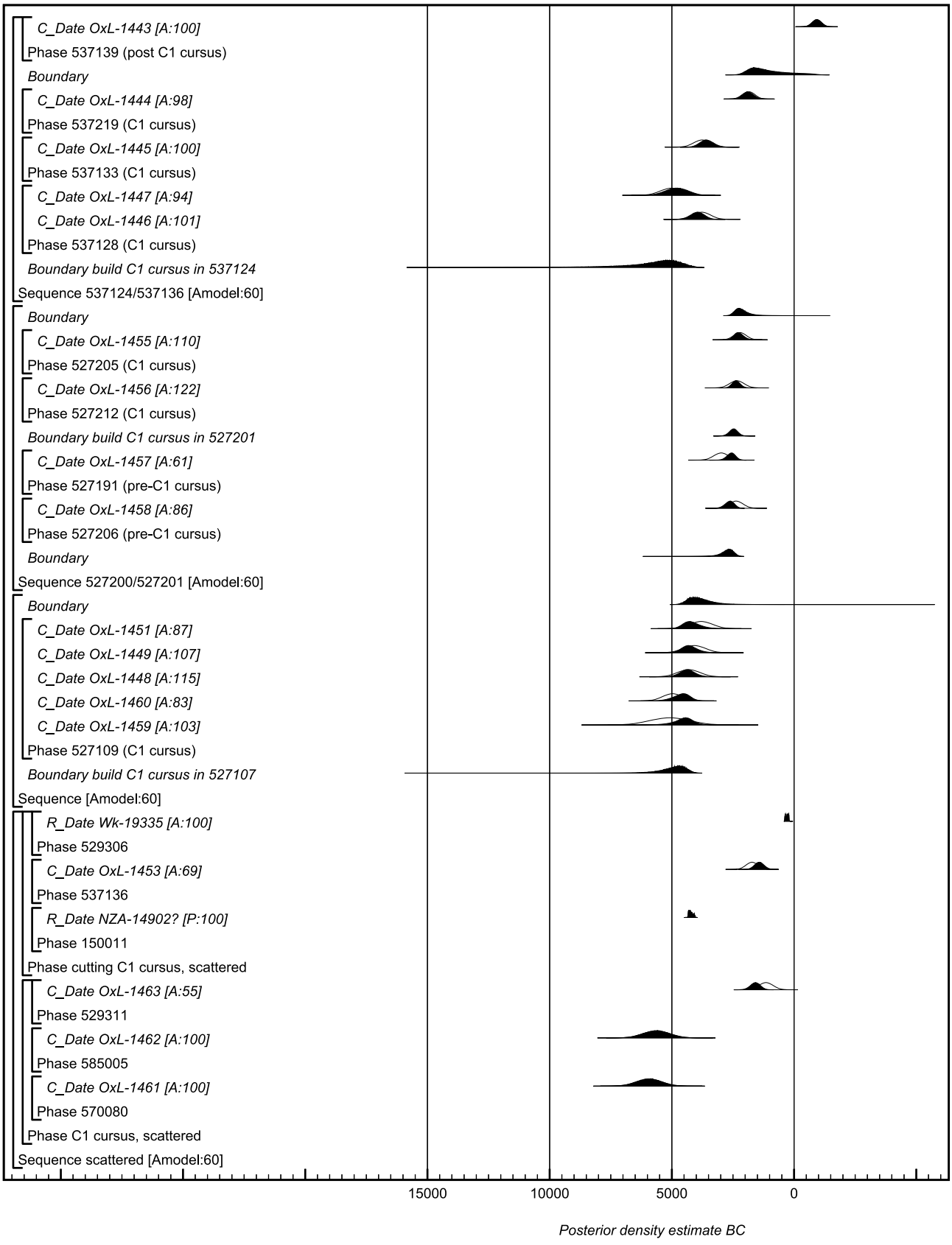


Figure 2. Optically Stimulated Luminescence (OSL) and radiocarbon dates from the C1 cursus and contexts related to it. Individual stratigraphic sequences in 537124/537136 and

527200/527201 are modelled separately, as is a group of five measurements from context 527109, at a further location. Other measurements are modelled as ‘scattered’. Where two distributions are plotted for a single measurement that in outline is the entire probability distribution of the measurement and that in black is based on the chronological model. The model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 2 and 3.

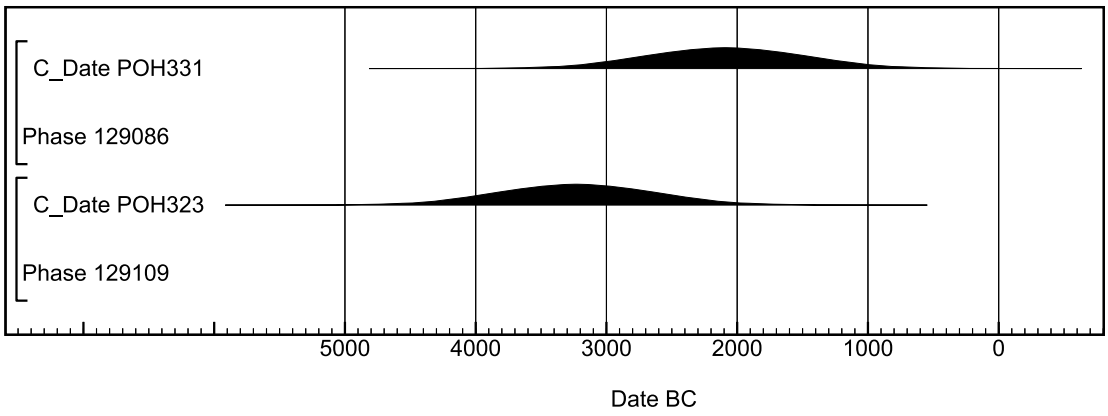


Figure 3. Thermoluminescence (TL) dates for features 129109 and 129086. Information about samples and contexts is to be found in Table 1.

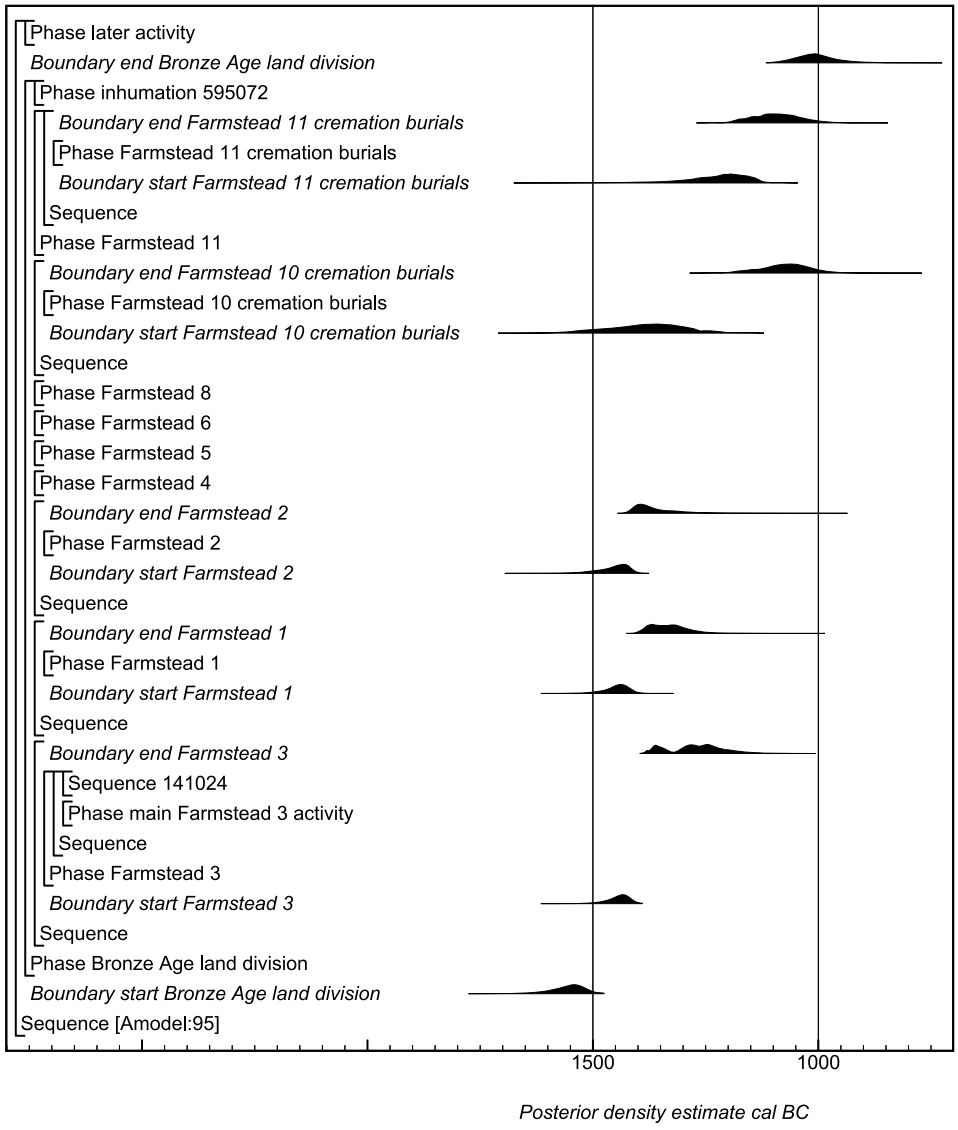
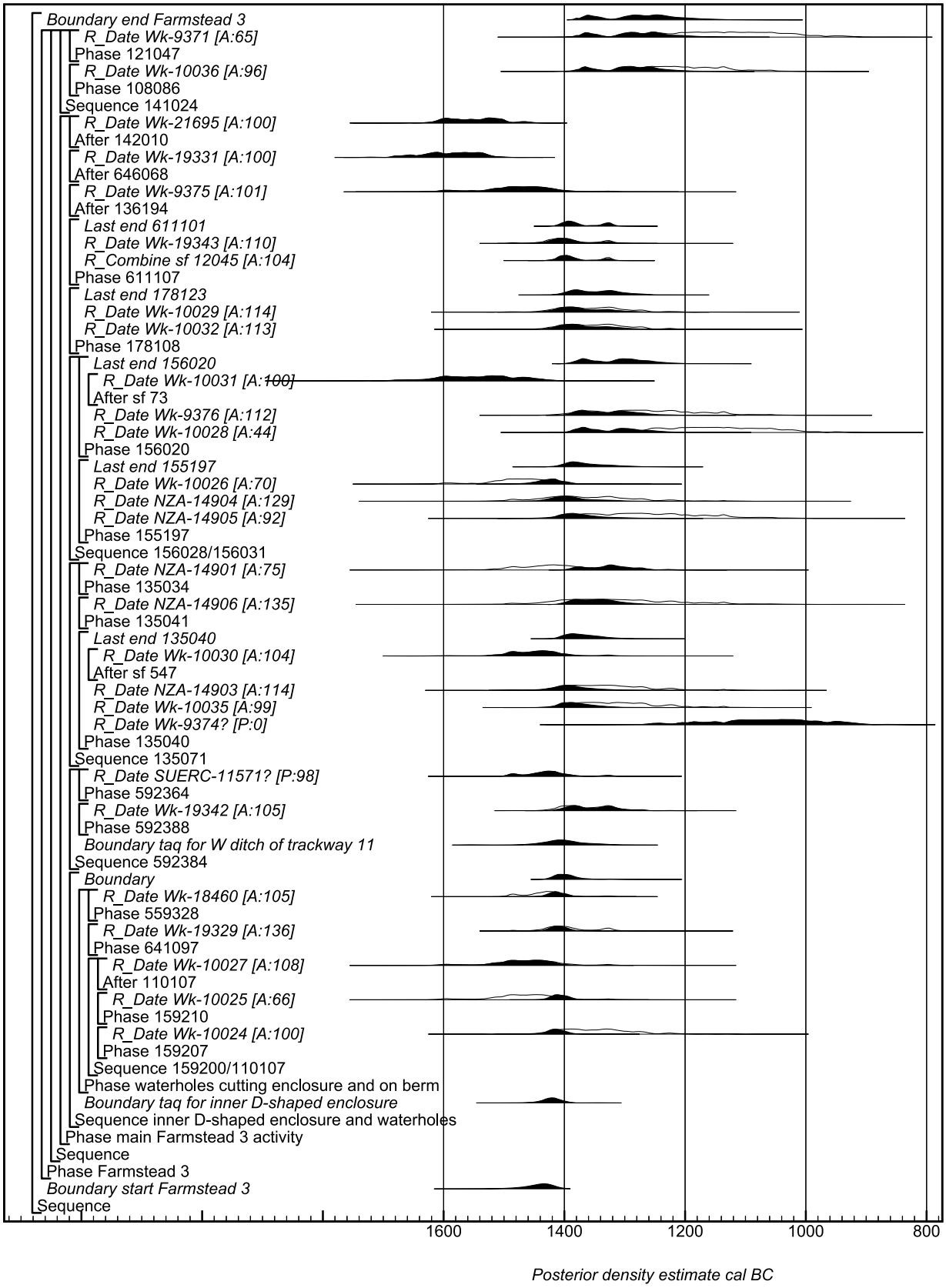
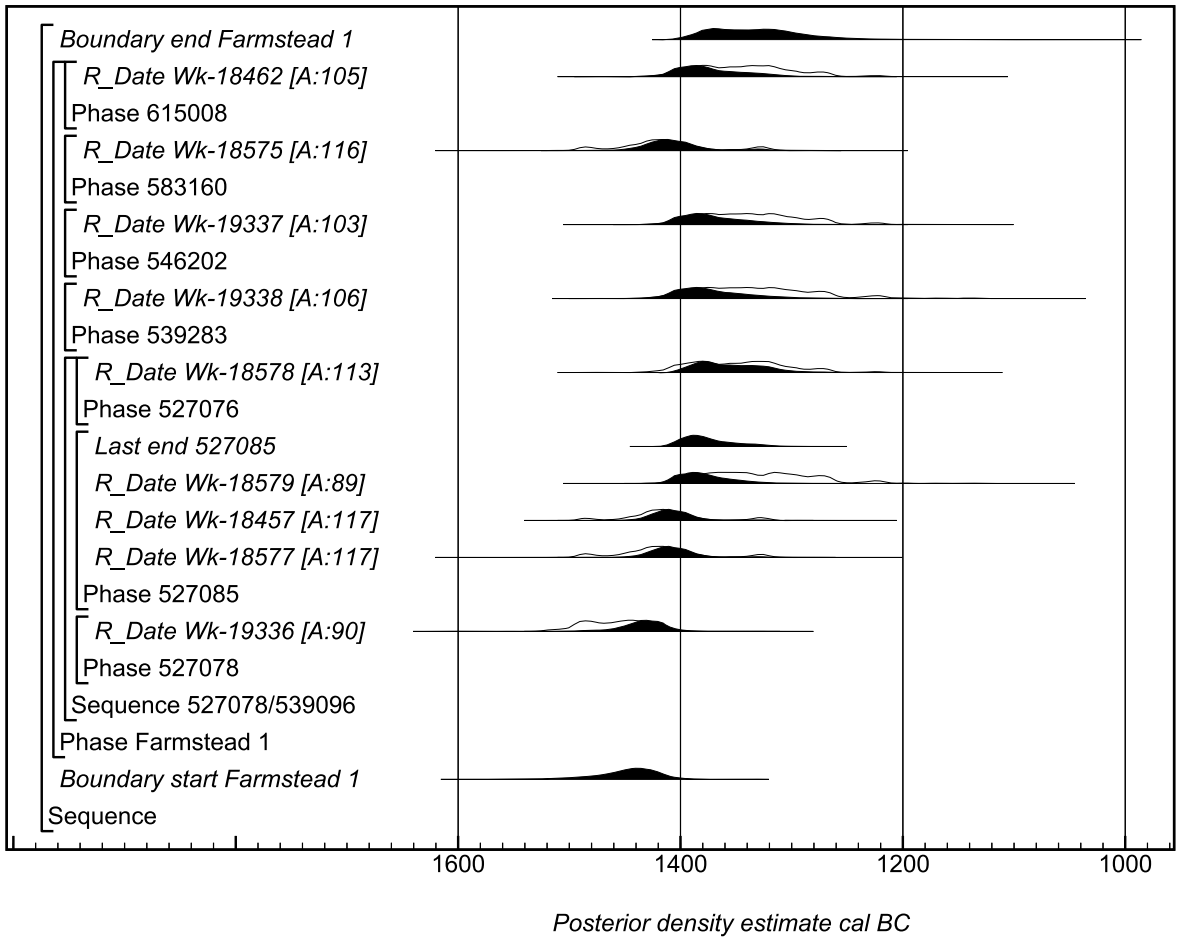


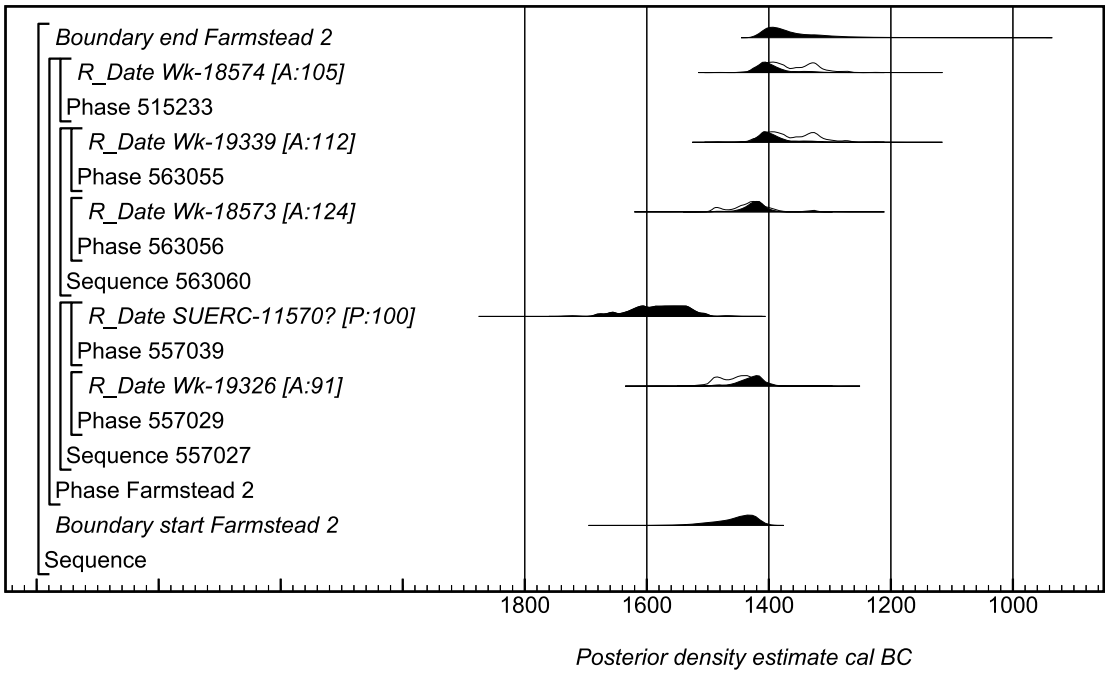
Figure 4. Overall structure of the model shown in Figures 5–13 and 18. The model is defined by the large square brackets down the left hand side, along with the OxCal keywords. The probability distributions shown correspond to aspects of the model. For example, the distribution '*Boundary start Bronze Age land division*' is the estimated date for the start of activity associated with the settlements and fields.


Boundary end Farmstead 3
R_Date Wk-9371 [A:65]
Phase 121047
R_Date Wk-10036 [A:96]
Phase 108086
Sequence 141024
R_Date Wk-21695 [A:100]
After 142010
R_Date Wk-19331 [A:100]
After 646068
R_Date Wk-9375 [A:101]
After 136194
Last end 611101
R_Date Wk-19343 [A:110]
R_Combine sf 12045 [A:104]
Phase 611107
Last end 178123
R_Date Wk-10029 [A:114]
R_Date Wk-10032 [A:113]
Phase 178108
Last end 156020
R_Date Wk-10031 [A:100]
After sf 73
R_Date Wk-9376 [A:112]
R_Date Wk-10028 [A:44]
Phase 156020
Last end 155197
R_Date Wk-10026 [A:70]
R_Date NZA-14904 [A:129]
R_Date NZA-14905 [A:92]
Phase 155197
Sequence 156028/156031
R_Date NZA-14901 [A:75]
Phase 135034
R_Date NZA-14906 [A:135]
Phase 135041
Last end 135040
R_Date Wk-10030 [A:104]
After sf 547
R_Date NZA-14903 [A:114]
R_Date Wk-10035 [A:99]
R_Date Wk-9374? [P:0]
Phase 135040
Sequence 135071
R_Date SUERC-11571? [P:98]
Phase 592364
R_Date Wk-19342 [A:105]
Phase 592388
Boundary taq for W ditch of trackway 11
Sequence 592384
Boundary
R_Date Wk-18460 [A:105]
Phase 559328
R_Date Wk-19329 [A:136]
Phase 641097
R_Date Wk-10027 [A:108]
After 110107
R_Date Wk-10025 [A:66]
Phase 159210
R_Date Wk-10024 [A:100]
Phase 159207
Sequence 159200/110107
Phase waterholes cutting enclosure and on berm
Boundary taq for inner D-shaped enclosure
Sequence inner D-shaped enclosure and waterholes
Phase main Farmstead 3 activity
Sequence
Phase Farmstead 3
Boundary start Farmstead 3
Sequence
1600
1400
1200
1000
800
Posterior density estimate cal BC

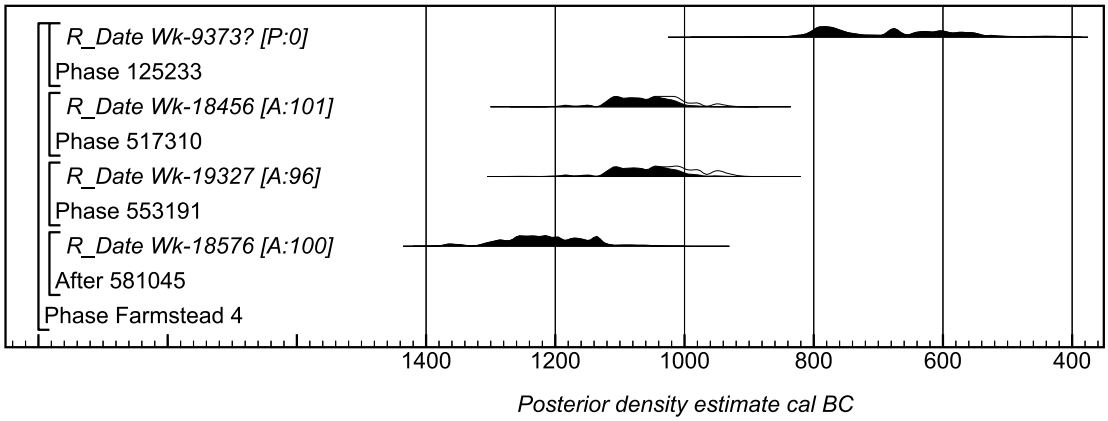
5. Probability distributions of radiocarbon dates from Farmstead 3 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



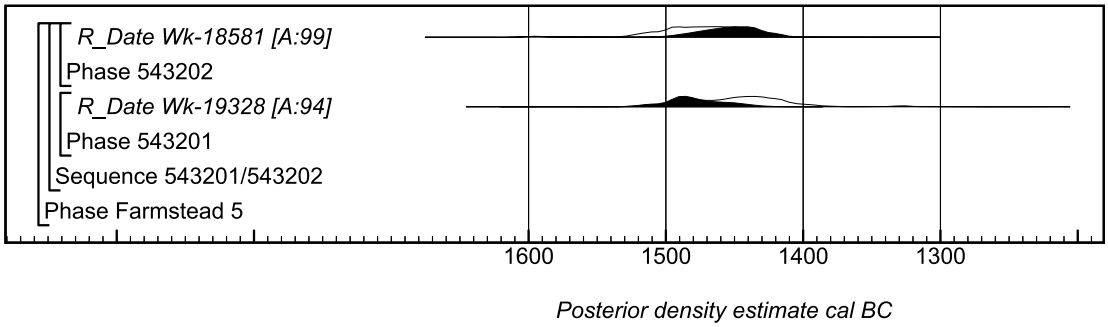
6. Probability distributions of radiocarbon dates from Farmstead 1 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



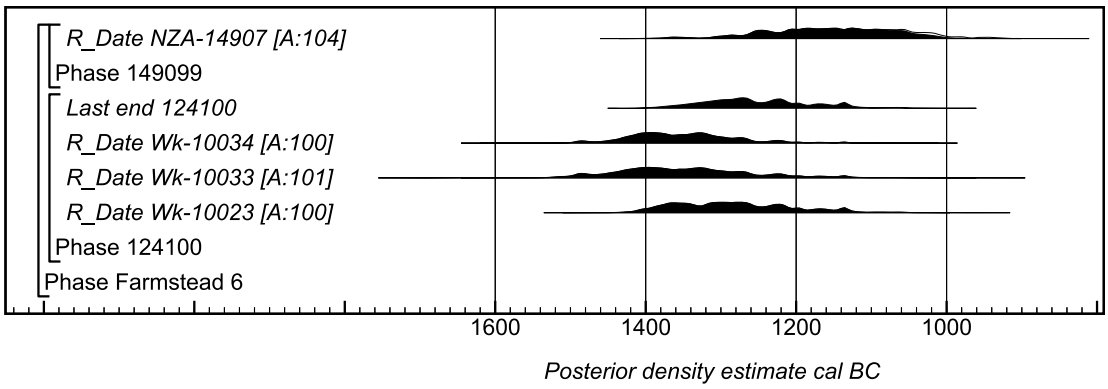
7. Probability distributions of radiocarbon dates from Farmstead 2 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



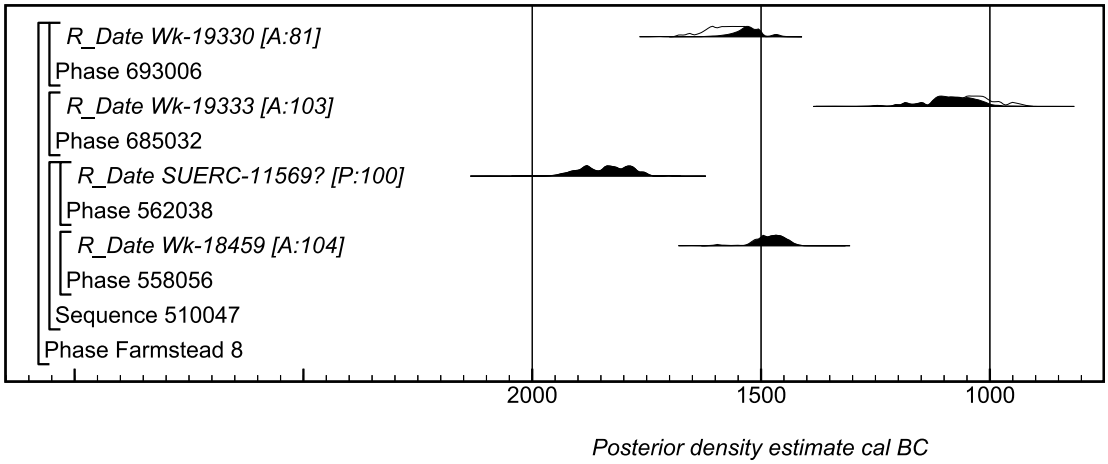
8. Probability distributions of radiocarbon dates from Farmstead 4 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



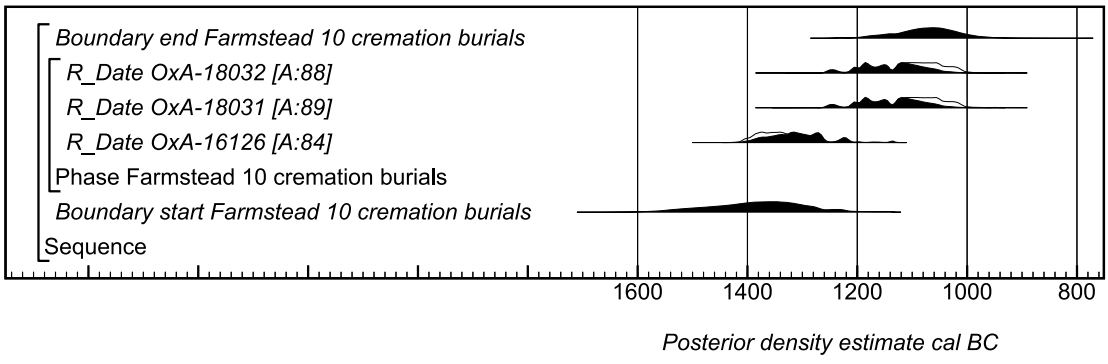
9. Probability distributions of radiocarbon dates from Farmstead 5 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Two distributions are plotted for each measurement. That in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



10. Probability distributions of radiocarbon dates from Farmstead 6 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.

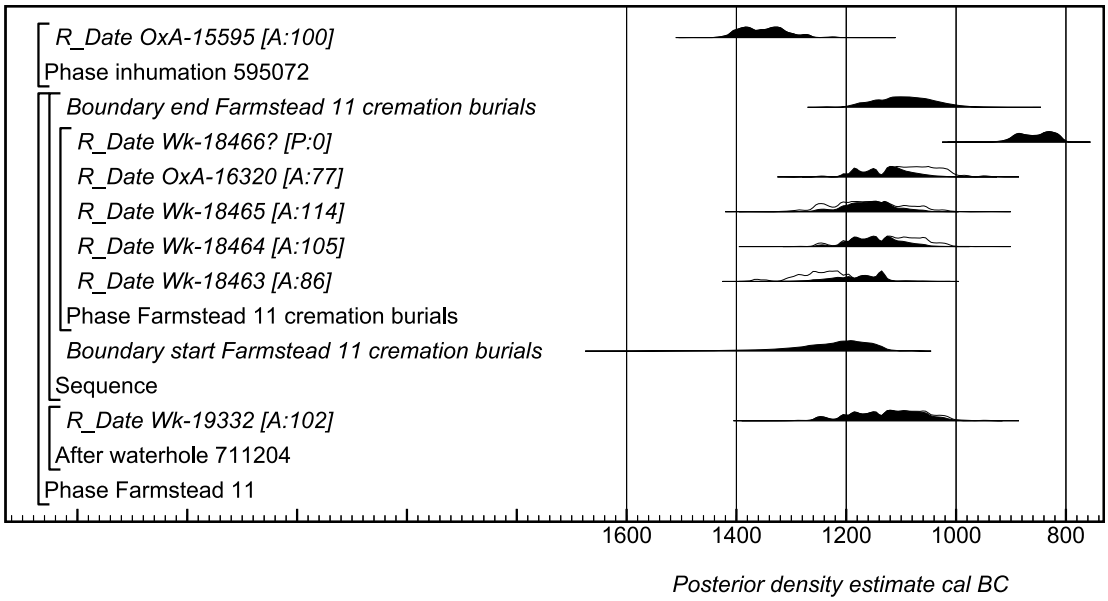


11. Probability distributions of radiocarbon dates from Farmstead 8 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.

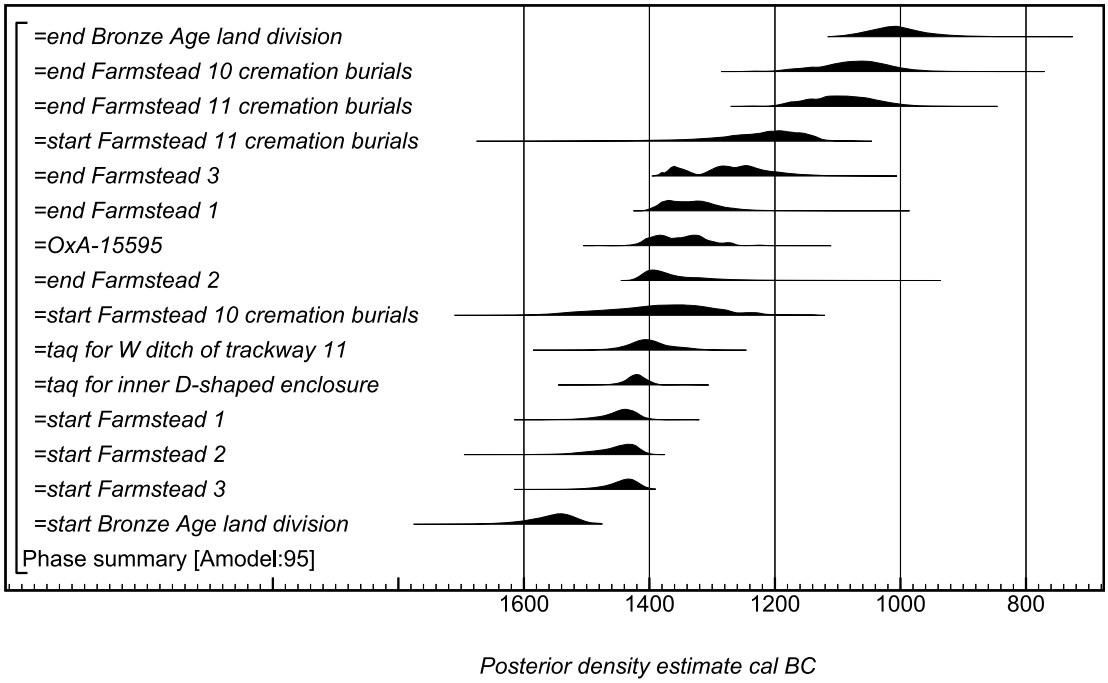


12. Probability distributions of radiocarbon dates for cremation burials in Farmstead 10 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted

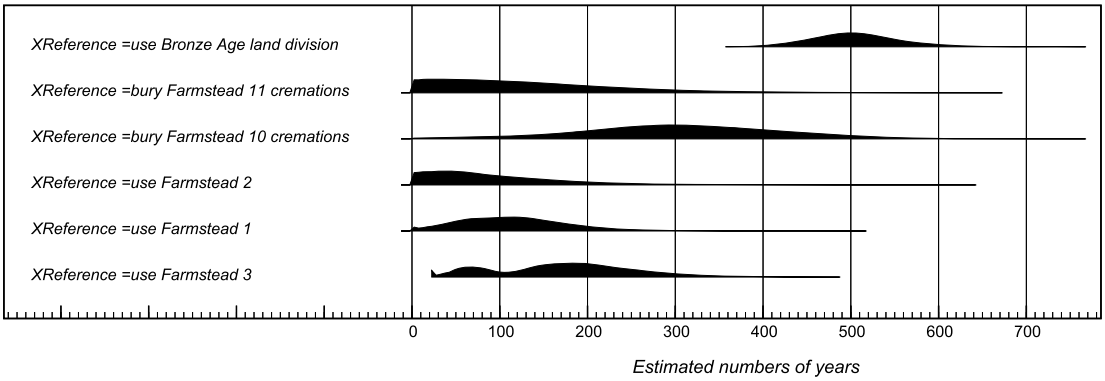
for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



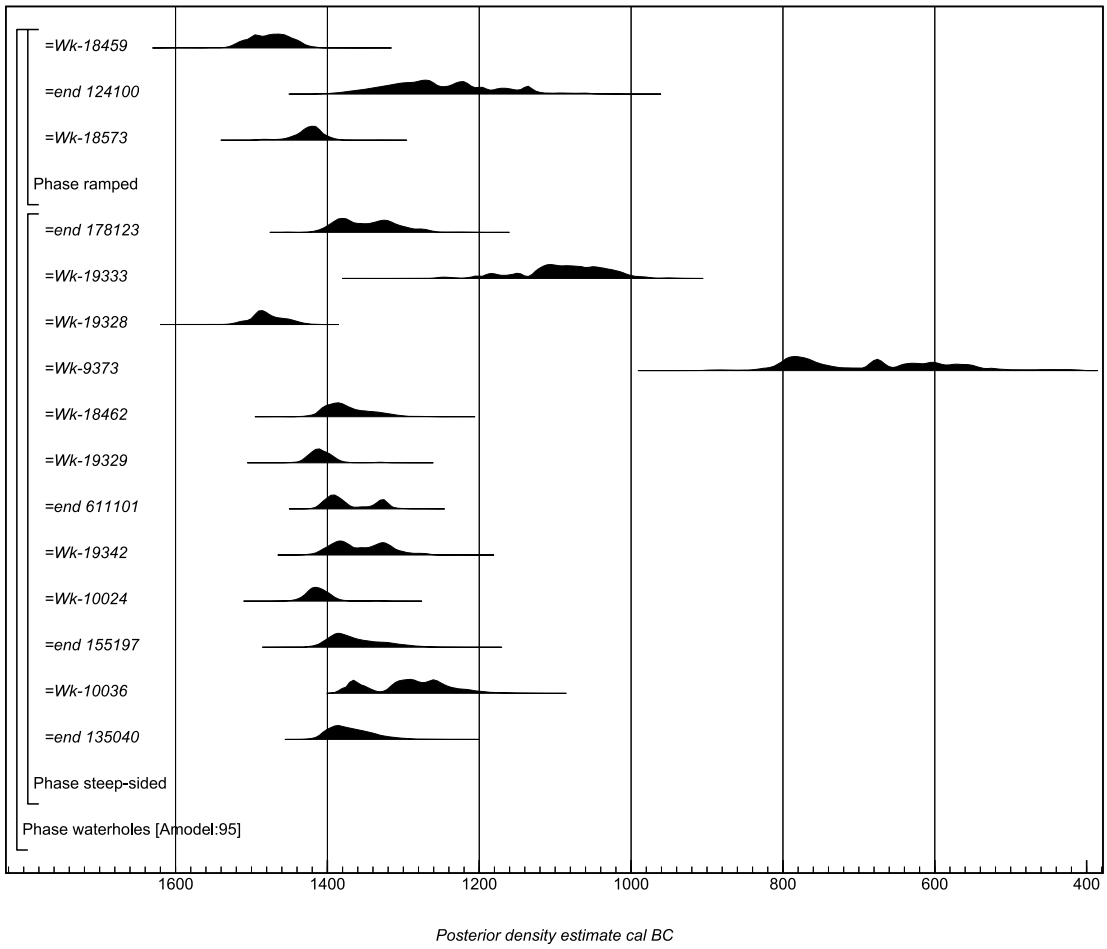
13. Probability distributions of radiocarbon dates from Farmstead 11 and inhumation 595072 within the overall model outlined in Figure 4. Each distribution represents the relative probability that an event occurred at some particular time. Where two distributions are plotted for a single measurement that in outline is the result of simple radiocarbon calibration (Stuiver and Reimer 1993) and that in black is based on the chronological model. This section of the main model is defined by the large square brackets down the left hand side, along with the OxCal keywords. Information about samples and contexts is to be found in Tables 3 and 4.



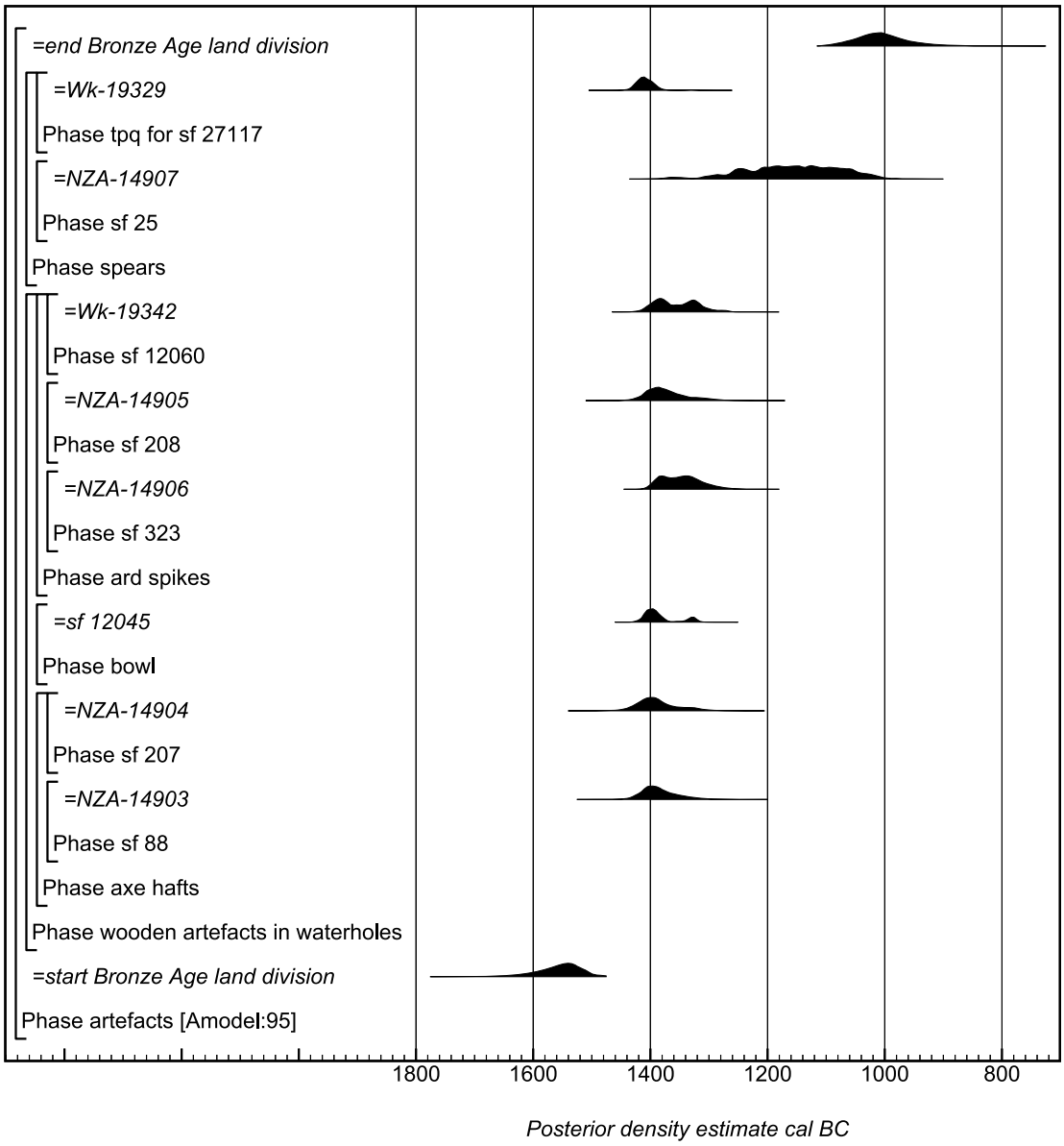
14. Probability distributions of selected parameters derived from the model defined in Figures 4–13.



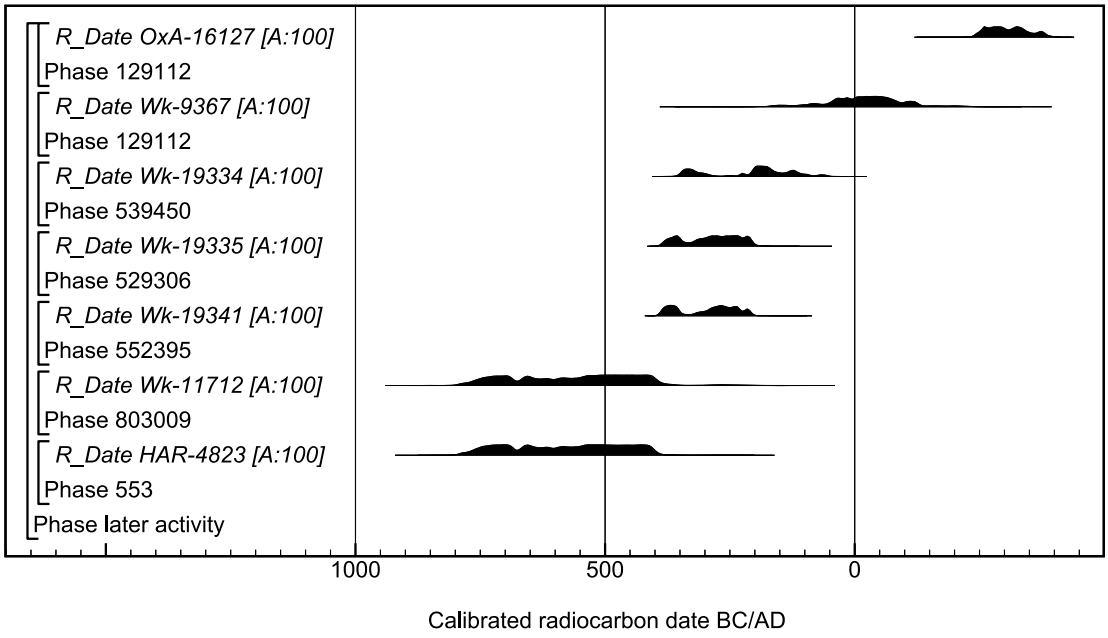
15. Estimated durations for the Bronze Age land division and for the better-dated episodes within it, derived from the model defined in Figures 4–13.



16. Probability distributions of dates and estimated parameters relating to the construction or early use of straight-sided and ramped waterholes, excluding *termini post quos,* derived from the model defined in Figures 4–13.



17. Probability distributions of dates relating to wooden artefacts placed in waterholes and to copper alloy spearheads, derived from the model defined in Figures 4–13.



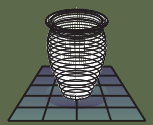
18. Probability distributions of radiocarbon dates relating to activity in the first millennia cal BC and cal AD. These distributions are the result of simple radiocarbon calibration (Stuiver and Reimer 1993). Information about samples and contexts is to be found in Tables 3 and 4.

Landscape Evolution in the Middle Thames Valley
Heathrow Terminal 5 Excavations Volume 2

This is one of the
24 specialist reports
provided with
the above publication.

Framework Archaeology
Monograph 3

ISBN 978-0-9554519-2-8



Framework Archaeology

BAA Heathrow